

KERALA LOOKS AHEAD

INTERNATIONAL CONFERENCE AND CONSULTATION

PROCEEDINGS



GOVERNMENT OF KERALA State planning board

APRIL 2021

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KERALA STATE PLANNING BOARD APRIL 2021

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Foreword

The Government of Kerala organised a three-day online international conference and consultation titled "Kerala Looks Ahead" from February 1 to 3, 2021 to consult frontline national and international experts in certain areas identified as critical to Kerala's economic future. The Kerala State Planning Board was the main organiser of the conference.

The topics in which sessions were held were the following: modernising agriculture, animal resources, and fisheries; new directions in industry; information technology; modern skill development; higher education; e-governance; and tourism. There were special sessions on local governments, federalism and development finance, and industrial prospects.

This report is a documentation of the proceedings of the conference. It provides, for each topic, the concept note, a summary of discussions held, and the key ideas and recommendations emerging from the discussions in the session.

When the present Government of Kerala came to office in 2016, it took the important decision to continue the process of economic planning in the State. It also decided that it would deepen and extend Kerala's achievements in human development, in social justice, in gender empowerment, and in health and school education and use the strengths thus built as a foundation for the rapid growth of production and employment in the State.

Despite the setbacks that the State suffered in terms of natural calamities, problems in the sphere of federal finance, and the economic setbacks from demonetisation in 2016 and the implementation of GST in 2017, the Government of Kerala recorded substantial development achievements during the period of the 13th Five-Year Plan.

The most enduring contribution, the lasting legacy of this Government is that today in development terms, Kerala is on the move and is poised for a major transformation. In Kerala, every transformation, every new policy is a matter of public debate and widespread public consultation, of which this conference is a part.

The conference was the outcome of efforts of many.

The Chief Minister of Kerala conceptualised this consultation and identified the topics for discussion. His guidance, leadership, and regular review were crucial for its success. The Ministers who participated in the conference gave us comments and insights. The Departments of the Kerala Government provided support to this initiative.

The Kerala State Planning Board was assisted by partner organisations – Institute of Information Technology, Bangalore (IIIT-B), Gulati Institute of Finance and Taxation (GIFT), Kerala Institute of Local Administration (KILA), Technopark, Kerala Institute of Digital Sciences, Innovation and Technology, Kerala State IT Infrastructure Limited, and ICT Academy, Kerala – in organising certain sessions of the conference. Their contribution was important to the success of the conference.

Members and Chiefs played a crucial role in identifying the more specialised areas of deliberation and in selecting the speakers. Chiefs of the Divisions helped in selecting the invitees of the conference. Dr V Venu IAS, Member Secretary, Kerala State Planning Board, guided and coordinated the efforts of the conference secretariat team headed by Gayatri Nair, Economic Advisor to VC, in organising the conference. The conference secretariat included (in alphabetic order) Akhil Bharathan, Bipin Chandran, Riya Anie Cherian, T P Harshan, Susmita Vinod, and C K Vijayasuryan. Rekha V Dev, Chief of Evaluation Division handled the file work related to the conference. Ibrahim Siddique assisted in arranging the technology aspects related to the conference. The officers of the different Divisions of the Board contributed in various ways to the organisation of the conference. The conference secretariat team and the division officers also drafted the proceedings of the conference. I am grateful to all of them.

As the Chief Minister noted in his concluding speech, the conference has served two purposes: first, it has stimulated national and international discussions between scholars and experts in the areas that were part of the conference. We hope that this contact and discussions will continue. Secondly, many suggestions have emerged from the conference. There are issues of long-term and strategic interest to the State and also recommendations regarding policies that can be implemented in the short run. These suggestions, which have come from all over the world, are of particular interest to us. The proceedings of the conference will contribute in different and important ways to the formulation of economic policy in Kerala.

V K Ramachandran Vice Chairperson April 15, 2021

INTRODUCTION

The Government of Kerala organised a three-day online international conference and consultation titled "Kerala Looks Ahead" from February 1 to 3, 2021 in order to consult frontline national and international experts in certain areas identified as critical to Kerala's economic future. The Kerala State Planning Board was the main organiser of the conference.

The objective of the conference was to learn from experience and best practices across the world in order to modernise the economy and bring the benefits of new levels of production and income growth and inclusive development to all the people of Kerala.

The three-day online conference had 22 sessions covering nine themes. The nine themes, which were recommended by the Chief Minister of Kerala, were as follows: modernising agriculture, fisheries, and animal resources; information technology; modern skill development; e-governance; modern industrial possibilities; higher education, including academic collaboration; and tourism. There were two special sessions – on local governments and federalism and development financing – to showcase Kerala's initiatives in the respective spheres. In addition, there was a special industry session, which discussed a roadmap for the future industrial growth in Kerala.

The Kerala State Planning Board was assisted by partner organisations for organising certain sessions of the conference. The International Institute of Information Technology, Bangalore (IIIT-B) was the partner institute for the session on e-governance, Gulati Institute of Finance and Taxation (GIFT) for the session on federalism and development financing, Kerala Institute of Local Administration (KILA) for the session on Local Governments, and Technopark, Kerala Institute of Digital Sciences, Innovation and Technology, Kerala State IT Infrastructure Limited, and ICT Academy, Kerala for the sessions on information technology.

More than 190 speakers from 11 countries and many important multilateral and national organisations participated in the three-day conference. The speakers included two Nobel laureates, India's leading industrialists, the Chief Scientist of the World Health Organisation, a World Food Prize winner, senior representatives of international IT businesses, senior national and international scholars, scientists, technologists, and other experts. Experts from the Government of India, International Labour Organisation, and other national and international bodies also participated in the conference.

The Chief Minister of Kerala, Shri Pinarayi Vijayan, inaugurated the conference. Each session was attended by the Minister in charge of the sector.

The conference was attended by Ministers, Members of Parliament and the Kerala Legislative Assembly, senior officials in government, scientists, technologists, students, teachers, social workers, administrators, political activists, and media persons. Other participants in the conference included scholars, academicians, industry bodies, farmers' organisations, local government representatives, heads of institutions, organisations, and youth.

M/s Stark Communications Private Limited was the event manager of the conference. MD Niche, a media consultant company, was in charge of the publicity of the conference. The conference was held online. All sessions were live streamed on the conference website, (www.keralalooksahead.com), Facebook, and You Tube.

There were pre-conference sessions in three areas – agriculture, animal resources, and information technology.

A brief description of the sessions is given below. Detailed description of the sessions is in subsequent sections of this Report. For each technical session, this report presents the concept note for the session, a summary of discussions, and key ideas and recommendations (or takeaways) from the discussion.

Pre-Conference Sessions

Pre-Conference Session: Information Technology

The pre-conference sessions on information technology were held on January 24, 2021 and January 27, 2021 to discuss issues in the software and hardware sectors respectively. The pre-conference session on software, chaired by Mr Santhosh Kurup, Chief Executive Officer, Information and Communication Technology (ICT) Academy of Kerala, had five speakers. The second session, held on January 27, 2021, on the hardware sector, was chaired by Dr Jayasankar Prasad. There were presentations by four panellists.

In both sessions, Mr Mohammed Y Safirulla IAS, Additional Secretary, Department of Electronics and Information Technology made the initial remarks on the status of the sector in the State. Dr Saji Gopinath, Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology, presented the thematic concept notes in the sessions.

Pre-Conference Session: Agriculture

The pre-conference session on agriculture was held on January 27, 2021. The session, which was chaired by Dr R Chandra Babu, Vice Chancellor, Kerala Agricultural University, discussed the need to raise productivity. There were presentations by three experts. The topics covered included the following: data-based analysis of yield gaps and major challenges, research advances to bridge yield gaps, and agriculture extension and productivity in Kerala.

Pre-Conference Session: Animal Resources

The pre-conference session on animal resources development was held on January 28, 2021. The session focused on the productivity of milch cattle in Kerala. Dr M R Saseendranath, Vice Chancellor, Kerala Veterinary and Animal Sciences University, chaired the session. The session discussed strategies for attaining sufficiency in milk production and milk productivity trends of milch cattle in Kerala.

Day 1: February 1, 2021

Inaugural Session

Chief Minister Shri Pinarayi Vijayan inaugurated the conference. Professor V K Ramachandran, Vice Chair of the State Planning Board, welcomed the participants and introduced the conference themes.

Dr Soumya Swaminathan, Chief Scientist at the WHO and Professor Joseph E Stiglitz, Nobel Prize winner and Professor at Columbia University were the keynote speakers at the session. Shri Ramachandran Kadanapally, Minister for Ports, Museums, Archaeology, and Archives; Shri K Krishnankutty, Minister for Water Resources; Shri A K Saseendran, Minister for Transport; and Shri E Chandrasekharan, Minister for Revenue and Housing spoke at the session. Dr Viswas Mehta IAS, Chief Secretary, Government of Kerala, also participated in the session.

Dr Soumya Swaminathan, Chief Scientist at the WHO, pointed out that health outcomes in Kerala were comparable to the highest in the world. Dr Swaminathan suggested developing the public health system further, building institutional capacity, looking beyond curative care to prevention and health promotion and creation of a foresight unit to understand health challenges of the future. Nobel laureate and Professor at Columbia University Professor Joseph E Stiglitz said that competent government institutions, competent administration, participatory democracy and decentralisation, reliance on science, and the continued importance given to planning had contributed to the success of Kerala. He emphasised the importance of planning, and said that government leadership working with the private sector and civil society is important for addressing future challenges.

Dr Venu V IAS, Member Secretary, Kerala State Planning Board, thanked the participants and concluded the session.

Day 2: February 2, 2021

Technical Sessions

There were 18 parallel technical sessions covering nine themes on February 2, 2021.

I. Session on Modernising Agriculture, Fisheries, and Animal Resources

Agriculture

The session on modernising agriculture had three sub-sessions, titled "Role of New Technologies in Bridging Yield Gaps," "Cooperatives and Agriculture: Learning from Global Experiences," and "The Promise of Value Addition."

The Minister for Agriculture, Government of Kerala, Adv V S Sunil Kumar, gave the opening remarks. The main speakers in the session on "Role of New Technologies in Bridging Yield Gaps"

were Dr Trilochan Mohapatra, Secretary, DARE and Director General Indian Council of Agricultural Research New Delhi, Prof Kathleen L Hefferon, Department of Microbiology, College of Agriculture and Life Sciences, Cornell University, and Dr K S Subramanian, Director of Research, Tamil Nadu Agriculture University. The session focused on the need to increase productivity and reduce yield gaps through the application of new technologies such as genome editing and nanotechnology.

In the session on "Cooperatives and Agriculture: Learning from Global Experiences," Prof Sukhpal Singh, Centre for Management in Agriculture, Indian Institute of Management Ahmedabad, and Dr Balz Strasser, Managing Director, Bio Suisse, Evilard, Berne, discussed the importance of cooperatives and successful national and international experiences in this sphere.

Mr Nutthanai Ninek, Business Development Manager, Tropicana Oil Company Limited, Thailand, Mr Jom Jacob, Senior Economist, Association of Natural Rubber Producing Countries (ANRPC), Malaysia, and Mr David Hogg, Chief Agriculture Advisor, Naandi Foundation, were the main speakers in the session on value addition.

Animal Resources

The session on animal resources included two sub-sessions, titled "Modernisation of Milk Cooperatives and Value Addition," and "Meat Sector." Shri K Raju, Minister for Forests, Animal Husbandry and Zoos, Government of Kerala, addressed the session. Dr H K Bhanwala, Former Chairperson, NABARD, chaired the session on the modernisation of milk cooperatives and value addition. Speakers at the session were Dr R S Sodhi, Managing Director, Gujarat Cooperative Milk Marketing Federation Limited AMUL, and Mr Meenesh Shah, Executive Director, National Dairy Development Board, Anand.

Dr Tarun Bajaj, Director, Animal Products, PFV Division, Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry, Government of India, chaired the session on the meat sector. Mr Fauzan Alavi, Vice President, All India Buffalo and Sheep Meat Exporters Association, and Dr R Thomas, Senior Scientist and i/c Food Quality Control Laboratory, ICAR-National Research Centre on Pigs, Indian Council of Agricultural Research, Department of Agriculture Research and Education, Ministry of Agriculture and Farmer's Welfare, Government of India, made presentations in this session.

The sessions discussed possibilities for diversification, value addition, and enhancing bovine meat production

Fisheries

The session on fisheries had two sessions, titled "Fisheries and Developing Economies: New Challenges and Opportunities," and "Kerala's Fish Resources – Marine and Inland Aquaculture: Possibilities of Growth in Future." Ms J Mercikutty Amma, Minister for Fisheries and Harbour Engineering, Government of Kerala, gave the opening remarks. Dr Modadugu Vijay Gupta Former Assistant Director General, World Fish Centre and World Food Prize winner; Dr Leela

Edwin, Principal Scientist Central Institute of Fisheries Technology (CIFT); Dr Ben Belton, Associate Professor, Department of Agricultural, Food, and Resource Economics, Michigan State University; Dr V V Sugunan, International Expert on Reservoir Fisheries and former Director CIFRI; and Dr P Ravi Chandran, Former Head of Crustacean Division, Central Institute of Brackish water Aquaculture and Former Member Secretary Coastal Aquaculture Authority were the speakers in this session.

The sessions discussed the best practices in India and the world with respect to production, the creation of marketing and supply chain infrastructure, blue economy possibilities, building value chains, possibilities of inland and brackish water aquaculture, and processing in the fisheries sector.

II. Session on Federalism and Development Financing

The session on federalism and development financing was organised in partnership with the Gulati Institute of Finance and Taxation. Dr T M Thomas Isaac, Minister for Finance and Coir, Government of Kerala gave the opening remarks. Prof M Govinda Rao Member, 14th Finance Commission and Honorary Professor, GIFT, chaired the session. The experts who presented in the session included Prof C P Chandrasekhar, Jawaharlal Nehru University, New Delhi; Mr Rajesh Kumar Singh IAS, Additional Chief Secretary, Finance Department, Government of Kerala; Prof D Narayana, Honorary Professor, Gulati Institute of Finance and Taxation; and Prof Pinaki Chakraborty Director, National institute of Public Finance and Policy. Prof Sushil Khanna, Indian Institute of Management, Calcutta, was the discussant in the session.

The session discussed fiscal federal arrangements, goods and service tax and its implications, revenue and expenditure mechanism, and development finance.

III. Session on Information Technology

The Chief Minister presented the vision statement on information technology in the session. The session was chaired by Mr Santhosh Kurup, CEO ICT Academy Kerala. Mr Mohammed Y Safirulla IAS, Additional Secretary, Department of Electronics and Information Technology made the opening remarks and Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology, presented the theme of the session.

Mr S D Shibulal, Co-founder, Infosys; Mr Srikanth Srinivasan, Head, Membership and Outreach, NASSCOM; Ms Nivruti Rai, Country Head, Intel India, VP Data Center Group; Mr Nandakumar K Nair, Founder and CEO, Suntec Business Solutions; and Prof Prahlad Vadakkepat, National University of Singapore, were the speakers in the session.

The session on information technology underscored the need to promote IT policy and to revise it suitably, especially in specific sectors, keeping pace with relevant developments. The sessions underlined the need to incentivise the hardware sector in the State. Other suggestions included faculty deputation to startups, promoting research driven by real-world applications and challenges, and teaching the fundamentals of innovation in all undergraduate programmes at the college level.

IV. Session on e-governance

The session on e-governance was organised in partnership with the International Institute of Information Technology, Bangalore (IIIT-B). The session focussed on three thematic areas: (i) citizen access to services and empowerment, (ii) decision support systems and analytics, and (iii) legal and policy dimensions. Sixteen experts spoke on different aspects of the thematic areas. Mr Mohammed Y Safirulla IAS, Additional Secretary, Department of Electronics and Information Technology, Government of Kerala and Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology, gave the opening remarks in the sessions.

The session focused on affordable and accessible digital infrastructure, technology design approaches that integrate well with local practices, coordination across departments through interoperable frameworks for better decisions, the need for State agencies to build trust with citizens on matters related to digital data, engagement with regulations on privacy, and implications for automated decision-making applications.

V. Session on Local Governments

The session on local governments was organised in partnership with the Kerala Institute of Local Administration. There were two sub-sessions, one on best practices by Local Governments and the second on the future of decentralisation and local governance in the State.

Shri A C Moideen, Minister for Local Self Governments, Government of Kerala gave the opening remarks.

In the session on best Practices, moderated by Prof K N Harilal, Member, Kerala State Planning Board, model projects by local governments were presented. The session on decentralisation and local governance discussed the interventions of the State Government in strengthening local governments and future interventions required to deepen decentralisation in the State. The session was moderated by Ms Sarada G Muraleedharan IAS, Additional Chief Secretary, Local Self Government Department. The panellists in this session were Prof Prabhat Patnaik, Professor Emeritus, Jawaharlal Nehru University; Prof Patrick Heller, Professor of Sociology, International Studies, and Public Affairs, Watson Institute, Brown University; Prof Harry Blair, Visiting Fellow, South Asian Studies Council, Yale University; Dr S S Meenakshisundaram IAS, Visiting Professor, National Institute of Advanced Studies, Bangalore; Ms Aruna Roy, Founder, Mazdoor Kisan Shakti Sangathan; Mr S M Vijayanand IAS (Rtd.), Former Chief Secretary and Chairperson, Sixth State Finance Commission, Kerala; and Dr J Devika, Professor, Centre for Development Studies, Thiruvananthapuram.

VI. Session on Modern Skill Development

Shri T P Ramakrishnan, Minister for Labour and Excise, Government of Kerala, and Ms K K Shailaja Teacher, Minister for Health, Social Justice, and Women and Child Development, Government of Kerala gave the opening remarks at the session. Prof K Ravi Raman, Member, Kerala State Planning Board chaired the session. The session included experts from Korea, Germany, the International Labour Organisation, Ministry of Skill Development and Entrepreneurship, Government of India, and national Universities.

The speakers included Prof Ju-Ho Lee, KDI School Former Minister of Science Technology and Education Republic of Korea; Mr Peter Rechmann, Deputy Head of GOVET and Head of Round Table Office, BIBB, Federal Institute for Vocational Education and Training, Bonn, Germany; Ms Sukti Dasgupta, Chief, Employment and Labour Market Policies Branch, Employment Policy Department, International Labour Organisation; Mr Gabriel H Bordado, Skills and Employment Specialist, Decent Work Technical Team, South Asia International Labour Organisation; Mr Srinivas Reddy, Chief, Skills and Employability Branch, Employment Policy Department, International Labour Organisation; and Mr Atul Kumar Tiwari IAS, Additional Secretary, Ministry of Skill Development and Entrepreneurship, Government of India. Prof Santosh Mehrotra, Centre for Informal Sector and Labour Studies, Jawaharlal Nehru University, and Prof Jeemol Unni, Economics and Public Policy and Chair, Master of Arts in Economics Programme, Ahmedabad University, were the discussants for the session.

VII. Session on Modern Industrial Possibilities

There were five speakers in the session on modern industrial possibilities. Mr. Rizwan Zoomar, MD and CEO, DP World spoke on the topic "Latest developments in the areas of logistics and port-based industrial development, particularly on opportunities for Kerala." Prof V Ramgopal Rao, Director, IIT Delhi spoke on "Entrepreneurship nourishment and industry-focused research in academic institutions, particularly the experiences of IITs." Ms Daisy Chittilapilly, MD, Digital Transformation, CISCO spoke on "Possibilities for industrial and economic development in rural and semi-urban areas on account of changes in communication technologies." Prof M Jae Moon, Director, Institute for Future Government Studies, Yonsei University, made a presentation on "South Korean experience in promoting industrial development and the economic growth possibilities for Kerala in the emerging global order." Mr Tony Thomas, former CIO, Nissan Motors talked about the need to build a modern and technologically vibrant industrial sector in Kerala.

The session highlighted the important role of technology in building industries of the future and on interactions among universities (and research institutions), industry and the government. It was recognised that Kerala's unique strengths lies in skilled labour. Kerala has a big advantage is the sphere of food and agro-processing industries and knowledge industries, including electronics, biotechnology, life sciences, and a range of other new innovative industries.

VIII. Session on Tourism

Shri Kadakampally Surendran, Minister for Co-operation, Tourism and Devaswoms, Government of Kerala gave the opening remarks of the session. The speakers of the session included Mr Suman Billa, Director, Technical Cooperation and Silk Road UNWTO, Madrid; Ms Christina Beckmann, Vice President, Global Strategy for Adventure Travel Trade Association and co-founder of Tomorrow's Air; Dr Nimit Ranjan Chowdhary, Professor, Department of Tourism and Hospitality Management, Jamia Millia Islamia; Dr Harold Goodwin, Founder Director, International Centre for Responsible Tourism, United Kingdom; and Mr Dipak Deva, Managing Director, Travel Corporation of India.

The session also discussed the need for world-class training in skill development. Tourism needs to be reoriented to meet the tastes of a new demographic of travellers as most of the tourists are now going to be youth.

IX. Session on Higher Education

Dr K T Jaleel, Minister for Higher Education and Minority Welfare, Government of Kerala, gave the opening remarks. Dr Rajan Gurukkal P M, Vice Chairperson Kerala State Higher Education Council chaired the session. The panellists included Prof Gopinath Ravindran, Vice Chancellor, Kannur University; Prof Ronald J Herring, Professor Emeritus, The Department of Government, Cornell University; Prof N V Varghese, Vice Chancellor, National University of Educational Planning and Administration; Prof Shyam B Menon, Central Institute of Education, University of Delhi; Prof Daniel Little, Professor of Sociology and Public Policy, University of Michigan; Prof Devika P Madalli, Documentation Research and Training Centre, Indian Statistical Institute, Bengaluru: and Prof Sukhadeo Thorat, Professor Emeritus, Centre for the Study of Regional Development, Jawaharlal Nehru University. Prof K P Sudheer, Executive Vice President, Kerala State Council for Science, Technology, and the Environment, also participated in the panel discussion.

The session focussed on curricula and innovations in teaching methods, institutional innovations, innovations in libraries and information, and social inclusion.

Day 3: February 3, 2021

Special Industry Session

There was a special industry session on the concluding day of the conference. Leaders of Indian industry including Mr Ratan Tata, Mr Azim Premji, Mr Anand Mahindra, Ms Kiran Mazumdar Shaw, Mr M A Yusuf Ali, Mr Kris Gopalakrishnan, Mr B Ravi Pillai, and Mr Azad Moopen spoke at the session. The Chief Minister made the concluding remarks.

Concluding Session

Nobel laureate Prof Amartya Sen delivered a special address to the concluding session.

Summaries of the discussions at and the takeaways from each technical session of the conference were presented in the concluding session. The Chief Minister gave the concluding speech.

INAUGURAL SESSION

Professor V K Ramachandran, Vice Chairperson, Kerala State Planning Board Welcome address

Chief Minister of Kerala Shri Pinarayi Vijayan, Professor Stiglitz, Dr Soumya Swaminathan, Members of the Cabinet, Members of Parliament and the Kerala Legislative Assembly, speakers in all sessions, scientists, technologists, students, teachers, social workers, administrators, political activists, media persons, partner institutions, my colleagues in the Planning Board, and many others. We are honoured by your presence today. Welcome to Kerala Looks Ahead.

Kerala's accomplishment shows that the well-being of the people can be improved and social, political, and cultural conditions transformed when there is appropriate public action. In Kerala, the action of mass organisations and of mass movements and the policy actions of Governments have been the most important constituents of this public action.

When the present Government of Kerala came to office in 2016, it decided – against the trend at the Centre and in other States of India – to continue the process of economic planning in the State. The Government decided that while it would continue to deepen and extend its achievements in what is called human development, it would use these achievements as a foundation on which to create new employment opportunities for the people, particularly youth, to increase incomes from production in agriculture, industry, and income-bearing services, and to build infrastructure.

The last four years and a half have been turbulent, truly tumultuous. There were extreme weather events – cyclone Ockhi in 2017, and extreme rainfall events followed by floods and mudslides in 2018 and 2019. The floods of 2018 were the worst in a century. There was an outbreak of Nipah virus disease in two districts of the State in 2018. There were new stresses on the State economy caused by demonetisation in 2016 and the introduction of the Goods and Services Tax in 2017. And in Kerala, as elsewhere, the crisis associated with Covid-19 and the pandemic has unsettled the economy as never before.

Nevertheless, we are happy to say that these have been years of achievement as well.

We have achieved, in the last four years in Kerala, the most sweeping changes in decades with respect to public schooling. There have been great changes in the health sector with regard to public access and high quality health facilities for all. There has been a transformation in major physical infrastructure, a new policy direction in industry and information technology, a deepening of participatory local government, and a renewed emphasis, particularly after the floods, on livelihoods and job creation. And once again we have strengthened our policies in the spheres of social protection and gender empowerment.

Today we believe that Kerala is poised for a major transformation. In this State, as many people who have followed the State know, every transformation, every new policy is a matter of public debate and of widespread public consultation. This conference is a part of that process.

The Chief Minister, who is also the Chairperson of the State Planning Board, was keen that we organise a conference, not to teach – and certainly not to preach – but to learn from the world on subjects that we believe to be of great importance to our future. Thus, the sessions of this conference include sessions on modernising agriculture, fisheries, and animal resources, on modern industrial possibilities, on information technology, modern skill development, on higher education including international academic collaboration, on tourism, and e-governance. We also have three special sessions – one on local governments and another on federal finance in the Indian context, and a special session that will be addressed by leaders of Indian.

We want to be ambitious in our vision – hence, this unique consultation with some of the best experts and minds in the world. This session indeed sets the tone for the conference. Dr Soumya Swaminathan, our first special guest, is a world famous pediatric/thoracic specialist. She is a former Director General of the Indian Council for Medical Research and is now Chief Scientist at the World Health Organisation. Professor Joseph Stiglitz is the winner of the Nobel Prize in Economic Sciences and one of the two most famous development economists in the world. The other one will join our concluding session.

We have been humbled by the response to our invitations to participate in our effort. As you will see from our programme, more than 190 participants from more than 11 countries and many important multilateral and national organisations are part of our three-day conference. And those who join us on Zoom, on YouTube, our Facebook page, and our website come from many more countries.

I look forward to three days of discussion.

Thank you and welcome once again.

Address by Dr Vishwas Mehta, Chief Secretary, Government of Kerala

The Honourable Chief Minister, the Honourable ministers, Professor Joseph Stiglitz, Dr Soumya Swaminathan, Professor V. K. Ramachandran, and distinguished participants. It is an honour to be part of this prestigious event Kerala Looks Ahead, organised by the Kerala State Planning Board.

Kerala is considered a role model in universal health, literacy, human development index, gender empowerment, and inclusive growth. The State has consistently been ranked number one in the country for best governance and for its progress in achieving the Sustainable Development Goals of the United Nations. Through this international conference we would like to explore new frontiers in growth and development in a post-Covid world. The resilience of people of Kerala in the face of natural disasters and the pandemic has caught the attention of people all over the world. Today, through this conference, we wish to explore our future road in key areas of agriculture, animal resources, fisheries, e-governance, higher education, industry, information technology, skill development, and tourism. We are very happy that esteemed dignitaries such Professor Joseph Stiglitz from Columbia University and a Nobel laureate in economics and Dr Soumya Swaminathan, Chief Scientist of WHO, are keynote speakers in today's session. Dr Soumya Swaminathan is among the country's top scientists and a public health expert who has been at the forefront of the global community's response to the Covid-19.

Professor Joseph Stiglitz, in his phenomenal work *Making Globalisation Work*, has written that development is about transforming the lives of people, not just about transforming economies. This is perhaps what Kerala's model is all about and we are proud of this legacy.

We look forward to listening to all your great ideas.

My congratulations to Kerala State Planning Board for organising the conference.

Thank you very much.

Address by Shri Ramachandran Kadannappally, Minister for Ports, Museums, Archaeology, and Archives

Respected Chief Minister, Ministers, esteemed speakers, distinguished personalities and colleagues, Dr Swaminathan, Professor Joseph Stiglitz, Professor V. K. Ramachandran, Chief Secretary Dr Vishwas Mehta, Dr Venu V, Member Secretary.

It is a pleasure to attend the inaugural meeting of the 3-day international conference and consultation titled "Kerala Looks Ahead."

Kerala is well known across the world for advances in the sphere of land reforms, health, education, secularism, social justice, gender, and social protection. Kerala has also been commended by the world for achievements in human development.

This Government, led by Shri Pinarayi Vijayan, which assumed office in 2016, has stood by its commitment to the development and welfare of the people. The time has come to build on this foundation for growth of productive forces and infrastructure in the State. The Government now plans to rebuild the State and build a new Kerala – a new phase of economic development in Kerala, using its natural resources and an educated, skilled and politically conscious work force.

The idea behind this effort suggested by the Chief Minister of Kerala, Shri Pinarayi Vijayan, is to seek the views of experts. I compliment the Chief Minister and the Vice Chairperson of the State Planning Board. Credit is also due to all Members and staff of the Board, who have put together a group of distinguished speakers in important sectors.

We have to use all sources [and] opportunities to revitalise the economy of our State. This international conference, which will discuss various features of selected sectors, including agriculture, fisheries, e-governance, higher education, industry, information technology, tourism, and skill development, is an earnest step towards achieving this goal. Our Government, under the charismatic leadership of Chief Minister Shri Pinarayi Vijayan, has sincerely attempted to address

all matters connected with the development of the State. I shall not take more time. I extend my sincere good wishes for the grand success of this great endeavour.

Address by Shri A K Saseendran, Minister for Transport

Respected Chief Minister, Shri Pinarayi Vijayan, other ministers and dignitaries attending this function.

The Government of Kerala is organising an international conference named Kerala Looks Ahead in order to consult international experts in a few sectors that are identified as important for Kerala's economic future. The major themes are higher education, modern industrial possibilities, modern skill development, modernising agriculture, fisheries, and animal resources development, tourism, Information Technology, and e-governance. Special sessions are on local governments, and federalism and development financing.

Kerala's present economic policy has two important aspects. First, to build on Kerala's historic achievements with respect to health, education, and secondly to make sure of the economy's growth through production and application of modern science and technology, particularly in agriculture, industry, information technology, transport, other large-scale infrastructure facilities and other productive areas. In the transport sector, the major achievements are the enhancement of technology. This has been one of the turning points in the transport sector in mainly two ways – in terms of serving travellers and providing real time information from the electronic ticketing machines.

This conference will help formulate strategy for the State and the valuable inputs of experts will help further development in Kerala.

I wish the conference great success.

Address by Shri K Krishnankutty, Minister for Water Resources

Respected Chief Minister and other dignitaries.

I am happy that modernising agriculture is one of the main themes of this conference. Farmers are going through a crisis at this time. Many studies have highlighted that, in the last 40 years, farmers alone have experienced a substantial increase in income. Agricultural policy must (i) reduce the cost of production while increasing productivity, and (ii) ensure fair prices for agricultural products.

It is essential for a farmer to get a living wage. In USA, a farmer, on an average, gets \$62,000 every year. Here, even if a farmer does not get as much as farmer gets in USA, he/she must get the equivalent of a living wage. For this, we must recognise the farmer as a service provider. Farmers who feed a population of 140 crore do not get the incentives/support that an MLA or any other service providers get. There is a question of where the money for this will be obtained. If we keep aside a part of the profit from value-added products, we can use that money to prepare an

Agriculture Budget. Let me present an example here. We sell around 40 tonnes of rice every year. For every kilogram of rice sold at Rs 40, the farmer gets Rs 22.50. If we keep aside 1 per cent of the profit, we get Rs 400 crore. If we get Rs 400 crore, we can give Rs 15,000 as bonus for cultivating 1 acre of land and also give Rs 2500 each to three wage workers per acre. All this can be done with Rs 50 crore.

The remaining Rs 350 crore can be utlised to provide incentives that other public servants get – such as bonus, health insurance, etc. – to farmers. No additional money from other sources would be required. We must adopt a policy that recognises that farmers have a rightful claim to a part of the profit obtained from value-added products such as Lays (potato chips), processed milk, etc. Only then can we revive the agricultural sector from the crisis.

On increasing productivity: In Kerala, we have about 22 lakh hectares of agricultural land. Of this, only 4 lakh ha are irrigated. If we irrigate cash crops, productivity can be increased by a multiple of six to seven. We should also think of ways to increase foreign currency earnings from agriculture.

I thank you for giving me an opportunity to attend this conference.

Address by Shri E Chandrasekharan, Minister for Revenue and Housing

Dear friends, delegates, and dignitaries.

Land has always been the greatest promise or gift to humankind. It is clear – for example, from the recent farmers uprising in Delhi, where the issue is the protection of the rights of farmers – that the politics of land is pivotal in all domains of human development, anywhere on this planet. Kerala is acclaimed as an important example in Independent India of development policies that have placed human welfare at their centre. The strength of this development is based on the revolutionary land reform measures boldly initiated by the Communist Party-led Government of Kerala, which came to power following the first general election of the State in 1957.

Prior to 1957, only a few thousand families in the State owned land. As a result of land reform legislation, which was accomplished over a long period, from 1957 to 1970, today more than 80 lakh families in Kerala have absolute ownership of the land they live on and cultivate. The people of Kerala, socially and economically empowered by land reform, grew confident to seek and reach advanced and emerging provinces of learning and culture of all parts of the world. They have brought home not only bank remittances but huge reserves of contemporary and futuristic knowledge as well. Centuries before globalisation acquired the current corporate-composed political definition, people and Governments in Kerala had trade and cultural relations with the people of the Mediterranean in the west and China in the east. International cooperation is not new to Kerala, and some historical ties with civilisations in far-off places still continue to thrive.

Our commitment to development policies based on the equitable distribution of resources also has been growing. Hence, to keep our promises to the people of Kerala, land, which is one of the most fundamental requirement for the industrial and economic development is being conserved by the State Government and its revenue department. [Our policy aims at a] judicious investment of resources, appropriately allotted to sustainable development projects that build up productivity, employment, and the welfare of our people.

Recent achievements with respect to commissioning large projects such as the GAIL pipeline, international seaports, and airports, are evidence of the fast, efficient, and transparent land acquisition practices of the State Government, which follows a policy of zero tolerance towards corruption. I hope we will all keep in mind these basic features of governance that Kerala follows in fixing its developmental priorities. Looking ahead to plans that can transform our society, I am sure that the scholarly discourse in this consultation will put forward brilliant ideas that can lead to beneficial change in Kerala's development achievements. I take this opportunity to welcome all dignitaries, experts, and participants of this international conference to Kerala. I congratulate the efforts of the State Planning Board for organising this event so well. I welcome all once again. Thank you.

Dr Soumya Swaminathan, Chief Scientist, World Health Organisation Keynote address

The Honourable Chief Minister of Kerala Shri Pinarayi Vijayan and respected dignitaries.

Thank you so much for inviting me to speak at the Kerala Looks Ahead conference. It is indeed a great honour and privilege to join you today and share a few thoughts with you. Kerala is well known for its excellence in development as well as in attaining the highest health indicators. And it has been a model that has been studied over many years to show how, in a developing country, a middle-income country, one can actually achieve health outcomes that are comparable to some of the highest-income countries in the world.

We have recently seen the National Family Health Survey (NFHS)-5 data, which look at different health parameters as well as some social indicators and determinants of health. We see clearly that progress is being made in areas like infant and maternal mortality – which were already very low in Kerala – as well as in almost universal literacy, in sanitation, clean drinking water, access to education, access to institutional deliveries, and care for ordinary diseases such as diarrhoea and respiratory infections.

So today I don't want to focus so much on all the impressive achievements – of which there are many and on which one could speak for a long time – but rather on a few challenges and areas. I do so because this is a conference where we're looking ahead, always striving to do better and to look for gaps that might need to be filled.

I would like to start basically by focusing on public health because, as never before, the Covid pandemic has taught us the importance of investing in public health. This includes a robust surveillance system, which is based on digital data collection, having the right kind of human resources, trained epidemiologists who can investigate outbreaks immediately in every district, laboratories that can do diagnostics (and nowadays we see that sequencing has become an integral part of what we call genetic epidemiology), supply chains and logistics and communication networks, and, contact and communication with communities, at which, I believe, Kerala's record has been very good. Kerala has done well in terms of healthcare in general and in providing clinical care and taking care of people's needs when investing in the in the primary healthcare system. As a result, we have seen that there has been a reduction in out-of-pocket expenditure and that people are increasingly turning to the public health system, which is a very good development.

We need to now go beyond the clinical and look at these other aspects of public health, which include prevention, disease prevention and health promotion and attention to risk factors and determinants of disease that are outside the health sector. I am talking about things like air pollution, nutrition, balanced diets and dietary diversity, tobacco and alcohol, road safety to reduce the number of fatalities due to traffic accidents, and attention to mental health. I think this is where we need to look at the data very carefully, because from what I saw of the NFHS-5 data we see a worrying increase in overweight persons and obesity in adults as well as in children. And we see that almost a quarter of the adult population suffers from diabetes and about 20 per cent from hypertension.

These chronic diseases are the ones that actually give rise to cardiovascular disease, stroke, cerebrovascular disease; many of them increase the risk of cancer as well. And because lifespan is going to continue to increase, we are going to be faced with an increasing burden. So while we need to certainly focus on treatment of those who already have these conditions, because early detection and treatment definitely improves the quality of life and prevents complications, we also need to look upstream at the factors that are actually causing an increase in obesity, in diabetes, and try to address them. This is where the multi-sectoral and inter-sectoral linkages come in, including agriculture, food, sectors like road transport, and the planning of cities.

In terms of improving on clinical care, we've seen again during the pandemic the accelerated uptake of digital tools and technologies. Telemedicine is something that can be used much more widely because these technologies exist, we have a shortage of specialists and in order to reach more people with specialist care the use of telemedicine is a very good option. I've also seen in some hospitals recently including in the Arvind eye hospital in Pondicherry the use of something called shared care, where again if you have a group of people suffering from a similar disease, you could have them connected to a specialist who provides group counselling and group therapy and group advice so that everybody is learning from each other and asking questions. This has to be tested on a wider way using tele-facilities. What has been done so far is in-person shared care but we could also look at virtual shared care and also use all of these applications that were developed for Covid – contact tracing and tracking –for things like chronic diseases to track tuberculosis patients, to track people with hypertension, to ensure that they are well and then they are taking their treatment. So I think digital tools have a lot of scope and we can expand their use.

On surveillance as well we need to use digital tools. The WHO uses something called the Epidemic Intelligence System which actually collects data from different sources, including media reports. Millions of data sources are picked up and then analysed using artificial intelligence in order to pick up those that may be of concern and need further investigation. Similarly, I mentioned genomic surveillance. We need to build the capacity to do whole genome sequencing. The infrastructure, the hardware is getting cheaper and more affordable, as well as even portable now.

But what we need is training of those bioinformatics specialists who can look at and analyse the sequence data. This has been done for Covid and, in fact, that's the reason why we know today about these new variants that are being identified in the UK, in South Africa, and Brazil. These are really causing concern at this point because if the virus is able to mutate in a way that it's able to bypass the immune system, the antibodies that people who are infected or people who are vaccinated generate, then it's a very serious situation indeed. So it's really important to keep track of this.

The next point I would like to make is on strengthening institutional capacity, particularly in some areas such as the evidence-to-policy translation. We need to build institutional capacity, which already exists in places like the Sree Chitra Tirunal Institute. But we need more of that capacity to do health technology assessment; to do prioritisation; to do cost effectiveness analyses; to be constantly analysing data, which is then used to inform policy. And we've seen again in Covid that countries and States that have used data – real-time data – to inform policies and have been able to strategically shiftheir focus areas and change their policies based on what they're seeing on the ground have done much better than others who had fixed ideas and were not willing to change. The sector of manufacturing of medical devices, diagnostics, the huge area where innovation can contribute a lot to affordable healthcare, is something that needs to be further strengthened, investments made so that it will definitely have many returns. We have seen in the last year that India has done well on innovation, and in many areas where we were previously importing products, it's possible to manufacture it in India itself.

On traditional medicine, again Kerala, because of the system of ayurveda has had a very long history and a tradition of both the practice of traditional medicine, the belief that people have in traditional medicine and documentation. And so what Kerala could do is really to leverage the strengths and the capacity that exist in order to both improve the practice of traditional medicine and primary healthcare documented but also to do systematic research including randomised clinical trials to show where ayurveda adds value and particularly in diseases where allopathy does not have a curative solution.

Finally I think learning from experiences and improving is always a good idea. and I have seen many countries that have done intra-action reviews. The WHO has guidance on how to do this. I am thinking about Covid and learning from the successes, the challenges, the mistakes that were made and how things can be done better in the future because certainly this is not going to be the last pandemic that we see. We know that pandemics are going to most likely arise from animals, that there are going to be viruses that transmit from an animal species to the human beings and then learn how to transmit between human beings. They evolve to make themselves more efficient at transmission and Kerala's had an experience with Nipah, which was handled excellently and was actually the outbreak was contained and controlled with minimal impact and loss to lives.

The Covid pandemic, however, has overtaken the capacity of the best health systems in the world. Therefore this is a good time to actually review what has happened and to identify where policies could be improved as well as where there are gaps, both in human resources and institutional capacity. So setting up a foresight unit which might already exist but specifically looking at health issues, and looking not just forecasting for future disease outbreaks or epidemics though that

would be an important element forecasting natural disasters but also foresight on what the health challenges are likely to be 10 years 20 years from now and what needs to be done today to prevent things from going out of hand at that time and what investments need to be made today it would be a very useful function. It also allows us to look ahead to see what technologies there could be in the future that are going to make a big impact on the way we do things today and clearly artificial intelligence and machine learning algorithms are one that are going to have a big impact on health but also they're going to be many advances, there already are many advances and genetic technologies which can be used not only for surveillance but also for treatment.

We are looking at, in the next few years, curative treatments becoming available for diseases like sickle cell anemia, thalassemia, and so on using CRISPR technology. Even though it is still expensive, we haven't come to the situation where it can be widely deployed but this will happen. And planning for that and investing in the capacity, that's going to be needed in order to bring gene therapy to people would be important. So finally, as I close, I would like to think that we have three basic principles in our mind as we plan the health systems for the future. Equity - I think we should not forget that even within well-developed States like Kerala there are pockets of underdevelopment, pockets of poverty, and pockets where there are highly vulnerable people whose health outcomes are far worse than the rest of the population. The second is sustainability. Anything we do would need to be sustainable. And the third is resilience in the face of health shocks that come from time to time. And with those words I would like to again thank you very much for this opportunity.

Greetings and I wish everyone well. Thank you.

Professor Joseph Stiglitz, Columbia University Keynote address

Well thank you very much for this opportunity to address you and I want to thank the Chief Minister and all the other participants in this conference. And I want to echo the words of the Chief Scientist of the importance of this conference of Kerala Looks Ahead – looking ahead, learning from the lessons of this terrible Covid-19, which is going to change the global economy and going to necessitate a change in economic frameworks of countries around the world. So before I come to that I want to also join what's already been mentioned - celebrating Kerala's achievements particularly in health and education. One of the reasons I was enthusiastic of joining you in this meeting is that, like others who studied development in different countries, Kerala stands out as one of the places where there have been real achievements in these very important areas of sustainable development. There are many other aspects of Kerala's development, of Kerala's governance that I want to emphasise and I'll come back to them. And in terms of the response to the Covid-19, competent governmental institutions that was emphasised by the Chief Scientist, competence in administration is a necessary condition for a successful development. I believe part of that is consultation of the kind that you are engaged in here. Kerala is also well known for its participatory democracy, its decentralisation. A third aspect that's very important and very related to its successes in education is the importance of science - reliance on science. And finally I want to mention something where Kerala has got a different course than many other countries and a different course than the rest of India where it has continued to give importance

to planning. Now, of course, planning isn't the same as it was 70 years ago, when there was an idea that a central planner could write down everything that had to be done in a complex society. But there is still need for planning, for thinking ahead, for as this conference says Kerala Looks Ahead for thinking about what are the sectors that ought to be expanding, what are the needs of society. Markets don't do that very well. Markets are short-sighted. In fact even in an advanced country like the United States we discovered over and over again how short-sighted markets are. In 2008, in the run-up to the financial crisis, which had a devastating effect around the world, we saw how short-sighted our financial markets were. But in the context of Covid-19, we've also seen how short-sighted our manufacturing has been. Americans, people all over the world were shocked that the United States could not produce even simple products like masks or protective gear, let alone more complicated products like ventilators or tests. We had lost our productive capacities. We were short-sighted. We built cars without spare tyres. We didn't contemplate adequately the risks ahead. And that's often the case for markets. And so that's why there needs to be leadership from the Government working with the private sector, working with civil society, the business community to try to think together about the direction of where the economy, where the society is going. And I'm going to make some remarks about the views, the lessons, the implications of Covid-19 in just a few minutes.

Covid-19 has been a kind of natural experiment. It has affected countries all over the world. We don't fully understand the randomness of it why it has affected some countries more – so much more – than others at the beginning. We thought that poor countries with poor health like Africa would be disproportionately affected. It has affected South Africa terribly but there are other places that have not been affected. Still, as we look across similar countries, we see very different outcomes. We see places like New Zealand, Taiwan, Vietnam, and South Korea that have managed to basically contain the disease. They haven't done it in an authoritarian way as it has been done in some other countries. They've done it in a very democratic way. They've done it by engaging their citizens. They've done it by reliance on science. They've done it by government leadership. They've done it by promoting trust between citizens and their governments, and citizens and each other. They've, for instance, gotten across a very simple idea that when you don't wear a mask you impose an externality on others. You impose risks, costs on others – a risk of others dying. And it's respect for others that leaves one to want to wear masks. There are some other things/lessons that have come out of Covid-19.

Two of those lessons concern globalisation. One of those is that cooperation is important. Just as cooperation is necessary for dealing with climate change – it's a global problem – by definition, a pandemic is a global problem. It's a disease, an epidemic, affecting the entire world in which the WHO has done a fantastic job in showing leadership. So we need cooperation. The scientific community has cooperated in a way as never before: put aside personal rivalries, the normal concerns about who is first and they've worked together all over the world to rapidly produce vaccines, therapeutics, tests. Unfortunately some governments and some companies have not cooperated. In some places we have seen vaccine nativism, healthcare nativism. Ironically even the United States, which imports far more medicines than it exports, there was on the part of President Trump an attempt at a nativism early on and pointed out if other countries reciprocated, we would be in much worse shape. So cooperation is absolutely essential. But also what we've learned from Covid-19 is that borders matter, that the basic unit even today is the nation State, and quite often

it's the sub-national State. In the United States, the Federal Government was totally incompetent and the response to Covid-19 had to rely on the sub-units on the stakes, on our cities. New York city, New York State has done a much better job than the federal government, which abdicated its responsibility. So India, where the stakes still have considerable sway, what Kerala does is very important and that's why the kind of initiative that you're undertaking today is so important.

We've seen how just being a wealthy country isn't enough. Of course being a poor country puts one in a disadvantageous position. In the United States, as in some other countries around the world, there was at that moment, an incompetent and authoritarian leader, a leader with authoritarian tendencies who did not trust in science, who did not build trust within his people, who abdicated the responsibility of Government. And that is why in the United States so many people have gotten the disease and so many people have died – well over four hundred thousand. And no matter how strong the reaction at this point of our new president President Biden, it can't undo the damage of having a year of President Trump at the helm has done to our country and to our world.

When the crisis started, we all turn to Government as we do whenever there's a crisis. But 40 years of denigrating the role of Government under neoliberal ideology had left Government in a position that could not respond. The Trump administration for instance defunded the central agency responsible for responding to a pandemic - the Centres for Disease Control, which had been one of the leading agencies of its kind around the world and that taught other countries how to respond to this kind of infectious disease. But unfortunately he defunded that. As the Chief Scientist just pointed out, viruses are going to arise and jump from animals to humans and the irony was that he defunded that particular part of the CDC particularly. In the United States, under President Obama, we had become aware of the dangers of a pandemic. We had been warned. We had been warned by SARS, by MERS, by Ebola. And under Obama there was created a White House Office of response to pandemic. That was the importance that was given to the threat of a pandemic. But then under President Trump that kind of that office was disbanded. So having governments that don't understand the important role of Government is dangerous and leaves a society vulnerable. We've seen that in the United States and unfortunately other countries such as yours have experienced a similar kind of incompetence at the central level. And that's why it's so important for the State of Kerala to take strong actions.

Now the one thing that was good about the response in the United States was because of the initiative taken by particularly the Democrats in our Congress, recognising that there was going to be a dramatic downturn. They passed a strong stimulus action. And the Central Bank responded in like measure. So the Federal Government spent over three trillion dollars and the Central Bank expanded its balance sheet by three trillion dollars. Result – not a very well designed programme. It was a bazooka but it actually worked reasonably well. It left out some of the vulnerable. It wasn't sustained. But when we look at the contrast between what has happened in the United States to our economy – not to our health but to our economy – and what has happened in the EU, we see the role of a strong government response. The magnitude of the economic downturn in Europe is twice that of the United States even though the disease has afflicted them somewhat less. And the reason is that we had a strong stimulus response on the part of the Federal Government that has sustained the economy.

Well given what I've just said about what makes for a successful response to the health crisis, Kerala was actually well prepared. As I said it had a competent government, a competent administration, a kind of trust, a reliance on science, a strong education, a strong healthcare system. This disease is not an equal opportunity virus. It goes after people in poor health. And that's one of the reasons it has had such an adverse effect on the United States is that we have so many people without adequate health care and without adequate income. But what this Covid-19 has also exposed is that education having a strong education and health system is also necessary but it's not sufficient.

Kerala has relied, I believe, to a large extent on remittances as a source of income. And it has particularly relied to a large extent on remittances from the Gulf States. The irony is that in that way Kerala has become indirectly dependent on oil, on our carbon economy. You don't think of yourself as a part of the fossil fuel economy but indirectly you are. And that's why it's very important for Kerala to be looking ahead. Part of looking ahead is recognising that by 2050 the world will be largely based on renewable energy. And that means the Gulf States that are so dependent on oil and gas, on fossil fuel will not have the kind of position they have today unless they reform, restructure their economies far faster than they have done in the last 30 years. That suggests, that combined with the point that I made before about borders mattering, means that it is imperative for Kerala to think ahead about a strategy that creates more jobs in the State itself. It can't rely it can't be dependent, on remittance. It has to generate its own productive capacities. And it can't rely on the Central Government in New Delhi, which has shown itself in so many ways to be economically incompetent – for instance, in the demonetisation initiative, which affected so adversely so many parts of India itself. So the State of Kerala has to go its own way to the extent that it can. But it has to strengthen its productive capacities.

Unfortunately another lesson of Covid-19 is that one cannot be reliant in that development strategy on debt. The countries around the world that relied on debt are now facing difficult times. There are debt crises in country after country. So Kerala will have to rely to a great extent on its own resources. As one thinks about what are some of the areas, what are the economic strategies, going forward. Let me mention just a few in this short time. I can't lay out a full agenda.

But there are two principles I want to mention. The first is the importance of diversification. That Kerala was too dependent on one source of income – remittances, important to have a diversified economy including manufacturing, agriculture. Tourism, I think, will rebound and when it rebounds that will help Kerala. I've had the pleasure of enjoying tourism in Kerala and I'll be back visiting you again once the Covid-19 is under control. The second thing is one has to take advantage of your skills, the skills that you've already developed but recognising the changes in the global economy and the opportunities, and the challenges that they posed. So, for instance, you have a great advantage in education. But there are going to be very large changes in the skill requirements necessary as one looks ahead. One of the concerns that I have is that artificial intelligence will decrease the returns to routine jobs, to jobs that require only limited amounts of skill. One will have to go to higher levels of training, higher levels of skill. Health is another area in which Kerala stands out. The Chief Minister and others have already talked about some of the opportunities that have worked through telemedicine delivering – one can deliver both education

services and health services – at a distance. Another area where there are potentials and in combining new with the old is manufacturing of technology related to the provision of telemedicine, of healthcare. Some parts of India have been very successful in generic medicines, in developing generic pharmaceuticals. These are areas where there's a natural comparative advantage to Kerala.

So in conclusion let me just say thank you once again for inviting me. To reiterate there are many lessons that have emerged from this terrible scourge, Covid-19. That Kerala has enormous advantages as it goes looks ahead. But it has to, at this juncture, look at its current strengths, recognise the world going forward is going to be, in many ways, markedly different and take advantage of its strengths and respond to these new challenges posed by the changes in the global economy that will be inevitable in the coming decades, because of Covid-19, because of climate change, and because of the changing geopolitical scene.

Inaugural Address by Chief Minister, Shri. Pinarayi Vijayan

Distinguished speakers, Dr Joseph Stiglitz, Dr Soumya Swaminathan, Vice Chairperson of the State Planning Board, Professor Ramachandran, Ministers, Chief Secretary, Members of Kerala State Planning Board, distinguished scholars, experts, delegates, officers, and friends. I welcome you all.

The Government of Kerala and the State Planning Board have organised this three-day conference Kerala Looks Ahead in order to learn from the world. Kerala has been and remains the most important example in independent India of the power of public action to improve the well-being of the people. The first priority of this Government, which took office in May 2016, was to consolidate and deepen the gains the State has made in human development.

We believe that today Kerala is set for a great transformation, one that builds on its historic achievements in land reform, education, health, social justice, and decentralised government. We can and must emerge successful in our attempt to find productive employment for our educated and highly skilled citizens. We must be successful in creating a progressive modern economy – one that serves every one of its citizens. In the context of the pandemic and its consequences, too, we need to think collectively on how to move forward, learning from the best ideas and practices from different parts of India and the world. We look forward to ideas from all of you that will help transform Kerala into a true knowledge economy founded on new technologies and innovation.

This conference will discuss ways to give a big thrust to the development and management of our agricultural, animal, and fishery resources. In the industrial sector, we will discuss the areas on which the State should concentrate attention given its abundant natural resources but also its inherent constraints of land and population. How do we upgrade our centres of higher education to new standards of excellence; how do we learn from international experience to provide high quality services to citizens and to make government transparent, efficient, and responsive; how do we make Kerala the skilled labour hub of India? I am confident that the experts gathered here will find answers to these and many other questions. As the State prepares for the fourteenth Five-Year Plan and a new government will start its term, the time is ripe for new initiatives and schemes.

The insights drawn from the discussions at this conference will be very valuable in the formulation of new projects and for revising existing schemes. I am sure that the trajectory of key sectors of the economy will be influenced by the suggestions and inputs drawn from the deliberations over the next two days. On behalf of the Government of Kerala, I would like to thank all the distinguished personalities who have agreed to participate in this conference. Special thanks to Nobel laureates Professor Amartya Sen and Dr Joseph Stiglitz, to Dr Soumya Swaminathan, Chief Scientist of the World Health Organisation, leaders of Indian industry Shri Ratan Tata, Shri Kumar Mangalam Birla, Shri Azim Premji, Shri Anand Mahindra, Shrimati Kiran Mazumdar-Shaw, Shri Kris Gopalakrishnan, Shri M A Yusuff Ali, Shri Ravi Pillai, Shri S D Shibulal, Shri Azad Mooppen and all the representatives of national and international organisations, including the WHO, ILO, ICAR and academic and professional organisations in different parts of the world for kindly consenting to attend various sessions of this conclave.

I congratulate the Kerala State Planning Board for the efforts they have made to identify the areas which the State needs to focus in the coming days and for bringing together this extraordinary assemblage of renowned academics, industry leaders, planners, and administrators on this platform. As I mentioned earlier we are here to learn from you. I am sure that this conclave will throw much needed light on areas where we need to focus our collective attention and investments. With these words I take great pleasure in inaugurating this conference. I wish its proceedings all success. Thank you.

Vote of Thanks by Dr Venu V, Member Secretary, Kerala State Planning Board

Ladies and gentlemen, it is my privilege on behalf of the State Planning Board to offer a vote of thanks to the dignitaries who have attended this inaugural session. Let me start by thanking our Honourable Chief Minister. The Chief Minister with his vision and leadership has given us the right guidance while we were going about the task of designing the conference. Many of these programmes, the themes were identified by the Chief Minister personally. He is the captain of our ship as our State charts new waters. Sir, on behalf of the State Planning Board, thank you very much for your kind words and for inaugurating this conference. Our heartfelt thanks to Professor Stiglitz. His words were stimulating and thought provoking and has truly set the stage for the deliberations of tomorrow, when we have sessions across the day from eight, nine different themes. I think Professor Stiglitz has given us plenty of pointers to the future and for the responsibilities of the State as an enlightened controller and facilitator of development in Kerala. Our thanks to Dr Soumya Swaminathan for her insights and perspectives, particularly on the future aspects of public health much of which will come into play in the State of Kerala as we confront the challenges – the new challenges – in the health sector. On behalf of the State Government, may I also extend an invitation to Professor Stiglitz and Dr Soumya Swaminathan to visit us. Professor Stiglitz, you are most welcome to come again to Kerala. Please do so at the earliest convenience as the guest of Government of Kerala.

On behalf of the State Planning Board, may I thank the honorable Ministers Shri E. Chandrasekharan, Shri K. Krishnankutty, Shri A. K Saseendran, and Shri Ramachandran Kadannappally for their august presence and for their good wishes for the conference. Our heartfelt thanks to the Chief Secretary, Dr Vishwas Mehta for his inspiring words. He has also always been the guiding light for us officers and has led by example.

I would be failing in my duty if I didn't thank the main architect of this conference Dr V. K. Ramachandran, Vice Chairperson of the State Planning Board for leading the team from the front, for his attention to detail, and for his perseverance. He is really the real architect of all that will happen in the next two days. My thanks also to all the other members of the State Planning Board, each of whom have worked assiduously and taken a lot of effort to identify the right people and to invite them on behalf of the Board. Tomorrow's delegates and speakers are a result of their combined efforts.

I'm also thankful to all my colleagues in the State Planning Board, all of whom have worked tirelessly. Particular mention should be made of Ms Gayatri, Dr Harshan, and all team members in the Vice Chairperson's Secretariat who have been working on this for many weeks. My thanks to all government officials who have cooperated with the Planning Board, all members and representatives of the media, all attendees and participants. I would close by saying thanks to all the people who are observing this, who are watching us on our website, on YouTube and on other media. Please join us for further discussions tomorrow and the day after. Thank you very much.

That brings us to the end of the inaugural session. Thank you all once again for joining us and we welcome you to a remarkable programme of technical sessions and special sessions in the days again. Thank you.

TECHNICAL SESSIONS

Session I

MODERNISING AGRICULTURE, FISHERIES AND ANIMAL RESOURCES

The session on modernising agriculture, fisheries, and animal resources was held on February 2, 2021. There were two pre conference sessions on agriculture and animal resources on January 27, 2021 and January 28, 2021 respectively. "Kerala's Agriculture – The Need to Raise Productivity" and "Animal Resources – Productivity of Milch Cattle in Kerala" were the themes of the pre-conference sessions.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

The future of agriculture in Kerala depends on how far and how fast it travels on the road to modernisation.

Kerala is a location of world significance with regard to its plant diversity and wealth, and is, in addition, endowed with a coastline rich in marine fisheries and with inland water bodies. Kerala's historical strengths — land reforms, education, decentralised governance, and co-operative sector — are its unique features. These strengths provide the State with human resources for agriculture that are unavailable in most other parts of India.

Despite this enormous potential, when this government assumed office, the year-on-year rate of change in the agriculture sector was actually negative, -5.1 per cent. The growth in crop production was worse, -7.91 per cent.

Agriculture and related activities have been a crucial area of concern of the present Government of Kerala. Agriculture and agricultural modernisation are key components of the Plan. The slogan for the agricultural sector in the Thirteenth Five-Year Plan was to enhance productivity, profitability, and sustainability. Enhancing productivity means modernising agriculture through better modern science-based inputs and farming practices. Higher profitability means higher farm business incomes to farmers. Better sustainability emphasises farming that respects the environment.

The agricultural policy of the Government of Kerala has shown results. After consecutive years of decline, annual growth in the agriculture sector increased to 1.72 per cent. There was 0.4 per cent growth in crop production. The production of paddy increased from 5.49 lakh MT in 2015-16 to 5.78 MT in 2018-19. Productivity of paddy increased from 2790 kg/ha in 2015-16 to 2920 kg/ha in 2018-19. The area under vegetable cultivation and vegetable production increased significantly in this period.

In the post-Covid economy, agriculture can be an important staging ground for recovery. The Government of Kerala has already announced a large-scale agricultural programme that emphasises production, value addition, and marketing.

Internationally, it is well accepted that scientific modernisation will be the basis for future breakthrough in agriculture. Kerala has much to learn from new developments in the world. The development of agriculture is increasingly focused on new research to increase productivity, particularly in biotechnology and nanotechnology. These new means also constitute the best ways to ensure sustainability of agriculture. Precision farming, which ensures a more efficient use of soil, water and minerals is also an important new area of growth.

Kerala must select certain crops with respect to which it will meet its own domestic requirements and build an export capability as well.

In order to learn from international and national best practices in selected areas, the conference/consultation session will concentrate on certain selected themes.

- 1. Bridging yield gaps and increasing production in selected crops: In order to ensure productivity growth, Kerala has to embrace the best technologies in use globally, particularly with respect to modern seeds and planting material, and crop management.
- 2. Strengthening extension methodologies. Explore new IT-based extension methods.
- 3. New forms of production organisation: Given the nature of land distribution and homesteads in Kerala, production organisation is a major challenge in the State. Kerala will benefit from learning from international experience in successful farmers' cooperatives, while always keeping the specific features and needs of Kerala's farmers in mind.
- 4. Water use: Kerala's agro-ecological diversity demands that agricultural growth be based on a watershed plan. This local-level thrust should continue. At the same time, the State's next stage of planning for water should include a larger plan to ensure efficient use of water from the 41 rivers that empty into the Arabian Sea. For this purpose, a coordinated development of surface and groundwater irrigation, major and minor, will need to be considered. Focus should also be on precision technologies like drip and sprinkler irrigation as well as polyhouses and greenhouses.
- 5. The future of spices and plantation agriculture: Kerala's agricultural growth has historically been hinged to the dominant presence of spices and plantation crops. However, given the export orientation of these crops and the presence of central commodity boards, the State has not given the required direct attention to these crops. Their markets and price formation lie outside the control of the State government. Kerala needs a specific plan for the development of this sub-sector of its agriculture.

The session will bring together scientific, practical, and policy-making expertise from Kerala, the rest of India, and other parts of the world. A strategy paper that brings together the concerns discussed above will be an outcome of the session.

Summary of Discussions

Pre-Conference Sessions

Pre-Conference Session: Kerala's Agriculture: The Need to Raise Productivity

The session started with the welcome address by Shri S S Nagesh, Chief, Agriculture Division, Kerala State Planning Board.

Dr R. Ramakumar, Member, Kerala State Planning Board in his introductory address pointed out that low productivity of crops compared to other States and yield gap (maximum attainable productivity under scientific management) are the major weaknesses in Kerala's agriculture. Serious reliance on modern agricultural science and dissemination of its validated principles is needed to raise productivity. The key focus of Kerala's agriculture should be to increase productivity and thereby increase the income of farmers. The pre-conference sessions were intended to lay out the challenges and chart out the broad path to be followed in future for increased productivity.

The sessions concentrated on identifying issues related to yield gap in the crop economy, research outputs available to narrow down the yield gap, and the extension policies available to ensure effective lab to land transfer of technologies.

Dr R Chandra Babu, Vice Chancellor, Kerala Agricultural University, was the Chair of the session. In his opening remarks, he highlighted that small holding size, inadequate primary and secondary processing infrastructure, multiple level intermediaries in supply chain as some of the constraints in the State for sustainable agricultural development. Academic wisdom and political will to take stock of the current support system to improve efficiency with respect to productivity and macroeconomic impact are needed to overcome the constraints.

Supply stress because of decline in yield, reduction in losses in food production, modernisation of technology for efficient use of resources – water, soil, fertilizer, any inputs that contribute to increased productivity, dissemination of technologies such as remote sensing, drones, internet of things (IoT), weather forecasting, improved crop cultivars, input technology for increasing per unit land productivity, promotion of socially inclusive strategies – farm and non-farm employment and integrated farming systems, agricultural diversification to higher value commodities, market development, building partnership among the farmers and between consumers, human resource development, and promotion of agri startups are the factors that need to be considered in moving towards sustainable agriculture development

Dr Jacob John, Professor and Head, Integrated Farming Systems Research Station, Karamana, dealt with the topic of "Data based presentations on yield gaps and major challenges." He emphasised the need to have an idea on the yield gap that exists in the State. He highlighted the low state average yield of crops compared to district-wise average yield as well as low average yield in an agro ecological unit (AEU) compared to the best farmer yield by analysing yield data of crops

mainly rice, coconut, tapioca. Lack of consistency in data available, low adoption of available technology, and lack of availability of improved planting material are the major areas of concern.

Introspection of ongoing interventions and developing strategies for improving and strengthening them, generation of realistic data, identification and adoption of AEU specific technology to improve the yield, improving availability of quality inputs in a timely manner and popularising practices suitable to the situation are the areas to be concentrated to reduce the yield gap. It was recommended to revamp the present system by shifting from crop-based system to a system-based approach through recycling and organic farming thereby improving profitability and livelihood security.

Dr Madhu Subramoniam, Director of Research, Kerala Agricultural University covered the topic, "Research Advances to bridge yield gaps." It was pointed out that the research areas for bridging yield gap should focus on crop improvement, crop production, and crop protection. The presentation focussed on the need to bridge yield gap through crop improvement, crop production, soil health management, and crop protection. The research in crop improvement need to concentrate on developing short duration varieties of rice with qualities of *Uma* and *Jyoti*, stress tolerant varieties to counter vagaries of weather, exploiting hybrid variety in vegetables, micropropagation in coconut, and improved availability of quality planting materials.

In crop production, focus of research need to be on integrated nutrient management (INM), biofertilizers for macronutrient supply, micronutrient formulations for micronutrient deficiency, open precision farming and fertigation for fertilizer use efficiency, and development of salinity tolerance varieties for Pokkali and Kaippad areas.

Refined Package of Practices (PoP) based on AEUs for most crops, integrated nutrient management package for vegetables, customised nutrient solutions in all AEUs, alternative (eco-friendly) for plastics since plastic mulche is a major component in precision farming, development of nanotechnology – nano sensors for more precise and efficient delivery of fertilizers, nano fertilizers, slow release formulations with low environmental contamination were spelt out as the major research challenges in soil health management.

Integrated pest management to combat biotic stresses, breeding resistant varieties against viral diseases, biocontrol agents against excessive use of pesticide, and integrated pest management package for sucking pests were indicated areas of research in crop protection.

While crop productivity through varietal development and soil health management, crop improvement ensuring timely availability of quality planting materials and bio inputs, AEU based INM, and bio intensive pest management are the areas recommended to be concentrated to bridge yield gap as well to enhance productivity, the need for a policy direction for resource allocation as well as for setting up research agenda is of utmost importance.

Dr Jiju P. Alex, Director of Extension, Kerala Agricultural University, in his deliberations on "Agriculture Extension and Productivity in Kerala" reviewed the extension activities undertaken in Kerala and its merits and demerits. The existence of institutional arrangement for technological advancement for increasing productivity in the State was highlighted. The drawbacks of the unique

model of providing extension service through Krishi Bhavans at gram panchayat level prevalent in the State, low adoption of new varieties, package of practices, technologies such as mechanisation and slow pace of production enhancement, and subsequent transition to secondary agriculture were pointed out as the major issues. Providing conducive environment to farmers for adoption of technology, development of comprehensive productivity plan through multidisciplinary consultation for enhancing productivity through area planning, linkage of research and extension for area planning, mapping of problems and solutions, setting long term and short term goals, development of production protocols specific to AEUs and crops, content generation for customised advisory service, and delivery to farmers in the field are the thrust areas of extension activities for enhanced productivity.

Application of GIS technology, awareness on soil fertility and need to enrich soil health, soil health card to every parcel of land, ensuring quality inputs and planting material availability through local bodies with the help of block level agriculture knowledge centres are the important interventions required.

Technology development, its dissemination, and its adoption by end users should be directed towards fostering, validating, and converting innovations by farmers to technologies. Updating skills of extension personnel and para extension workers, reorientation of public investments in extension, institutionalisation for utilisation of skilled labour, reintroduction of group management of resources, incentivising technology integration and innovative practices, employment of ICT tools, utilising cooperatives for capital for infrastructure development, integrated farming, enhancing farmer-scientist-extension interface across State at gram panchayat and block level, and above all promoting entrepreneurship development and encouraging startups are important.

Pre-Conference Session: Animal Resources: Productivity of Milch Cattle in Kerala

The session started with the welcome address of Shri. S S.Nagesh, Chief of Agriculture Division, Kerala State Planning Board.

In the introductory remarks, Dr Ramakumar, Member, Kerala State Planning Board, pointed out that self-sustainability in milk production is to be achieved through genetic improvement of the cattle population in Kerala. The average productivity of cross bred cattle of Kerala is high, 10.22 litres per day, above the national average of 7.85 litres per day and the major share of milk was produced by cross bred cows (93.5 per cent). The session concentrated on increasing productivity and attaining self-sufficiency of milk production in the State.

Shri. M. R. Saseendranath, Vice Chancellor, Kerala Veterinary and Animal Science University (KVASU), in the opening remarks urged for the essentiality of genetically improved cattle suitable for the environmental condition of the State. Lack of awareness of scientific dairy farming, deficiency in adoption of innovation technology, scarcity of scientifically cultivated fodder farms, inadequate training in modern cattle management, shortage of skilled labour force, and deficiency in information technology and transfer of technology are the main constraints affecting the progress of the dairy sector in Kerala. Nutrition efficient feeding practices, mineral mapping of fodder and feed, Government support for mechanisation to cut down labour cost and

strengthening of the quality infrastructure facilities are essential for productivity enhancement in the dairy sector.

Dr Jose James, Managing Director, Kerala Livestock Development Board, covered the topic "Milk Productivity Trends of Bovines in Kerala." Dr James highlighted that availability of high-quality semen in the suitable environment is essential to cater to the needs of farmers. He concentrated on the introduction of superior germplasm from outside the State and suggested that action should be taken to prevent unauthorised use of germplasm for cattle breeding. Structured and scientific breeding programmes and implementable breeding policy in Kerala is essential to achieve highest crossbred to indigenous cattle ratio and highest artificial insemination performance per thousand breedable population. Government should focus on a feed and fodder policy concurrent with the breeding policy in the State. Dairy farmers should have access to cattle with high genetic potential and good quality fodder and mechanisation for accelerated development of the dairy sector.

Dr Sudheer Babu, Professor and Head of College of Dairy Science and Technology concentrated on the topic "Strategies for attaining self-sufficiency in milk production." He suggested that competition among public and private agencies in the field of milk procurement and processing be strengthened and measures may be adopted to give benefits to both the farmers and consumers, viz, farmers in terms of fair price and consumers high quality milk and milk products. Equipping the cooperative dairy sector to compete with free trade policies (Regional Comprehensive Economic Partnership (RECP)) and other milk federations including AMUL is the way forward to attain self-sustainability in milk production.

Scientific management including genetic improvement of cattle population, automation and mechanisation for reducing labour cost, and extension of fodder cultivation to fallow and unutilised land is essential for attaining production and productivity in the dairy sector.

Main Conference

The main conference session on "Modernising Agriculture, Fisheries, and Agriculture" was held online on February 2, 2021 in three sessions. The agriculture sessions had three sub sessions "Role of new technologies in bridging yield gap," "Cooperatives and agriculture: learning from global experience," and "Promise of value addition."

Agriculture

In the welcome address, Shri S S Nagesh, Chief Agriculture Division, formally invited all the speakers and delegates to the session "Role of new technologies in bridging the yield gap." In the introductory remarks, Dr R. Ramakumar, Member, Kerala State Planning Board, stressed that the basis of this international conference is to prepare a new plan to revive and modernise Kerala's agriculture by learning from other countries and States of their success that can be adopted and adapted in our customised environment. He pointed out that during the 13th Five-Year Plan, the slogan put forward for agriculture by the Kerala State Planning Board was productivity, profitability, and ecology. Even though the State could make progress in these fields, factors such as demonetisation exercise of 2016-17, which destroyed the supply chains and sucked out cash
from rural areas significantly, the flood of the century in 2018, extreme rainfall event of 2019, and Covid-19 pandemic of 2020, and continuing in 2021 has impaired our growth.

The Honourable Minister for Agriculture, Adv. V.S. Sunil Kumar, in his opening remarks underscored the need to make the agricultural sector in Kerala an important driving force for development. He stated that the focus should be to transform Kerala from a consumer State to a producer state. He mentioned that one of the biggest drawbacks with the production sector is the lack of adequate value-added enterprises of agricultural products and the main hindrance in the development of agricultural sector in Kerala is the lack of adequate agro-industrial enterprises. Bringing co-operatives into the field of value addition can improve the situation. Popularising planting of exotic fruit crops along with existing plantation crops, expansion of prospects of value addition, exporting and marketing, promotion of floriculture and apiculture are other areas that need to be explored in the sector. Honey produced by the farmers could be marketed under the brand "Kerala Honey", which could be stored, processed, and marketed similar to MILMA model. He concluded by sharing the idea that only through agrarian-based progress can we move forward for a sustainable future for Kerala.

Sub Session I: Role of New Technologies in Bridging Yield Gaps

The first sub session had three speakers. The need for rapid increase in productivity and reducing yield gap were the major focus of discussions in the session on modernising agriculture and animal resources. With no scope for increase in area due to shrinking land availability, increase in crop productivity is the only way to increase income farmers. Serious reliance on modern agricultural science is essential to raise productivity. The successful experiences and latest technologies that can be adopted in the State were highlighted by the national and international speakers.

The first speaker was Dr K. S. Subramanian, who is currently the Director of Research and Professor at the Tamil Nadu Agricultural University. He is the founder head of the Department of Nano-science and Technology and assisted the Indian Council of Agricultural Research in developing a research framework of nanotechnology platform in agriculture. In his topic on "Nano Technology for Agriculture," he indicated nanotechnology as an emerging field of science, and Indian agriculture particularly Kerala needs to explore the possibilities of its application. The application of nano diagnostics to assess the quality of food, especially in the export context and to ensure safe food and nutritional security, the role of nano agri inputs such as nano fertiliser to reduce quantity of input usage and smart delivery of nutrients and usage of nano pesticide and bio inoculants need to be explored. Application of drone technology for monitoring crops, spraying pesticides, bio inoculants, and boosters was suggested. The application of nano technology in the form of nano stickers or pellets or nano film (made of nano fibre) in fruit preservation will help in extending shelf life of fruits by 6 weeks. This will help in export and long term transport of fruits and also ensuring supplies during times of glut in the market. The nano pesticide technology was explained highlighting the development of Nano SCIR Lure for stem borer monitoring in rice and nanopesticides developed against tea mosquito.

Prof Kathleen L Hefferon, Department of Microbiology, College of Agriculture and Life Sciences, Cornell University, New York, the second speaker of the sub session, spoke on "Role of New Technologies in Bridging Yield Gaps with Special Reference to CRISPR Technology." Her presentation started with the emphasis on the need to increase agricultural productivity in proportion to the increasing population. To double the productivity by 2050, new technologies have to be adopted. New breeding technologies are the way to go and the three main ones in it are molecular plant breeding, genetically modified foods, and genome edited crops. Molecular plant breeding helps to figure out how to breed quickly and readily and select the crops with the traits we want. Genetically modified Bt cotton has been extremely helpful and made a world of difference for Indian farmers by reducing their reliance and dependency on pesticides. Genome editing is widely used in research labs and is a very handy tool indeed. Of the various types of genome editing such as mega Lee nucleuses, the zinc fingers, and CRISPR, CRISPR seems to be the most popular right now having revolutionised medical field.

Genome editing can be used for crops and crop yields as well, and that has been expanding enormously over the last few years. In terms of accuracy, genetically modified is not so accurate. However, genome editing can be highly accurate and it is easy, fast, and cheap. It is a robust tool to stop plant viruses. So, plant breeders can have genome editing to improve crop varieties. She pointed out that just by tweaking some of the genes involved in different metabolic pathways, we can get plants with pest resistance or herbicide tolerance, and can improve photosynthetic ability. It is possible to change fruits, grains, size, shape, numbering time, senescence, when the plant is ready to be harvested, increase the number of micronutrients, and yield of the plant. Some of the products of CRISPR technology – drought tolerant rice, salt tolerant rice, low cadmium elite Indica rice cultivar via CRISPR Cas9 and CRISPR tomatoes – were mentioned.

It can be summarised that, use of genome edited crops will help in improving yield by stimulating growth, better quality, reduce usage of inputs such as fertilizers and pesticides, have better resilience to poor climate conditions through pest and disease resistance and biotic and abiotic stress tolerance, can also reduce post-harvest losses, and produce more nutrient dense foods and more and bigger seeds.

The third speaker of the sub session was Dr Trilochan Mohapatra, Secretary, DARE and Director General, Indian Council of Agricultural Research, New Delhi on the subject "Role of New Technologies in Bridging Yield Gaps with Special Reference to Biotechnology." The presentation focused on the role of technologies in improving productivity. He suggested that it is necessary to reinvent and deploy technologies to sustain the achievements. The technologies suggested in green revolution were not followed as per recommendations hence resulted in depletion of resources and polluting environment. Climate change, population growth, diversified needs for food, and above all, enhancing the income of farmers are major challenges to be addressed. The need of the hour is to enhance productivity, reduce the costs involved in production, reduce wastage, improve the quality that is acceptable by consumer, and create markets, nationally and globally, so that agriculture become more remunerative and consumer gets the value of whatever he pays thereby providing a healthier planet, healthy human beings, healthy animals, and a healthy environment.

In order to increase the productivity and bridge the yield gap, Kerala should take maximum advantage of the huge germ plasm, which is agronomically superior, available in the State to have stress tolerance. India has developed more than 70 bio fortified crop varieties. Kerala should be able to deploy some of those which are already developed. The State can also develop its own bio fortified crops varieties, with a higher yield and stress tolerance, so that we meet all the requirements of the State, and new value chains can be built around such varieties which are productive, nutritious, and at the same time climate resilient. It was suggested that Kerala can focus on using nano based solutions which can be profitable to farmers as well are environment friendly to improve upon the micro nutrient deficiency which are there in the soil. Internet of things, Artificial Intelligence platforms deployed globally, including sensors, automation, and machine learning system, and precision agriculture are other novel technologies that can be adopted in the State which can contribute greatly to enhancing productivity and bringing in more precision in agricultural systems.

Further he explained the use of blockchain technologies in management of post-harvest losses and establishing market linkages from production sites to the marketplace and to the consumers and establishing whole chain. Kerala has plenty of potential in rice, spices, fishery sector, and the root crops. It is necessary to take advantage of this technology in spices, since it is being exported. Establishing block chain technology, in case of spice, traceability, and also appropriate use of pesticides using proper technology, would enable a greater export market. Discovering new molecules in spices for utilising in immunotherapy was also suggested. The importance of generation of employment opportunities, cannot be left out, he concluded.

Sub Session II: Co-operatives and Agriculture, learning from Global Experiences

Dr Ramakumar, Member, State Planning Board, in his welcome address, indicated that the focus of the session is to showcase different experiences from across the world as to how collective action can be harnessed to increase agricultural growth and productivity. Kerala, which has a rich history of cooperatives, has used cooperatives in the field of credit provision and at some areas of marketing quite intensively, but has been unable to use them adequately in the sphere of production. The Covid-19 pandemic has taught that supply chains and networks of marketing resilient to shocks are extremely important to ensure that economic activities are not affected adversely in the future. This focus on resilience in supply chains also meant discussions on how States such as Kerala can use different forms of collective action to ensure resilient marketing systems in the State and what can be learned from other countries in this area.

The second sub session had two speakers on the topics "Thailand and FPC Models" and "Learning from Swiss experiences with Co-operatives in Agriculture." The first speaker of the sub session was Prof Sukhpal Singh, Centre for Management in Agriculture, Indian Institute of Management Ahmedabad, one of the most distinguished agricultural economists of India. He spoke on the topic "Thailand and FPC Models." The speaker elucidated the experience from Thailand, on how they leveraged contract farming for agriculture development, and also the need to look into the role of farmer producer companies which are the new generation cooperatives in agriculture development. Contract farming started as early as 1970s in Thailand and served as a mechanism or strategy for rural development through their five-year plans for 10 years to bring about agricultural development and by 1990s spread across all crops and allied sectors making Thailand the kitchen of Japan. The speaker mentioned that India needs to look at this experience because, as of now, and even in the future, corporate farming is not an option at all.

The strategy around contract farming was called four sector cooperation plan, with the contract farmers, contracting companies, the government extension department, and the bank for agricultural cooperative working together for the betterment of all. Thailand prioritised and encouraged group contracts and provided extension support to the contract farmers, including training to farmers in contract farming, and facilitated the banking support in terms of lower cost credit for contract growers. According to Prof Singh, contract farming as a mechanism is neither good nor bad. It depends how it is leveraged and how strategy is planned and actions are taken on the ground to make it deliver for smallholder development. Thailand lesson shows that in order to make inclusive agriculture development, it is necessary to let contract farming happen in the country.

Thailand did a standard model contract farming agreement. Their policy was to enable farmers to participate in contract farming, with physical infrastructure, institutional infrastructure, and extension infrastructure provided by the State and cooperatives playing a great role in the success of Thailand model. It promoted competition in contract procurement. Instead of getting one area to one company for one crop, they brought many companies for the same crop in the same district.

This made all the difference to the farmer realisation of incomes, in terms of what they could get out of it. It was also stated that overtime, in Thailand, State started withdrawing from the scene.

In India, recent government policy is to promote Farmer Producer Companies by tax relaxation and providing subsidies. He mentioned that it is very important to consider the role of collectivisation. It is necessary to give platforms to small farmers in pre-production and postproduction aggregation to make them part of the agriculture development agenda in future. The role of FPCs comes in there. The positives of Essential Commodities Act by amendment are that FPOs can benefit if they have warehouses and are into processing, storage, packing, transport, and any activities that adds value. They can also be allowed to set up e-markets. There will be no mandi taxes, and there will be more competition for them to buy better and sell better. On the negative side, despite all the focus on FPOs, the government has chosen to club FPOs with the farmer in definition, however there's no FPO in this country involved in production. They mostly do buying and selling, buying of inputs and supplying to member farmers and non-members or selling and value addition to output of the farmers. Instead, they should have been on the buying side, not on the selling side. This is a disservice to the very concept and practice of FPOs in this country. Another negative side is as per the amendment is that there is separate payment mechanism for FPOs, which is quite unnecessary. The speaker is of the view that FPOs are member owned and member-controlled entities, so government should not interfere.

Dr. Sukhpal Singh in the concluding discussions stated that policy options are necessary to increase farmers' income and changing of laws or opening the market free for all is not going to help farmers. Kerala with a good history of cooperatives, and even producer companies, can gain through innovative planned production and marketing. Multiplicity of options such as cooperative

APMC, private APMC, private wholesale market, direct purchase option, farmer consumer market yards, e-markets, e-Nam, and contract farming can be exploited. The State can't withdraw from agriculture and institutions and play a proactive development role – enabling role, not necessarily regulatory.

Dr Balz Strasser Managing Director Bio Suisse, Evilard, Berne, Switzerland, the second speaker of the session spoke on "Learning from Swiss Experiences with Co-operatives in Agriculture." He began with the agriculture scenario in Switzerland thirty years back when the Swiss agriculture was heavily subsidised in terms of product price which led to more production of milk by farmers to get more subsidies. This was stopped twenty years back. A change in the policy system and direct payment was introduced. The farmers are not getting paid because they produce, but are paid for maintaining the landscape, that is, Switzerland does not have farmers, but gardeners, who are being paid by the Government. The borders are open to sell the product and also consumers can go to the European Union to buy products at cheaper price.

He introduced the working of Fenaco, the biggest agriculture co-operative federation in Switzerland, which is a conglomerate of different companies. They are into energy business, agribusiness, agricultural input business, and food business. The objective of Fenaco is to support Swiss farmers in their economic development. There are around 80 companies belonging to Fenaco at the moment. It is owned by LANDI and their 45,000 of farmers. LANDI is basically the local cooperative, across Switzerland. It buys products from farmers, and sells inputs, fertilizers and seeds to farmers. LANDIs have their delegates and they vote to choose the Board of Directors of Fenaco. From the experience of Switzerland, it was mentioned that regional product specification method of production is practiced there, and organic local products have a good market. It was also pointed out that Switzerland is not concentrating on subsidised production or on export. They are producing for the local people based on local taste and they are getting high price for their produce and the same strategy was suggested for Kerala as the State has a good developed middle class.

Dr. Baul Strasser responded to the questions stating that what is extremely important for the farmers at the end of the day is to realise a fair and good price for the products you transform, or the products you produce and not how they're organised. He also mentioned about Swiss Federal administration scheme on the State investing half the money on a brilliant idea on how you can value add something in a specific region, Also, while selling the products, farmers give a certain amount for advertisement campaign too. He is of the view that instead of dumping, government should support the production of local products. And the lesson from the Covid-19 is that people always try to buy what is local and what comes, from farmers and around themselves.

As concluding remarks, Dr Ramakumar mentioned that there are many examples of contract farming already in Kerala. It's widely prevalent in Kerala sectors such as spices, broiler farming, vanilla, and muesili. The point is how to use this to Kerala's advantage, not allow big huge private corporate firms to profit in the sector, but to reform the sector in such a way that farmers' interests are held supreme and a larger share of the money flows into the farmers' pocket. Kerala needs to work out ways to utilise contract farming and its strength in cooperatives, evolve new collectives,

and facilitate establishment of huge cooperative marketing networks like Fenaco by learning and adopting the best practises that are adaptable to the State.

Sub Session III: The Promise of Value Addition

The third session on "The Promise of Value Addition" had three speakers. "Value Addition in Coconut in Thailand", "Value Addition, Processing, and Marketing of Rubber" and "A Primer to Produce the World's best coffee : the Araku Story and its relevance for Wayanad" were the topics covered in the session.

Mr. Nutthanai Ninek, Business Development Manager, Tropicana Oil Company Limited, Thailand spoke on the topic "Value Addition in Coconut in Thailand" sharing the experiences in processing and value addition of coconut in Thailand. Tropicana Oil Company started their business with coconut oil production for local market. Now, they have diversified coconut products that are being exported to 20 countries, have gained organic certification from international institutes, and use modern techniques for processing, marketing, and data analysis. Quality management, social responsibility, and environmental sustainability are key to the success of an entrepreneurship. The waste from the production is being utilised as an organic plantation material to grow the organic vegetable. Brand awareness to public through social media, exhibition, and digital marketing can facilitate marketing and thereby profit. Kerala needs to encourage investment and concentrate on diversified products, he suggested. According to him, it is important to think locally first and improve the quality, and then you can think globally.

The topic on "Value Addition, Processing, and Marketing of Rubber" was handled by Mr Jom Jacob, Senior Economist Association of Natural Rubber Producing Countries (ANRPC), Malaysia. The objectives and functioning of ANPRC was covered in brief. He shared experiences and the best practices in the value chain of the natural rubber industry across the world. The major challenge confronting the rubber sector is the non-availability of labour. Covid-19 pandemic has aggravated the situation especially in countries that are dependent extensively on migrant labour. However, it also taught the importance of local sourcing of raw materials, as well as skilled manpower. Family labour was used for tapping without depending on hired labour. Availability of motorised tapping knife is making tapping tasks easier even for new comers. Since tapping wage constitutes 70 to 80 per cent of the total variable cost of production of natural rubber, tapping by itself is going to have some major impact on the net return from that venture.

The Vietnam model of rubber cultivation wherein the public as well the private sector encourages farmers to take up rubber cultivation to meet the demand of raw materials for their factories was described. The enterprises provide them high yielding planting materials services and planning. The prices are benchmarked with the rate prevailing at the Singapore Commodity Exchange, and hence there is no exploitation in price because it is benchmarked with the Singapore exchange price.

In Brazil, farmers sell the produce to processing factory, without middlemen, based on the price benchmarked with the Singapore Commodity Exchange and every factory provide advisory services to their neighbouring farmers. Water pollution being one of the major issues in rubber processing factories, processing companies use 80 per cent of the water requirement through recycled water.

Joint policy initiative by the Governments of Indonesia, Malaysia and Thailand called "Indonesia-Malaysia-Thailand Growth Triangle" (IMTGT), which aims at exploring the potential business collaboration in fostering the overall supply chain, was also described.

Addressing shortage of labour availability through engaging family labour, tapping once a week without sacrificing yield, use of Chinese motorised tapping knife, recycling of water in processing companies for reducing pollution, collection of raw materials without intermediaries, ensuring assured buyers to farmers, and creation of Special Economic Zone are the suggestions for profitable, sustainable, and eco-friendly rubber sector.

The topic "A Primer to Produce the World's Best Coffee: The Araku Story and It's relevance for Wayanad" was handled by Mr David Hogg, Chief Agriculture Advisor, Naandi Foundation. The speaker shared his long years of experiences in the field of coffee in India. In order to ensure that Indian coffee is sustained by a good price, by confidence of the coffee farmers, it's very important to give support to them in value addition and Naandi Foundation is functioning with this mandate. The initial step taken to make coffee cultivation remunerative included value addition, forming farmer collectives, and setting up of central processing unit to ensure quality product. Different techniques of fertilizing soil, specialised composting system, and training farmers on the right harvesting stage of berries are concentrated upon in the field.

Profit and not price are critical for farmers' commitment. quality produce is key for developing a product to go beyond commodity pricing, selective quality harvesting, regenerative agri-methods to ensure the development of a productive, high carbon landscape, terroir classification to differentiate taste profiles and product diversity, shared value among all players in the farmer to customer chain are the learning lessons from the Araku model which can be extended to Wayanad district for a more productive and profitable Wayanad coffee ecosystem.

Animal Resources

Sub Session I: Modernisation of Milk Cooperatives and value addition

The sub session on "Modernisation of Milk Cooperative and value addition" and "Meat sector" started with the introductory remarks of Shri. S. S. Nagesh, Chief, Agriculture Division, State Planning Board.

Dr R Ramakumar, Member, Kerala State Planning Board in the opening remarks pointed out that Kerala has a very important place in the milk map of India and the State is very close to selfsufficiency in milk production. Over the last four to five years, the State is in a position to reduce the import of milk from other States to considerable levels. The advantage of Kerala in livestock farming is the availability of high per cent of cross breed cows in the overall cattle population. Around 90 to 92 per cent of the population is cross breed compared to 26 to 27 per cent at the national level. Secondly, Kerala is the State with second highest level of productivity of milk in India after Punjab which has about 13.5 to 14 kg per day per cow. The level of productivity of milk in Kerala was about 10.2 kg per day. The third important advantage of the State is the considerable growth of the cooperative sector in the fields of rural production. About 30 per cent of the total purchase of milk in the State was through the dairy cooperatives, and the State will attain surplus in milk production and the supply management in terms of storage, processing, and value addition are the important issues to be addressed in future.

The Honourable Minister for Animal Husbandry and Dairying highlighted the sharp increase in the number of animals in the Livestock Census 2019, and the support given by the Government to the farmers through the schemes viz, the Re-build Kerala Initiatives and flood relief schemes during the flood. Kerala is self-sufficient in milk production and therefore focus should be given to product diversification and quality improvement of value-added products.

Dr H. K. Bhanwala, former Chairperson, NABARD concentrated on modernisation of milk cooperatives and value addition by incorporating investment in animal husbandry infrastructure in terms of improved milk production, adequate food, fodder production, availability of crossbred cows, and improved artificial insemination. Focus should be given to nutrition security rather than food security. More investment both public as well as private is required for reorienting the animal husbandry infrastructure. Thrust should also be given to IT based solutions for holistic development of the sector.

Dr R. S Sodhi, Managing Director, Gujarat Cooperative Milk Marketing Federation Limited (AMUL) pointed out that 20 per cent of milk production in Kerala is handled by the unorganised sector. Modernisation and automation of the sector necessitated the intervention of the youth by extending credit facilities at cheap rates. The advantage of exposure to overseas markets of the State can be explored through exporting quality dairy products. Care should be taken to launch 'Operation Flood Kerala' with additional investment in the dairy sector to the tune of Rs 200 crore to Rs 500 crore for the next 4 to 5 years. This will create more employment opportunities in the State.

Mr Meenesh Shah, Executive Director, National Dairy Development Board, Anand, Gujarat, emphasised the need for strengthening of fair and transparent milk procurement system. Technological interventions such as developing soft wares and digital platform are the need of the hour. Improved health coverage to cattle, better hygienic conditions, improved transportation facilities to the processing units, improved genetic programme, usage of sex sorted semen and bull rotation programme, and product diversification needs to be considered for improved infrastructure facilities in the dairy sector. Private sector interference needs to be increased and essential policies to be formulated for increasing investment through credit facilities.

Sub Session 2: Meat Sector

Dr. Tarun Bajaj, Director, Animal Products PFV Division, Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce and Industry, Government of India, highlighted the quality of meat products exported by India. High production cost, outbreak of avian influenza, and trade barriers are the main challenges in the poultry sector. In the session on the "Challenges and Possibilities of Enhancing Bovine Meat production", Mr. Fauzan Alavi, Vice President, All India Buffalo and Sheep, pointed out that the Government should focus on animal health care services. To provide feeder support to farmers, the linkage between State and Centre should be strengthened. To provide quality meat, quality infrastructure facilities such as hygienic slaughter houses and availability of good quality male calf should be ensured.

In the session, "Exploring the Potential Piggery Sector and Learning for Further Development", Dr Thomas, Senior Scientist, Department of Agriculture Research and Education, Ministry of Agriculture and Famer's Welfare, Government of India, pointed out that significant improvement should be made in infrastructure facilities in areas such as production, feeding, housing, artificial insemination, vaccinations, waste management, slaughter facilities, and marketing. He urged for implementation of an effective breeding policy. Technical support should be extended to establishment of liquid boar semen processing labs and micro pig stations.

Fisheries

Sub Session I: Fisheries and developing economics – new challenges and opportunities

The session on fisheries was chaired by Dr R. Ramakumar, Member, Kerala State Planning Board. The Honourable Minister for Fisheries, Smt Mercykutty Amma made the opening remarks of the session. The Honourable Minister stressed the need for sustainable use of fish resources for economic and social development of the sector and State as a whole. Minister remarked that fish continues to be one of the most traded commodities worldwide and there is tremendous potential to provide nutritional security to the population and food security. Fisheries sector plays an important role in the social economic scenario of Kerala with a 590 km long coastline and 4 lakh hectors of inland water bodies. Around 1.1 million people depend on fisheries sector for livelihood and the number of active fishermen in Kerala is 2.43 lakh, in addition to 85,000 allied fish workers.

The per capita supply of fish in Kerala is 24 kg per year, which is more than the world average of 20 kg per year. The average marine fish harvest in the sea in Kerala is close to the current potential which indicates that a future increase will lead to depletion fish resources. The State has taken many steps to optimise and ensure sustainability of fish resources including juvenile fishing ban. The State has set up Fisheries Management Council and Harbour Management Societies to ensure the participation of fish workers in decision making process.

The Minister also opined that another area which needs more attention is how to reduce the wastage of fish. A rough estimate indicates that 20 to 24 per cent of fish landings in the State go as waste and there is urgent need to introduce cold chain system in fish distribution and marketing. The Minister concluded with the remarks that the State has huge potential to increase inland fish production in fresh water, brackish water, reservoir, and paddy fields. The fisheries sector needs to integrate traditional knowledge and modern technology and effective engagement of stake holders to ensure that fisheries development is ecologically and economically sustainable.

Dr Modadugu Vijay Gupta, former Assistant Director General, World Fish Centre presented a paper on "Fisheries and Developing Economics – New challenges and opportunities." Dr Gupta with 55 years of experience in fisheries sector in Asia-Pacific area stressed the need to improve fish production for food nutrition and livelihood security. At the national level the fisheries sector gets attention of policy makers as the Government of India created a separate ministry for fisheries sector. In case of capture fish production, the sector needs large scale infrastructure and cold chain facility to reduce the wastage and to improve value addition. The present production and productivity of fresh water aquaculture in India is very low compared to other countries such as Vietnam. The policy makers have to integrate fisheries and aquaculture into national development plants and policies for future growth of the sector.

Dr Riji Johan, Vice Chancellor, KUFOS presented a paper on fisheries development in Kerala. He stressed the availability of fish seed production for fisheries development. He opined that in Kerala, there is a requirement of 12 crore fresh water fish seeds for implementation of aquaculture development programs. A rough estimate shows that indigenous production of fresh water fish seeds in Kerala is as low as 5 crore and the short supply should be reduced to increase fish production. Another issue is that Kerala has large number of research and development institution in fisheries sector and the research output is not easily percolating into the farming and fishing community. There is a need to diffuse the research and developments related to new fishing methods and technology to the fishing and farming community.

Sub Session II: Kerala Fish Resources – Marine and Inland aquaculture: possibilities of growth in future

The second sub session was on "Kerala Fish resources – Marine and Inland Aquaculture: Possibilities of growth in future." Prof R Ramakumar, Member, Kerala State Planning Board welcomed the participants and chaired the session. There were 4 paper presentations in the session.

- 1. Dr Leela Edwin, Principal Scientist, CIFT presented a paper on deep sea fishing in Kerala.
- 2. Dr Ben Belton, Associate Professor, Michigan State University presented a paper on building value chain, leaning from Andhra Pradesh experience.
- 3. Dr V. V. Sugunan, Former Director, CIFRI presented a paper on possibilities of Inland aquaculture learning from best experiences.
- 4. Dr P. Ravichandran, Former Member Secretary, CAA presented a paper on brackish water aquaculture possibilities for Kerala.

Dr Leela Edwin in her presentation showed that there is a decline of 15 per cent in Kerala's marine fish landings in the latest estimate as compared to the previous year. It was because of over exploitation of the coastal zone up to 50 meter depth. It is high time for diversification and fishing and moving into the deep-water sea fishing. The National Fisheries Policy, the Pradhan Mantri Multya Sambada Yojana announced in September 2021 and the Union Budget presented last year shows that there is a lot of emphasis in the development of deep-sea fishing in the country. Since the capital investment for deep see fishing is very high, the State can make use of the existing cooperative system available in our fisheries sector.

Support for acquisition of deep-sea fishing vessels for traditional fishermen, for up gradation of the existing deep sea fishing vessels, and for setting up bio toilets and fishing vessels is required.

Kerala occupies the third position in marine fish production in the country and accounts for about 20 per cent of the landings. The State has a coastline of 570 kilometres, more than 1500 landing centres, and the annual potential yield is estimated to be 7.5 lakh tonnes of which the State has exploited only a small portion.

In India, we do not have standards for designing construction and operation of fish and deep-sea fishing vessels. But now CIFT has developed a standard deep sea fishing vessel design which has been accepted by the Government of India. The long coastline of Kerala offers large scale opportunity for deep see fishing in the State.

Ben Belton's presentation was on aquaculture value chains in Kerala that has important implications for the State. Ben Belton in his presentation stressed aquaculture growth, which is driven mainly by domestic demand of fish. Kerala needs to focus on identifying emerging farm and business clusters to leverage linkages in the sector. The Andhra Pradesh fish farming experience of Kolleru lake demands adequate planning and development to avoid conflicts and environmental problems in fisheries development. The aquaculture development in Kerala is at its intermediate stage of development and it has lots of scope for improvement.

According to V V Sugunan, the growth of fish production depends on aquaculture especially fresh water aquaculture, coastal aquaculture, mariculture, and new production systems. The coastal aquaculture includes vannamei, white shrimp, brackish water, and fin fish culture. In case of reservoir fisheries, cooperative societies can be empowered and strengthened. Entrepreneurs need to be encouraged for RAS and Bio flock and all these initiatives have to be aligned with national level initiatives such as PMMSY. He analysed the strength, challenges, and needs of the fisheries sector in Kerala and India in his presentation.

P. Ravichandran stressed brackish water aquaculture and traditional system of farming in the country. It shows that aquaculture shrimp production in India is showing a continuous declining trend. In spite of the high brackish water resources available in the State and fishes such as Pearl spot, mullets, milk fish, and tilapia were landed from the backwaters. Aquaculture still at a very infant stage in Kerala. Availability of seed is one of the major bottlenecks in establishing fish farming. The major constraints of coastal aquaculture development are environmental issues, coastal regulatory issues, resource user conflicts, and ownership of water bodies. He demanded strict regulation of coastal aquaculture activities.

Key ideas and recommendations emerging from the discussion Pre-Conference Sessions

Pre-Conference Session: Kerala's Agriculture: The Need to Raise Productivity

- 1. The key focus of Kerala's agriculture should be to increase productivity and thereby increase the income of farmers.
- 2. Academic wisdom and political will are needed to overcome the constraints in the sector. We need to take stock of the current support system to improve efficiency with respect to productivity.

- 3. We need an active mechanism to study market trends. This will help different types of farmers' groups including farmer producer organisations, cooperatives, and joint liability groups to plan production, avoid distress sales and improve profitability.
- 4. Technologies that are becoming increasingly important in agriculture include remote sensing, drone technology, the Internet of Things, and weather forecasting.
- 5. Agricultural diversification to higher value commodities is required.
- 6. Promotion of agriculture-related startups need to be studied and encouraged.
- 7. Packages of Practices (POP) must be developed on a priority basis for each agro-ecological unit in the State.
- 8. Research in crop improvement needs to concentrate on
 - 1. developing short duration varieties of rice with qualities of Uma and Jyoti,
 - 2. stress tolerant varieties to counter variability in weather,
 - 3. micro-propagation in coconut, and
 - 4. in general, improved availability of quality planting material.
- 9. The thrust areas for extension activities are the following:
 - 1. providing **a** conducive environment to farmers for the adoption of technology;
 - 2. developing a comprehensive productivity plan;
 - 3. linking research and extension for area planning;
 - 4. developing production protocols specific to agro ecological units and crops; and
 - 5. customised advisory services.

Pre-Conference Session: Animal Resources: Productivity of Milch Cattle in Kerala

- 1. Productivity enhancement is this sector requires:
 - 1. nutrition-efficient feeding practices,
 - 2. Government support for mechanisation,
 - 3. strengthening infrastructure facilities,
 - 4. making available high-quality cattle semen for cattle with high genetic potential, and
 - 5. extending fodder cultivation to fallow and unutilised land.
- 2. Structured and scientific breeding programmes and breeding policy in Kerala is essential.

Main Conference

Agriculture

Sub Session I: Role of New Technologies in Bridging Yield Gaps

- 1. Participants recommended that the State popularise the cultivation of exotic fruit crops along with existing plantation crops, and promote floriculture and apiculture. Honey produced by farmers can be marketed under the brand "Kerala Honey," which could be developed in a way similar to the MILMA model.
- 2. Nanotechnology is an emerging field of science. Kerala needs to explore the possibilities of its application to agriculture.
- 3. The use of gene-editing (CRISPR) technology will help improve yields. It will lower costs by reducing the use of inputs such as fertilizers and pesticides. The technology can help improve

resilience to weather conditions, improve pest and disease resistance, improve biotic and abiotic stress tolerance, reduce post-harvest losses, and produce foods that are more nutrient-dense.

- 4. In order to increase productivity and bridge yield gaps, Kerala should take the best advantage of its huge germ plasm resources.
- 5. Participants recommended other technologies that can be used in the State, including the Internet of Things, Artificial Intelligence platforms deployed globally, including sensors, automation, and machine learning systems, blockchain technology, particularly with respect to spice cultivation, and precision agriculture.

Sub Session II: Co-operatives and Agriculture, learning from Global Experiences

- 1. Kerala with a rich history of cooperation and cooperatives and farmer producer companies can gain through innovative planned production and marketing.
- 2. Focus on local taste and locally produced goods.
- 3. Learn from the experience of cooperatives in Thailand and Swiss in contract farming.

Sub Session III: The promise of value addition

- 1. Quality management, social responsibility, and environmental sustainability are important for success in entrepreneurship.
- 2. Suggestions by participants for a profitable, sustainable rubber sector included the following:
 - 1. tapping once a week without sacrificing yield,
 - 2. using Chinese motorised tapping knives,
 - 3. recycling water in processing companies to reduce pollution,
 - 4. collecting raw material without intermediaries,
 - 5. ensuring buyers farmers, and
 - 6. the creation of a Special Economic Zone.
- 3. Participants suggested that the Araku model can be extended to Wayanad district for a more productive and profitable Wayanad coffee ecosystem.

Animal Resources

Sub Session I: Modernisation of Milk Cooperatives and value addition

- 1. Focus should be given to product diversification and value-added products.
- 2. "Operation Flood Kerala" suggested to be started with additional investment of Rs 200 crore to Rs 500 crore in the dairy sector for the next 4 to 5 years.

Sub Session 2: Meat Sector

- 1. The following areas need immediate consideration:
 - 1. improved health of cattle,
 - 2. better hygienic conditions,
 - 3. better transportation facilities to

- 4. processing units, improved genetic programme, and
- 5. product diversification.
- 2. Private sector participation needs to be encouraged.
- 3. To provide quality meat, quality infrastructure facilities such as hygienic slaughter houses and availability of good quality male calf should be ensured.
- 4. Implement an effective breeding policy.
- 5. Technical support should be given to pork production.

Fisheries

Sub Session I: Fisheries and developing economics – new challenges and opportunities

- 1. Sustainable use of fish resources is important for the economic and social development of the State.
- 2. Kerala has a huge potential to increase inland fish production in fresh water and brackish water, reservoirs, and paddy fields.
- 3. The capture fish production sector needs investment in infrastructure and cold chain facilities to reduce waste and improve value addition.
- 4. Kerala has a large number of research and development institution in fisheries sector. They need to take research and development on new fishing methods and technology to the fishing and farming communities.

Sub Session II: Kerala Fish Resources

Marine and Inland aquaculture: possibilities of growth in future

Key ideas and recommendations emerging from the discussion

- 1. The long coastline of Kerala offers important opportunities for deep sea fishing in the State. Since capital investment for deep sea fishing is very high, the State can make use of the cooperative system now existing in our fisheries sector.
- 2. Cooperative societies can be encouraged to develop reservoir fisheries.
- 3. Entrepreneurs need to be encouraged to adopt recirculating aquaculture systems and biofloc technology.

Session II Federalism and Development Financing

The session on federalism and development financing was organised in partnership with the Gulati Institute of Finance and Taxation. Dr T M Thomas Isaac, Minister for Finance and Coir, Government of Kerala gave the opening remarks. Prof M Govinda Rao Member, 14th Finance Commission and Honorary Professor, GIFT chaired the session. The experts who presented in the session included Prof C P Chandrasekhar, Jawaharlal Nehru University, New Delhi; Mr Rajesh Kumar Singh IAS, Additional Chief Secretary, Finance Department, Government of Kerala; Prof D Narayana, Honorary Professor, Gulati Institute of Finance and Taxation; and Prof Pinaki Chakraborty Director, National institute of Public Finance and Policy. Prof Sushil Khanna, Indian Institute of Management, Calcutta, was the discussant in the session.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

Kerala has a long history of State-led development strategy with a focus on social sector spending. This approach paid rich dividends as the State is known for its achievements in human development. Kerala's development model has been widely appreciated.

The Covid-19 induced crisis has trapped governments the world over in a double bind, with expenditure requirements rising to address the pandemic and its economic fallout and revenues falling because of the contraction in economic activity. Kerala, along with many other India States, finds itself hit hard by this fiscal squeeze.

The problem in India is particularly severe for four reasons.

First, fiscal reform that involves tax forbearance and concessions aimed at incentivising private capital has curtailed fiscal transfers from the Centre to the States.

Second, the current implementation of the Goods and Service Tax regime has meant that States find that actual receipts have fallen short of what was envisaged.

Third, the flexibility of the States to borrow, even in emergency situations, is limited by the imposition of FRBM requirements that are more burdensome at the State level.

Four, resource mobilisation outside the Budget through Special Purpose Vehicle's with or without Government guarantees.

The resulting fiscal crisis has meant that forward-looking capital expenditures needed to finance crucial physical and social infrastructure requirements have fallen short of the just requirements of States. The session would seek to address questions arising from this fiscal situation. They include the following issues:

- 1. What needs to be done to reverse practices that have eroded, despite the constitutional provision for revenue sharing based on recommendations of Finance Commissions, both the volume of sharable revenues and the relative shares of the States?
- 2. Can the GST regime be made a meaningful form of indirect tax revenue generation?
- 3. What is the case for a change in federal fiscal arrangements that would provide greater headroom with flexible limits for borrowing by the States, especially in times of crisis such as now?
- 4. What innovative measures can be adopted to both enhance the own tax revenues of the States as well as widen the scope for sustainable market borrowing at competitive interest rates?
- 5. How do we revisit the attempts being made to restrict the rights of the States for resource mobilisation outside the Budget?

Summary of Discussions

Professor K J Joseph

Kerala being one of the sub-national entities in the Indian federal structure, the way in which fiscal federalism has evolved over time assumes importance. There are following issues faced by State Governments including Kerala.

1. How to reverse the practices of constitutional provision for revenue sharing based on the recommendation of the Finance Commission or the volume of sharable revenue and the relative share of State?

2. Can the GST regime be made more meaningful form of indirect revenue generation?

3. How to ensure greater headroom with the flexible limits for borrowing?

4. What are the possible innovative measures to enhance the own tax revenue of the State as well as to widen the scope for sustainable market borrowing at competitive rates?

5, How do we revisit the attempts being made to restrict the rights of the State for resource mobilisation outside the budgets?

Dr Thomas Isaac

As Kerala is undergoing a shift in its development paradigm, particularly in the economic base, we have to move away from low productive labour intensive traditional industries and from energy intensive polluting chemical industries to knowledge skill intensive service industries which are more in tune with our resource endowments, both natural and human resources. This involves a three pronged strategy.

- 1. 1 Strengthen social sector achievements, that is, strengthen public education, public health system, social security, and strengthen mechanism for ensuring livelihood of the poor.
- 2. Financing for infrastructure development as 60 to 70 per cent of the public borrowing is channelised towards social sector.
- 3. Shift in financing to knowledge economy as knowledge industries are highly attracted in Kerala.

This three-pronged strategy is constrained by the nature of the fiscal federalism in India which is getting highly concentrated at the Centre.

Fiscal Federal Arrangements: As per the FRBM Act, the State has to eliminate revenue deficit within a specific time period and fiscal deficit has to be contained at 3per cent. States are being monitored with regard to these limits and would have to pay a price to adhere to the FRBM targets. This creates an asymmetry in the implementation of the FRBM system.

Despite the recommendations of Finance Commission, Central government has manipulated the tax system without giving due share to the States. As a result, the actual share of States is not 42 per cent but around 32 per cent of the divisible pool. Finally, there are a number of new legislations that are being passed by the central government which are further constraining the policy autonomy of the States in education, agriculture and so on in every sector.

GST: As 70 per cent of the revenues come from GST, SGST must be fixed within a band with every State having the right to choose their rates. There should be a higher split share for the State from the current 50:50 per cent for Centre and States. The share of the State government should be higher and the ratio of State and Centre should be 60:40 per cent which is more in tune with the ratio of taxes which was subsumed into GST.

The present rates are not revenue neutral and in order to increase the revenue, the rates are to be increased. Finally efficiency of collection has to be improved by improving the IT backbone. Instituting a system of collection, which is based upon artificial intelligence can be a step in the right direction.

Revenue and Expenditure Mechanism: Kerala should target to control increase in revenue expenditure to around 12 to14 per cent per annum beyond which it becomes unsustainable. Capital expenditure has to be doubled to resolve the infrastructure deficit problem. Incentivising the investors through concessions, subsidies amongst other interventions to attract infrastructure investment should be a priority for the State.

Enhancing revenue receipts is of paramount importance. The State Government will have to undertake and explore the possibilities of non-tax revenues such as sand mining, the quarries, and minerals from the sea resources has to be made State monopoly. This would help in controlling the revenue deficit.

In Kerala, the ratio of capital expenditure to GSDP is less than two, one of the lowest in the country, it has to be doubled, which would mean that capital expenditure would have increased by 20 to 25 per cent and that's an outstanding number. Central transfers should be increased and mobilisation of funds outside the divisible pool should be discouraged. The share of Centre in Centrally Sponsored Schemes should be increased as opposed to the current trend of enhancing State share.

Investment should be promoted in priority sectors which would mean incentivizing the investors. This ensures that there is sufficient credit support to the new investors in Kerala. So this strategy has serious financial implications. So there will be a significant increase in the revenue expenditure, it cannot be brought down below 12 per cent at any rate. There will be very significant increase in

the capital expenditure which then would have to be met largely from outside the budget. And there has to be financial support for the new investors in Kerala. So this involves that the revenue receipts of Kerala would have to increase at least by 14 to 16 per cent per annum.

Development Finance Institutions – Lessons from KIIFB: Kerala instead of going for each project having a Special Purpose Vehicle has created a powerful financial institution, that is, the Kerala Infrastructure Investment Fund Board (KIIFB) which borrows and makes available money for various SPVs to implement these projects. KIIFB shows the way to finance capital expenditure in the State.

KIIFB has a very intricate asset – liability management system where the borrowings are backed by part of States' revenue like motor vehicle tax and road tax. Though KIIFB has been lauded as a major financial innovation, the report of the Comptroller and Accountant General is a major assault on the authority of the State. Their arguments are mainly centred on off-budget borrowing, which are direct liability and therefore constitute an infringement of Article 293 of the Constitution. Kerala Legislative Assembly has considered this matter in detail and after eight hours of discussion rejected these paragraphs.

The shift to knowledge economy has two parts to it-one is massive reskilling wherein skilled persons register through web portal, which can be accessed by any employer abroad or in India and the workers can work from one central workstation and government takes care of the social security of the workers so employed. Second is restructuring of the higher education, the knowledge so produced to be converted to innovations and innovations to lead to start-ups and knowledge industries.

Funding of start-ups and knowledge industry require funds and this will be taken care of by the Kerala Bank with a deposit of **Rs** 60,000 crore. Finance is going to play a fundamental role in transforming Kerala. Hence the financial architecture has to be protected amidst the serious challenges posed by the financial policies pursued by the central government.

Professor M Govinda Rao

Fiscal Federal Arrangements: The Fifteenth Finance Commission has recommended 41 per cent tax devolution to the State. The 15th Finance Commission has also recommended a number of sector specific grants to eight different sectors and performance grants. But the Government of India, in its Action Taken Report has not accepted the sector specific grants. The Finance Commission has also put in a number of conditions with regard to grants to local bodies.

The Finance Commission has also recommended that the borrowing limits may be kept at 4 per cent of GSDP in the first year, 3.5 per cent in the second and third year and thereafter 3 per cent in the ensuing two years. For the first year, an additional half per cent is allowed subject to the condition of power sector reforms. The Government of India has accepted the fiscal responsibility roadmap suggested by the Finance Commission. Even after the direct devolution has been made, Government of India is levying cess and surcharges in the current budget. Government of India

has announced Agricultural Infrastructure Cess on a number of items including Agriculture Infrastructure and Development Cess of Rs 2.5 per litre on petrol and Rs 4 per litre on diesel.

In the year 2014-15, cess and surcharges constituted 7.1 per cent of the gross tax revenue and in 2020 it constituted 15.3 per cent of the gross tax revenue. With the imposition of additional cess and levy of additional excise duty on petroleum products, this is likely to be more than 20 per cent of the gross tax revenue. The pandemic has been a double edged sword for the States. There has been a sharp decline in the revenues and sharp decline in the devolutions and borrowing limits also have been attached with conditionalities.

A more serious issue for financing capital expenditure is the huge infrastructure deficit in Kerala. There is a considerable amount of continued spending on the social sectors. In the case of elementary education as the situation is different in the context of declining birth rate, do we require number of teachers and schools? Considering the constraints in resources, how best we can allocate the resources for various users is the main thing. The pandemic is likely to increase inequalities as Kerala has so many return migrant labours especially from Gulf countries. For the return migrants we have to create seed capital. This is one of the additional challenges the State is going to be face in the short run.

GST: The goods and services tax has been having teething troubles. There should be flexibility in the determination of the structure of tax rates to the States similar to the model in Canada wherein the Centre sets a basic rate leaving the tax room open for the States to set their flexible rates. Likewise, the States should be given the right to decide GST rates.

Revenue and Expenditure Mechanism: The States' share in total expenditure has shown a steady increase from about 50 per cent in 1991, to 62.7 per cent by 2009-2010 and today it is almost 70 per cent of the total expenditure. The States are coming closer to the people as they have to provide growing requirements of social and physical infrastructure. But many of the States are faced with fiscal crisis due to resource crunch.

Professor C P Chandrasekhar

Development Financing: Long term finance is required for capital expenditure for investing in projects. The long term investments are characterised by much longer maturities and much less liquidity, even if you have paper which can be traded associated with those assets. In developed countries, the commercial banking system was not seen as an entity which could finance long term investments. In order to finance long term investment, the best thing is the bond market in which one can put out long term paper, in which people know what kind of risks and what kind of brand maturities they are taking on. But if the bond market is not active, specialised institutions are needed to address this credit deficit.

The specialised institutions basically consider two components, one is access to capital despite the kind of investments that they are going to make and the other is long term needs to retain this capital. When the development finance institutions were set up in India it had a very complex architecture for a long period of time, the ICICI, the IDBI etc, all of which were converted into

commercial banks under liberalisation. These institutions had special sources-the ICICI had World Bank funding besides what the government provided. But in case of others, there was a long term finance window of the Central Bank, where the Central Bank actually backed development finance institutions with resources at relatively low interest rates. The State has given the specialised institutions implicit or explicit sovereign guarantee which helped them to mobilise additional capital from the market at relatively low interest rates. This constitutes the essence of development financing.

Apart from financing in physical infrastructure like ports, roads, aviation airports importance has to be given to the social infrastructure which is funded out of the State budget. As the budget resource is mainly used for social infrastructure, for physical infrastructure financing long term financial institutions are required. Because of the unwillingness in the part of private sector, the ability of the State to mobilise adequate resource to finance its activities including capital expenditure became very difficult. The share of borrowing in the financing of long term investment has increased and for adequate capital funding, especially for social infrastructure, apart from the budget, the States have to move in for other development financial institutions like NABARD for financing.

In order to mobilise resources, the government has created many specialised institutions and nonbanking financial institutions and allowed some of these financial institutions to set up as commercial banks. It is clear that even for the Centre it is becoming difficult to finance a range of activities and therefore planning to create new development financial institutions. The current budget also allocated twenty thousand crore as seed capital to create a development finance institution.

As more and more expenditure is being undertaken at the State level, they have more responsibility but have less capacity to mobilise resource so the centre has to provide more fund to the State especially for social infrastructure development. As the Government of India is going ahead with the process of centralisation, the credit for all investment activities is going to the Centre but the implementation is managed by the States. In this context, setting up of development financing institution like KIIFB which will be able to meet the need for medium and long term and long term finance idea should be appreciated.

Rajesh Kumar Singh LAS, Additional Chief Secretary

Fiscal Federal Arrangements: In addition to the Finance Commission's mandated transfers, the fiscal federal arrangements also include non-Finance Commission transfers under Article 282 of the Constitution. These are often seen as a residuary item, but particularly after the abolition of the Planning Commission, they are almost 18 per cent of the union's gross tax revenue and 30 per cent of total central transfers. Another contentious issue is regarding Article 293 of the Constitution, which enables the Union government to regulate the borrowing space available to the State governments in the context of the attempt by the Union Government to link the additional borrowing space to the GST compensation shortfall issue.

In the broader context of inter-governmental transfer, there is a vertical fiscal gap that exists in India in terms of revenue and expenditure. Union government with 62 per cent of revenue is responsible for 37 per cent of expenditure while it is vice versa for the State which is responsible for higher share of expenditure. The Finance Commission acknowledges that, in the context to the pandemic this vertical fiscal gap has meant that the States face scissors effect of declining revenues, combined with rising expenditure burden on health and social security.

In terms of horizontal evolution formula under the 15th Finance Commission, the per capita income distance criteria, where the weightage is 45 per cent followed by various parameters like population, environment area as well as performance in terms of tax performance and demographic performance. The divisible pool went down from 2.5 per cent under the 14th Finance Commission to 1.945 per cent in the interim report of the 15th Finance Commission. Kerala has become a victim of its own success in stabilizing its population growth and achieving better than average per capita income growth in the recent past. In 2021, Kerala's share of all central transfers as a percentage of GDP is only 3.3 per cent against the national average of 6.6 per cent.

15th Finance Commission has done a balancing act by giving some breathing space to States like Kerala which have achieved higher levels of the sustainable development goals and higher expenditure on areas like education and health through the retention of the revenue deficit grant mechanism. They have been retained on a tapering basis giving us access to about **Rs** 19,000 crores in 2021-22, **Rs** 13,000 crores in the 2022-2023, **Rs** 4700 crores in 2023-24 and thereafter tapering to zero. Given the control of Centre on conditional and unconditional transfers, there exists an unequal relationship between Centre and States in the division of fiscal domain. In addition, the ability to raise new cesses including petroleum cess and agriculture and infrastructure cess has led to reduction in State access to divisible pool.

GST: When the Government of India was faced with a shortfall in the GST Compensation Fund to the tune of Rs 2,31,000 crores due to the pandemic, the Union government initially offered States the option of Rs 96,000 crores as compensation to be taken as a loan by the States against future accruals to cess and the balance to be given after the transition period. This offer was further sweetened by allowing an additional 0.5 per cent of their GSDP as an unconditional additional borrowing limit, plus the flexibility to take it to the next financial year.

Under the fiscal distress, all States including Kerala reluctantly have accepted the formula of a common borrowing window to borrow against the cess fund. The fiscal autonomy of the States was first curtailed by the GST Act and thereafter, by the way it was implemented in the context of the pandemic using the so called 'an act of God' argument. Taking note of this curtailment, the 15th Finance Commission has recommended a higher borrowing ceiling for the coming financial year at 4 per cent and then 3.5 per cent with an additional 0.5 per cent, which is linked to power sector reforms.

Capital expenditure as a per cent of GSDP is 1.2 per cent against the national average of 2.5 per cent. The fiscal deficit, revenue deficit and debt ratios of Kerala are higher than the national

average. In this context, the fiscal transfers that have been announced by the Finance Commission is a mixed bag for Kerala. There is an erosion of fiscal autonomy along with declining devolution share as the State becomes a victim of its superior demographic performance.

Development Financing: In the face of unsustainable debt to GDP ratio of 36.11 per cent, the State has to undertake fiscal consolidation not just by adopting innovative mechanisms such as KIIFB to enhance our capital expenditure but also trying to increase our resource mobilisation from the limited domain left particularly in the areas of petrol and diesel, liquor, stamp duty and lotteries.

Professor D Narayana

Federal Fiscal Arrangements: The Centre is increasingly encroaching the territory of the subject list of the States and those in the concurrent list. As per the 14th Finance Commission, between 2002-05 and 2005-11, revenue expenditure by the Union government on State list subjects increased from an average of 14 per cent to 20 per cent and on concurrent list subjects from an average of 13 per cent to 17 per cent.

If the States borrow and spend it on infrastructure and the centre borrows and splurges on revenue spending then ideally any squeeze on fiscal deficit should fall on the Centre and not on the States if infrastructure spending is the goal. The States should be allowed to borrow more so that their capital spending can be enhanced and infrastructure deficit can be addressed.

Fifteenth Finance Commission in its recommendations has maintained that the fiscal deficit be brought down to 3 per cent for the States with some conditional relaxations. However, the Finance Commission is basically giving a free hand to the Union in terms of managing their deficit paths.

Revenue and Expenditure Mechanism: Fiscal consolidation is often aimed at ensuring macro-economic stability and accelerating economic growth and at keeping deficits and the stock of public debt at prudent levels. In this context it may be instructive to quote Lawrence Summers that reducing prospective deficits should be a key priority, but should not take over economic policy. According to Lawrence Summers, just as repressing inflation is misguided, repressing budget deficits can also be a serious mistake if it is made at the expense of nation's infrastructure.

The conventional view is that the fiscal deficit should be for capital spending. But Indian experience from 1990's onwards shows an inverse relationship between fiscal deficit and gross capital formation in the public sector as percentage of GDP. Both central and State government together is running a gross fiscal deficit of close to 7 per cent of GDP. About 50 per cent of this fiscal deficit is actually revenue deficit which means we are borrowing to spend on our current expenditure.

State governments barring certain exceptions have maintained their fiscal deficit well below the FRBM target of 3 per cent in most of the years. While the central government runs a fiscal deficit of close to 5 per cent on an average, 70 per cent of it is allotted for meeting the revenue deficit. Capital spending is only about 1.5 per cent of the GDP for Union Government. Out of that, about 0.6 per cent of GDP is for defence capital spending. The Centre spending on civil infrastructure

is just about 1 per cent of GDP whereas the States spend around 2 per cent of the GSDP in infrastructure.

Development Financing: Infrastructure deficit is a serious issue not just in Kerala but is a pan-Indian phenomenon. The falling government investment in infrastructure of the past two decades could be a major factor in the falling of growth rates across the country. The OECD and East Asian growth miracle was built on large investments in physical and social infrastructure with specific emphasis on technical education. The infrastructure levels in India today in many sectors are lower than in East Asia in 1960s and extent of tertiary education is very low in India. The substantial infrastructure gap was believed to be filled by private investment. When we examine the past experience, we can see that the public private partnership suffers from severe limitations and there is no alternative to significant levels of budgetary support for investment in infrastructure development in India.

Professor Pinaki Chakraborty

Fiscal Federalism: In the context of the economy facing contraction and the vertical share being kept at 41 per cent, the overall flow of the resources will decline owing to the decrease in the overall revenue availability. Finance Commission has recommended a review of the Centrally Sponsored Schemes which should ideally provide more fiscal autonomy to States.

Development Financing: In the context of budget numbers, GDP growth budget is assumed to be 14.4 per cent for the year in nominal terms for the year 2021-22. Total expenditure in the budget is Rs 34.83 lakh crores which is around 15.6 per cent of GDP and total expenditure (RE) for 2020-21 is estimated at 17.7 per cent of GDP. This fiscal expansion in the budget coupled with a revenue shortfall in the budget to the extent of Rs 4,65,000 crores lead to the high fiscal deficit of 9.5 per cent of GDP which would make the medium term debt unsustainable. Hence, macro-economic stability is a central function that the Centre has to emphasise upon on a serious note.

At the same time, there are issues related to expenditures, which are redistributive in nature and falls in the revenue account of the States. Hence, there will be a pressure on the revenue deficit for most States and that can have an adverse impact on capital expenditure at the State level.

So within the overall resource constraints, only option was to allow both Centre and States to borrow more thereby culminating in a new normal fiscal deficit which is going to be above 6 per cent in the medium run. Unless the revenue deficit is reduced, this would have implications in terms of the quality of capital expenditure.

Professor Sushil Khanna

Development Financing: Recognises the role of Development Financial Institutions such as KIIFB to provide long term funding is essential in our economy. Despite the significance attached to private sector investment in infrastructure, the pivotal contribution to gross capital formation has come from the State Owned Enterprises. The National Highway Programme and Dedicated Freight Corridors are classic examples of State-led capital formation.

A good model would be a public sector financial institution which is well governed, well-managed with professional governance. State owned enterprises can be well-managed and well-governed through autonomy and formation of professional boards. For State government enterprises, there should be a dividend expected out of them every year,

Investment is vital to rebounding the economy and the State capital expenditure plays a vital role in enhancing infrastructure investment. Railways are far more efficient than roads in moving goods and freight corridors should be a vital area of investment in infrastructure. The minor ports garner a substantial amount of revenue and Kerala also has a potential of using its minor ports to be a source of revenue.

Key ideas and recommendations emerging from the discussion

1. Fiscal Federal Arrangements

The centre has manipulated the taxation system through cess and surcharges thereby reducing the due share of States in the divisible pool resulting in reduced fiscal autonomy of the States. A review of the Centrally Sponsored Schemes in accordance with the recommendations of Fifteenth Finance Commission should be undertaken to provide more fiscal autonomy to States. Central transfers should increase and mobilisation of funds outside the divisible pool should be discouraged. The share of Centre in Centrally Sponsored Schemes should be increased as opposed to the current trend of enhancing State share. The States should be allowed to borrow more so that their capital spending can be enhanced and infrastructure deficit can be addressed.

2. Goods and Services Tax

There should be flexibility in the determination of the structure of tax rates to the States similar to the model in Canada wherein the Centre sets a basic rate leaving the tax room open for the States to set their flexible rates. There should be a higher share for the State government. It should be 60 per cent instead of current 50 per cent that is more in tune with the ratio of taxes which was subsumed into GST. The present GST rates are not revenue neutral and in order to increase the revenue, the rates are to be increased and efficiency of GST collection has to be improved through strong IT backbone based upon artificial intelligence (AI).

3. Revenue-Expenditure Mechanism

Kerala should target to limit the increase in revenue expenditure to around 12 to14 per cent per annum beyond which it becomes unsustainable. Capital expenditure has to be doubled to resolve the infrastructure deficit problem. Incentivising the investors through concessions, subsidies amongst other interventions to attract infrastructure investment should be a priority for the State. Enhancing revenue receipts through non-tax revenues such as sand mining and minerals from the sea tribute which in turn have to be made State monopoly should be a priority.

4. Development Financing

As more expenditure is being undertaken at the State level, they have more responsibility but have less capacity to mobilise resource so the centre have to provide more fund to the State especially for social infrastructure development. In this context, setting up of development financing institution like KIIFB which will be able to meet the need for medium and long term and long term finance idea should be appreciated. The shift to knowledge industry requires funding which will be taken care of by the Kerala Bank and hence our financial architecture has to be protected amidst the serious challenges posed by the financial policies pursued with the central government. Kerala has so many returning migrant labours especially from Gulf countries and for the return migrants we have to create seed capital.

Drawing from Kerala's success in decentralised health care governance, the PSUs in Kerala could introduce governance reforms by way of creating more responsible and professional boards. For State government enterprises, there should be a dividend expected out of them every year. Railways are far more efficient than roads in moving goods and freight corridors should be a vital area of investment in infrastructure. The minor ports garner a substantial amount of revenue and Kerala also has a potential of using its minor ports to be a source of revenue.

Session III Information Technology

The session on information technology was held on February 2, 2021. In particular, the session on IT and ITES sought to showcase the range of possibilities in the field of information technology, introspect on the specific areas that Kerala should focus and discuss players and policies needed for success. In order to maintain and enhance the momentum of development of Kerala's IT sector, it is necessary to identify new growth areas for the IT industry in the State.

The session was organised by the Kerala State Planning Board in collaboration with Kerala University of Digital Sciences Innovation and Technology, Technopark, ICT Academy of Kerala, Kerala State Information Technology Infrastructure Ltd (KSITIL) and the Department of Electronics and Information Technology (GoK). In preparation for the session the following concept note was readied to guide the organisation and conduct of the session.

Concept Note of the Session and Main Themes of the Conference

The concept note began by noting that while the Government of Kerala is committed to increasing and developing the productive forces of the State, it also recognises the important role of the Information Technology sector as a key element for Kerala's growth. Under the current political leadership it has pro-actively assisted the growth of this sector, and has been committed to continued investment in infrastructure, enhancing Kerala's digital connectivity and networking, undertaking initiatives to upgrade the quality of skilled human resources from Kerala, and reaching out to investors from different parts of India and internationally to invest in the State. As a result, the State has registered significant gains and progress in these efforts.

Alongside these initiatives, the Government has also invested strongly in the start-up sector, and the Kerala Startup Mission has won national recognition for its performance. The start-up sector is closely connected to the IT sector and the development of start-ups is widely acknowledged as essential to the growth of IT.

The Covid-19 pandemic and subsequent lockdowns have had serious consequences for the IT sector, especially for the many small and medium firms that are part of the State's IT ecosystem. There were recessionary trends in the global economy even before the pandemic struck, and their impact on Kerala's IT sector was a matter of concern. However, in India and globally, several IT firms have managed to not only cope with the stresses but also register strong growth in business and revenues.

In order to maintain and enhance the momentum of development of Kerala's IT sector, it is necessary to identify new growth areas for the IT industry in the State. We must also to promote Kerala as a IT destination, emphasising its strengths.

The following themes were identified for the IT sessions of the proposed conference.

Winners and Losers in the IT sector. The recent recession and pandemic have had an unequal impact on different sectors of the IT industry as a whole. Understanding the impact of recent trends on diverse sub-the industry will help the State to focus its efforts in attracting new and viable investment in the sector.

Global Digital Transformation Hub for Conventional Sectors: Several sectors of industry and business are undergoing substantial digital transformation to stay competitive. Automobile, healthcare, hospitality and tourism etc. are some of the early adopters of digital transformation. Kerala has made an entry into this with Nissan Motors choosing Trivandrum as their first Global Digital Centre to develop new e-mobility solutions. What are the other sectors that can be identified in which leading enterprises can be attracted to set up their digital transformation knowledge centres in Kerala? To what extent can Kerala attract attention and investment as a Global Digital Transformation Hub in the region?

New work patterns and their impact on IT infrastructure: Kerala has thus far invested in high-quality infrastructure in centralised locations for the IT sector. However, the widespread recourse to workfrom-home has changed our perceptions about future investment in such central locations. What are the current developments and the value of investing further in new options such asworknear-home, decentralised work spaces, and the use of the State's tourism potential for developing Kerala as a "workation" (work+vacation) destination?

R&D in the IT sector: Kerala needs fresh effort in research and development in the IT sector that would further contribute to its growth in the State as well as adding to the S&T research infrastructure. The network of engineering institutions and the newly inaugurated Digital University can provide base for such an effort. What shape should such an initiative to build R&D in the State take? What institutional form should it have?

Kerala and Industrial Revolution 4.0: New trends in robotics and artificial intelligence (AI) are key to the future of There has already been enthusiasm in Kerala in this field among start-ups. It is important to survey trends and specific possibilities for the Kerala IT sector in these fields.

Electronic Component Manufacturing Supply Chain: The lack of an electronic component supply chain is currently a barrier to further development of start-ups and innovation hubs. However, due to some pioneering efforts, Kerala has developed considerable capacities in the electronics component sector including some of the best electronic R&D facilities under CDAC, India's largest incubator for start-ups in electronics and high end digital fabrication facilities. How can these be utilised to further develop a supply chain of electronic component manufacturers and high quality start-ups and SMEs in electronic hard ware sector in Kerala?

Creating a Fab-City: India's major barrier to excellence in electronic manufacturing is the near total lack of high-quality fabrication facilities for chips and microprocessors. Can Kerala plan a state of the art foundry for creating large scale electronic chips, sensors and microprocessors? Can the State create a Fab-City through public-private partnership State to leapfrog into the hardware sector?

The main IT session of the conference was preceded by two thematic deep-dive sessions, one on the "software" aspect, covering the first four themes and the second the "hardware" dimension covering the last three themes. In the main session, the key conclusions and recommendations of the pre-conference sessions were presented for final discussions, leading to an overall conclusion on strategies for the future as the main outcome of the conference.

Brief Summary of the Event

The pre-conference session on January 24th focused on 'Software' while the one on January 27th focused on 'Hardware'; the session on February 2, 2021 focused on IT as a whole. The conference was conducted online mode through Zoom platform by giving access to selected invitees, the public and other stakeholders were part of deliberations through the dedicated website (www.keralalooksahead.com), YouTube (https://bit.ly/2MaaDBX), and Facebook (www.facebook.com/spbkerala) which live streamed the sessions. Experts were from the industry and the academia from the State and across India and world. Leaders of IT/ITES industry, academia, policy makers, general public and start-ups attended the sessions.

A brief overall description of the sessions is detailed below followed by a more detailed account of the proceedings.

Pre-Conference Session on Software

The main speakers of the pre-conference session on Software were, Prof T Kesavadas, Director, Health Care Engineering Systems Centre University of Illinois at Urbana Champaign; Mr Sreekanth Arimanithaya, Global Talent and Enablement Services Leader Global Delivery Services, Ernst and Young; Mr Nandakumar K Nair, Founder and CEO, Suntec Business Solutions; Mr Anoop Ambika CEO, CLAP Research; and Dr. Rajasree M S, Vice Chancellor APJ Abdul Kalam Technological University; Prof T Jayaraman, Member, Kerala State Planning Board; Mr Mohammed Y Safirulla, IAS; Additional Secretary, Department of Electronics and Information Technology; and Dr Saji Gopinath, Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology. Mr Santhosh Kurup CEO, ICT Academy Kerala moderated the session. The general format of this session was as follows. Panellists had their remarks or presentation followed by a panel discussions.

Pre-Conference Session on Hardware

The main speakers of this session were Prof. Prahlad Vadekkapat, National University of Singapore; Mr. Christo George, Chairman and Managing Director, Hykon India Ltd.; Mr.Althaf Jehangir, CEO and Execuive Director, NeST SFOT Technologies; Mr. Gautam Shankar, VP Operations, India and Japan, Kimball Electronic; Mr. Mohammed Y Safirulla, IAS, Additional Secretary, Department of Electronics and Information Technology, Government of Kerala; Prof. T Jayaraman, Member, SPB and Senior Fellow at M S Swaminathan Reasearch Foundation; Dr. Saji Gopinath, Vice Chancellor, Kerala University of Digital Science, Innovation and Technology. Dr. Jayasankar Prasad C, Managing Director, Kerala Information Technology Infrastructure Ltd.

(KSITIL) moderated the session. The general format of this session was as follows. Panellists had their remarks or presentation followed by a panel discussion. Subsequently there was a moderator led question answer session and then general discussions.

Main session on Information Technology

The session was held online and the welcome address was made by Prof V K Ramachandran, Vice Chairperson, Kerala State Planning Board. Shri Pinarayi Vijayan, Chief Minister of Kerala made the vision statement. The main speakers of this session were Mr S D Shibulal, Co-founder Infosys; Mr Srikanth Srinivasan Head, Membership and Outreach NASSCOM; Ms Nivruti Rai, Country Head Intel India, VP; Mr Nandakumar K Nair, Founder and CEO, SunTech Business Solutions; Prof Prahlad Vadekkapat, National University of Singapore; Prof T Jayaraman, Member, Kerala State Planning Board; and Dr Saji Gopinath, Vice Chancellor, Kerala University of Digital Sciences. Mr Santhosh Kurup, CEO ICT Academy Kerala moderated the session.

Sessions of the Conference

Pre-Conference Session on Software

Date: 24-01-2021, Time: 6:30pm – 9:00pm Moderator: Mr. Santosh Kurup, CEO ICT Academy, Kerala.

Prof. T Jayaraman, Member Kerala State Planning Board, who welcomed all dignitaries to the session, noted that Government of Kerala is giving considerable importance to this conference, organised by the Kerala State Planning Board. Kerala leads other States with regard to developing, improving, and enhancing the well-being of its people. But this cannot be sustained without a foundation in modernising and developing all productive sectors of the Kerala economy. To move forward, Kerala needs modernity in productive activities, including investment in science and technology and investing in those sectors of economy that are part of the future.

He also mentioned the various prospects of growth and added that suggestions, ideas, and comments are required from the Keralites as well as the well-wishers of Kerala to enhance the IT sector.

In his opening remarks Mr. Mohammed Y Safirulla, IAS, stated that there are three factors which the Government of Kerala and IT Department have focused on for the last few decades in order to create robust foundations for the growth of the IT Sector. The factors include the following:

Creating effective networks. Kerala was one of the first States to create a wide area network and then follow it up with novel initiatives such as infrastructure development and other government projects. One of the recent initiatives Kerala has undertaken was the Kerala Optical Fiber Network (KFON) through which high-end bandwidth connectivity is to be provided to more than 30,000 government offices and a large number of households in the State. Through this project, 20 lakh families will avail free internet out of a total of 75 lakhs families in Kerala.

Stress on Innovation. Innovation was emphasised through building a robust start-up ecosystem.

Progress in e-governance. Kerala is one of the top players among States in e-governance today. Not only on transaction but also on the field level. It started with the formation of Akshaya Centres, which evolved as a Common Service Centre and the KITE Project earlier called IT@School, which helped to improve the IT literacy of students at early education levels.

Mr. Safirulla added that he had confidence in the future growth of the IT sector and its enhancement due to the presence of skilled human resources, and the presence of a robust ecosystem of software, network companies and start-ups. New policies brought forward in the budget 2021-22 would also help to lay the foundations to transform Kerala into a knowledge Society.

Dr. Saji Gopinath, Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology, in his overview/introductory presentation, noted that IT is a sunrise-sector and in the next five years is expected to provide considerable increase in employment. The IT sector of Kerala has a turnover of Rs 25,000 crore, out of which almost 30 per cent is merchandise exports from the State. There are 4 key elements that distinguish the Kerala IT sector: industry (eg: IT parks, incubators), capacity building (ICT Academy, ICFOSS), infrastructure (eg: KSITL, SDPK) and the State IT mission (eg: governance, applications).

Dr. Saji Gopinath also noted that both short-term and long-term trends in the IT sector need to be considered in the current situation. Short-term trends include the effect of Covid-19 and changes in business models, which have resulted in decentralised models of working. In the short term accelerated growth has been noted in some sectors such as e-commerce and logistics, edtech, fintech, online gaming and entertainment. Kerala has developed a well-established online video conferencing solution which gained attention from various parts of the world. Growth in other sectors such as manufacturing travel and hospitality has however decelerated.

Among the long-term trends, the following four aspects were emphasised.

- 1. There was enhanced development in communication technology, including 5G, IOT, social media, and cloud computing. The distance between producers and consumers has reduced with new channels for digital products.
- 2. Adoption of technology by conventional sectors has increased substantially.
- 3. There are changes in the employment structure and in the emergence of freelancing platforms.
- 4. Transition to knowledge industries is another important trend, where pure service is being replaced by IT based services. Also, digital technologies are going to become a strategic enabler in various sectors of the economy.
- 5. Finally, the changes in employment structure due to rapid change of technology and enhancement of connectivity.

Kerala is focusing on four areas for the advancement of IT Sector: learning from the past, digital transformation of traditional sectors, network patterns and skills, and climbing up the value chain.

The model of transformation of Kerala should be based on support infrastructure, investment offers, governance, and deliverables.

Prof T Kesavadas, Director, Health Care Engineering Systems Centre, University of Illinois, US, pointed out that there are four key segments of interest for investment in Kerala in the post covid-19 scenario.

- 1. Health Care (telemedicine and health, digital diagnosis, genomics, monitoring at home, apps and mobile tracking, 5G and robotic medicine)
- 2. Industry (e-commerce, IoT and connected factories, conference call, virtual learning, virtual offices, warehousing, logistics)
- 3. Knowledge Themes (artificial intelligence, data science, cyber security, virtual reality, block chains, digital twinning)
- 4. R&D (fundamental and applied research, workforce development, relationships, translational research and start-ups)

He emphasised the importance of Government investment for research and cited the investments done by the US Federal Government for research, which are very significant. In the U.S, 70 to 80 per cent of all research projects are funded by National Science Foundation for Engineering and National Institute of Health for Medicine. But in India, the infrastructure to utilise funds and convert it into meaningful research is lacking. Government-industry partnership is important and finding industry level problems and proposing a solution need not be carried out by Ph.D students, but it can be done in master level thesis. At Ph.D level, scholars should be more deeply focusing on coming up with various ideas that would be computationally and theoretically important for the future.

Mr. Sreekanth Arimanithaya, Global Talent and Enablement Services Leader, Ernst and Young, stated that there are four developments which can help Kerala develop into a global software/application development hub. Digital Software Engineering/Application Engineering now provides a vast area of job opportunities all around the world. Software Engineering is increasingly agile in a distributed computing environment and together with DevOps and Continuous Integration makes it possible for software development. The development of Micro-Services means the breaking down of software engineering into many small modules/task, as this method is found to be more effective than monolithic services. It deals with the development of single components and integrates them to build the required software. These developments provide new opportunities for employment, especially women who are looking to be part of the work force, especially if care-giving at home, child care and so on have interrupted careers or do not allow them to work full-time.

He identified some factors for the improvement of job opportunities in Kerala.

- 1. Cost Advantage Kerala continues to provides a cost advantage and this factor must not be lost sight of. This can help in increasing job opportunities in Kerala.
- 2. Pyramid Management Generally, there are more employees in the lower level of the employment pyramid with 2-3 years of experience or those who are college level graduates.

However, it is also important to hire experienced employees with 4-6 years of experience in software engineering domain or project managers/product managers and it is not easy to make it happen. There is a need to rethink about the employees in the middle level and top level of the pyramid. For this, Kerala can try to hire experienced people from Kerala who are currently working outside the country. In order to have a Software Engineering hub, this pyramid structure is essential.

- 3. 3-tier talent structure: Mr. Sreekanth also emphasised the need for a 3-tier approach to the talent structure, with the various levels being
 - 1. Trade apprenticeship level equivalent to ITI graduates
 - 2. Diploma equivalents with polytechnic equivalent education
 - 3. Engineering graduates/post-graduates in engineering.

As in legacy industries, in digital industries too, apprentice level workers could be used for practices such as coding, testing, and IoT which will be cost effective. As we climb up the pyramid structure of management, the centre portion would be diploma equivalents and top tier could be B-Tech graduates or post graduates. This will create huge job opportunities in Kerala. Besides cost effectiveness and pyramid management systems, productivity, innovation and <u>d</u>omain knowledge are also very important. Kerala can develop innovation and domain knowledge in four areas; healthcare sector, insurance, transportation, and banking.

He emphasised the 'Know, Do, Contribute' system at the work place where an employee has to study, work in a project and finally contribute to a project and its development. Persons with disabilities should also be encouraged to work in the software domain and the Government has to take more initiative on this front.

Mr. Nandakumar K. Nair, Founder and CEO, Suntec Business Solutions, began by pointing that the changes happening in the digital domain for the last 8 months are fascinating. With respect to future growth he noted:

- 1. Every business sector has to restructure their business processes. Activities like supply chains, and customer relationships will be digitised. Thus, the whole business ecosystem will be transformed.
- 2. Such a transformation will require graduates employable from day 1.
- 3. Kerala has all the potential for the growth in future. But for this to happen Government of Kerala has to explore more opportunities and change some of their determinations.

Mr. Anoop Ambika, CEO, CLAP Research, raised his concern regarding the current situation where the research works are only confined to a mere research paper orientation or oriented towards obtaining publications rather than raising it to deal with real life scenario. Some of the examples cited by the speaker, where such real-life problem-oriented research could be carried out included:

- 1. Analysis and optimisation of resource allocation strategies for cloud computing systems.
- 2. Fine grained search and access control schemes in multi-user searchable encryption.
- 3. Computer-aided diagnosis and grading of diseases (such as prostate cancer) from diagnostic images using AI and machine learning techniques.

Referring to the example of an international software giant, regarding improving Indian language transliteration in map software, in the context of industry-academic collaboration and infrastructure, he queried whether ICFOSS could collaborate with this software giant on vernacular language research? Since the multinational is particularly doing a lot of work in Malayalam including voice to text in Malayalam, search in Malayalam, and maps in Malayalam with unstructured text, so who could be better than a regional research centre such as ICFOSS to provide inputs for this. He noted that currently all the research works were only on publications or papers and were not developed on a product perspective. Simply giving training on certain skills to a person is not fruitful because it will never make that person ready for the industry. There exists a gap between industry and academy. Kerala has a large number of research organisations for various sectors. But we should have a focus on creating a robust research ecosystem in order to provide solutions to the problems faced by society. Some of the relevant fields of interest in this regard were: telemedicine, vaccination tracking through blockchain, warehousing and logistics, space technology, and AI/ML.

Mr. Anoop Ambika suggested a research framework to promote Translational Research in the newly formed Digital University, in which all the universities, research institutes, industry and even individuals who had some research work in IT related areas could register under a School of Applied Research which would help the researchers with funds, industrial partners and grants to take the research to a commercial level once the research was completed. Lastly, he also mentioned the Government's One district – One cluster plan and suggested the integration of the research framework with this plan.

Dr Rajasree M. S., Vice Chancellor, APJ Abdul Kalam Technological University, began her intervention with reference to the perspectives of industries on skilling and knowledge. About the skilling part, she pointed that we need a clear framework that clarifies what are the skills and what are the qualifications expected for each job, which would attract many companies to hire such skilled people for their firms. From the university side also, additional add-on courses should be given and those courses should clearly define for which job profile such courses are helpful. She mentioned that domain and technology wise skilling should be imparted to students.

In Kerala Technical University, along with curriculum, minor programmes were organised for which credits are also given to the students. These skill courses should be provided along with internships, so that students would get an industry level exposure. There are around 145 engineering colleges across the state. There is a Centre for Engineering Research and Development at Kerala Technical University and they are open to industries or the Government to come up with suggestions that can be taken up by the PhD students for their research. For this, industries/Government could provide researchers with funds and fellowships. The university needs faculty members from abroad to discuss new ideas, problems and interesting case studies and as guide to the students for a short-term period. She concluded that both skilling and applied research should be well planned and all should work together on it for a better output. Overall, Dr. Rajasree's intervention was an emphatic and broad-minded welcome to industry for greater collaboration and cooperation with academia.

After the question and answer session, Mr. Santhosh Kurup concluded the session by thanking all the panel members and also the Kerala State Planning Board for giving the opportunity to moderate the session. Er. Joy N.R, Chief, I&I Division, Kerala State Planning Board delivered the vote of thanks for the pre-conference session on Software. The session came to an end at 9.15 pm.

Pre-Conference Session on Hardware

Date: 27-01-2021, Time: 10:00 am - 1:00pm

Moderator: Dr. Jayasankar Prasad C, Managing Director, Kerala Information Technology Infrastructure Ltd. (KSITIL).

The pre-conference session began with the welcome address by Prof. T. Jayaraman, Member, Kerala State Planning Board, drawing attention to Kerala's achievements in public action. Kerala's response to the demand of social welfare, human development and most recently in disaster management has set new standards and raised the standards for such performance by all Governments. As we come out of these disasters and build and look forward to the future, we realise that a sustainable future is not possible without tremendous growth that was still to come in economic productivity, in the modernisation of Kerala's production sectors and in the provision of high value employment and livelihoods and providing firm foundations for the progress of social welfare in the State.

In the process of modernising the economy and its productive capacity, it would be a truism to say that IT has a central role to play. While a lot of attention had been paid to the way in which IT replaces or enhances the cognitive skills of human beings, perhaps less attention is paid, especially in our country and in Kerala, to the fact that this kind of development requires a material basis. In the hardware sector, India lacks with respect to the development of products, machinery and equipment, and the infrastructure required for the growth of information technology. The same applies to Kerala also. So, we look forward with the particular interest to ideas and inputs that should focus on how the material base of IT industry can be developed in the State. The organisers and government should listen, learn and look forward to open and frank suggestions for how to take Kerala up, not only in terms of developing software but also the manufacturing and physical infrastructure basis of IT industry.

In the opening remarks by Mr Mohammed Y. Safirulla IAS, Additional Secretary, Department of Electronics and Information Technology, Government of Kerala, remarked that Kerala has come along long way in the area of IT, particularly in the domain of software. In his view success in the area of hardware had shown mixed results. We had shown our ability in certain areas through the success of private industry in various domains, which were one of the best in the world in health care and other areas. Keltron had built some Centres of Excellence in the areas and even makes products for different industries of the country. Moreover, Hardware Mission under Electronics and IT Department identified some areas where Kerala could develop its expertise leading to increased employment in the skilled category. There are three points to be noted in the area of hardware.

- 1. Designing an ecosystem in the area of emerging technologies especially in IOT. This was an area where Kerala could develop expertise.
- 2. Second area was in utilising the benefits of "Atmanirbhar Bharat" programme of Government of India which is also supported by Government of Kerala. For example, in the manufacture of laptops, there is lot of potential for developing local players and synergising their presence in the supply chain linkages. Local companies which manufacture are encouraged in India, under the Atmanirbhar Bharat program.
- 3. Some of the potential success areas are particularly in start-ups and setting upn the entire supply chain for it.

He mentioned the technology innovation zone, the biggest startup complex in the entire country, to be completed in the year 2021. The Kerala Block Chain academy produces the largest number of block chain experts in the country. There are hardware incubators, innovation zones, academics, ICT and if we link and put this entire chain together, we can make a centre of excellence in hardware also.

Dr Saji Gopinath, Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology, stated that electronics manufacturing was one of the key areas where Kerala has made some strides in the past and the State still has excellence in few areas primarily due to a few of the companies. In the national scenario study in 2017 it was estimated that India had a market potential of 400 billion USD by 2025. Currently 50 per cent of USD 134 billion electronics products are imported. Kerala achieved export of USD 11.28 billion in 2019-2020. By 2025, product demand would reach to USD 368 billion with 70 per cent produced internally. Kerala has an opportunity of around 200 billion USD in next 5 years and can create 10 lakh new jobs. Production currently contributes to 3.3 per cent of economy. During 2016-2019, the sector grew at a CAGR of 14 per cent. It is expected to accelerate at CAGR of 16.6 per cent during 2020-2025. The National Policy on Electronics 2019 can convert India into global hubs for mobiles, various components, and electronics manufacturing.

With regard to Kerala, public sector organisations such as Keltron made substantial impact in 70's and 80's, as per the studies done by CDS. Keltron developed a unique decentralised model of development of electronics industry. He noted the emergence of few large players in ESDM and electronic product sector along with niche development in medical electronics, space electronics around VSSC and other organisations.

He emphasised scientific research by organisations led by VSSC, Sree Chithra Thirunal Institute, CDAC in power electronics, Rajiv Gandhi Centre for Bio-technology, incubators including major Government players who support ecosystem development and key private players such as SFO and Delphi who were helping develop the ecosystem. As far as industry development was concerned, the main focussed parks had been set up in Kakkanad, Ernakulam, NEST, HI Tech Park, Ernakulam, Defense Park, Palakkad, Amballoor-Ernakulam and Electronic Hardware Park. The global trends indicate that electronics was one of the fastest growing industries estimated to reach 7.3 trillion USD by 2025. This was going to be a large opportunity for countries in Asia.

South East Asia, South Asia and in China had achieved high growth rates. It was noted that there was a potential leap in this particular field which is close to one trillion US dollars. And with emergence of industry 4.0, global IOT Market will hit about 950 billion USD. In the next 5 years Kerala could see another leap in this particular area.

When there were disruptions in supply chain because of Covid-19 pandemic, it actually prompted people to look at new segments such as electric vehicles and space technology which are all growing in an exponential manner. The import of electronic goods in 2019-20 was a total of Rs 3.59 lakh crore, in which 40 per cent of import was mainly from China. This import has to be substituted by domestic production. The Electronic and Software Promotion Council estimates 60 per cent growth in the near future.

There are huge opportunities for the State. Currently, 95 per cent of active components, 50 per cent of passive component, and 30 per cent of electro-mechanical components are imported. This was an area where there is a substantial amount of scope. In 2020, Government of India announced two new schemes and allocated about Rs 50,000 crores to support this. The key sectors of growth possibility for Kerala are auto electronics, medical electronics, industrial electronics, and strategic electronics – aerospace and defence market, and telecom products. There is a large need for import substitution.

The development of supply chain component sector is a key element today.

Dr. Saji Gopinath noted that we should create policies, models and processes for transformation. That transformation was something which needs to come out from our discussions. He also added that we should look into what type of offerings are to be made, what sectors we need to focus on and how do we incentivise and support entrepreneurs and start-ups. Moreover, we should also note what type of governance models have to be put in place so that we would have specific deliverables which would actually make best use of opportunities.

Mr. Christo George, Chairman and Managing Director Hykon India Ltd, mentioned that the major disruption that is going to happen in this century would be in transportation and energy. In the transportation sector, internal combustion engine vehicles are going to be replaced by electric vehicles. It would happen in the near future, even if the industry experts in automobile sector say that it would take 10 to 15 years for the transformation. The main reason for that being the cost of electric vehicles which was mainly dependent on the lithium-ion batteries. Over the last decade, the cost of lithium-ion battery has been declining every year at a rate of 10 to 15 per cent.

If this trend continues, within next 2-3 years, the cost of electric vehicles would come down and thus the whole disruption will happen. It would increase the requirement of large quantity of electronic hardware in Kerala, particularly DC Controllers, batteries, DC motors, and different types of chargers. Thus, overall opportunities will increase in the MSME sectors in Kerala. He shared his concern that companies of Kerala were lacking technologies for these changes. In other parts of world, the required technologies were developed by universities jointly with industries. Kerala had to look ahead for this collaboration in order to fill technology gap.
The second area that will cause disruption in the future is the conventional energy sector. The scope of solar energy harvesting is rising. The price of solar panels was dropping down at a rate of 15 per cent every year just like the cost of lithium-ion batteries. Thus, in next few years, the overall cost of solar energy would be reduced to the same as that for conventional energy production. Here also, the opportunities for production of various hardware components such as inverters and chargers would increase in the MSME sector. Kerala has a large number of skilled resources for the production of essential hardware. In this case also, the required technology was lacking. For developing a technology related to this sector, Kerala needs a design centre which would develop technology for mass production of the required hardware. Also, this technology could be given to MSMEs at a subsidised rate. Low-cost technologies were one of the main requirements that MSME's are lacking for the mass production of hardware. With an investment of Rs 2-3 Crores, thousands of production units could be developed in Kerala. By filling this technology gap, huge expansion of industries in Kerala is possible.

The main challenge in manufacturing was that the units are not receiving the subsidies because of certain policies and rules. As per the FLAME Policy of Government of India, for any company to get the subsidies, all the manufacturing parts such as motors and controllers should be made in India. This becomes very difficult as the number of manufacturers for certain products are limited in India. Big players in the market such as Mahindra and TVS are getting these subsidies as they were able to produce all the manufacturing parts on their own. Government of Kerala has launched a subsidy of Rs 25,000 for private companies and Rs 30,000 for Government firms. There is a chance for all to receive this particular subsidy and if this happens soon, the manufacturing of electric vehicles would shoot up not only for 3-wheelers but also for 2-wheelers.

Mr. Thomas Abraham, on behalf of Mr. Althaf Jehangir, CEO and Executive Director, NeST SFO shared the statistics on India being 2nd as the world's most promising source of disruptive technology, world's 3rd largest producer of electricity, world's 3rd largest military spender, ranked 34th in Global Skill Index 2020, ranked 40th in International Intellectual Property Index and ranked 48th in the Global Innovation Index 2020.

With regard to Kerala, the State was adjudged as the best governed State in India, ranked 10th in export preparedness, ranked 5th in the Global Innovation Index, received best score for School Education Index 2020, having the highest female literacy rate of 92 per cent, completed stipulations for ease of doing business, and established the first Medical Devices Park at Trivandrum.

Regarding the contribution of each district of Kerala in component manufacturing, Ernakulam accounts for 62 per cent, Trivandrum 15 per cent, Thrissur 5 per cent, Calicut 3 per cent, Palakkad 3 per cent, Alappuzha 3 per cent, Kollam 2 per cent, and Wayanad 1 per cent. In the Electronic System Design and Manufacturing (ESDM) market, India imports almost 60 billion USD worth of electronic equipment, assemblies, components, and raw materials every year, mainly from China. The Government understands that if domestic manufacturing was not encouraged in India, imports of electronics was going to overtake crude imports in the near future. In the electronics manufacturing service sector (EMS), employment potential was expected to additionally increase by 4 lakhs direct and 9.2 lakhs indirect additional jobs by 2025 (more employability for women in

this sector) from the current number of 5.7 lakhs. This employment figures don't take into account the domestic electronic component industry. This large potential employment can't be taken lightly by the Government.

Some particular pointers for future potential in the ESD market was,

- 1. India has become the second largest smart phone market.
- 2. Indian railways plan to invest 6900 Million USD to enhance metro networks across Indian cities.
- 3. India is forecasted to become the 4th largest EV market over the next 20 years.

India has the potential to become a major manufacturing hub for electric vehicles, smart devices, wearable devices, medical electronics, automotive electronics, industrial electronics, and sensors.

The achievements and future prospects of SFO Technologies in ESDM sector were mentioned. SFO Technologies had received more than 20 approved patents and had more than 150 publications. Also, they had actively participated in the offset programme of defence procurement and participated in Digital India programme. The various challenges faced by SFO in Kerala/India in the ESDM sector was with regard to components, finance, waste management, and logistics. He concluded the presentation by giving Government of Kerala suggestions for developing Electronics Manufacturing Service (EMS) sector. They were:

- 1. Support Electronics Manufacturing Service (EMS) companies by incentivising them to bring level playing situation for exports.
- 2. Support Electronics Manufacturing Service (EMS) companies by providing acceptable terms to supply chain channel partners such as Avent and Arrow to set up their stock point in Kochi.
- 3. By taking immediate steps to publicise for investments in Kerala both in electronic components and ESDM.

Mr Althaf Jehangir mentioned two areas where Government of Kerala could work for making Kerala an electronic manufacturing hub. Firstly, in electronic manufacturing, customers ask to reduce cost by bringing in localisation and redesigning of the boards. So, when a component is manufactured by SFO Technologies in India, the major problem faced is the unavailability of timeline from technical inspection (TUV) labs across India. Once an electronic PCB is manufactured in India, it had to undergo rigorous testing such as vibration test, and also need to get various certifications. Mostly the test labs are established in Pune and Bangalore. So, the main problem is unavailability of test labs in Kerala. If the Government could set up test labs in Kerala, it would be very advantageous for any electronic manufacturing companies.

Mr. Althaf Jehangir added that NeST SFO Technologies had conducted a study on why Foxconn decided to go to Chennai for expansion. Based on that it was understood that Chennai was already known for its automotive hub with presence of highly skilled labour. Another advantage of Chennai was the harvesting of solar energy. Companies like Foxconn is looking for alternative energy sources for huge manufacturing. Another essential component Foxconn found in Chennai was the ease of working with Government in order to develop an infrastructure and run it within a very short time period of 180 days. He also stated that if we could provide R and D incentives to MNC's to set up in Kerala, it would be a right point to start with manufacturers. The engineering

students in our country need training once they enter into an industry for job. So, the institutions should work and understand what ecosystem should be provided for students in institutions to fill this gap and to make them industry-ready. He added that virtual reality and augmented reality were two big set ups that is happening in India. We should do focus on these two areas which would be another edge to attract companies.

Prof Prahlad Vadakkepat, National University of Singapore, mentioned that a company from Kochi and Singapore came together during Covid to develop affordable emergency ventilators. There were different technologies involved in this. One aspect looked at was the cost of ventilators are so high and if we look at the feature versus cost and feature versus utility, we could try buy at 1/10th of the cost and bring in affordability and could make those products available to people. This was the concept of more from less, that is, simply stripping out the features. Another aspect was open innovation. The above-mentioned companies could not have done this technology unless they tried to open themselves for each other. They had good thoughts, leaderships to really help each other and looked to get help from US, Europe, India, Singapore and also from all institutions from India.

Thus, they tried to create a borderless, multi and cross disciplinary approach for addressing complex problems. Later the team decided to get into robotics. In Singapore they had advanced re-manufacturing technology centre and they lead a ROS industrial consortium in specific areas. The members from these companies got in to the learning of robot operating system. There is an industrial version as well as it helps them to do a number of experiments with physics engine. He recommended this software in educational institutions and industry to help reduce the cost especially during prototyping and control related algorithms.

With Industry 4.0, complex tasks are being now executed by machines. By 2025 it is estimating that 85 million jobs may be displaced by a shift in the division of labour between human and machines. Some 97 million new roles may emerge that are more adapted to the new division of labour among humans, machines and algorithms. Policies that encourage experimentation learning, human capital accumulation, and risk taking can pay huge dividends in the form of future economic growth. He mentioned about open innovation that had a lot of scope in the industry especially in robotics and AI, ML and Deep Learning related aspects.

Educational institutions have so much resources and yet they don't know how much has been utilised. He suggested every bachelor's degree in Kerala should have an innovation enterprise module in the curriculum, wherein desirability, technical feasibility, and business viability aspects and the art of oral communication are taught. This has to be facilitated by entrepreneurs. It is also very important to understand technology readiness levels especially in robotics and TRL.

Massive investments in health care and life sciences and cross skilling engineering workforce to cater to biotech and health care industries should be made. Kerala had a vibrant health and engineering ecosystem that can be easily combined to get in to manufacturing opportunities in life sciences and health care equipment.

He suggested supporting startups for supplying government projects and projects such as street light automation etc. can be given to the people who are studying/working at fab labs with good mentoring. This would provide employment as well as experience for students. Hardware projects in the State should be given to local startups/companies. Government can invest to bring in experts from various PCB manufacturing industries to train and advice students/workforce on various projects.

Prof Prahlad Vadakkepat noted that dual-sided multi layered PCB board manufacturing is located only in Bangalore or Chennai. There is scope in Kerala for investing in this area. Investing in labs is great, but the focus is lost on buying essential items. Expensive machines are not always needed. Simple equipment is sufficient and imported 3D printers for several lakhs are not needed where the material cost is not affordable by start-ups. However, large scale manufacturing is not possible with Fab lab.

He had some specific suggestions about Industry 4.0, AL, Robotics-Health Care, and Biomedical Devices – viz. to start a cluster of industries which support each other so that the whole ecosystem becomes self-sustainable on a long term, with government as an investor in infrastructure with long term returns. To invest in entrepreneurship around smart manufacturing capabilities and AI industry 4.0 accessible automation, align manufacturing to focus on high growth domain products rather than just technology and bring in the right policy and regulatory support. He concluded the session by suggesting open innovation and co-development, inclusive leadership, frugality, and agile development as key focus areas.

Mr Gautam Shankar, VP-Operations, India and Japan, Kimball Electronics stated that the quality and scale of supply chain was not up to the mark in Kerala. There was a need for some equipment and parts to be imported. In this area, the cost and also the time required for the import/export was a great concern. Subsidy/Incentives were another important requirement while coming to manufacturing of electronic products in Kerala. By quickly looking through the IT hardware policy, and the segmentation of what we want to achieve, we should target those specific segments by understanding investment required in that segment.

The moderator of the session, Dr Jayasankar Prasad C then invited question from the participants. Mr Christo George was asked about the challenges faced by him in electric vehicle manufacturing sector. He answered by stating that they were not receiving the subsidies due to certain policies and rules. He mentioned the factors that are important while ramping up the local component manufacturers. Firstly, their existing original equipment (OE) customers abroad had already got their own components list which was approved through certain product specification. Now in the approved vendors list, their components are coming from any of the competitive countries at the design stage itself. Once they had got the product specification approval, it is very difficult for them to change it and go through all the approval process again.

Second difficulty was the capacity of Indian manufacturers to meet the cost constraints. The OE's produce components in larger volumes and that was the reason why they are chosen by manufacturers at better price. Another thing is that OE's establish contracts with the

manufacturers regarding price. These prices had to be matched with the price of local manufacturers for acceptance.

Regarding the strategy framed by Coconics Pvt. Ltd along with the Government of Kerala for hardware manufacturing which was acclaimed by the Government of India level, Mr. Sreejith Nair (Chief Operating Officer, Coconics Pvt. Ltd.) replied to the query. He stated that Coconics Pvt. Ltd had a unique PPP model with Government of Kerala formed 2 years ago. The experience of Coconics Pvt. Ltd shows how a homegrown company could compete with the MNCs. Another requirement was to have an aggregated demand which is assured to this company to make it commercially vibrant. Also, there was a need to have the right kind of paid-up capital. It is important to make sure that companies are supported throughout by the Government to create an ecosystem in and around us.

Er. Joy N R Chief, I&I Division, State Planning Board thanked all the dignitaries for the valuable inputs and suggestions. The session came to an end at 1 pm.

Main Session on Information Technology

Date: 02-01-2021, Time: 10am – 1:00pm Moderator: Mr. Santosh Kurup, CEO ICT Academy, Kerala.

Prof V K Ramachandran Vice Chairperson, Kerala State Planning Board welcomed the gathering, including Chief Minister of Kerala Shri Pinarayi Vijayan and the entire panel. He stated that a major accomplishment of Kerala is to show that the wellbeing of people and the economic conditions of the State can be transformed by public action. Such public action has ensured human development in the State, increased material production, increased income from agriculture and industry, and developed infrastructure on a large scale. Such a process of economic modernisation as well as building the resilience of Kerala economy is not possible without the development of information technology and also the deepening and growth of its linkages with other sectors of the economy in the State.

Kerala Government is keenly interested in the further development of usage of IT in order to bring government and governance closer to people, to enable their interaction with the government with minimum bureaucracy and the maximum efficiency possible. In this regard, the people of Kerala are keenly pursuing the goal of digital literacy. Along with this, leveraging of IT is very essential for increasing the provision of high skilled employment and the consequent rise in income while adding to the generation of value in the growth of productive assets and wealth. For this, the involvement of public and private sector are both equally important. The Government of Kerala had faced and overcame some of the diseases and disasters that affected the economy, including flood, nipah virus, and also some events such as the setbacks caused by demonetisation and issues with a set of economic institutions as well. The Covid-19 pandemic had slowed down the growth of employment and productivity, as well as overall economic development.

He added that Kerala has tried to turn this adversity into an opportunity to look ahead and make our economy resilient and also to learn from the lessons of pandemic for future development particularly in the IT sector. An important factor that Kerala was dealing with in the planning process was the digital equity in our State. A fundamental feature of the school education sector in Kerala was that it is universal. A large section of those who finish high school, go for higher education. This educated youth is drawing a large section of income to the economy, through employment. In this circumstance, the issues of digital equity or equal access to digital facilities becomes even more important. Kerala is trying to bring developments in modern science and technology to a wider section of people who are excluded currently from various opportunities.

Honourable Chief Minister of Kerala Shri Pinarayi Vijayan, in his vision statement, stated that for a sustainable and prosperous future of our people, the State must attend to the improvement and modernisation of productive capacities in the economy. An important way to do this was to invest in technologies and industries of the future. IT had a prominent and leading role to play in the future of Kerala. The IT revolution had been in progress for more than 30 to 45 years now and it continues to be at the forefront of modern technological advancements. Like the machines of the 19th century industrial revolution, the silicon chip is the key to the technological revolution. Unfortunately, like machines in an earlier era, our country lacks behind even today in the manufacturing and fabrication of the range of silicon chips that are at the heart of the hardware, which powers the IT revolution.

In Kerala, we were determined to advance in the IT sector in the production of software and hardware. It contributes to value addition, growth of productive assets, advanced knowledge generation, and the promotion of highly skilled labour and employment. In the last four and half years, the government has taken a number of initiatives to promote this sector. Nevertheless, we were keenly aware that this was only the beginning of a journey that is important to our State and its future. Our Government had declared an IT policy. If required, we could renew and rework this policy, in order to meet new demands and change the circumstances. The State is keen to promote investment in this sector and to work with the private sector to develop innovative models to attract and sustain such investments.

Mr Mohammed Y Safirulla, IAS, Additional Secretary, Department of Electronics and Information Technology, stated that Kerala has come a long way in the areas of IT, particularly in the domain of software, skilling and training and Kerala has made many initiatives for the development of the IT sector. He highlighted three areas where the IT Department is working today in order to design the ecosystem in hardware and software.

- 1. Designing an ecosystem in the areas of emerging software and hardware technologies.
- 2. In creating infrastructure and in moving towards the next generation e-governance services.
- 3. The State has been working on various projects, in order to encourage and support the startup ecosystem.

Dr Saji Gopinath, Vice Chancellor, Kerala, University of Digital Sciences pointed out that the IT sector was a key contributor to Kerala economy with regard to turn over, total employment, and exports. IT sector is a sunrise sector having incredible growth. It was expected that the market growth in the software sector will be 350 billion dollars from the current rate of 191 billion dollars, and that for the hardware sector would be from 400 billion dollars from 134 billion dollars in 2025. It would create employment of around 10 million in the next 5 years. There are schemes for export

promotion and import substitution. The Government of Kerala has various achievements and opportunities in the areas of IT and electronics industry, with respect to human capital, policy, and infrastructure support. There were four key areas that support the development of Kerala IT Sector: industry, capacity building, infrastructure, and governance.

There are two trends that are favourable for the IT sector. The short-term trends include the effect of covid-19 and the consequent changes in the areas of focus and corresponding business models, increase in decentralised model of working, and supply chain disruptions and need for import substitution. The long-term trend includes increased emphasis on knowledge-based work, emergence of digital economy and digital transformation, long term structural changes in the industry, and growth in strategic sectors.

A few specific areas for enhancing the eco-system for growth is development of talent, climbing up the value chain, key area focused growth, infrastructure and policy support and new opportunities of inclusivity and growth. The model for transformation of Kerala should be based on support infrastructure, offerings, governance, and deliverables.

Mr S D Shibulal, co-founder, Infosys, emphasised the efforts made by Government of Kerala and Planning Board for the development of IT sector, even during the tough times of the Covid-19 pandemic. One of the industries that has moved forward in this period is the IT Industry. Once the pandemic began, the demand for digital technology increased. Many things that were totally unexpected all this time become realistic during this period. During this pandemic, many of the startups which were using digital technology re-architectured their business processes to fit the time and situation. Covid19 period led to the opening up of various areas that were not explored before the pandemic, such as health care, education, and transportation. Digital technology has moved forward, as compared to pre-covid19 times.

There were mainly three changes that happened globally of relevance to the IT industry. Firstly, in service industry, new expectations emerged in this industry. Conventionally, it has been called as IT industry, which has been changed to IT Solutions industry, since the industries were coming up with various solutions, in order to overcome the pandemic situation. This increased the various opportunities that both industry and the State could leverage upon. Secondly, openness to new technologies. Kerala has a very strong start up ecosystem and also has many home-grown technologies, and MSME. Many firms would be accepted by Kerala, if they come up with intellectual properties that were relevant to the customers and global arena. And thirdly, digitalisation would continue at an incredible rate. Every aspect of business and personal lives are getting digitalised. The trend of digitalisation has started long back because of its efficiency and cost effectiveness. He mentioned the fast growth with regards to digitalisation in sectors like education, health, transportation, and e-governance. There are great opportunities for the Government in creating a market and encouraging the industry.

S D Shibulal added that Kerala should actively build a brand for its projects. Kerala has done an excellent role in building brand for tourism. Those brands create awareness and market potential which reduces entry barriers.

Ms Nivruti Rai, Country Head, Intel India, VP introduced herself as "India is inside me", just as devices advertise the slogan "Intel Inside". China has a plan to invest more than 100 billion USD for silicon design and technology in the next couple of years. She emphasised two areas of importance, electronic market (consumption and export) and electronic production. The market has been growing at of 16.6 per cent CAGR and production rate has been growing at of 23.4 per cent CAGR from 2019 to 2025. In 2019, we were producing one third of what we were consuming. Now the ratio is more than half of the production. By 2025, if we continue the manufacture initiative, we will become number three in global ESTM consumption. Today from the manufacturing perspective, 3.3 per cent of the electronic production is happening in India and by 2025, we will double it and thus becoming 6 per cent.

Today, India is doing 3.3 per cent of electronic production where as China is doing 25 per cent. India has scope for significant improvement. Our electronic production can add to the GDP by about 410 billion which is 36.7 per cent higher than the 300 billion today, not this will have economic impact, but also social impact. This will result in one crore plus jobs in India. Not only jobs, the lifestyle quality improvement is significant. She added, for the last 10-15 years, the number of gadgets that we had in our home has now increased in an exponential rate. In terms of importing, about 60 to 100 billion dollar can be saveed by using local manufacturing part.

Over the last 3-4 years, we had been driving lot of manufacturing initiatives in India. Also, India was the largest phone manufacturer of Samsung. This has resulted in attracting attention for phone manufacturing from other companies such as Apple. Also, silicon along with the phone is a very critical component. Besides phone, we need to focus on silicon, electronics hardware, and memory board. If digitisation was happening, it is essential to drive, local manufacturing, not just for economic growth, or creating jobs, but also for enabling security based on the digital industry.

Intel helped created a company called Coconics; Keltron was a key member and UST Global and Acceleron, a start-up incubated by Intel were also the key members. All of these bodies got together and created the concept of Coconics. In 2019, they were in search of manufacturing of engineering reference boards and silicon validation boards. In 2019, Coconics were able to create 14-inch laptops. In about a years' time, they were able to snap together that enables public private collaboration. In 2020, Coconics launch happened and an educational laptop was developed, which was far more capable than some laptop.

It is absolutely essential to work jointly. There was expertise that was available in different people, different companies, and different academics.

Four different vectors from the learning experience were obtained from the last four to five years with the manufacture of boards, validation boards and memory modules, Wi-Fi modules and Coconics. These were:

Best in Class Infrastructure: Government experts should look into test infra available to enable development to happen in Kerala, providing incentives and support enabling quality, and speed.

Incentives; we need more incentives, subsidies and cash flow based funding because many of these electronic manufactures require heavy financial investment.

Human Capital; People were absolutely essential and thus more skilling programs that were happening right now. First block chain training was enabled by Intel. Intel also created many entrepreneurs and many kids are learning new skills, quality and skills are needed. Research has to be converted into products, which needs industry – academia link up. Human capital, training, research with academia link-up is absolutely essential.

Demand: This is the field where Coconics struggles a lot. Creating demand to push forward the product is absolutely necessary. If we look at the leading automotive/mobile manufactures, start with local demand and then grow with quality and innovation – "Make in India, but make for the world".

We need a holistic approach with all levels enabled to attract investments on electronics manufacturing. She also shared her hope that, with entrepreneurial, innovating, and forward-thinking States such as Kerala, more than 6.6 per cent growth is achievable.

Mr. Santhosh Kurup, CEO, ICT Academy, Kerala, the moderator of the session pointed out that it is quite exciting to know that Kerala is number three in terms of consumption and number five in terms of production and also, more job opportunities have been created.

Mr. Sreekanth Sreenivasan, Head, Membership and Outreach NASSCOM, stated that the tech industry is undergoing continues transformation. The scope of the industry has increased beyond expectations. The need to be continuously innovative and the need for cutting edge technology were extremely critical. The fusion of technologies has been achieving pace like never before. The vaccine for small pox was invented only after about 200 years of discovering the disease, but today vaccine for a global pandemic is invented within 12 months of its detection. This shows the power of technology. There are a number of technologies that has impact and growth potential in today's scenario. Some would be big data analytics and artificial intelligence. Even things such as 3-D printing is accelerating. Recently, an entire building was 3-D printed by using the advantages of the emerging technologies. That was how technologies transformed and this is how it was going to create the jobs of the future.

There are other emerging technologies that has a lot of potential and impact on multiple scenarios such as blockchain and quantum cryptography. These would eventually contribute to technology and industry. Virtual check-ups and virtual online classes are daily – life affairs today. These are great examples of digital transformation. Going a little ahead, the three key areas where the attention should be provided are the basic infrastructure, skilling, education, and social infrastructure. We could contribute more with better skills. Skilling can be organic and inorganic. Organic skilling is done at the college level and university level and incorporating the students with industry in the form of apprenticeship or internship. Students gain the knowledge of technology in the industries and it makes them ready when they enter to a regular job. In organic skilling, the basic understanding was that, what someone know or do today may not be relevant tomorrow. We need to rework on current skills. Kerala is already doing very well in the above related areas.

The State has been formulating a number of policies, as in cloud policy or in terms of data centres and so on. Some of these had not been discussed sufficiently with other players. Today's world is very competitive and other States are vigilant in rechecking the policies and newer versions are always created for the time. It may be good for Kerala if this is taken into consideration. The advertising of these activities is also a great concern as marketing also adds to the values of any product by making sure that it reaches the masses. Some of these policies will take Kerala to next level.

The vision for India in the field of technology is to reach to an industry of worth 500 billion USD by 2030. That would happen by the combined effort of every State. We need to create a competitive edge all the time.

Mr Nandakumar K Nair, Founder and CEO, SunTech Business Solutions, made a presentation on business solutions and opportunities in software. He emphasised on doing more with less. He asked whether we can bring in innovation as a culture and can that be a subject in the curriculum. There should a methodology for that. We were in an artificial intelligence world and why should not innovation be process oriented. We have to really consider both, otherwise it would be hard to sustain. Humanity needs to do more with less. How do we bring in collaborative mind set?

The world of 2030 will be in a fundamentally different place and software will be the substrate of this transformation. The technologies that will dominate the software industry and the way we design, build, and deploy software will be fundamentally different products that will accomplish more with less. A mind set focused on first principles designs will be the key: especially for platforms focussed on business ecosystems. A strong talent pool along with an ecosystem of startups, established companies, educational institutions, research organisations and a strong infrastructure and technology base will be the key. The role of Kerala Government will be essential in building the success for us in this journey.

Mr. Nandakumar claimed that with the right attitude and the right plan, we can certainly be the leaders that will help the rest of the world be ready for 2030. With the potential and the right resources including talent, knowledge and infrastructure, the onus is on us to flourish through the right actions and decisions. Focus on creating the start-up ecosystem that helps in creating products. Support start-ups by doing initial business with them and helping them scale. Provide options for providing collateral free working loans and encourage employees of IT companies to become entrepreneurs. Encourage faculty of education institutions to join start-ups on deputation. Set up a system of research as a service, which can be tapped by the companies in Kerala

Prof Prahlad Vadekkapat, National University of Singapore, spoke on opportunities in hardware sector. He emphasised well-rounded education, lifelong learning, translation research, curriculum aligned with Industry 4.0, knowledge alliance, innovation, and enterprise and industry post graduate programs. He noted that they have some kind of alliance at NUS with South East Asian industry and academy. And also, in Bio+Digital engineering in medicine. He said that there are lot of investments happening during the Covid pandemic in South East Asia countries such as Taiwan,

Hong Kong, and Singapore for knowledge transfer. India/Kerala fostering a knowledge alliance with the South East Asian countries will go long way.

Other suggestions he made included: alignment to the fusion of bio and digital; massive investments in health care and life science; cross skilling the engineering work force to cater to biotech and health care industries, and developing engineering in medicine. Kerala had a vibrant health and engineering ecosystem capable of providing manufacturing opportunities in life sciences and health care equipment. Opportunities, identification, generation and evaluation, design and thinking methodology, financial consideration, customer needs, product specification should be considered for user desirability. Concept generation, selection and testing, patents and intellectual property, product planning, platform and architecture and quality system and product certification comes under the requirement for technical feasibility.

He emphasised advanced learning for advanced technology. NUS had evolved a system, Graduate Research Innovation programme (GRIP), where industry players are brought in as mentors and PhD research was translated for applications. Universities or Government can give scholarships for industry persons to come in to universities for doing post graduate programme or vice versa.

Government, he suggested, should support the robotics industry following the South Korean model. Open innovation and frugality is required. Borderless, multi and cross-disciplinary approach for addressing complex problems should be adopted.

After the question answer session and general discussions, the moderator summed up the session and emphasised that the investment of energy, thoughts and sheer passion drawing from our own experience, knowledge of Kerala and the different visions of the future, had been striking. Mr Joy N R Chief, I&I Division, Kerala State Planning Board, thanked all the eminent panellists, distinguished audience and participants. The session came to an end at 1 pm.

Key ideas and recommendations emerging from the discussion

The following are some of the key takeaways from the main and pre-conference sessions on information technology (IT) of the Kerala Looks Ahead conference.

1. In the hardware ecosystem, serious attention should be given to basic infrastructure facilities. The hardware ecosystem requires a Test Lab, which can be set up on a Public Private Participation model. Other initiatives to be considered urgently in the hardware sector are Printed Circuit Board (PCB) manufacturing facilities (e.g., dual side multi-layered PCBs), a statement of policy on e-waste and a processing facility, and the launch of hardware industrial parks. Major players in this sector also need clarity on access to alternate energy sources. Key segments for promotion and investment include medical electronics, electric vehicles, and solar power electronics. Consistent efforts should be made to scale up Coconics, a company formed in partnership between Government of Kerala (KSIDC), the public sector (KELTRON), and the private sector (UST Global and Acceleron, an Intel supported accelerator). For such partnerships to succeed it is necessary to insist on the quality of production, and the development of a component ecosystem. Government intervention and incentives play a key role in promoting manufacturing, as in the case of electric vehicles.

Hardware and related manufacturing initiatives are best led by the IT Department, with the active support and collaboration of the Industries Department, but the lead is best given over to IT.

- 2. Specific suggestions were provided for the identification of new domains in a focused manner in the hardware and software sectors. Potential domains for growth in IT solutions that found mention included health, transport and logistics, energy and energy systems, banking, robotics, artificial intelligence and machine learning, and data-science applications associated with sustainable development.
- 3. Curriculum review and the redesign of all levels of IT education and the strengthening of industry-academic partnerships are two areas of immediate and urgent action, to be initiated as rapidly as possible. Several specific suggestions were made to promote innovation through linkages between industry and academic institutions. The first was to inculcate innovation culture at the undergraduate level. This utility of this suggestion extends well beyond the IT domain to all sectors. The second suggestion was to promote an understanding of real-world problems by involving industry professionals in regular science and technology education. The third suggestion was to promote faculty deputations to startups and industry R&D projects. Significant learning could be gained from similar programmes elsewhere, including Korea, Singapore, and the United States. The fourth was to ensure an appropriate balance of real-world problem-oriented research in research programmes. All research work should be encouraged to indicate potential applications.
- 4. Skill development and employment generation attracted some suggestions for key strategic initiatives. One was to promote a multi-tier structure for skill development particularly directed at the IT sector. There is an urgent need for a curriculum panel and some 20 to 30 organisations to take up such training. New methodologies in software development, such as DevOps and Continuous Integration, provide the potential for independent development of micro-applications. Such new methodologies can be used to promote work-from-home employment opportunities in significant numbers, especially for women. The absence of suitable personnel for middle level management is a major gap in human resources for IT in the State and needs to be addressed.
- 5. The State Government needs to update policy in general and specific policy initiatives on a regular basis in order to keep up to date. Other States have now begun to declare specific policies for example, on data or cyber security, or other specific issues that are of interest to potential investors. Policies must be advertised widely, and must be known to industry and investors. Efforts should be undertaken to build Kerala as a brand in specific products and services (one should usefully learn from tourism in this regard). Where feasible, Government should also be the first customer to increase confidence in specific products.
- 6. A portal is urgently required for information exchange on opportunities and collaboration in knowledge, innovation, production and investment. This can be established as a 3-way partnership of government (led by IT department), industry, and academia. Many specific offers of assistance, collaboration and mentoring were made during the IT sessions of this conference. The web portal will assist in following up the offers already made and to seek and promote other collaborations.
- 7. Kerala must envision the future in simple, clear and bold slogans. Leveraging our strengths and utilising present opportunities while simultaneously dreaming new frontiers will be the keys to success.

Session IV E-Governance

The session on e-governance was organised in partnership with the International Institute of Information Technology, Bangalore (IIIT-B). The session focussed on three thematic areas: (i) citizen access to services and empowerment, (ii) decision support systems and analytics, and (iii) legal and policy dimensions. 16 experts spoke on different aspects of the thematic areas. Mr Mohammed Y Safirulla IAS, Additional Secretary, Department of Electronics and Information Technology, Government of Kerala and Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology gave the opening remarks in the sessions.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

The Government of Kerala is committed to equitable development. It is committed to making efficient public services available to all citizens and to ensuring that public institutions are responsive to people's needs in a modern, technologically advanced world. Information and communication technology is essential to meeting these commitments.

Kerala has sturdy historical foundations on which to build its e-governance structure. It has strong institutions of local government and people's participation in administration and development. The IT policy of the State, announced by the Government of Kerala in 2017, envisages a knowledge-powered digital society and the overall social and economic empowerment of all citizens. Young people in Kerala are educated, employable, and responsive to modern technology.

The Government of India's Digital India policy, with which the Government of Kerala is in broad agreement, has three major components. These are: (1) to create digital infrastructure for citizen access as well as industrial and commercial purposes; (2) to provide services for citizens and businesses from online and mobile platforms and (3) to ensure the digital empowerment of people by building digital literacy and sharing government performance data in open platforms.

The recent experience of pandemic management has also contributed to our understanding of the future course of e-governance.

The session on e-governance at the conference will consider five themes.

Citizen access to services. This continues to be the most challenging issue, especially in the context of increased requirements in terms of bandwidth and demand for quality service. Citizen access concerns not only the availability of physical infrastructure, but also the access that all sections of society have to digital services. The pandemic showed up, for instance, certain urgent requirements when education and a part of the health services have to move online. We need to understand cost-effective technological options for improving access to services.

Informed government decision support systems. Most e-governance applications today are discrete and transactional in nature. The potential of IT technology to enable collaboration among various departments and coordination of policy has not fully been realised.

Administration of technology systems: Technologies in this field change constantly, as do the requirements of the people who use e-governance services. There are also increasing issues of data privacy and cyber security. The administrative structure of e-governance needs special attention.

Citizen participation and empowerment. This is an important objective of the 2017 IT policy of the Government of Kerala. The experience of the floods and pandemic indicate the need for technology that helps coordinate and focus public action from above and form below. We shall consider global best practices in this regard in order to design and implement a system appropriate to Kerala.

Policy environment and regulations. In recent years, many new Acts and regulations with respect to data security, privacy, and use have been introduced at the national level. These regulations have implications for the functioning of government as a whole and for individual departments. State-level policy must continuously monitor the policy environment and current regulations and legal requirements.

Session 1: Citizen Access to Services and Empowerment

Summary of discussions

Speaker 1: Mr. Jayant Bhatnagar, Director, Centre for Development of Telematics (C-DOT)

Title: Technology as an Enabler: C-DOT's R&D initiatives for boosting connectivity and digitally empowering the citizens across the nation

Abstract:

One of the key objectives of "Digital India" campaign is empowering the citizens with technology that acts as an enabler for the creation of a knowledge economy. Given the vast and diverse geography of our nation with varied levels of literacy, it remains a challenge to design all-encompassing technology solutions that can benefit all sections of the society. C-DOT, the premier Telecom R&D centre of India has been at the forefront of technology with its telecom innovations that aim to bridge the "Digital Divide" between rural and urban India. C-DOT has been steadfast in its commitment towards digitalizing the nation with its cost-effective, power-efficient, readily deployable, customisable and easy-to-use ICT technologies and solutions have an immense potential to revamp the lives of the masses including the senior citizens, illiterate and the specially-abled persons. Extending secure and cost-affordable access to internet with key focus on its utilisation by the masses for the overall growth of the nation has been the driving force for C-DOT's R&D endeavours.

The talk provided a glimpse of a few ongoing efforts at C-DOT for creating affordable and accessible digital infrastructure.

Speaker 2: Dr. Chang Yong Son, ICT and Disaster Risk Reduction Division, United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP)

Title: Leveraging digital infrastructure and ICT against COVID 19 to engage the public in Korea

Abstract:

In recent years, digital infrastructure has been increasingly recognised as a vital social–economic infrastructure to bolster national economy across nations. United Nation's 2030 Agenda for Sustainable Development Goals (SDGs) states that information and communication technology (ICT) and global digital interconnectedness carry great potential to accelerate human progress and develop knowledge societies. In this context, a majority of the countries and their policy makers are attempting to boost digital economy or digital transformation and it is now more critical than ever to enhance the ICT connectivity, bridge digital divide, and engaged people to ensure no one is left behind.

Furthermore, the ongoing Covid-19 pandemic has demonstrated the vital role of digital technologies in making humanity safer, stronger and more connected, from online schooling to remote working. Nevertheless, not all countries can harness the benefits of digital infrastructure. Globally, more than half of the population remains offline and only one in five people uses the Internet in Less Developed Countries (LDCs).

The presentation explored how the Republic of Korea, one of the leading countries in the ICT development, is adopting its digital infrastructure against the Covid-19 pandemic. Supported by a high-level of broadband and 4G mobile penetration – the nation has already rolled-out 10 million 5G network subscription in 2020 and is embracing innovative technologies such as AI, Big Data, IoT and robotics across sectors. The presentation also focused on how policy makers have mobilised the existing digital infrastructure to safeguard citizens during the COVID 19 crisis.

Speaker 3: Dr. Shirin Madon, Associate Professor of Information Systems, London School of Economics

Title: E-Governance for Service Delivery: Focusing on local practice

Abstract:

The rationale for implementing e-governance initiatives tends to be framed around the principles of increasing efficiency, and improving citizen participation, transparency and accountability. Since the 1980s, the focus of e-governance initiatives has shifted from achieving these principles through back-end processes, to front-end citizen-centric applications with the most recent of efforts driven by digital identity platforms for improving service delivery. While most e-governance evaluation frameworks focus on the degree of alignment of a project with techno-managerial criteria, we

argue that this presents an incomplete view of e-governance outcome for service delivery drawing on lessons derived from research on two projects: The Akshaya telecentre pilot in Malappuram.2002-2011, and the current Aadhaar-enabled Fertiliser Distribution System (AeFDS) in Krishna District, Andhra Pradesh.

Drawing upon the above projects, the talk concluded that the real impact of e-governance systems on service delivery occurs as a result of the way in which the system meshes with local practice. This implies that there should be scope within the design of e-governance projects for local tiers of governance to accommodate changes in order that the system remains relevant to local users and user organisations through continuous adaptation.

Speaker 4: Dr. Joyojeet Pal, Principal Researcher, Microsoft Research and Associate Professor, University of Michigan

Title: Social Media Platforms and Threats of Misinformation

Abstract:

With the increase in social media use around the world, there are new forms of large scale access to information from sources outside of mainstream news. In this talk, an overview of some of the risks of misinformation that have been seen around the world in the last few years was provided, along with a discussion of the role of the platforms on which this misinformation takes place. Some specific risks relevant to India were also highlighted.

Speaker 5: Ms. Anju Mangal, Asia Regional Coordinator, Alliance for Affordable Internet, World Wide Web Foundation (with, Mr. Osama Manzar, Digital Empowerment Foundation)

Title: Advancing affordability and Meaningful Access to connect the last 50 per cent: focussing on closing the connectivity gaps in Asia and the Pacific

Abstract:

The Alliance for Affordable Internet (A4AI) is a global initiative of the World Wide Web Foundation. A4AI works with governments, civil societies, academics, public and private partners to drive down the cost of internet access in low-and-middle-income countries through regulatory reform. Driven by the belief that affordability should not be a barrier to internet access, they use a combination of advocacy, research, and in-country engagement to develop the policies needed to reduce the cost to connect and enable everyone, everywhere to afford to come online. A4AI has developed the good practices database which is a library of case studies around telecommunications and ICT policies. In 2020, the A4AI team produced an in-depth 2020 Affordable Report calling for governments to develop effective national broadband plans to make internet access more affordable and enable more people to connect. We focus on three steps to success when it comes to broadband plans: open consultations, clear targets, and committed funding. Countries like India have seen the cost of 1GB mobile broadband come down by more than 60 per cent during this time period. One of the most significant barriers to internet access for

the 50 per cent of the globe still offline today (and even for some who are online, but have limited access) is the high cost of connecting to the internet. To consider whether access is affordable, we have to consider [at least] two factors: the amount of data and the cost for purchasing that level of access. To measure affordability, we use a '1 for 2' threshold — 1GB of data must be available for 2 per cent or less of average monthly income in order to be considered affordable. The talk had a focus on some of this aspects considered useful in making internet access affordable.

Key ideas and recommendations emerging from the discussion

- Kerala's achievements in school and university education and the high levels of digital literacy in the State enable it to extend and deepen e-governance on a unique scale in India. In the first place, e-governance means the on-line provision of all services of government to citizens. Secondly, it means the transition to electronic files and administration in the process of Government. Participants commended the seriousness with which the Government of Kerala approaches the task of strengthening both aspects of e-governance, and the task of using egovernance as an instrument of people's empowerment. Many early e-governance projects began in Kerala and provided rich experience and knowledge for other parts of the country.
- 2. Digital means of governance must be made available to all sections of the State's population. In order to do so, particular attention has to be paid to local production capacities and a knowledge of local social, economic and political conditions.
- 3. Design approaches for e-Governance projects should incorporate flexibility to cater to variations in local practice. We need to move from plan-driven methods to more agile and responsive methods.
- 4. E-governance projects are often measured in terms of how they speed up government procedures. This criterion is important, but not adequate. E-governance projects must be evaluated in terms of a range of criteria. These include the contributions made by e-governance to the goals of accountability, equity, and social coverage.
- 5. State agencies should work towards building trust with respect to data collection, handling, and usage practices. Such policies were very effective, for example, in the Korean response to the Covid-19 pandemic.
- 6. E-governance includes countering the social spread of misinformation, and the task of providing citizens with reliable information. Suitable regulatory and enforcement mechanisms should be established for this purpose.

Session 2: Decision support systems and Analytics

Summary of discussions

Speaker 1: Dr. Rahul De', Professor of Information Systems, Indian Institute of Management Bangalore

Title: Leveraging Open Source for Digital Transformation

Abstract:

Open source software has a major role to play in the digital transformation that many private firms and governments are undergoing. Its role is often underplayed or remains absent. On the other hand, Kerala is one of the States in India that pioneered the adoption of open source software. This talk briefly touched upon Kerala's open source experiment, and then discussed the potential of open source for the future.

Speaker 2: Dr. Manish Gupta, Director, Google Research India

Title: Artificial Intelligence (AI) for Social Good

Abstract:

The talk had a presentation on examples of how AI (Artificial Intelligence) can be applied to areas like health, education, and access to information, to improve the lives of millions of people. Engagement of Google Research with an NGO called ARMMAN to improve maternal and infant health, and with StoryWeaver to help create content for children's storybooks in underserved languages was mentioned. Efforts to democratise access to information for every Indian by Google's work on multilingual representations and query processing to support the rich diversity of Indian languages was also discussed. Finally, some areas of concern, especially bias that can be reinforced by AI systems, to make a case for studying bias more deeply in the Indian context was also discussed.

Speaker 3: Dr. Silvia Masiero, Associate Professor, Department of Informatics, University of Oslo

Title: Covid-19: What does it mean for Digital Social Protection?

Abstract:

Covid-19 has hit a world in which social protection schemes are increasingly augmented with digital measures. Digital identity schemes are especially being adopted to match citizens' data with social protection entitlements, enabling authentication through demographic and, increasingly, biometric data at the point of access. The session discussed three sets of implications that Covid-19 has yielded on digital social protection, whose central trade-off – increasing the probabilities of accurate user identification, at the cost of greater exclusions – has become even more problematic during the crisis. In the talk, it was argued that three forms of data injustice – legal, informational

and design-related, previously identified in datafied social protection schemes, will need to be monitored in the post-pandemic scenario. It was finally observed that the crisis exposes the longterm need to place digitality within social protection schemes that expand user entitlements rather than constraining them. Implications of such reflections were drawn for the study of data-based social welfare interventions.

Speaker 4: Ms. Gabrielle Iglesias, Senior Monitoring, Evaluation and Learning Officer, SEAOHUN and Fellow for Disaster Risk Management and Climate Change Adaptation, Ideacorp

Title: Leveraging Digital Data for Disaster Risk Management: Supporting Cross-Sector Dialogue and Learning

Abstract:

Disaster risk management has an enormous range of decisions that benefit from the timely availability of risk-related data – from managing logistics during emergencies to mapping disaster risk and modelling risk scenarios as inputs to development planning. Great challenges still lie ahead for public organisations from the impacts of climate change and globalisation, raising not only the potential for cascading catastrophes but also the unsustainability of development efforts. Examples from the Asia-Pacific region were presented during the talk to show how public policy and decision making can improve the flow of digital data, from owners and stewards to a wider range of users to promote synergy in risk management actions, engender trust between government and its public, and support societal learning to manage the uncertain future that climate change may bring.

Speaker 5: Mr. T Mohana Dhas, Deputy Director General, National Informatics Centre and SIO, Kerala

Title: Kerala State Digital Architecture – Interoperable Framework

Abstract:

A strong State Digital Architecture is essential to realise not only citizen access to services and empowering citizens, but also to make Decision Support, MIS and Analytics seamless. This talk highlighted the need and design of an interoperable framework using a practical approach and from a practitioner point of view along with sharing of experience gained while working on the Kerala State Digital Architecture.

Key ideas and recommendations emerging from the discussion

1. Software and the means of e-governance should be effective and operable across departments. Such interoperability requires discussion and coordination across organisations. The usefulness of e-governance tools that can be used across departments and agencies becomes particularly relevant in emergency situations, such as during the recent extreme rainfall events, and during the pandemic.

- 2. Some administrative decisions require data processing and analysis. These include decisions regarding resource allocation and distribution. The systems to support such decision-making processes are called decision support systems. Artificial Intelligence (AI) can enhance the quality of decision support systems. Nevertheless, when using AI to help decision support systems, we need also to pay attention to considerations of equity and the elimination of bias.
- 3. Free and open-source software (FOSS) should continue to be encouraged; it can also help bring in more transparency and explainability to Artificial Intelligence algorithms.
- 4. There is an enormous increase in the data collected from citizens by the State (and by private organisations). These data, when used statistically or otherwise, must be used for the individual and common good.

Session 3: Legal and policy dimensions – Ways Forward

Summary of discussions

Speaker 1: Mr. Apar Gupta, Executive Director, Internet Freedom Foundation

Title: The constitutional adoption of digital technologies in strengthening democratic values

Abstract:

The talk drew upon and laid a foundation on the basis of a constitutional understanding of digital rights. It commenced from how a constitutional understanding that embeds with principles of technical design helps advance democratic norms. The speaker drew on his experiences while litigating in the Shreya Singhal and Anuradha Bhasin cases on the relationships on free expression (more importantly fundamental freedoms) and then in the two Puttaswamy Cases (Privacy and Aadhaar) on informational privacy to highlight specific concerns and ways forward. *Speaker 2:* Dr. Subhasis Banerjee, Professor of Computer Science, Indian Institute of Technology, Delhi

Title: On privacy protection in large public service applications

Abstract:

India has become a leading deployer of digitisation in public life with large public service applications like national identity systems, health registry, national population and voter registries, public credit registry, income and other tax registries, face recognition based access control to airports and other facilities, bluetooth based contact tracing and a national intelligence grid. However, the privacy issues in these deployments are not well understood, and this has led to a constant tension between the State and the civil society often resulting in litigations. This talk focused on unpacking some of the issues and discussed the possibilities for a privacy protection architecture in large public service applications. Speaker 3: Dr. N. Subramanian, Senior Director (R&D), Centre for Development of Advanced Computing (C-DAC)

Title: Data security and Privacy aspects in the context of 5G/IoT and AI

Abstract:

We are witnessing considerable increase of digitisation enabled by prolific use of internet and smartphone across the globe. Wider proliferation of Internet of Things (IoTs) and evolving 5G and dynamic programmable networks through Software Define Networks are changing the paradigm of data access and security. Key characteristics of 5G include Enhanced Mobile Broadband (eMBB) for bandwidth consuming requirements, Ultra-Reliable Low Latency (URLLC) requirements and Massive Machine-Type Communications (mMTC). Deployment of large number of devices (IoTs) and setup of Edge Computing solution enables movement of data, compute and storage methods very closer to user for improved efficiency. In such a scenario, role of AI is getting more interesting whereby enabling various levels of analytics such as network, device, application and user level.

This opens up opportunities for development of novel applications across various sectors like governance, health, education, agriculture, manufacturing, public safety and smart cities. While such an evolving ecosystem offers wide range of new applications and use cases, it is important for us to analyze the impact of the same from Data security and privacy perspectives. Aspects of specific security requirements, movement/collection of data from privacy angle, coordinated monitoring framework from policy aspects etc needs to be considered.

The talk covered the above backdrop of the evolving technology landscape at global and national level and touched upon how it is bringing out the various opportunities. Global approaches were highlighted and suggested practices towards addressing policy related concerns from data security and privacy were also mentioned.

Speaker 4: Ms. Vidushi Marda, Senior Programme Officer, Article 19 and Affiliate Researcher, Carnegie India

Title: On biometrics, AI and societies - towards a critical approach

Abstract:

Biometrics are increasingly used by State and private players across the world for a range of use cases across law enforcement, governance, retail, education etc. The technologies in question include biometric authentication systems that make up digital ID systems (like Aadhaar), and also include newer, AI-based tools like facial and emotion recognition. There is a strong assumption in favor of the utility, usefulness, efficiency and legality of the use of these systems. This talk explored the ways in which AI-based biometric systems come to be deployed in societies around the world, uncovered findings from latest research on the utility and legality of these systems, and offered methods for critically thinking through the societal impact of these technologies. The speaker drew

upon her work done in multiple jurisdictions, including India, Europe, China, Myanmar and Kenya.

Speaker 5: Mr. Divij Joshi, Lawyer and Independent Researcher

Title: The Law and Policy of Automated Decision Making in Public Administration

Abstract:

The talk focused on the legal and policy frameworks under which ADMS are/should be governed in India. The speaker outlined the challenges that the use of Automated Decision Making Systems can pose to core values of public administration, and posited a few mechanisms or frameworks through which these challenges may be resolved.

Key ideas and recommendations emerging from the discussion

- 1. With increased digitisation, and Internet of Things (IoT) and AI applications (in domains of identity management, facial recognition, emotion detection, and automated decision making), issues of privacy and data protection become critical.
- 2. When considering issues of privacy and security (and, technology innovations generally), our solutions must be grounded in constitutional values.
- 3. Governments must play an active role in safeguarding the privacy and security of the people. Systems that depend on individual consent (such as ticking a box that says "I agree") do not necessarily ensure privacy and security. Governments should be accountable for safeguarding the privacy and security of their people by means of appropriate laws, regulations, policies, and institutions. Privacy and security cannot be based on consent alone. More informed usage regulations must be developed.
- 4. Freedom of speech regulations online, such as shutting down the internet or blocking websites, needs to be based on procedural justice, that is, there is a need for transparency in decision-making.

Session V

LOCAL GOVERNMENTS

The session on local governments was held on February 2, 2021. The session was organised in partnership with the Kerala Institute of Local Administration. There were two sub sessions – one on best practices by Local Governments and second on the future of decentralisation and local governance in the State. Mr A C Moideen, Minister for Local Self Governments, Government of Kerala gave the opening remarks.

In the session on "Best Practices," moderated by Prof K N Harilal, Member, Kerala State Planning Board, model projects by local governments were presented. The second session on "Decentralisation and Local Governance" discussed the interventions of the State Government in strengthening local governments and future interventions required to deepen decentralisation in the State. The session was moderated by Ms Sarada G Muraleedharan IAS, Additional Chief Secretary, Local Self Government Department. The panellists in this session were Prof Prabhat Patnaik Professor Emeritus Jawaharlal Nehru University; Prof Patrick Heller Professor of Sociology International Studies and Public Affairs Watson Institute, Brown University; Prof Harry Blair Visiting Fellow South Asian Studies Council Yale University; Dr S S Meenakshisundaram IAS, Visiting Professor, National Institute of Advanced Studies Bangalore; Ms Aruna Roy Founder Mazdoor Kisan Shakti Sangathan; Mr S M Vijayanand IAS (Rtd.), Former Chief Secretary and Chairperson 6th State Finance Commission, Kerala; and Dr J Devika Professor Centre for Development Studies.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

Kerala's experience with local government (LG) is unique in three aspects – financial devolution, plan formulation and implementation, and extent of people's participation. The system of decentralised planning in the State serves as a model for other States in India.

Kerala is into its silver jubilee year of the people's campaign for participatory planning. The first people's plan campaign in 1996 broadened and deepened the process of democratic decentralisation in the State. The Thirteenth Five-Year Plan coincided with the second people's plan campaign. The second campaign has further strengthened the process and broadened the scope of decentralisation in the State.

Kerala's model of decentralised planning is widely recognised as the most enduring and one of the most successful experiments of its kind in the world. The highly famed participatory governance experiments in different parts of the world, including the famous Participatory Budgeting (PB) of Brazil in Porto Allegra, have either been weakened or discontinued. There are multiple reasons for the success of the Kerala experiment including the legacy of the larger democratic movement in the State that the people's campaign had sought to take forward. However, the single most important reason for the success of the people's planning in the State has been the commitment

of the present Government to pursue democracy as an end in itself, notwithstanding its obvious instrumental values. The people's plan, no doubt had several other important goals, such as development of local infrastructure, enhancing efficiency in service delivery, improving local production and distribution, ensuring environmental harmony, extending social justice, and augmenting welfare. But, an over-determining goal, which complemented and enhanced every other objective, has been that of deepening democracy. People's planning extended by leaps and bounds the scope for collective action by the people. It is this extensive scope for citizen's participation and collective action, which worked as an inbuilt mechanism of self-learning and rectification from within, that made the Kerala experiment successful as well as enduring.

People's planning generates informed deliberations involving people at all levels, such as households, neighbourhoods, gramasabhas, development seminars, working groups, elected councils, District Planning Committees (DPCs), beneficiary groups, mass organisations, NGOs, and media. Moreover, it has attracted large number of scholars from within as well as outside the State in undertaking insightful studies on various aspects. There have also been conferences and academic endeavours attempting comparative research in the area. Mention must be made also of the seminal contribution of various commissions and study groups appointed by the Government. This incessant process of learning from the experience of doing, especially self-critiquing, helped in correcting mistakes and strengthening the virtues. For instance, preparation of the Thirteenth Five-Year Plan was used as an opportunity to assimilate the lessons of the first two decades and to overhaul the methodology of participatory planning from below.

The international conference will try to bring together lessons learnt over the past 24 years, focussing primarily on the experience of the Local Governments who are demitting office in 2020. In the last five years there has been marked improvement in the functioning of Local Governments; as can be seen in the process of plan formulation and implementation, local governance in general, as well as in various qualitative and quantitative outcome indicators. But, there are many important issues that are yet to be addressed. The way forward would depend on the willingness to learn from the past experience. Nonetheless, it is equally important to be mindful of the new challenges and opportunities emerging. Rapid spatial transformation of the State in terms of urbanisation, spatiality of development, ecological and environmental vulnerabilities, climate change, economic upheavals, and demographic transition presents new challenges to the LGs and the local communities. Accumulated experience, access to new technologies, growing ownership of the people as well as greater support extended by the upper tiers of the government present new opportunities as well.

The sessions on local governments in the conference will seek to showcase the highlights of decentralised planning in Kerala. The session will focus on the following sessions.

- 1. The first session will present a study on representative case studies with a view to learn from the exemplary initiatives of individual LGs. The case studies will be drawn from important areas of LG involvement.
- 2. The second session will be on the way forward. It will focus on the new challenges and opportunities facing the Local Governments. The conference will seek to develop a programme for reform to be taken up in the 14th Five-Year Plan of the State.

Summary of Discussions

Sub-session I: Best Practices

The first session on Local Governments was on the "Best Practices" or model projects taken up by the Local Governments in the State that are worth emulation and replication in other parts of the State. The session was led by Dr K. N. Harilal, Member, State Planning Board, Smt. J. Josephine, Chief, Decentralised Planning Division, and Dr Joy Elamon, Director, KILA. The Honourable Minister for Local Governments Shri. A. C. Moideen participated in the session. Dr Joy Elamon, Director, KILA welcomed all the participants to the session and mentioned that Kerala has a chequered history of decentralisation and emphasised the need to recall the process in the past, to understand the limitations and gaps before moving forward. Shri. A. C. Moideen, the Honourable Minister for Local Governments in his opening remarks pointed out the key policy changes introduced in the 13th Plan as part of the second phase of the Peoples' Plan campaign as well as the pivotal role played by local governments in containing and tackling the Covid-19 pandemic. He cited few examples of the role of local governments such as managing the community kitchens during the lockdown and managing Covid First-Line Treatment Centres. He also expressed hope that the conference in which the experience of 25 years of decentralisation is showcased will immensely help in deepening the process of democratic decentralisation in the State.

Smt J. Josephine, Chief, Decentralised Planning Division made a presentation on the major policy decisions taken in the 13th Plan to deepen the process of decentralisation and make it more participatory. The presentation also contained major initiatives as well as the prospects of decentralised governance in Kerala. The exemplary work done by the Local Governments (LGs) in the time of the floods in 2018 and 2019 and the Covid-19 pandemic was highlighted, including the decisive role played by LGs in making development more inclusive. The 12-point programme of the Government of Kerala as well as the Subhiksha Keralam, an integrated food security programme, was also presented to emphasise the commitment of the government towards giving more power to the people.

Dr K. N. Harilal, Member, State Planning Board and the moderator of the session mentioned that the beauty of decentralised participatory democracy is innovativeness, as the Local Governments are capable of gathering new ideas at the local level. He also commented on the lack of documentation of the model and innovative projects undertaken by the local governments and urged them to not only take up such projects but also to publicise them through various social media and other multimedia platforms for showcasing it to the public in the country as well as world over.

This was followed by presentations by the heads of various Local Governments on the best practices or model projects undertaken by them. Dr Beena Philip, Mayor of Kozhikode Corporation mentioned the efforts taken to make the Panchayat filament free by retrofitting conventional street lights with energy-efficient LED lights, thereby saving millions of units of energy as well as reducing carbon dioxide and greenhouse gas emission. Smt Seetha Ravindran, President, Kunnamkulam Municipality spoke on the "waste to fertiliser" project in the Municipality, where the waste collected from households and establishments are converted into bio-fertiliser and sold resulting in not only revenue generation for the municipality but also effective waste management system. Smt Mariamma Benny, President of Mulanthuruthy GP and Shri Renji Kurien Gopinath, Vice-President mentioned the efforts taken by the GP to make it an elder-friendly Panchayath with schemes such as free dialysis for old age people, free doorstep medical and lab services, ambulance services, and *pakal veedu* for engaging them at day time. Smt. V Ambili, President, Nedumangad Block Panchayath made a presentation on the project called 'Jaivagramam' (organic farming) wherein 3 acres of land lying fallow was converted into an organic village with the cultivation of various organic plants and fruits and the seedlings provided to the public. Shri. P. P. Venugopal, President, Paravoor Gram Panchayat highlighted the efforts taken to make the Panchayat a child-friendly panchayath by taking steps such as children's gram sabha, specific schemes targeting school dropouts among tribal children, and *water bell* programme in schools to ensure adequate water intake. Smt P. P. Prasannakumari, President, Peelikode Panchayat made a presentation on the energy conservation projects called Oorjayan where awareness campaigns on energy conservation were conducted and filament free bulbs were distributed. Dr P. K. Jayasree IAS, Director of Panchayaths made a presentation on the complete ISO certification of Panchayats.

Finally, Smt J. Josephine, Chief, Decentralised Planning Division thanked all the members for their wholehearted participation. The role of women leadership in local governments in taking up model projects and the role of kudumbhasree in bringing women to the forefront was specifically mentioned. She also expressed hope that the conference will help in deepening the process of decentralisation and giving more power to the people.

Presentation on Model Projects

1. Energy Conservation – Led Streetlight Project-Kozhikode Municipal Corporation: Presented by Dr Beena Philip M, Mayor

Kozhikode Municipal Corporation is one of the oldest Municipal Corporations in Kerala founded in 1962. It was the capital of the erstwhile Malabar region and is spread over an area of 1900 sq. km with a population of 6.09 lakhs. The Kerala State Electricity Board limited generates, transmit and distributes the electricity supply in the State. Within the corporation, the KSEB has two electrical divisions, which is further divided into fourteen electrical sections.

In line with the objective of being filament free State soon in 2019, the Kozhikode Corporation entered into a contract with Karnataka State Electronics Development Corporation to make it free of filament lights. Even though the Covid-19 pandemic affected the progress of the project, nearly 90 per cent of work is completed and the filament bulbs have been replaced with LED bulbs. The Mayor stated that with the fitting of 5000 more bulbs, it will be the first corporation in the State to be filament free. This will be achieved by the end of February 2021.

Kozhikode Municipal Corporation took a proactive approach towards finding the best solution to street lighting and its maintenance. Retrofitting the conventional street light with energy-efficient LED lights would save millions of units of energy every year and also help in reducing CO2 emission and global greenhouse gas production. Over the years the major roads and all the streets in Kozhikode Municipal Corporation were dominated by the conventional florescent lamps, combat fluorescent lamps, sodium vapour lamps, and mercury vapour lamps which have many disadvantages. These lambs use mercury and the disposal of the same after use creates major environmental issues. The effective lights outboard per watts consumed were poorer when compared with the LED. The system of energy building practised for the street lights was of unbilled compact tariff system by the KSEB and the energy bills were paid to the KSEB by the Corporation along with the annual maintenance of the street lights which included the cost of spares, fittings, equipment rental charges, and labour charges. This is a huge burden on the Corporation and the complaints related to the street lighting of the general public could not be solved on time. The Corporation found that it is spending approximately Rs 42.00 lakh towards monthly energy charges and another Rs 16.00 lakh is spent towards the maintenance and repair cost every month.

In view of these facts, it was proposed to convert conventional street light fitting to energyefficient LED street lights. But this would entail a huge investment for the Corporation and again investment is necessary for the installation of the same. It was also noted that the disposal of conventional fitting would be another herculean task for the Corporation. Thus, a nationwide tender was called in which it was required to convert the 35,102 conventional lights to LED together with operating and maintaining the same for 10 years and also ensuring that the streets and roads are lit as per the national lighting code. Among the companies that participated Karnataka State Electronics Development Corporation Limited was the L1 bidder and was selected to execute the project for 10 years with an EMI of Rs 47.5 lakhs per month which includes the energy charges payable to KSEB and also the maintenance charges. It is to be noted that the Corporation has to make zero investment in the project and an additional 10 per cent increase in the light quantity was also accounted in the monthly EMI of Rs 47.5 lakhs and would remain the same for the 10 years for the 39600 LED lights even if there is an increase in the unit energy charges payable to KSEB. But as there exists the risk of city expansion and there is always a need for new lights it was decided to consider a future expansion offer to 100 per cent increase in the number of lights in the corporation in project duration. But the EMI for any additional lights shall be calculated by means of a linearly diminishing rate based on the total connected load of the LED lights which is one of the main highlights of the project. The functioning of the streetlight will be monitored through a Central Controlled and Monitoring System (CCMS). The reports about the non-functioning lights and energy consumption will be auto-generated and reported to the officials of the Corporation. Together with the Central Controlled and Monitoring System, the O&M Service provider will set up a control room and a 24/7 toll-free number to attend to complaints of the general public. To facilitate a faster complaint rectification, operation and maintenance team will be divided into different zones and each zone will be equipped with the required number of technicians and equipment.

Other than this, during the operation and maintenance, it is required that the O&M service provider maintain 3 key performance parameters as follows.

1. At any time, the total number of non-burning lights to be below 2 per cent of the total number of lights. Failure to maintain uptime of minimum 98 per cent of all LED lamps in the project

area will attract the penalty of 0.01 per cent of EMI payable for the month for each such day or days witnessed or documented in the CCMS.

- 2. A non-burning light above 48 hours invites penalty to the O&M Service provided such that 10 times the energy chargers for the non-burning hours shall be levied from the service provider if the service is not resumed within 24 hours.
- 3. There should be a guaranteed energy saving of 54 per cent from the conversion of the conventional lights to the LED lights. It is quite evident that this project can enhance visibility and safety and help to reduce electricity consumption and cost, free up recourses for other pressing needs, and ensure high-quality street lighting as expected by the citizens and their quality of life. To conclude this will serve as a model and better solution to the other cities as well.

The Mayor congratulated the workers who have been working all along, the KSEB and the Keyonic which does the accounting for the Karnataka State Electronics Development Corporation Limited, a private sector organiser. The mayor stated that this project would be a model for other Corporations, the Municipalities in the State and outside the States.

2. Waste Management-Kunnamkulam Municipality: Presented by Ms Seetha Raveendran, Chairperson, Kunnamkulam Municipality

Kunnamkulam Municipality in Thrissur district was formed in 1948 with an area of 34.18 square kilometres having a population size of 54,071. The waste management issue of Kunnamkulam Municipality was solved by the efforts of the Municipality in 4 years through proper planning and implementation of projects. Earlier, all waste in the Municipality were deposited in a 5-acre trenching ground namely 'Kurukkanpara' which is 2 kilometres away from the town. In the early days, the trench was filled with human excreta, but later the ground was filled up with organic and inorganic urban wastes. With the growth and development of the city, both city waste and industrial waste increased and this resulted in heaps of waste in many parts of the town. People residing near the locality suffered a lot and their agitations resulted in numerous endeavours to find a solution for this, but nothing materialised. In October 2016, the Municipality authorities conducted discussions regarding the setting up of a plant for converting wet waste into fertilizer. With the help of the Integrated Rural Technology Centre (IRTC), a plant was commissioned successfully for converting wet wastes into fertilizer. It is estimated that 4.5 tonnes of biowaste was generated daily by 3,062 establishments and 12.17 tonnes by 13,588 households within the Municipality. The waste from the establishments is sent to the centralised plants. Bio digestible bins have been distributed in all schools and offices. Moreover, the bio digesting bins have been made available at subsidised rates for the treatment of household wastes.

Currently, 34 per cent of household wastes are treated at the source. Thus, out of the total 16.67 tonnes of biowastes in the Municipality, 22 per cent is treated through a centralised waste treatment plant and 24 per cent by decentralised systems. Coco peat and inoculum are essential materials for making biofertilizer. In the beginning, coco peat was obtained from Pollachi. But later a coconut husk processing unit was started in the Municipality. The aerobic composting methods which treat biowastes with the help of coir peat and inoculum are implemented with the help of the Integrated Rural Technology Centre (IRTC), Palakkad. One of the major factors hindering the activity of

micro-organisms is the moisture in the waste heaps. The stagnant water eliminates the aerobic condition and causes the waste to decompose. The coir pith absorbs this water and then evaporates it. The inoculum is full of bacteria and fungi that work in different conditions and speed up composting. The success of this treatment system is because it provides the right conditions for the functioning of micro-organisms.

The wastes from various institutions in the city are collected by two Kudumbashree groups namely 'Aiswarya' and 'Sevana'. These wastes are then sent to the plants at Kurukkanpara. These wastes are composted by a group of six local women known as 'Samatha'. The waste is then mechanically cut into small pieces and added to the coir pith and inoculum and accumulated in small piles with dimension of 60 cm wide and 1mtr height mounts to ensure ventilation. After 10 days these mounts are dismantled, turned over again and sprinkled with water. The compost is collected after the 30th day is filtered, packed, and sold as required. The fertilizer is sold to the farmers in the municipality at Rs 12.00/Kg. Prior to the commercial sale of fertilizer, the testing of fertilizer is carried out at the University of Agricultural and Horticultural Sciences, Karnataka to ensure the quality. Last year 400 tonnes of manure was produced, of which 174 tonnes were sold. In addition to the compost manure, micronutrients such as trichoderma, fluorescent pseudomonas, and VAM are added to the fertilizer. Two Kilogram of micro manure is added to 1 tonne of manure. Last year fertilizer was sold for Rs 1,39,200. 40 kg bags were sold at Rs 12.00 per sack.

Chicken waste was another menace that the Municipality encountered as it was strewn in ponds and rivulets. People came forward and with the guidance of IRTC, a plant was started in 2019 to convert chicken waste to fertilizer. Kunnamkulam Municipality spent Rs 57.50 lakh on various stages to make the Kurukkanpara plant operational. The Municipality charges Rs 5.00 per kilogram from poultry traders for collecting the poultry waste. Garbage collecting group charge fees from the institutions and through this 10 kudumbhasree workers are getting an income of around Rs 10,000 per month. Apart from the financial assistance from the local body, all other responsibilities for waste management are carried out by the microenterprises group 'Samatha' of Kudumbhashree workers.

About 400 tonnes of manure are produced annually as part of these activities, of which 174 tonnes of fertilizer was sold last year. It is being sold in the municipality at Rs 12/kg. collecting Rs 20.88 lakh through this. IRTC contribute Rs 6.00 lakh per annum to 'Samatha' and an additional amount of Rs 2,16,000 is paid directly by the Corporation. The total revenue comes up to Rs 29.04 lakh. Through this, a balance of Rs 1,57,715 is received. Currently, Haritha KarmaSena is collecting inorganic materials from 9,064 households and 3,000 stores in the city.

Through this, 58 people got permanent employment. A pelletising unit has also been set up to recycle plastic. Through this, a turnover of Rs 1.15 lakh has been achieved to date. The municipality was able to encourage the people through the campaign 'My waste My responsibility' and persuaded all to neither litter nor burn waste materials. Municipality also collected penalty as a punitive measure for dissuading persons from indulging in littering. For reducing the sale of plastic in shops the Municipality imposed a fine on shops selling plastics and through this Rs 2,57,000 was obtained. At the same time through the Haritha Karma Sena and Kudumbhasree, the production and promotion of cloth bags were intensified. Over the past four years, the waste

landfill trench ground has been transformed into a green park, the city's comprehensive sustainable development intervention centre, testing centre, and workshop. Green park is moving forward with an emphasis on bioproduction instead of biowaste treatment and on its recycling through scientific segregation rather than the collection of biowastes. Today green park has become an institution where students from nearby schools and researchers from foreign universities come to study. With the support and assistance of IRTC and other government agencies, green park is constantly evolving and moving forward.

In this area of waste processing, the Municipality needs to utilise technologies for the processing and management of wastes and for that IRCTC is offering technical support.

3. Organic Farming (Jaiva Graamam), Nedumangad Block Panchayath: Presented by Ms V Ambili, President, Block Panchayath and Mr. Biju, Former President, Nedumangad Block Panchayath

Ms V Ambili, President, Block Panchayath

Nedumangad Block Panchayath supports sustainable development and self-sufficient society. The Block Panchayat has undertaken and implemented many projects as part of the Nava Kerala Mission and "Jaiva Graamam" project is one of the most important projects in this regard. The project was started in the year 2016, by converting 3 acres of fallow land near the Block Panchayath office into "Jaiva Gramam" or "organic village". It was registered in 2017 under the Charitable Societies Registration Act. The organic village programme has become very profitable by providing quality vegetable seedlings at an affordable rate. Poultry with 1,000 hens was started by using the profit from this project.

In addition to the poulty unit, units of goats, ducks, and fish were started under the project known as "Samriddhi". The project has succeeded in creating effective employment. Nedumangad block panchayath depicts a typical example that shows different areas in which a block panchayath in Kerala can create wonders and how the organic agricultural revolution that was started in 2015 is still going on successfully.

Mr. Biju, Former President, Nedumangad Block Panchayath

Under the title "For the Long Life of Human and The Earth", Nedumangad block panchayat has implemented various projects in the agriculture sector for the last 55 months. It is to be specially mentioned that as much importance was given to the successful implementation of the project as was given to the planning process. All the projects were able to gain wide appreciation when social audits were conducted on completion of the projects.

The organic agricultural revolution in Nedumangad Block panchayat started in 2015 with a capital of Rs 4.25 lakh collected by and from the officials and elected representatives of the block panchayat office. The first step was to prepare three acres of land which was unutilised land filled with overgrown bushes and an open dump yard for waste. In the initial stages, the elected representatives and officials along with their family members started vegetable cultivation on a small scale in this land. A group of local public also joined hands with them. The block panchayat

paid back Rs 4.25 lakh invested initially by the officials and elected members, proving that organic farming could earn profits.

Organic vegetable farming started then has been successfully going on to date. As the next step, the Block Panchayat initiated an Organic Farming Service and Training Centre in 2017. 389 organic groups with 10 members in each group have already completed training from the training centre. Training inputs are also being supplied by the centre. The success of this people's movement is evident from the fact that these groups have been doing vegetable farming in about a hundred acres of leased land. Inputs such as seedlings and organic pesticides are also supplied by the training centre at a cheaper rate than the State Government approved rates.

"JaivaGraamam" is the result of the combined effort of elected representatives and officials of the Nedumangad block panchayat office. The message that organic farming with an integrated farming approach is profitable is being disseminated through the training cum service centre registered under the charitable societies act.

Nedumangad "Jaivagraamam" or "Organic Village" is the first and only one of its kind in the State, promoted by a Local Self-Government Institution. The centre provides jobs for 17 labourers directly and for more than 70 people indirectly. The fact that this initiative of Nedumangad block panchayat was chiefly instrumental in creating a new culture of agriculture is worth mentioning. The project got a profit of more than Rs 15 lakh in the year 2018-19. When half of Kerala was submerged in the floods of 2018, Nedumangad block panchayath extended its helping hand with free supply of 3,000 kilograms of organic vegetables to the relief camps in Chengannoor and 2,000 kilograms of organic vegetables to the relief camps in Nilambur. In addition to this, an amount of Rs 1.00 lakh was donated to CMDRF from the profit. As part of integrated farming about thousand hens and goats are also being reared in the "Jaiva Graamam" project. People can get eggs at a reasonable rate from the centre. During the covid-19 pandemic lockdown period, 2000 eggs were supplied free of cost to community kitchens. The Nedumangad block panchayat has also adopted the Subhiksha Keralam programme and started agricultural activities in all the five gram panchayat areas under the block panchayat. 20,000 vegetable saplings have been distributed as part of this and activities are in progress to extend organic farming to an additional 12 acres of land. Nearly 4 lakhs of vegetable saplings have been distributed as part of this and 10 lakh more would be distributed in the coming days later. Nedumangad Block Panchayat is implementing organic farming successfully.

4. Child-Friendly Panchayath, Peravoor Gram Panchayat, Kannur District: Presented by Mr P P Venugopalan, President

Peravoor Gram Panchayat won the National Award for Child Friendly Local Government in 2020 on account of its continuous activities and schemes for children.

Peravoor Gram Panchayat with 16 wards spanning an area of 34.10 sq. km and a population of 23,704 (2011 Census) has 5,548 children of less than 18 years of age. Hence the focus is given to children specific issues like universal child immunisation, school dropout, physical and mental abuses, drug abuse, and children's grama sabha. The major issues confronting children are lack of

adequate facilities for sports activities, mobile phone addiction, dropouts among children from Scheduled Tribe communities, malnourishment, and other nutritional issues. Hence various children-specific programmes were formulated to tackle these issues such as Children's Grama Sabha, sports and games coaching and a standardised playground, yoga and martial arts training for physical and mental health, organic farming in the schools, scholarship programmes for the upliftment of the disabled children as well as several projects in tribal areas to reduce the school dropouts were introduced. 24 Anganwadis were converted to child-friendly Anganwadis. As a result of all these activities, Peravoor Gram Panchayat received National Award for Child-friendly Gram Panchayat in 2020.

After attaining training in KILA, grama sabha for the children was held in all wards of the panchayat under the leadership of children wherein several issues were highlighted. On one side children were lacking access to modern technology to study and on the other hand, they were getting addicted to electronic gadgets like mobiles. Children's grama sabhas made suggestions on planning and based on the suggestions projects are being prepared for children.

The children's ward at the taluk hospital has been converted into a child-friendly ward with babyfriendly painting, playground and all other facilities. Pregnant women can get monthly check-ups. Arrangements were made to complete vaccination from birth to 15 years of age on time. BPL Cardholders were able to get maternity benefits and also children below the age of 18 are being provided free medical facilities.

As part of the project, *Drug-Abuse Free Panchayat*, a proclamation rally was organised in the town under Peravoor Panchayat and a seminar and quiz competition was also organised as part of this in schools for the children.

Water Bell Programme was implemented by which each child brings boiled water in steel bottles and when the bell rings the children drink water. Thus, when the bell rings four times, all the water is finished in the bottle. This ensures that children have adequate water intake.

Being the hometown of Volleyball Legend Jimmy George, the Panchayat has given due importance to sports among children. Children with sports talents are identified, given hostel facilities and given training in volleyball, football and athletics by some of the leading coaches. Kalari training is also given to improve the physical and mental health of the children. All such activities in a way help the kids in overcoming mobile addiction. Training is also given in self-defence.

The project called "Thudikottu" was introduced for the prevention of dropouts of tribal children of Peravoor Panchayat. The teachers were given the responsibility to teach the tribal students in all tribal colonies from 7.00 am to 9.00 am. Special aid is provided to the children who are marginalised in society. The whole process of schooling, including transportation and food, is provided to the children. Through this project, the school drop out of the tribal children could be reduced.

The projects implemented by Peravoor Gram Panchayat is a model which can be replicated by other local governments for the welfare of the children.

5. Old Age Friendly Gram Panchayath, Mulanthuruthy Gram Panchayat: Presented by Ms Mariamma Benny, Former President, Mulanthuruthy Gram Panchayath

Smt. Mariamma Benny, former President of Mulanthuruthy Gram Panchayath stated that the project, "Old Age Friendly Gram Panchayath" was aimed at ensuring the protection and welfare of all senior citizens in Mulanthuruthy Gram Panchayath. The project ensures health care, nutrition, shelter and welfare, financial security, protection of life and property of senior citizens. She added that the welfare of the senior citizens was the collective responsibility of several organisations such as Community Health Centre, Primary Health Centre, Palliative Care Unit, Ayurveda Dispensary, Homeopathy Dispensary, 3G Anganwadi, and *Pakalveed*. Accordingly, the project envisages better co-ordination, follow up and service delivery of these institutions to cater to the special needs of the senior citizens. She later invited the former Panchayath President and the present Vice President to share a few words on this project.

Followed by this, Shri Renji Kurian Gopinath, Vice President of Mulathuruthy Gram Panchayath made a brief narration of the project as follows:

According to the 2015-16 survey details of Mulathuruthy Gram Panchayath, the old age population of the Panchayath is 5,200 people, including 2,470 males and 2,730 females. The Panchayath has constituted old age neighbourhood groups in each ward. At present, there are 117 such working groups. They conduct weekly meetings under the leadership of Kudumbhasree units. The Panchayath also provides the service of palliative care units under the supervision and control of the Primary Health Centre, ensuring improved health care facilities to the needed at doorsteps. The Primary Health Centre (PHC) provides outpatient as well as inpatient treatment facilities, 24 hours ambulance service, and emergency health care on a regular basis. A project, "ALIV" is implemented by the Medical Officer of the PHC. The project aims to give free dialysis to old age people. They also provide free orthopaedic services to old age twice a week. Ayurveda Dispensary of the Gram Panchayath conducts yoga classes for the elderly.

Thereafter the Vice President made a presentation regarding the various project components envisaged in the "Old Age friendly Panchayat," as follows:

- 1. Hridyarogi Aim of this project is to access lifestyle diseases among the elderly, improve awareness among them and ensure well-being. Trained ASHA workers from the health department conduct surveys in the panchayath area. As a first step during the survey, they identify elderly people who are suffering from diabetics and hypertension. Subsequently, booklets are circulated for awareness of lifestyle diseases. Finally, identified patients are referred to specialists and PHC.
- 2. The other project is 'Snehasanjeevani', which is meant for checking the blood sugar levels of the elder persons at their residence itself. This helps them to avoid unnecessary travel. Beneficiaries of the project are old age people in the panchayath area who are economically backward. Implementation of the project is entrusted to the ASHA workers and Anganwadi workers. They conduct house visits for counselling elderly people and distribute glucometers.
- 3. Another project ensuring the welfare of the elderly is the supply of bed cot for old age. The project aims to distribute wooden bed cot to selected senior citizens in the panchayath area. Beneficiaries of the project is prepared by the grama sabha from applications received by it

and later the Panchayath Committee approves the list. The project gives priority to economically backward groups, widows, unmarried women, and bedridden patients. This project is implemented by the ICDS supervisor of the Gram Panchayath. The total cost of the project is Rs 12 lakh. 250 bed cots are targeted for distribution among the selected beneficiaries.

- 4. Another project is the establishment of "*Pakalveed*" for the aged. It is an effective system to empower and motivate the elderly to visualise their life from a different perspective. With old age, most people face a feeling of loneliness, discrimination, and helplessness. Older people become more vulnerable to physical disabilities as a result of socio-economic and emotional isolation or solitude. Here senior people can engage in various activities such as agriculture and horticulture, crafting, and cover making. Being in a homogeneous group they can regain their self-esteem in society as worthy individuals and achieve strong mental and physical balance. Facilities for communication and active interaction with the same group of people will help them to maintain their physical and mental wellbeing positively. The existing *Pakalveed* of the Gram Panchayath now available in ward 6 provides all facilities for the wellbeing of the inmates. Separate vehicle for picking up and dropping them are also arranged. It also helps them to resume their past hobbies, identify their hidden talents and ensures happy life.
- 5. "3G Anganwady" This model institution functions as a daycare centre for infants below the age of one year, children in the age group of 2-6 years, and women in the age group of 15-45 years. For those who are above the age group of 60, the Anganwadi function as a Santhwanana Bhavanam. 3G Anganwadi aims to find solution for the mental and social problems faced by women, from teenagers to the elderly. The service of a trained gender counsellor is provided here. Awareness classes and coaching for competitive exams are organised for youngsters. Legal aid is provided in case of dispute regarding assets. Internet facility and television are available in the Anganwadi. Arrangements are made for children and the elderly to interact with each other. The Anganwadi functions from 8 am to 5 pm. Timely food and refreshments are provided here. This project is implemented by the ICDS supervisor of the Gram Panchayath. The aim of the project is to ensure the well-being of all age groups.

6. Filament Free Panchayat (Oorjayan) Pilicode Gram Panchayat :Presented by Ms. P P Prasannnakumari, President

Pilicode Panchayat is at the southern end of Kasargod district spanning around 26.77 square kilometres with a population of 25,122 persons. The panchayat has received the *Nirmal Puraskar* award for the construction of clean lavatories for 2030 families.

The model project of the Panchyat presented at the session was *Oorjayan*, the energy conservation programme. Increasing consumption of energy especially electricity necessitated the Panchayat to launch this programme. The main objectives of the programme are to create awareness among the people about the need for energy conservation, to make energy conservation a social concern rather than an individual concern and thereby reduce the consumption of energy, to impart technical skills of meter reading among people and inculcate a habit of practising the same, reduce the consumption of energy at domestic level by participating women in this programme and thereby reduce and control energy consumption at large. Also, the increasing use of energy is a

serious challenge to the environment. The project aims at a behavioural change on buying energyefficient equipment to mitigate the harmful effects on the environment. Altogether, the project aims to enlighten the whole community by exposing them to various options of energy-saving methods and make the panchayat an incandescent bulb free, energy-efficient local body.

The panchayat conducted a people's campaign to conserve energy by the name Oorjayan with the help of Energy Management Centre, (EMC) Kerala. People's committees were formed at various levels and fifty selected volunteers were given two days of intensive training at EMC, Thiruvananthapuram. Second phase training for 100 volunteers was also held at the panchayat level. Groups comprising of 50-70 households were formed and awareness building classes were given.

Six hundred and fifty-one volunteers including women were trained for intensive house survey. These volunteers conducted frequent house visits and distributed pamphlets. Meetings were conducted at school, kudumbhasree groups, and merchants' association. At the neighbourhood level, metre reading training was also given. Special oorjayan grama sabhas were organised to convey the need for energy conservation.

Oorjayan people's survey was carried out from 16th to 26th January 2017. Through this survey, filament bulb and other inefficient electrical appliances were replaced with LED bulbs and star rated equipments. A whatsapp group was formed and an app for calculating energy consumption in each house was popularised through it. People quit incandescent lamps (ICL) and replaced energy-inefficient equipments and came forward to replace ICL with LED bulbs. EMC has also provided 36,000 LED lamps and 1000 star rated fans at subsidised rates.

All the street lights were converted to LED. About 50,000 ICLs were replaced. EMC and the Bureau of Energy officially extended financial and technical support throughout the programme. EMC and KSEB conducted institutional audit and 116 Oorjayan groups conducted constant auditing and the panchayath was honoured with Kerala's State Energy Conservation Award for 2016-17. Through the project, KSEB certified that monthly energy electricity consumption was reduced by 1,06284 units amounting to Rs 4.00 lakh during March 2017. Moreover, the project resulted in minimising carbon emission also. Meanwhile, all government offices and schools under the panchayath were urged to designate energy managers and the respective officers constantly monitored energy consumption. EMC provided LED tubes and star rated fans to all offices and schools and declared them energy-efficient green offices. As a result of this, on 12th April 2018, Hon. Chief Minister of Kerala Shri. Pinarayi Vijayan declared Pilicode Gram Panchayat as India's first filament bulb free panchayat.

Record Management In Gram Panchayath: Presented by Dr P K Jayasree LAS

ISO 9001:2015 certification of Local Self-Government is one of the prestigious projects of the Government of Kerala. It standardises and certifies the quality management system in institutions. ISO 9000 is the international certification for quality management systems of an organisation. It may be probably first in history that a department in India has attained ISO certification for all its institutions. To ensure uniformity and effectiveness of the Quality Management System

implemented in gram panchayats, the government utilised their fund for the process. KILA was entrusted with providing the consultancy support and Total Quality Services were selected for the auditing services. This project is rooted in the concept of Total Quality Management. The major thrust areas included are front office management, record management, improving the working environment and overall infrastructure thereby ensuring quality services. ISO certification of gram panchayats under KILA consultancy was initiated in May 2018. By the end of January 2020, 939 Gram Panchayats achieved ISO, 5 district level offices of Deputy Director of panchayats and State level Panchayat directorate office have also achieved ISO certification by this time. The changes in the front office, record management, overall infrastructure and working environment along with positive changes in the attitude of employees were appreciated, and it has been reflected in overall citizen satisfaction levels.

The journey of implementing a quality management system was not so easy for gram panchayats. Being an office frequently accessed by the public, their activities such as record sorting and setting were done during off days and after working hours. The commitment of elected representatives and employees towards this project was remarkable. Though natural calamities such as flood and covid pandemic had shifted their focus to disaster management activities that did not stop their enthusiasm to implement a quality management system. The changes created through this project are visible in these offices.

Even though the front office management system has been developed a decade ago, the ISO 9001 project has significantly improved the performance and aesthetics of the front office management. Emphasis was given to provide high standard facilities for the public, self-explanatory information boards, and effective functioning. A tremendous change was noticed in the front office which was greatly appreciated by the general public.

The gram panchayaths in Kerala have 27 mandatory functions, 14 general functions, and 76 sectorwise functions as mandated by the Third Schedule of the Kerala Panchayath Raj Act 1994. People approach the gram panchayats more than any other government institution for various services and redressal of grievances. The Right to Information Act, 2005 has promoted transparency and accountability in the working of Government institutions. Both the above aspects have made the proper upkeep of records essential. It is the responsibility of gram panchayats to provide all records to citizens as per the RTI Act. To reduce the work and time of providing answers it is essential to maintain an efficient record management system. Record management began to be accorded the need importance with the advent of ISO certification process initiated in gram panchayats. Till then there was no common method adopted for record management in gram panchayaths. While a few gram panchayaths did have a working system, it was found that in most cases there was no proper record room or even if a record room was there, most of the records were haphazardly kept outside the record room in boxes and gunny bags with no proper identification or retrieval system. A way out of this state of affairs towards a common standard in the maintenance of records was necessary and the 5S in Quality Management System adopted for ISO certification offered exactly such an opportunity.

ISO certification of gram panchayats was one big milestone in their quality improvement that paved the way for more initiatives. They have set an example for other departments and
institutions. Kerala has always been a pioneer in introducing policies and schemes that served as a model for the nation. ISO certification project is just the beginning of the quality wave that could trigger tremendous changes in the way government institutions deliver quality services to the citizens of the entire country.

Sub-session 2: Decentralisation and Local Governance

The session on Decentralisation and Local Governance was led by eminent faculties and experts in the field namely Prof Prabhat Patnaik, Professor, Emeritus, Jawaharlal Nehru University; Prof Patrick Heller, Professor of Sociology, International Studies and Public Affairs, Watson Institute, Brown University; Prof Harry Blair, Visiting Fellow, South Asian Studies Council, Yale University; Dr S S Meenakshisundaram IAS (Rtd), Visiting Professor, National Institute of Advanced Studies, Bangalore; Ms Aruna Roy, Founder, Mazdoor Kisan Shakti Sangathan; Mr S M Vijayanand, IAS(Rtd), Former Chief Secretary and Chairperson, 6th State Finance Commission, Kerala; Dr J Devika, Professor, Centre for Development Studies; Prof K N Harilal, Member, Kerala State Planning Board. The session was moderated by Dr Sarada Muraleedharan, IAS, Additional Chief Secretary, Local Self Government Department.

The session reviewed the decentralised governance in Kerala in the last 25 years and touched on the achievements, challenges, and the future direction for decentralised governance system in the State.

Dr V K Ramachandran

Dr. V K Ramachandran, Vice Chairperson, Kerala State Planning Board gave the welcome address. In his address, he stated that Kerala's decentralised local governance is unique and the enlightened public action is the reason for the improved socio-political conditions and various development accomplishments in the State. Vice Chairperson appreciated role of local bodies in disaster management during floods and Covid-19 pandemic. He added that the learnings from the floods led to the design and preparation of disaster management plans by every local body of the State.

He explained the focus and direction of the State Government in prompt economic planning to strengthen decentralised governance in the State. Kerala is the only State in India to have a 13th five-year plan. The four flagship missions of the Government have supported the decentralised system. He also pointed out the possibility of 'Subhiksha Keralam' as a recovery programme during and after the pandemic. Vice Chairperson cited issues such as complications of urbanisation, problems of town planning, issues in providing skill employment at the local level to youth and issues in improving agriculture and industrial production as few among many challenges faced by the local governments. He emphasised the need for creative assistance and planning to overcome such hurdles and invited the panel to have a resourceful discussion on the subject.

Dr Sarada Muraleedharan

The Chair of the session, Dr. Sarada G Muraleedharan IAS, ACS, Local Self Government Department, shared her immense experience with decentralised governance and explained the functioning of local bodies in Kerala. She also mentioned the challenges that are being looked at in terms of urban governance, spatial planning, dynamics of transportation, and production and services.

Dr Prabhat Patnaik

Dr Prabhat Patnaik, Professor Emeritus of Jawaharlal University and former Vice Chairperson of Kerala State Planning Board suggested the need for futuristic planning of decentralised governance. He shared his Marxian perspective of a futuristic society beyond capitalism where competitive commodity production can be replaced by non-commodity exchange and mentioned the importance of local governments in supporting this process of transition. He also pointed out the need for bringing together scattered population through mass organisations for strengthening the decentralised governance.

He discussed the socialist aspect of decentralised governance and need of increased State investment in local bodies. He emphasised the need for transformation of Local Governments from administrative and fund dispersing bodies to productive bodies that owned and controlled direct production. He pointed out the model of sub urban enterprises and communes in China, which could be incorporated into the Panchayats to produce for local needs.

Prof Patrick Heller

Prof Patrick Heller of Brown University highlighted the need of strengthening local bodies in urban cities with public participation He opined that the quality of service delivery and public participation in local governments are better in Kerala than any other State of India. But the challenges posed because of rapid urbanisation needs to be addressed. The State should focus on inclusive and sustainable growth of cities to avoid dynamic contrasts in the society. He suggested the need for improved quality of service in sanitation and higher civic engagements.

He also mentioned the lack of collective authoritative power of citizens in urban areas. Most of the urban population do not exercise the rights of a citizen and are depended on councillors to communicate with the State officials. He also cited the need for empowering local body legislators from service mediators to policy and decision makers. The autonomy of local bodies should be practiced with standards and rights as base line. He also emphasised the need for strategic planning and land management in the cities of the State. Though most departments are quite effective, some still operate as top-down service delivery departments that do not cater to the cities.

Prof Harry Blair reflected his insights of democratisation of decentralised governance in global context. He credited the left political engagement being the reason why Kerala is only an Indian State to adopt participatory budgeting. He expressed his concerns of decline of democracy in many countries and expressed his fascination of enlightened democratic empowerment in Kerala. He emphasised that the role of local governments remain significant for the realisation of people centred development despite the policy shift towards privatisation and globalisation.

Dr S S Meenakshisundaram

Dr. S S Meenakshisundaram IAS (Rtd), appreciated the State for the exemplary role in handling the disasters and the pandemic using the local government machinery and expressed his views on the importance of decentralised disaster management systems. Explaining the role of local governments in disaster management he suggested the formation of localised response groups and administrative working group at local body level with more regulatory powers.

He suggested that a future plan for disaster management of the State should focus on empowering the capacities of local governments such as i) transferring the regulatory powers to local governments, considering most decisions should be taken according to local conditions ii) the responsibility of communicating accurate information should be authorised to local bodies to avoid misinformation iii) delivery of essential supplies should be channelled through local self-help groups. Kudumbasree and civil societies should be creatively engaged in this process and iv) mobilisation of local resources for effective response under local body supervision.

In addition, he recommended local governments and local authorities to take interest in forming farming societies to cater to the local population and also suggested the government to consider the possibility of entrusting Gram Panchayats with water supply, sanitation, and rain water harvesting. Further, he suggested the setting up MSMEs in each Gram Panchayats for making use of the skills available in the form of locally available resources. He concluded that it is better to build and empower the capacities of local governments for dealing with disasters and higher government bodies to support them with required resources.

Dr Aruna Roy

Dr Aruna Roy, Social Activist and Founder of Mazdoor Kisan Shakti Sangathan in her presentation appreciated the functioning and structures of decentralised governance in the State. She also warned about the need of resistance to any move towards centralisation of governance without understanding the aspirations of the population and cited the example of farmers protest against Farm Acts. She voiced the necessity for showcasing achievements of local governments to counter majoritarianism. She emphasised the need of participatory understanding of encroachment of democracy in various forms. Further she added, participatory policy and legislation should become the concern not only of the State but also of every local body.

Shri S M Vijayanand

Shri S M Vijayanand,IAS, former Chief Secretary to Government of Kerala and present Chairman of State Finance Commission, emphasised the importance of ensuring social justice in the process of decentralisation and State funding. He suggested the need for strengthening the involvement of local bodies in the development of marginalised communities especially the Scheduled Castes, Scheduled Tribes and the fisher folk. He added, self-assessment of well-being should be the main criteria of assessment for welfare activities. He suggested to set up SHGs for the elderly population of the State under local body's supervision. He also suggested to reconstitute the voluntary technical groups to accumulate the wisdom and expert advice in addressing issues and initiate developmental activities from Panchayat to Panchayat. He also advised the Panchayats to shift to rights based framework to ensure social justice to all sectors of the society. He cited the importance of developmental planning structure and the importance of joint planning with the State, separate implementation and coordinated monitoring. He also shared his opinion of the transition from 'welfare state' to a 'caring state' with the empowerment of the citizens.

Dr J Devika

Dr J Devika in her presentation opined the need for gender inclusive development and suggested the creation of awareness for eco-friendly development at lowest tier of governance. She suggested the integration of vulnerable sections of the society into the local body framework. She also shared her concerns of corporate take overs of local governments with huge capital investment. She suggested the formation of forums in local governments where citizens can voice ecological concerns.

Dr K N Harilal

Dr. K N Harilal, Member of State Planning Board, credited the achievements and success of the decentralised governance system of the State to the willingness of learning from experience. His factual reflections on the functioning and structuring of the three-tier decentralised system provided a realistic picture of local governance in the State. He mentioned the importance of maximising the autonomous power of the local governments and the practical side of streamlining guidelines. He praised the efforts of incumbent government for prompt planning and timely implementation of various developmental activities. He threw light on how the local governments benefited through timely economic planning and reducing bureaucratic guidelines. He recommended the local governments to identify and initiate proper mechanisms for agriculture and industrial production that is sustainable. He cited the model of Nedumangadu Panchayat as sustainable agriculture production model. Further he stated that the local governments can play a significant role in creating awareness of new technologies in agriculture and value addition of agriculture produces.

Ms Josephine J

In the concluding session, Ms Josephine J, Chief, Decentralised Planning Division, Kerala State Planning Board expressed the Board's gratitude towards the distinguished panel for their insightful and resourceful sessions. She stated that the accumulated wisdom from the enlightening sessions will act as a guide and aid the State in future planning of decentralised governance.

Key ideas and recommendations emerging from the discussion

- 1. Increase State investment in local bodies.
- 2. Emphasis on transformation of local governments from administrative and fund dispersing bodies to productive bodies that owned and controlled direct production.
- 3. Strengthen local bodies in urban cities with public participation.
- 4. Focus on inclusive and sustainable growth of cities.

- 5. Future plan for disaster management of the State should focus on empowering the capacities of local governments by i) transferring the regulatory powers to local governments ii) the responsibility of communicating accurate information should be authorised to local bodies iii) delivery of essential supplies should be channelled through local self-help groups and iv) mobilisation of local resources for effective response under local body supervision.
- 6. Form farming societies to cater to local population.
- 7. Set up MSMEs in each gram panchayats to make use of locally available skills.
- 8. Improve the capacities of local governments for dealing with disasters.
- 9. Strengthen the involvement of local bodies in the development of marginalised communities especially persons belonging to Scheduled Castes and Scheduled Tribes and the fisher folk.
- 10. Set up self-help groups for elderly population of the State under the supervision of local bodies.
- 11. Reconstitute voluntary technical groups to accumulate wisdom and expert advice in addressing issues and in initiating developmental activities.
- 12. Panchayats to shift to rights based framework to ensure social justice to all sectors of the society.
- 13. Need for gender inclusive development and creation of awareness for eco-friendly development at lowest tier of governance.
- 14. Identify and initiate sustainable mechanisms for agriculture and industrial production.

Session VI Modern Skill Development

The session on modern skill development was held on February 2, 2021. Mr T P Ramakrishnan, Minister for Labour and Excise, Government of Kerala and Ms K K Shailaja Teacher, Minister for Health, Social Justice, and Women and Child Development, Government of Kerala gave the opening remarks of the session. Prof K Ravi Raman, Member, Kerala State Planning Board chaired the session. Dr Mridul Eapen gave the welcome address. The session had experts from Korea, Germany, International Labour Organisation, Ministry of Skill Development and Entrepreneurship, Government of India, and national universities.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

Kerala has the potential to be India's skilled-labour hub.

The State's skilled professional workers have been the preferred choice of employers in India as well as other parts of the world.

The Government of Kerala recognises that skill training and development play a crucial role in promoting economic growth. A relative abundance of educated and skilled workers, a long history of entrepreneurship, and exposure to the wider world are our strengths. As global manufacturing becomes more automated and knowledge-intensive, Kerala's strengths with respect to school and higher education make it better equipped than most other States to deal with the new challenge.

The State's industrial policy and information technology policy envisages rapid increase in investment in different sectors. This calls for the highest levels of skill development and training to be made available to the youth of Kerala for participation in the process of structural transformation of Kerala's economy.

The "Future of Work" debates and research point out the fast changing nature of work as a result of the development of information and communications technology. Some of the areas in which Kerala has made a start in this respect are robotics, machine learning, artificial intelligence, and 3D printing. The Covid-19 pandemic and the evolving situation have added new dimensions to the Future of Work. While disruptions in some sectors are evident, new opportunities and requirements are emerging in significant areas. We must make available the most modern skill training and development to prepare Kerala's youth for opportunities in skilled employment in these sectors.

Further, certain sectors such as IT-enabled services, transport, storage and communication, banking and insurance, construction sector, health care and medical equipment, food processing and tourism and hospitality have significant employment possibilities in Kerala. Continuous reskilling programmes are also required.

Skill training programmes should also be used as instruments of empowerment and social change. They should include, for instance, specialised training in emerging areas for women and young men and women of the scheduled tribes and scheduled castes.

The international experiences on successful employment policies and strategies indicate the role of the State in developing an integrated skill development policy framework and systems. Such a system recognises the linkages between education – higher secondary and tertiary – and industry and employers' needs.

The International Labour Organisation in particular has delineated the three areas with respect to skilling, that is, (1) linking training to current labour market needs as well as anticipating and building competencies for the jobs of the future; (2) building quality apprenticeship systems and incorporating core skills into training for young people; and (3) expanding access to employment related training in order to equip women and men to work in the formal economy. These areas are of significance to Kerala.

The session on skill development will seek to learn from the global best practices in skill development. The session will focus on the following.

- Labour Market Information Systems: The current Government of Kerala's State job portal is limited in its scope and reach and hence effectiveness. The International Labour Organisation (ILO) and Organisation for Economic Co-operation and Development (OECD) have compiled the global best practices in this regard.
- 2. Technical and Vocational Education and Training (TVET): This theme will deal with three issues: (1) the relationship between TVET and the rest of the educational system; (2) the role of industry in TVET; and (3) global trends in occupational changes and TVET.

Summary of Discussions

Dr Mridul Eapen, Member, State Planning Board

Dr. Mridul Eapen, Member, State Planning Board welcomed all the delegates and participants to the session on modern skill development. She pointed out the significance of this session since skill development is basic to the advancement of all sectors in the economy and for all people, from the less educated to the highly educated, and to the lifelong learners. The fact that within a short span of time a few developing economies have managed to grow into the fastest growing economies of the world on the backs of vibrant technical and vocational education systems (TVET), is an important lesson to learn; particularly the fact that education, skill training and economy all need to develop in parallel and complement each other to meet not only the current demands of the economy but also to anticipate and build competencies for jobs for the future. The State was the lead actor in developing such systems in these economies helping also to bring about some unification between technical, vocational education and higher education with necessary ladders and bridges. These experiences open up several opportunities for a State like Kerala with an educated population, and a large number of skilling institutions. Currently because of the Covid-19 pandemic so much disruption has been caused in the functioning of educational institutions and the job structure with new technology driven skills growing rapidly. It has become very obvious that the digital economy will have a significant role to play in our lives impacting education, skilling, and employment. In all likelihood digital technology may also lead to massive changes in the traditional ways of teaching and learning. While a strategy as to how such challenges can be met is yet to unfold and requires more discussions, we must prepare to meet the future challenges in the realms of technology and economy, devise strategies to eradicate inequalities in respect of gender and across other disadvantaged groups from our systems of education and skilling.

Having said these words, Dr Eapen welcomed the two ministers Sri T P Ramakrishnan, Minister for Labour and Labour Welfare and Smt. K K Shylaja, Teacher Minister for Health and Family Welfare, Social Justice and Women and Child Development, the speakers who have come from Korea, Germany, representatives of ILO and India as well as the two discussants and all the participants.

Mr T P Ramakrishnan, Minister for Labour and Excise, Government of Kerala

Mr T P Ramakrishnan, Minister for Labour and Excise, congratulated the Kerala State Planning Board for organising the international conference to help the State to evolve innovative development models. The conference and the discussions would give strength to the massive mission of the State Government to create a new Kerala by strengthening the socio-economic and infrastructure sectors. The Minister emphasised that the State is the owner of unique development and welfare models that the world is observing keenly covering the entire population including the marginalised. The EMS Government of 1959 laid the foundation for the unique development process of Kerala. Based on social justice, unprecedented progress has been made in various areas such as education, health, social security, land ownership, housing, employment and protection of labour rights. It must be seen as an urgent need to strengthen this achievement and transmit it to new areas of development in consonance with the needs of the modern times.

He touched on the rapid development of information technology and now the unprecedented impact of Covid-19 in altering the structure and nature of employment. At the same time new opportunities are emerging in key areas and Covid-19 has induced fundamental changes in location of workplaces. Priority should be given to the modernisation of manufacturing and service sectors and steps should be taken to protect all employment sectors including traditional industries. The changes and opportunities in the labour market can only be utilised by developing knowledge and skills through skill development. Kerala has a strong presence in the workforce all over the world, whose knowledge and dedication are generally appreciated within and outside the country. The present Government is implementing various schemes aiming at skilling the youth to make them employable. Kerala Academy for Skills Excellence has been declared as the State Skills Development Mission. It has developed centres of excellence in collaboration with various institutions and agencies. Government ITIs under the Department of Industrial Training have revised the training schemes with emphasis on skill development in newer vocations. This Government has started the Indian Institute of Infrastructure and Construction in view of the employment opportunities in the construction sector. The vast majority of those who complete courses under these agencies received placements. In addition, Government has set up extensive training facilities for job seekers through career development centres and employability centres.

The Minister further informed that Kerala has already begun to explore the potential of information technology in areas of Robotics, machine learning, Artificial Intelligence and 3D printing. There are many employment opportunities in Kerala in IT based services -, transportation, communication, banking, insurance, manufacturing, healthcare, food processing and tourism in which continuous skill development programmes will be implemented. He emphasised the need to take special care to ensure a better percentage of women in skills training in the growing development sectors. Employment of scheduled caste and scheduled tribe youth should be given priority. The setting up of the country's first tribal employment exchange in the career development centre in Palode at Thiruvananthapuram is an important step in this direction. It was necessary to develop integrated skills development frameworks and systems which should be discussed, ensuring the participation of industry in skills training and training plans keeping in view the demand in the job market and future employment opportunities. Excellent vocational training systems should be built with expanded activities and enhanced representation for women. The State Government has created a job portal to facilitate job seekers and employers to come on the same platform, whose potential however, needs to be enhanced. Another notable intervention of the State Government is the skill registry which provides skilled and unskilled labour for daily needs. Employment can also be increased by promoting skill development for entrepreneurship, training programmes for which will be expanded through Kerala Academy for Skills Excellence, ASAP, and ICT Academy. The State Government has formulated a plan to bring the benefits of modern technology to all, considering seriously the possibilities of skills development in the traditional and agricultural sectors. The aim of the State Government is to create a knowledge society.

Smt. K. K. Shylaja, Minister for Health, Government of Kerala

In this new era of pandemic everything has to be renewed and we need to use the most modern knowledge and technology to fight the new challenges. Kerala is famous for its skilled workers throughout the world, the systematic knowledge and skill development programmes it has evolved. But, the Minister pointed out, Kerala had to walk miles to attain the knowledge exposure and take several steps to be able to achieve modern technology standards. The development of skills and training play a crucial role globally to promote economic growth. During this pandemic it is underlined that without new technology, Kerala cannot move forward; the economic sectors show a slowdown and some difficulties have occurred in every sector. Kerala is trying to move forward and find a solution through skilled labour, skill training and promoting activities depending upon skill development. She too, emphasised the great challenge posed by covid-19 throughout the world but which can throw up new opportunities also which should be identified and promoted. Several new technologies are developed during the covid 19 pandemic. Kerala has also initiated some start-ups in robotics, machine learning and artificial intelligence sectors. The youth and the entire society should be given training to compete with the world technologies and to address the question of egalitarian progress in the sector of work.

She highlighted the fact as pointed out by the International Labour Organisation, that gender gaps persist globally in women's access to skill development and participation in the labour market. Therefore it is necessary that countries should focus specifically on gender in national skill development policies and strategies and to create gender sensitive training environments and opportunities. Men should be encouraged to engage in social and care work to enable women to participate in lifelong learning opportunities. In the light of covid 19 pandemic, works have been intensified for women who bear the enhanced responsibility of household and care work with the closure of institutions. It is essential that special support be provided to overcome the gender digital divide so that women can participate equally in digital learning, emerging technology intensive areas of work in addition to challenging traditional gender roles. She reiterated the need to follow the ILO policy suggestions in this area.

She informed about an international conference on gender equality being organised by Kerala's Women and Child Department under the leadership of Gender Park and the theme is 'Gender in Sustainable Entrepreneurship and Social Business'. Eminent personalities are participating in it and will discuss all aspects of gender equality, emphasising opportunities for women entrepreneurs in social business and sustainable development. This would help to promote women entrepreneurship, providing an opportunity also for educated women to intervene and participate in skill development and sustainable development. These are some ways, she stated, to solve the problems of discrimination and challenges of the Covid 19 pandemic and other challenges arising in this new era. From this point of view this session of the webinar series of 'Kerala Looks Ahead' is the most important one. Everybody is eagerly waiting for the output with the hope that this will have some solutions for these problems and will provide better directions to move forward.

Prof V K Ramachandran, Vice Chairperson, Kerala State Planning Board

Prof Ramachandran welcomed all participants to the Session and pointed out that its basic objective was to achieve a reality that Kerala has the potential to be, that is, to be the skilled labour hub of India. Kerala's experience shows that the well-being of the people can be improved and social conditions can be transformed by enlightened public action. When the present Government of Kerala came to office in 2016, Kerala was the only State in India to decide that the process of economic planning would continue. Government also decided not only to continue activities to deepen and extend the achievements that Kerala has in the general sphere of human development, but to use these achievements as a foundation on which to create new skilled employment opportunities for the people particularly for youth to increase income from production in industry, agriculture and income bearing services and to build our infrastructure.

He noted that some of the very important changes in the last four years that are of great relevance to skill development are, to start with, the strengthening of high school and all levels of school education in the public sector. Kerala is the only State in India where there has been an influx into the public sector of students from the private sector. More than half a million students have actually come into the public sector of government schools in the last few years because of the greater attention to the new infrastructure and the quality of schooling system over the last few years. There has also been a growth in Kerala's IT enabled services, transport, storage and communication services, in the sectors of banking, insurance and construction, in healthcare services and medical equipment, food processing, tourism and hospitality, all of which have great potential for employment, in particular, skilled employment. It definitely remains the case that over the years our assets in this field have risen considerably and we find therefore a relative abundance of educated and skilled workers, a long history of entrepreneurship and an exposure to the wider world; Kerala's workers are known not only in India but they have been the preferred choice of employers in different parts of the world. Given this, there is still an extremely keen desire to learn from the world in the sphere of skill development and employability for Kerala youth which is at the core of the State's development efforts. He pointed out that there could not have been a better group of people to discuss their experiences, and the best practices in their countries and their organisations. This session was being watched with great keenness and expectations.

Prof K Ravi Raman, Member, Kerala State Planning Board (Chairperson of the session)

After welcoming the speakers and discussants, Prof Raman commented that Kerala has often been mentioned as a highly potential State from multiple perspectives connected with social and economic development; in fact there are Malayalis all across the world working in various fields. However, he pointed out that we haven't yet tapped the full potential of the population. So the question is how can Kerala enrich its skills potential and transform the same into economic productivity. This is the time when the future of work debate is at its peak. There are several changes taking place in the larger work-world. Four changes are worth noting.

The first major shift that has been taking place is transformation of workplaces to work spaces, which means that the work could be performed irrespective of physical places.

The second major shift is in terms of time; with a fixed time gradually fading away to flexible patterns.

The third major shift is in terms of gender, a point which has already been mentioned by the Minister for Health and Family Welfare, Social Justice and Women and Child Development. Nowadays we certainly find gender neutrality becoming the order of the day.

The fourth is that the world has already entered into the fourth Industrial Revolution articulated more in terms of the fusion of various technologies, artificial intelligence and machine learning. There is a strong need for a comparative cross-national knowledge sharing and exchange of ideas. This conference basically intends to be a platform for such cross border sharing as also to know more about the experiences of other parts of the country. The critical insights from other contexts shall be used to further enlighten and enrich efforts of the State in sustaining Kerala as a knowledge society. He emphasised that the major task is how best we can transform this knowledge society into a knowledge economy.

Prof. Ju-Ho-Lee-High Touch High Tech: Transforming Education after Covid-19

Prof. Ju-Ho-Lee shared the experience of high touch high tech (HTHT) education which transformed the education method of South Korea, especially after Covid 19. He outlined three sections of his presentation, i.education in the era of the Fourth Industrial Revolution; ii HTHT education and iii. HTHT initiatives of Education Commission, Asia which were then further detailed.

In the era of Fourth Industrial Revolution especially after the pandemic, changes have accelerated in the field of education, the major change being in the area of how we teach and how we learn and this change is from mass standardisation to mass personalisation. Prof Lee explained what he meant by this: In the older way of teaching and learning, learning was to take tests, it was vertical (teacher gives lecture and students take notes) and shallow (based on memorisation). In the new system this is to be transformed into learning to learn; horizontal learning (which encourages students to work with peer students to do projects under the teacher who plays the role of facilitator or coach) and deep learning (focusing well on basic concepts and higher order thinking skills like analyzing, applying and creating). All this really makes a transformation towards mass personalisation.

Lee argued that this big transformation is now occurring with the Fourth Industrial Revolution technologies, particularly A1 powered education which allows a personalised learning. The intelligent tutoring system or the adaptive learning system is more developed now to provide a dialogue based tutoring system, exploratory learning environment and automated writing evaluation and also chat bots upgraded with VR and AR. It can have A1 learning companion and A1 teaching assistant. However, an important point made by Lee was that these amazing technologies should be combined with classroom teaching. Technology alone cannot make a big change in learning. So it must really try to combine high tech with high touch and this is the spirit of high tech high touch learning.

The advantages of utilizing A1 intelligent tutoring system or A1 tutor can be seen for instance from the following situation: students in the same classrooms can have different problems; some of them cannot understand what they learned three years ago, some students do not understand what they learned one year ago. This has been a big challenge for teachers to provide the right level of teaching to students with really diverse levels of learning. But these problems can be solved through the A1 tutorial system since it can help identify what a student does or does not know. Through the A1 powered diagnostic test, an A1 tutor can develop a personalised learning path for each student which cannot be provided to every student in classroom teaching.

Lee then went on to show, looking at the pyramid of Bloom's taxonomy, that in the typical classroom, students just learn to remember and understand. The teachers have to deliver standardised content to every student. But if teacher can utilise A1 tutors or intelligent tutoring system, class rooms can provide students a learning opportunity far beyond understanding and remembering, moving to a higher level of learning, that is, applying, analyzing, evaluating and creating as well as social and emotional learning through human connections. Increasing evidence was now there across regions showing that HTHT education was beneficial for students. For

instance in Arizona State University in the US; 65000 students have an opportunity to study adaptive learning plus active learning through project based learning; there are 12 core courses. There was an increase in completion rates for algebra courses. Mindspark of India is also quite well known for adopting personalised computer assisted after school programme for middle school students which has attracted a lot of attention worldwide. Reported an increase in test scores for maths and Hindi.

He next shared the experience of high touch high tech initiatives of Education Commission of Asia, established last year and located in Seoul, South Korea (led by Gordon Brown, former Prime Minister of U.K and U.N special envoy for global education and Dr. Lee is the chair). The major structure of the HTHT initiative constitutes the University Consortium, K-12 Consortium and Global Consortium, based on the experience of South Korea with the aim of high-tech for all. Global Consortium will also work on high touch high tech and show that it could be a big event for major stakeholders to meet together and share the experience of HTHT learning. So in the case of University Consortium there are 24 member institutions, some four year Universities, many two year Technical Colleges and Collegiate Schools which are now starting with their first courses of HTHT learning and introducing A1 assisted adaptive learning courseware in their classroom.

Many Universities and their leaders in this consortium find it really important to try fundamental changes in learning and teaching system encouraged by the pandemic because typical learning based on face to face lectures cannot hold any more for many colleges. Adaptive course work in the university consortium provides some global and some local adaptive learning coursewares, and are starting to develop the advanced coursework, adaptive courseware utilizing A1. K-12 Consortium is more complicated with a number of stakeholders; Universities, Research institutions, NGOs, edtech companies and local Governments are to support schools to introduce a high touch high tech learning system.

The global Consortium started this HTHT learning for Vietnam – a proto type project for four international schools in 2019-20. It was a great success in improving test scores by 0.436, standard deviation which is equivalent to two years of learning. It is preparing for a more scaled up project for 40 schools in Vietnam with the assistance of ADB education commission.

In this way, South Korea is now introducing a new method of learning bringing about a fundamental change in learning and teaching with the assistance of A1 powered adaptive learning course wares. This is really a new experiment and new trial. It has been quite successful in implementing this new way of learning not only for Universities but also for schools especially for disadvantaged students and also for global projects. Prof.Lee welcomed the State of Kerala to join this exciting endeavor to make radical and fundamental change in education.

Peter Rechmann-Quality Features of the German Dual VET System

Mr Rechmann started his presentation by stating that he would largely focus on the well known and successful German dual Vocational Education and Training system since Kerala appears to be keen on strengthening its VET system as expressed earlier by the Labour Minister in his address. While there are other vocational education and training systems in schools and universities in Germany, the dual VET system is the most popular with at least half of its population joining this system in their lifetime. Given its historical specificities, the VET system of Germany cannot be transferred to other countries; however, German VET experts have been working on it for last 15 years and identified five quality features or success factors of the system which can be used as reference point when designing/improving VET systems in other regions. These factors have found their way into several strategies of the German Government especially in respect of international cooperation regarding VET and are basically accepted by the major stakeholders in the dual VET system in Germany.

Mr.Rechmann outlined the five success factors discussing each one further briefly:

First and the most important feature of the dual VET system is that the Government and the business community as well as the social partners - the employers' associations, chambers and apex bodies and the trade unions - work together in this system. Some authority, normally thought of as government authority, has been given to all stakeholders to monitor, supervise and support the VET system. They cooperate at all levels - from the national to the local - in formalised settings for example, on examination boards (at the local level), assessments, in VET committees at the district and federal level, in the development of VET standards (at the national level) or through joint financing of VET and shared responsibility between the trainees, employers and the government. Chamber organisations play a very important role in the system since every company is to register with them and they have been given the status of a competent body to monitor the correct implementation of the dual system at the district level. Once the apprentice joins a company, an apprenticeship contract has to be registered with the chamber. They register the contracts and organise the examinations. In training, the partners are mainly the labour unions and the employer organisations and they work together basically on negotiating the conditions for the apprentices in the companies. The Government is very important to the public vocational school part of the dual VET system its finances and the support systems, dually sharing responsibility with the employers. In Germany the biggest financial contribution lies with employers who get trained apprentices in return.

Second feature is the learning within the work process which is why it is called the dual system. There are two venues of learning, company and the school-a government school. A substantial part, that is around 70 per cent of learning takes place on the job. He learns the profession, how to handle customers and colleagues in a hierarchical structure of the company. In the school the training is based on school laws and like a regular school where 1/3 of the lessons are of a general kind and two thirds of the profession concerned.

Third is the acceptance of national standards even when there are a lot of stakeholders. All should follow the same standards to make it a system that allows mobility within the country. There are standards for in-company training and for vocational training which are coordinated jointly by the business community, the trade unions and the Government. Every company and vocational school should follow these standards as well and work out their curriculum accordingly. This quality feature ensures standardisation of VET all over Germany, which means that the apprentices can

get the same degree and standard of vocational training from wherever they learn in the country and can be employed anywhere.

Rechmann noted that with the rapid growth of digitalisation, new professions have been included in the VET system like logistics and IT professions; all existing professions have been updated by adding some aspects of digitisation. These professions are then standardised and all companies have to follow the new standards all over Germany.

Fourth feature is regulations regarding the VET staff to ensure that only qualified VET staff should train the young people. There are two learning venues and two different kinds of training – of personnel in the company and in vocational schools. The school teachers undergo normal teachers training at the University. In the company some of the existing employees could be trainers. However, every company must also employ one person who has undergone trainer's course.

Fifth feature, is the institutionalised research and advice on VET system. The major institution is the Federal Institute of Learning (BIBB) gathering and analyzing information and advising the government on action to be taken. Also there a multitude of stakeholders of dual VET system who provide advice to pupils, apprentices, companies, Government institutions.

Rechmann concluded by stating that the system of dual VET in Germany has no central quality management system; but quality contact points have been put together all over Europe together with most countries and they inform how to guarantee quality of training.

Sukti Dasgupta, Global Labour Market Perspective in the Context of Covid-19

Sukti's presentation focussed specifically on the Covid-19 crisis and its unprecedented impact on the world of work, particularly in the context of jobs and skills, linking to past trends, future of work drivers accentuating current challenges and opportunities and implications for middle income countries moving forward on jobs and skills in the new context. Over 2020, the depth and spread of the pandemic induced profound changes in the world of work, with particular relevance to the location of jobs, type of jobs, and skills required. Governments have been quite active in declaring stimulus packages and lockdown measures. The key issue will be a vision for the future that calls for strategic integrated and co-ordinated action for economies and job recovery for middle-income countries such as India.

She presented data from the ILO's most recent monitoring report on the labour market impact which show that during the whole of 2020 relative to the last quarter of 2019, about 255 million full-time jobs were lost (both employment loss and working hour reduction within employment), an impact which is about four times bigger than that during the 2009 crisis; the world economy had not really recovered from the 2009 crisis when the Pandemic happened. Therefore, global unemployment rose substantially (by 6.6 per cent), but the greater concern is that inactivity has grown and labour force participation rates overall have declined (by 2.2 per cent) and global incomes have declined by 8.3 per cent; "post-support labour income" has been uneven among groups. Of great concern is the shift to inactivity, 81 million persons, and this is particularly important for policy makers when talking about skills development, especially for young people.

How to get this huge group of young people back into the labour market? The ILO purposely decided to focus on working hour losses rather than unemployment because in developing countries, unemployment is not always the best indicator of labour market distress as evidence from India and S Asia showed.

Sukti highlighted the fact that data from actual labour force surveys (quarterly) for middle income countries, show that certain groups were hit far more than others, which also has very strong policy implications. These are young people, the self-employed and the women relative to men, the low skilled relative to the medium and high skilled. Data from the CMIE in India, bears out a similar narrative of young people, of whom many lost their jobs between April and June 2020; a larger proportion of females lost employment vis-à-vis men duringcovid-19 (Deshpande 2021). The uneven impact of the crisis on workers with different skill levels can be seen not only in terms of income but also when looking at decreases in employment. A sample of 50 countries shows that the magnitude of job losses tended to be much larger for low-skilled workers. The mean loss for low-skilled workers was 10.8 per cent in the second quarter of 2020, compared with 7.5 per cent for medium-skilled workers and 2.2 per cent for high-skilled workers. Migrant workers were also hard hit. Not only job losses but for many people in the informal economy it's also been a loss of basic needs like food, accommodation and many SMEs were closed down. As per the ILO report, about 38 per cent of MSMEs worldwide had to close down during the pandemic, which disrupted education training for young people entering the labour market. These data highlighted the fact that this crisis really accentuated the skill divides, the gender divides, the digital divides and the access to digital infrastructure too. Oxfam recently came out with a report with the title 'inequality virus' to capture the huge impact that this pandemic has had on inequality.

Sukti noted some of the issues of social concern emerging during the Pandemic: a major finding of a global survey was the huge mental stress found amongst people, especially the youth. Another was an increased burden of unpaid care work done by women during this 'work from home model'. But interesting figures, especially those coming out of India, and some analysis that is already being done, show that men's share of care work also increased but to a much lesser extent. So the question is whether this trend towards gender equality is going to last beyond the pandemic. Again, women are more represented in the health and care industry, and therefore, they were more vulnerable to the pandemic itself. So sometimes the choice for women was between unemployment and risky jobs such as ASHA workers, ANMs and AWWs ain India.

Sukti notes that it was not as if the labour markets were doing very well in the pre-covid period highlighting three issues which have very strong policy implications: i. a decline in employment elasticity of growth, so less employment per unit of output (during 1999-2017). ii. an increase in productivity, especially in China and many other lower-income countries, including India, which was not shared equally, resulting in a global decline in labour share even in countries where real wages were growing, which has implications for distribution. iii. informal employment persists, but some shift from unpaid family work towards wage employment amongst youth, which is positive, but mostly temporary, informal and casual and hence insecure. All this was further compounded by the fact that the future of work issues is causing some shifts in the labour market, three most important being in the fields of technology, demography and environmental sustainability. Firstly,

for technology there are jobs lost and jobs created. But the question remains how one govern the move and create skills coming out of these technological revolutions and the very big rise in gig work; India is one of the biggest suppliers of gig workers globally. Secondly, there is aging and its impacts on social security for older workers but also for youth employment, and it has impacted both negatively. Thirdly when it comes to environmental sustainability, the analysis is somewhat different because a shift towards more environmentally sustainable modes of production will have both positive and negative effects on jobs. Covid provides an opportunity to revamp production systems towards greater sustainability.

New technology is certainly changing the skill needs. It is found that there is a decline in demand for middle-skilled workers. This is particularly important because a huge bulk of young people entering the labour force actually are at the middle skill level, so it requires rethinking. There is a growth in the adoption of robots in manufacturing, it does not replace labour immediately but has implications for new kinds of skills which are more in tune with the new technology. Aging and shift from a three-stage model, that is education, work and retirement to a multi-stage model as people live longer and move in and out of jobs and from retirement back to work (including voluntary work)etc. has implications for lifelong learning and social protection systems and a new way of thinking about skill development. But on the other hand perhaps this trend towards ageing and the Covid crisis has shown that there will be a need for more jobs in the care sector. Kerala is already aware of this fact and has a number of schemes in place. The ILO estimates that there could be 269 million new jobs in the care economy; however, it should be ensured that these jobs are decent. The necessary skills are required and gender issues need to be addressed.

Sukti also discussed the potential of job creation in other sectors of the global economy as reported by ILO (2018) in moving towards green jobs and transitioning towards the circular economy. The point underlined by the ILO is to have a just transition, which means there will be need to invest in skills, in strong institutions and in the right kind of jobs for the particular local economy. Some can be absorbed but essentially what is extremely important here is that there is a huge need for reskilling and upskilling to reallocate within some occupations in the growing industries. There are very strong gender implications of these kinds of shifts, so the policies will need to be really gender sensitive. An interesting observation, based on some research done (Pew Research Centre and ILO) was that the young people of today seem to have the perception that they will have fewer fulfilling career options than their grandparents did. The technological anxiety is playing the role, not only due to the issue of losing jobs but also accessing jobs being created. It's clear that Covid has aggravated past challenges and to build back better there are huge implications for skills. Another thing that Covid has really exposed is the role of the State and good labour market institutions are critical.

On the other hand, countries like India which have diverse development patterns across the country, and states which have a very strong social justice commitment, social dialogue and public welfare institutions such as Kerala may be relatively better off in terms of responding to the challenges, both of the health crisis as well as rebuilding economies. Sukti emphasised the need to focus on the digital economy which will definitely create jobs and to make sure that jobs created through the care economy and the green economy are decent jobs. However, she emphasised that gender issues are going to be critical in all these transitions.

She concluded by stating that skills development cannot be looked at independently but has to be part of an integrated policy for recovery as deliberated by the ILO in its five pillars for a global human-centered recovery, that is (a) maintaining an accommodative macroeconomic policy; (b), assisting low/middle income countries with health measures, global solidarity; (c) supporting the hard-hit groups especially women, young people, focusing on reskilling and up skilling opportunities; (d) promoting a transition to a more inclusive society based on social dialogue; and (e) balancing the needs of diverging sectors. The key policy issues from the ILO perspective will be initiating a human centred development that coordinates two dimensions – Investing in jobs and incomes of people while harnessing appropriate skills.

Mr Gabriel H Bordado, Skills in South Asia:ILO Interventions towards Life Long Learning

Before Mr Bordado started his presentation on good practices in terms of ILO interventions towards lifelong learning, he commented on two other global trends: mass exodus of returnee migrant workers and climate change which would have had large impacts on the labour market in Kerala also.

He stressed the need to strengthen Technical and Vocational Education and Training (TVET) governance system in south Asia, highlighting the role of the private sector, the workers groups, and donor agencies. There was need to (a) take a sectoral approach in implementing skills development; care economy can be a sector India can concentrate on with greater participation of women who dominate the sector. Being largely informal it is necessary to consider how to formalise it to improve the working conditions of women; (b) expand the recognition and validation of skills and competencies in a scenario where people need not go to formal education and training system to validate their work experience and competencies gained; and (c) develop more flexible learning delivery systems, due to difficulties of face to face learning in the context of the pandemic.

The question of what needs to be done was discussed in terms of a need to inculcate foundational skills including learning to learn, adaptability, team work, innovation, critical thinking from early child hood and basic education. He emphasised the vital importance of Skills anticipation. Rapidly evolving skills needs and widening skill mismatch demand sharper labour market analysis and enhanced social dialogue on the identification of current and future skills needs. Using technology to promote flexible learning options is another important element. Active Labour Market Policies (ALMPs) like career guidance, counseling and support services play an important role in facilitating people's transitions from school to work, or mobility in the labour market.

Bordado's presentation showed that using a very pragmatic and down to earth approach, ILO has basically mapped its target customers or beneficiaries of skill development into three categories with relevant policy prescriptions. The first one is the new entrants looking for employment. It has four sub categories-i.people lacking skills basic, core and entrepreneurial skills; ii. lack of employment demand;iii. disadvantaged groups not having access to interventions; and iv.lack of financing mechanism for would-be entrepreneurs. The policy intervention should be focused on providing second chance education for acquiring basic skills, inclusion of entrepreneurship programme in formal education, strengthening of employability skills, expansion of employment service centres, on the job training for core skills and mandatory skill certification. In terms of lack of employment demand we have to facilitate wage or training subsidies to industry, labour intensive public works, mandatory skill certification, subsidy to employers hiring certified workers. For the disadvantaged groups, design programmes to fit their requirements and should provide incentives to employers and training providers. Finally we need to implement comprehensive entrepreneurship programme and micro financing for prospective entrepreneurs. The second category is existing workers in the formal economy which includes workers affected by technology and ageing workers. The third category is existing workers in the informal economy. They are low skilled and low productivity workers. The intervention should focus on the establishment of a system for workers to skill, re-skill and up-skill; they need to be provided work transition support system such as paid off time while on training. Strengthening the recognition of prior learning (RPL) for lifelong learning of workers and providing incentives to employers hiring certified workers are also important.

Among the good practices Bordado explained about ILO's current works in S Asia on reforming TVET system in Bangladesh and Sri Lanka. In the former, the system provided enhanced coordination of skill development intervention through Sector Wide Approach. The skill delivery system was expanded through e-campus for flexible skill delivery in the region. Formal recognition of qualifications of returning migrant workers is being done through e-RPL in collaboration with Bangladesh Technical Education Board.

In the case of skilling Sri Lankan migrant workers affected by Covid-19 for employment, decent jobs and entrepreneurship, success has been achieved through the collaboration with employers groups, worker's organisations and the government and training institutions referred to as social partners. One of the key highlights of this intervention is an innovative, flexible and inclusive "skills passport" or, smart card, recognised by employers Also the skill mismatch was measured and future skill needs of returnee, and aspiring migrant workers were anticipated. Public employment service centres were started in consultation with social partners and a programme operationalised covering returnee and aspiring migrant workers to promote entrepreneurship and SMEs, especially among women.

In conclusion Bordado suggested certain measures for improved quality and coverage of skill development services for India. India needs to strengthen approaches to measure skill mismatches and anticipate future skill needs at sector/national level. The country has to formulate policy recommendations for modernizing apprenticeship programme, which is being done as part of an ILO project in 4 countries. He suggested developing a regional skills qualification framework for South Asia which will provide an avenue to support member States in developing and implementing their own NQFs and quality assurance, stimulate trust and enhance a regional identity, and link various labour mobility and lifelong learning strategies.

Mr Atul Kumar Tiwari IAS, Modern Skill Development

Mr Atul Kumar Tiwari presented an overview of the skill development efforts undertaken by Ministry of Skill Development and Entrepreneurship (MSDE) which co-ordinates the skill initiatives across India. He observed that the Skill ecosystem depends upon two primary things-1.linkage to modern education system and the premium on vocationalisation. Unfortunately vocationalisation in India is very low on the aspirational scale; and 2.the skilling requirement which is driven by industry demand and economic development. The new National Education Policy has placed a bigger emphasis on vocationalisation of formal education and the UGC has also brought in the concept of embedded degree courses, which are to be embedded with apprenticeships and internships. MSDE provides short term skill training courses through Pradhan Mantri Kaushal Vikas Yojana (PMKVY) while long term courses are conducted through Industrial Training Institutes and there is also apprenticeship training, supported by National Centre for Vocational Education and Training (NCVET) and National Skill Development Corporation (NSDC). NSDC co-ordinates the vocationalisation and skill development through three training models: 1) fee based model where students pay for aspirational job trainings; 2) grant based model where training are conducted from the fund/subsidy of the Government to the training partner; and 3) apprenticeship model which has on-job training and classroom training, where cost is borne by Government and employers.

The speaker gave a detailed presentation of PMKVY through which largely short term skill trainings are conducted. PMKVY now, gives more emphasis to the empowerment, decentralisation, and involvement of the State Governments and the district skilling committees. Their common course norms, and qualification packs are decided by working with the sectors of skill councils, who also act as an input from the business and industry side and they inform what kind of qualifications are required. Then there are thousands of ITI's, private and Government, spread all over India some of which are in Kerala as well. Under SANKALP, a world bank aided scheme, improvement of the ITI's and increase of the job courses taking up new age courses, including capacity building of the District Skilling Committees. The objective is to take a well-rounded approach and a robust pathway while taking care of the education system and of the needs of the industry and business considering the type of training model where the skills can be imparted.

The implementation of national apprenticeship promotion scheme results in the vocationalisation of school education. There is also the short-term training recognition of private learning and the special projects. MSDE is also doing a lot of capacity building programmes in the States. There's a State level skill development mission, the Kerala Academy for Skill Excellence (KASE) in the case of Kerala doing a lot of work in the State which has unique opportunities in terms of a high human development index and a number of migrants. Tiwari mentioned some of the innovative initiatives of Kerala which can be replicated elsewhere in the country.

He stated, based on studies done by them, that through PMKVY trainings, people have greater chances to be employed and get higher salary compared to their counterparts without training. 738 Prime Minister Kaushal Kendras have been established all over India and 19 are in Kerala. These PMKKs are well designed and up-to-date with modern state-of-the-art training centres which can be utilised by the State Governments as well for their training needs. The speaker also observed that there is a need to bring the labour and work together and the labour market information system in the current State job portal is limited. The integrated skill management information system will bring the employers and candidates to a dashboard together ASEEM, to improve the

information flow and bridge the demand –supply gap, although it is a small one; Ministry would be happy for Kerala to come on board.

Kerala's advantages in terms of a relatively higher availability of skilled persons and among clusters in the State, the southern cluster has relatively higher availability of skilled persons and ranks second among 88 clusters in India with respect to Skill Index. The top sectors in Kerala as per information with the Ministry are the transport, logistics, rubber, chemical and petrochemicals, hydrocarbons, IT and construction. The top districts are Ernakulum, Thiruvananthapuram, Kollam and Kannur. Tewari cited the World Eeconomic Forum Report which states that 35 per cent of skills demanded globally will change in 2020 and there will be a 42 per cent shift in the required skills over 2018-22.

The speaker presented some of the future works which are identified by sector skill councils (SSCs). According to a study it was found that after an eight month on-the-job soft skill training programme in PMKKs the trainees will get triple E-Entrepreneurship, English and Employability so that the students or the trainees are also empowered to work in the business with much more understanding of the environment. Understanding the trend, the future skills have been identified by SSCs in partnership with NSDC. For example electrical vehicles are going to grow quite a lot in the coming years and geospatial mapping and other related softwares have been mapped as the future skill requirements. There are certain things which robots will not be able to do. Care work will remain as one of the job providing sectors and future of work will be future of care.

Then he spoke about the skilling and international workforce mobility initiatives; 95 India International Skill Centres (IISC) network member organisations across 535 IISc are available, out of which Kerala has around 15 network organisations across 36 IISCs, 19 sectors and 12 districts. Through operations of *Vande Bharat* many people returned to India. There are some data with the Ministry that can be useful in linking them with the employability. The Ministry of External affairs has initiated Pravasi Kaushal Vikas Yojana in which the pre-departure orientation training (PDOT) is being given to the Indian emigrants before they leave India. So far there is one centre set up in Cochin which is imparting PDOT to emigrants and another one is coming up in Thiruvananthapuram.

He shared some of the skilling collaborations of Government of India with other countries. The Union Cabinet recently cleared one scheme on specified skill workers (SSW) who can go as salaried employees with higher wages rather than as interns to Japan after undergoing training in Japanese language, culture and domain skills. Focus on Specific skill trainings is in 14 sectors with the overseas market in mind. Training for electrician, electrical automotive, plumber, mechanical automotive with skill qualification benchmarks of Saudi Arabia and United Arab Emirates is being given. Ministry is also working with Australia and Germany and other countries. Among best practices in Kerala, Tewari cited Muthoot Fincorp Limited, one of PMKVY special projects where training skill is given to loan processing officers, Centres of Excellence (COEs) funded by KASE and Community Skill Parks of ASAP.

Mr. Srinivas B Reddy, Skills Development: Key Aspects and Good Practices

In his presentation, Mr. Srinivas Reddy discussed some of the global perspectives and key developments in the arena of skill and lifelong learning. While acknowledging that availability of jobs is the most important and fundamental issue, his focus was on the huge mismatch seen between job skills and aspirations. In 2018, 45 per cent employers could not find people with the right set of skills while 1/3rd of the workers suffered from qualification mismatch. In 2020, the skill gap continues to be high, as 40 per cent of workers require re-skilling to match with job requirements. The major question is how to overcome this mismatch. The ILO Global Commission on the Future of Work dealt with these issues at great length, what will future jobs look like and what should be done to meet the requirements, and made three major recommendations: i.investment in people's capabilities;, ii.investment in situations of work; and iii.investment in creating decent and sustainable work. Mr. Reddy's presentation mainly focussed on some aspects of investment in people's capabilities and lifelong learning largely from a public policy point of view.

The speaker observed that in accordance with the changing world of work, outlined by the Global Commission, people need to be equipped with skills for the job opportunities emerging from new economies, (a) digital economy; (b) green economy; (c) care economy; and (d) rural economy. That the rural economy will continue to play an important role in job creation and offer a high amount of jobs in many parts of the world was also highlighted by the Commission In addition to all the on-going sectors of economy some of the new dimensions have been given importance, all of which culminated in the centenary declaration of ILO issued last year, which again emphasised the need for promoting skills, competencies and qualifications for all throughout their working lives and therefore recommended effective lifelong learning and quality education for all. In this background, the ILO –HRD 195 recommendation needs to be highlighted which states that skills development and lifelong learning should be an integral part of comprehensive economic, fiscal, social and labour market policies, very important for sustainable economic growth, employment creation and social development, including the environmental dimension.

From the policy point of view, lifelong learning and skill development as the guiding principle of education assumes importance, mainly because multiple transitions of jobs have become the way of life today; one job for life is a thing of the past. In such a situation the education system needs to cater to the changing demands which go beyond the initial acquisition of skills to empowering people throughout their active stages of life and calls for a new ecosystem for skills and lifelong learning for skilling, reskilling and up-skilling.

The speaker also pointed out some of the key elements of the new generation skills and LLL ecosystem which require economic, fiscal, social and labour market policies, but from an LLL perspective. The process of social dialogue between Government, employers and workers organisations is very important for empowering the existing workers (citing the German VETsystem which gives a decision making role to the three stakeholders). If workers are losing jobs or changing a job or moving to another sector, all round support is necessary to guide them through.

Needless to state, the changing nature of work and changing needs of skills require people to be continuously updating and continuously learning. As foundational skills, there is need to include the learning to learn skill in school education, to inculcate such thinking from early childhood so that people will have the ability to learn some of the core skills and learn to unlearn; similarly some skills are very essential in our daily life, for eg., digital skill and we need to integrate digital skills and green skills into the core skills. The skills must be transferable in an affordable way, and with a credible recognition system by the employers. During his presentation, Reddy also touched upon the topic of Skills and Migration, which is specially important in the context of India and Kerala. At the global level, a global skills partnership on migration has recently been launched with the ILO, UNESCO, the International Organisation of Migration (IOM), International Organisation of Employers (IOE) and International Trade Union Confederation. This is a very important partnership to really look at mutual recognition of skills and qualifications across the countries at global level and within regions. At the global level everybody wants to reduce the mismatch, everyone wants to work with the private sector. Apprenticeships can be an important solution in this regard, an issue to be discussed at the ILC in 2022-23:A New Global Standard.

Some interesting models are emerging on Life Long Learning (LLL) and skills financing, for example in France, Singapore and Netherlands in which the Government puts some amount of money for every person of working age(or above a certain age) to acquire any skill they want according to the demand for labour, allowing workers to up skill and reskill.

He concluded his presentation emphasising key points of the new skill eco system hat sees lifelong learning (LLL) as a guiding principle, supporting people throughout the active stages of their life, allowing multiple transitions in the people's life and similarly focusing on competencies not just qualifications. The competencies that the employers and the industry recognises are the core skills which include skills like learning to learn the changes, adaptability to change, communication, collaboration and teamwork and these are becoming very important in the changing nature of work. It should be socially inclusive, meeting particular needs of women, migrants and informal sector workers. Similarly, flexible learning and recognition options, are to be taken care of and the social dialogue between the industry/private sector, workers organisations and the Government is of crucial importance.

Dr. Santosh Mehrotra (Discussant)

Mehrotra started with a larger comment on the international experiences, largely based on the German dual VET system, drawing out pertinent learning lessons for strengthening skill development in Kerala. He drew attention to the stark difference between the skill ecosystem, as it existed in Germany, driven by employers and industry, which is a demand driven system, as opposed to a skill ecosystem driven by the Government or managed and financed by the Government, as in India which tends by and large to be supply driven.

1. So to strengthen the VET system in Kerala, formal industry has to be engaged in at least four types of activities within their enterprise and outside: i. curriculum design; ii. providing internships to students whether they are VET students or in higher education; iii. engaging in assessment; and iv. placement support.

- 2. Starting with Kerala's traditional sectors, skill eco-system has to be focussed on the service sector within which about nine modern segments have been generating most of the jobs in the last decade and a half. These include the sale maintenance and promotion of vehicles, e-commerce, water transport, air transport, financial intermediation, insurance and pension funds, IT, education and health. Coming to the traditional manufacturing sector, in particular clusters which have been doing well are: agro processing, bamboo, coir, cashew, ship building and then there are a whole slew of MSME's, which are a combination of formal and informal enterprises, for instance grain products in Trivandrum, food products in Kollam, bell metal in Alappuzha, and general engineering in Kottayam and Manjeri. The German experience of collaboration between Government, business chambers and trade unions, teaches us that formal industry could be engaged in skill development in these clusters; in fact support could also be sought from the NSDC to start skilling centres near the clusters.
- 3. In the new knowledge economy sectors, Kerala has enormous strengths, which are well known and the State can become the human resource capital of India. It is also well known that large multinationals from around the world have been locating their research and development centres in India. There are 800 such companies in India. Kerala could put in place a formal policy framework which encourages these multinationals to locate their R&D centres in Kerala, which itself will have multiplier effects in terms of skill generation.
- 4. In addition,Kerala has a very large NRI Malayali community across the globe who are reasonably well off to fund start-up activities through venture capital funding in Kerala. The Government could take action to attract venture capital of Malayali NRIs for start-ups in the technology space and other spaces. At the moment Chinese venture capital is funding a lot of start ups in India.
- 5. As is well accepted there are opportunities for Kerala to be a higher education destination. The higher education gross enrolment ratio in India shot up from 11 per cent of the relevant age cohort of 18 to 23 in 2011 to about 26-27 per cent, in Kerala, it is even higher. The problem is that the higher education system across the country but particularly in Kerala, is generating too many unemployables. So it is critical that at least in Kerala students are to be diverted early towards skill development for which, spending on T-VET must be increased rather than increasing spending on higher education.
- 6. The youth unemployment rates in Kerala are among the highest in the country and have really shot up between 2012 and 2019. Drawing on the earlier point about venture capital, start-up funding is essential. It should certainly be possible for Kerala to promote research in industry parks near its universities. Mehrotra pointed out that here perhaps Prof Lee's HTHT tutoring using AI could prove useful.
- 7. Covid-19 has accelerated digitisation and Kerala's penetration of internet is at 54 per cent. It is certainly the second highest among Indian States. Kerala's universities could offer many more online courses across the country and across the State to enhance employability.

He concluded by emphasising the importance of research in TVET as shown by organisations like BIBB in Germany. In India, very little research is going on in the whole T-VET space and Kerala should learn from this experience; and second, industry/employers should be integral to the assessment process, to assess competency of the person and not just meeting standards, as Srinivas Reddy had pointed out. Mehrotra ended by emphasising the need for national occupational standards.

Prof.Jeemol Unni (Discussant)

Jeemol started her discussion with the reminder that India and many other developing countries have really quite low mean years of schooling. Its average is less than 10 years, slightly higher for women than men, and even for the regular salaried employed, the mean years of schooling is 12. Now all these big and technology-intensive ideas are mounted on this kind of a very low base and hence the base should be strengthened. The schools and colleges should focus that the children learn the attitude towards learning and capacity to concentrate besides their basic skills.

While commenting on Ju Ho Lee' presentation and his ideas of 'learning to learn' and 'projectbased learning', she observed that our schools and colleges should put these ideas into practice rather than simply following the lecture-based systems. Though it is much easier for science and engineering learning, the humanities and economics teachers really need some trainings to be able to do project-based teaching to keep up the children's concentration. Commenting on Srinivas Reddy's presentation, she emphasised the importance of internships for bringing the world of education and the world of work together. Through internships students go to the enterprises and really learn what this world of work actually is, whatever it may be, engineering or economics or management. She cited the example of the Institute of Rural Management's internship programme which goes on three times in their two years, and the children learn most of what they learn right there being put with these organisations that they really have to deal with. Instead of mere internship programmes, colleges and universities should be able to have some kind of career development cells which help to place these students in internships.

Jeemol has given a few suggestions for incentivising the skill trainings based on the existing systems of the educational institutions, schools, colleges etc and skill trainings of NSDC and MSDE, not suggesting any new architecture. The schools, colleges and enterprises with some kind of an incentive system should be able to take up some of the skill training and technical education available in undergraduate colleges, both technical and non-technical ones. These colleges and institutions should be able to actually place their students not just in jobs but in internships, and should have successful placement systems. Second, there is need to have an incentive structure for firms and organisations which undertake on the job skilling. She also stressed the importance of the type of pedagogies regarding the concept of learning, re-learning and up-skilling through short training programmes, videos, quizzes as presented by Gabriel Bordado. In fact Covid pandemic has taught people to shift to a number of new activities, and teaching methods like zoom in order to be able to keep the attention of the students who are standing behind a blank wall.

Thirdly, it is essential to incentivise the educational institutions and enterprises to maintain the diversity, not only in terms of gender, social and economic status but also in terms of the subjects of learning. Diversity is an important learning device. The students should have the opportunity to learn multiple disciplines for the same course. For instance, in IRMA, students from commerce, management and even engineering have to sit in economics class to learn economics. They're learning a new subject and trying to learn to appreciate another discipline, which is extremely important because, ultimately, all new jobs would work in teams. Nobody is going to be working alone anymore and should do a lot group learning, group assignments and everything in groups.

She pointed out that our young generation feels that they are going to have fewer fulfilling careers than their parents or their grandparents as Ms. Sukti had stated. As the nature of job market is continuously changing and job insecurity matters, the lifelong learning question comes in. But there has to be a demand, and the demand has to come from children, students and people who are to learn and relearn. Again, the colleges and schools are very important in this context because they should be able to convey the ideas and basic concepts to the students and make them able to actually apply those concepts in real life. So continuous learning, reskilling and a mindset to learn should be instilled in our children right from the schools and then in colleges and then later in the work spaces.

Key ideas and recommendations emerging from the discussion

- 1. *High Touch High Tech (HTHT) education with the Assistance of Artificial Intelligence (AI):* A new learning system using high technology combined with classroom teaching (human touch) transformed methods of teaching and learning in South Korea, especially after Covid-19, from one of mass standardisation to mass personalisation. An Artificial Intelligence based tutoring system, developed to provide dialogue-based tutoring, can help identify what a student does or does not know and provide better personalised attention to the students with diverse levels of learning. A teacher using AI tutor can develop a personalised learning path for each student. Its success in implementation is seen not only for Universities but also for schools and for skill development.
- 2. Lessons from Vocational Education Training System of Germany: Five success factors Vocational Education Training (VET) system developed by Germany helped it become a manufacturing superpower:

First and most important is the cooperation of Government, the business community, and social partners (employers' associations and chambers and the trade unions), who work together in this system.

Secondly, there are two co-ordinated venues of learning, company and the Government school. Around 70 per cent of learning takes place on the job.

Thirdly, national standards are accepted by all stakeholders. This has created a system that allows mobility within and outside the country.

Fourthly, there are regulations emphasizing the need for qualified VET staff.

Fifthly, Federal Institute of Vocational Training (BIBB) gathers and analyses information and advice regarding further improvements.

- 3. Unprecedented impact of Covid-19 on the labour markets. Covid-19 has caused loss of employment, increase in unemployment, decline in overall participation rates and decline in global incomes. In addition, there has been a shift to inactivity, particularly important for policy makers when talking about skills development for young people. How to get this huge group of young people back into the labour market? Others who have been disproportionately affected by the pandemic are the self-employed, women, low-skilled workers and migrant workers.
- 4. Need to focus on working-hour losses rather than unemployment (as ILO has purposely decided) because in developing countries, unemployment is not always the best indicator of labour market distress.

- 5. An increased burden of unpaid care work was done by women during the "work from home" period. Data also show that men's share of care work also increased, though not as much as for women.
- 6. Women are more represented in the health and care industry, and, therefore, have been more vulnerable to the pandemic.
- 7. *Need of new skills in technology:* Worldwide data indicate that there is a decline in demand for medium-skilled workers. This is particularly important because most young people entering the labour force are actually at the middle skill level, so it requires a rethinking of skill needs. There is a growth in the adoption of robots in manufacturing. This has implications in the long run for new kinds of skills which are more in tune with the new technology.
- 8. Research shows that young people of today seem to have the perception that they will have fewer fulfilling career options than their grandparents did. There is an anxiety aspect to technical achievement and competence. This anxiety is heightened not only by the threat of losing jobs but also by the problems of gaining access to the jobs that are being created.
- 9. *Skilling in Care Sector:* The Covid crisis has shown that there will be a need for more jobs in the care sector. Kerala is already aware of this fact and has a number of schemes in place. The ILO estimates that there could be 269 million new jobs in the care economy. We must ensure that these provide decent employment. Issues related to skilling and gender issues in this sector are to be addressed.
- 10. *Need for reskilling and upskilling:* In its report in 2018, ILO has underlined the need to have a "just transition," which means there will be need to invest in skills, in strong institutions and in the right kind of jobs for the particular local economy. The problem of job losses because of the changes in the labour market and the Covid-19 pandemic will have to be addressed. This will require new training. Although some can be re-absorbed into old occupations, there is a huge need for reskilling and upskilling to relocate workers in growing industries. There are very strong gender implications here, and Governments will have to design gendersensitive policies in this respect.
- 11. *Integrated Policy*: Skill development should be seen as part of an integrated policy for recovery. The ILO has specified five pillars for a global human-centred recovery. These five pillars are:
 - 1. maintain an accommodative macroeconomic policy;
 - 2. assist low/middle income countries with health measures and global solidarity;
 - 3. support the hard-hit groups, especially women, young people, focusing on reskilling and skilling opportunities;
 - 4. promote a transition to a more inclusive society based on social dialogue; and
 - 5. balance the needs of diverging sectors.

From the ILO perspective, the key policy issues are to initiate a human-centred development, create appropriate skills, and invest in jobs and incomes for the people.

- 12. Need to strengthen Technical and Vocational Education and Training (TVET) governance system in South Asia: The governance of Technical and Vocational Education and Training (TVET) needs to be strengthened, as was done elsewhere, for example, in Germany. Three specific takeaways were the following:
 - 1. take a sectoral approach in implementing skills development. The care industry can be a sector on which India can concentrate, transforming it from an informal to a formal sector with requisite training and higher earnings;
 - 2. expand the recognition and validation of skills and competencies; and

- 3. develop more flexible learning delivery systems, particularly considering the difficulties of face-to-face learning during the pandemic.
- 13. What needs to be done:
 - 1. Inculcate foundational skills, including learning to learn, adaptability, team work, innovation, critical thinking from early childhood and basic education.
 - 2. It is vital that Governments anticipate skill requirements. This demands sharper labour market analysis and enhanced social dialogue.
 - 3. Use technology, particularly digital solutions, to promote flexible learning options.
 - 4. Promote Active Labour Market Policies (ALMPs) like career guidance, counselling and support services to facilitate people's transition from school to work, and to facilitate mobility in the labour market.
- 14. Higher education and vocationalisation: A skill ecosystem is influenced by two important factors:
 - 1. Linkage to the modern education system.
 - 2. The requirement of skilling that is driven by industry demand and economic development.
- 15. *Skill qualification framework*: India needs to formulate policies to modernise apprenticeship programmes, now being done as part of an ILO project in four countries.
- 16. *New opportunities and lifelong learning*: In accordance with the changing world of work, outlined by the ILO Global Commission, people need to be equipped with skills for the job opportunities emerging from new sectors, including the (a) digital economy; (b) green economy; (c) care economy; and (d) rural economy. The rural economy will continue to play an important role in job creation. The new skill eco system sees lifelong learning (LLL) as a guiding principle, supporting people throughout the active stages of their life, allowing multiple job transitions in people's lives, focussing on competencies (not just formal qualifications).
- 17. Focus on service sector: The skill eco-system in Kerala has to be focused on the service sector within which about nine modern segments have been generating most of the jobs in the last decade and a half. These include the sale, maintenance, and promotion of vehicles, e-commerce, water transport, air transport, financial intermediation, insurance and pension funds, IT, education, and health.
- 18. *Skilling in clusters*: Formal industry in Kerala could be engaged in skill development in agroprocessing, bamboo, coir, cashew, ship building and MSME clusters that are doing well. Support could also be sought from the National Skill Development Corporation to start skilling centres near the clusters.
- 19. *Formal policy framework to encourage* R *and D of multinationals*. Kerala could put in place a formal policy framework that encourages multinationals to locate their research and development centres in Kerala. Such R&D centres will have multiplier effects in terms of skill generation.
- 20. *Attract venture capital.* The Government can take steps to attract venture capital from non-resident Keralites for startups in the technology space and other spaces.
- 21. *Incentivise skill training*. Incentivise skill trainings, especially at the undergraduate level. There is also a need to have an incentive structure for firms and organisations that undertake on-the-job skilling.
- 22. Incentivise educational institutions and enterprises to maintain diversity not only in terms of gender, and social and economic status but also in terms of subjects of learning.

Session VII Modern Industrial Possibilities

The session on modern industrial possibilities was held on February 2, 2021. Dr K Ellangovan, Principal Secretary, Department of Industries, Government of Kerala chaired the session. There were five speakers in the session. The themes of discussion included latest developments in the areas of logistics and port based industrial development, particularly on opportunities for Kerala, entrepreneurship nourishment and industry-focused research in academic institutions, new industrial possibilities in Kerala, and the South Korean experience in promoting industrial development.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

Industrial production will henceforth play a crucial role in Kerala's economic development.

At the beginning of its tenure, the present Government of Kerala determined that it would utilise the historical advantages of the State with respect to school education, health, social provisioning, and the democratisation of Government to enhance production and the productive forces in Kerala.

Recent policy has shown striking results. The average rate of growth of industrial production in Kerala between 2016-17 to 2018-19 has been 11 per cent, with 11.2 per cent growth in 2018-19. The share of manufacturing in total GSVA of Kerala rose from 9.8 per cent in 2014-15 to 13.2 per cent by 2018-19. Kerala is at the forefront in implementing information and communication technology projects, e-Governance initiatives, and in creation of basic IT infrastructure. In the case of the power sector, installed capacity in Kerala saw an increase from 2835.68 MW in 2015-16 to 2995.87 MW in 2018-19.

Perhaps the most important gain of the last four years with respect to industry, however, has been the transformation of vision and mindset. The Government of Kerala has sent a clear message to India and the world that Kerala invites investment in modern industry. The State approved a new Industrial and Commercial Policy in 2018 with a vision to transform Kerala into a vibrant investment destination, and the Department of Industries has initiated several specific schemes and programmes to implement the 2018 policy.

The session on industry will seek to learn from the best possible advice and best practices in a range of industrial possibilities and themes that are relevant to the State. These include:

Manufacturing in technologically advanced sectors. These include medical equipment, life sciences, and pharmaceuticals. Kerala has also established leadership in certain high-technology sectors, including modern garment production, foundries, construction, value addition in spices and condiments (see [2] below), petrochemicals (see [3] below), synthetic footwear, information and

communication technology (on which there will be a separate session) and other sectors. Kerala derives advantages in these sectors because of the availability of skilled professionals in the State and strong foundations in the areas of health and education. The session will also consider possibilities for cooperation between industry and academia in this regard.

Agro-based and food-processing industries. The potential for the growth of agro-based industries is high in Kerala on account of both supply and demand factors. There are important possibilities for value addition in the case of agricultural products such as rice, coconut, rubber, pineapple, pepper, cardamom, and other spices and condiments.

Petrochemical complex. It is important to build on the existing investments and competitive advantages of Kerala to develop a cluster of industries. BPCL's recent investment of Rs 16500 crore on the state-of-the-art modern Integrated Refinery Expansion Project provides an important opportunity to develop the petrochemical industry complex in Kochi.

Industrial location: industrial parks and industrial corridors. The Government of Kerala's present strategy recognises the importance of industrial infrastructure to the future of industrial development. Under the current policy, industrial parks are to be established either by the Government or with private equity on a PPP mode. Developing a comprehensive road map for the Kochi-Coimbatore industrial corridor will also be of immense value. Kerala can learn from global best practices on a range of issues regarding industrial location, including industrial growth in adjacent areas, managing environmental externalities, and complying with labour and environmental laws.

Modernise traditional industry. The persistence of low technologies is a salient feature of traditional industries, which continue to be important sources of livelihood for a substantial section of Kerala's workforce. The consultation will consider the pathways to modernisation and technological transformation in these sectors.

Public sector units (PSUs). The session will consider ways in which PSUs in Kerala can utilise their resources (including land and buildings and technological expertise) more effectively and emerge as enablers and mentors of industrial growth in the private sector.

Summary of Discussions

Welcome Speech by Dr.Jayan Jose Thomas, Member, State Planning Board

The session started with the welcome speech of Dr Jayan Jose Thomas, Member, State Planning Board. In his welcome note, he addressed all the speakers of the session and welcomed them on behalf of the Kerala State Planning Board. He also welcomed other invitees and attendees. He pointed out that one of the main objectives of the session is to look at the ways in which Kerala's achievements in social spheres including land reforms, education, health can be translated into gains in industrial and employment growth, which is the need of the hour. In his presentation, he mentioned that one of the key strengths of Kerala as having a large pool of skilled workers. The data as on 2011 shows that 1.4 million people from Kerala work outside the State as nurses, doctors, engineers and other technically and professionally qualified workers. It is noted that 1.6 lakhs students join the tertiary education every year in the State.

There are best education and technical institutions in the State like KTU, CUSAT, IIT Palakkad, IIM Kozhikode to mention a few. There is a large domestic market as well in the State where the average per capita consumption expenditure is high. He noted that knowledge driven growth in the economy is the need of the hour in the State. There has been a slowdown in the growth of the working age population in the State. In 2011, population in the age group of 0 to 14 years was 23.4 per cent in Kerala as against 30.8 per cent in the country as a whole and 40.1 per cent in Bihar. There are unique challenges in the State in this regard because of high cost of land and also shortage of manual workers as compared to other States in the country. But at the same time, the opportunity lays in the availability of skilled labour. Hence Kerala cannot go further without utilising the working age population in the State.

He put forward that a striking aspect of recent industrial growth in Kerala was the mushrooming of small and smart firms. There has been a remarkable growth in the State of small and mediumsized firms, and Kerala is emerging as a major investment location in the country. The key areas for potential investment in the State were discussed further. He noted that chemicals and petrochemicals, port-based industries, industrial corridors and big infrastructure projects are the new anchor industries for Kerala. Vallarpadom and Vizhinjham are the two major ports in the State.

BPCL-Cochin Refinery in the petrochemical sector, Cochin Shipyard, which is a modern ship building yard in India, Petrochemical complex in Cochin, pharmaceutical industries and the Industrial Corridor project between Cochin and Coimbatore are the key anchor industries in the State. The State has a huge repository of raw material and market for food and agro processing, textiles and garments etc. Kerala produces a rich variety of agricultural products including rice, coconut, rubber, forest and marine resources. This has the potential to revive agro-based industries in the State. During the year 2017-18, Kerala produced 8.4 billion coconuts accounting for 35.5 per cent of the total coconut production in India. There are big possibilities for innovative products from coconut and he mentioned the example of health drink "neera", which is rich in minerals as an innovative product from coconut water.

Other key areas identified include electronics, life sciences, medical equipment and other knowledge-based industries. The State has been a pioneer in the electronics industry when it set up KELTRON in 1973, which was the first public sector development agency in electronics in India. The technopark was formed in the State during early 1990s. The Life Sciences Park is being set up in Thiruvananthapuram Kerala. The Government has visualised in spatially distributing knowledge based activities in the State. The industrial policy and industrial promotion was discussed and he noted that promoting small firms that are innovative should become a distinctive aspect of Kerala's industrial policy.

The high cost of land and buildings should not hinder the growth of such firms too. He then talked about the Triple Helix of University-Industry-Government model which will shape the industrial policy of the State fostering innovation. The universities in the State and research centres

should facilitate the growth of start-ups and innovative industries. He ended his welcome address by warmly welcoming everyone to the conference session.

Introductory Remarks of the Chairperson: Dr.K.Ellangovan LAS, Principal Secretary, Industries, Government of Kerala

Dr K Ellangovan offered warm welcome to all speakers and specially congratulated the Kerala State Planning Board for organising the timely and informative event. He noted that the State has both challenges and strengths. Kerala has a large advantage as compared to the rest of the States in the country owing to the availability of skilled workers. There are of course challenges too. But the problem is that all the advantages of the State in the social index are not getting transferred into economic terms.

The social bubble created is not getting translated to economic bubble. He identified three bottlenecks to this. He noted that the social bubble created can be translated to economic bubble only if opportunities are created, which is not really happening in the State. The three main interventions in this regard were further discussed. The first one is that the process of getting industrial licences in the State is cumbersome. To overcome this, relevant rules and acts were reviewed and 7 Acts and 10 Rules were considered for amendment to make licensing procedure much easier. Nearly 27 changes have been made in the three acts.

The element of transparency is ensured through operating in the electronic platform. This gives a time dimension for industrial licensing procedures. Also there has been a simplification in the procedures by reducing documentation. Industrial Development Amendment Act 2018, and MSME Facilitation Act 2019 are Acts ensuring easy proceedings for obtaining industrial licence. Automatic approvals can be initiated by reporting directly and can avail licence for 3 years without any stoppage. An ordinance has been passed in 2020 which ensures that any person applying for licence will get the licence in 7 days.

The second bottleneck is infrastructure development in the State. The cost of land is a barrier for industrial development. Creating infrastructure in the State is a must and the State will have to acquire land so that industrial parks will emerge in the State. There are nearly 125 industrial parks in the State. Another bottleneck identified is with respect to the investment barriers in the State. The State has a good pool of highly skilled human resources which will make the State a desired destination for new investments. There is good connectivity ensured through sea and air in the State. Hence the new industrial activity can be redefined along with logistics which will help in evolving more industrial parks in the State. All these aspects will ensure that Kerala will turn out to be the desired destination for all including other States and not just NRIs. It has to be noted that in the last 4 years, 43 per cent of MSMEs were created in the State with no flash strikes and no disputes. There should be a conscience based investment in knowledge based industries with skills set matching and position engineering in areas like electronics, manufacturing, defence, food processing etc to name a few. The next industrial policy and procedures should bear this in mind to be incorporated in the future.

Latest Developments in the Areas of Logistics and Port based Industrial Development particularly on Opportunities for Kerala: Mr Rizwan Zoomar, MD and CEO, DP world-port and logistic.

Mr.Rizwan Zoomar, noted that Kerala is a State full of growth opportunities. To realise the opportunities, infrastructure development, multimode logistic parks, and port support are required. He pointed out the key advantages from the investor point of view in the State. The State has been exporting oil, cashew and spices for a long period.

The coastline and maritime perspective is important as it forms one of the biggest advantages from logistics and trade network. The Vallarpadom project started operation by 2011 and it has turned to be a major leap for trading. The multi-mode connectivity has ensured transportation of essential commodities through such connectivity especially during the pandemic situation. The digital platform has evolved further owing to post pandemic situation. It has been noted that more opportunities need to be developed through integration of logistics in the State. For every 10 per cent increase in logistics, the exports will increase exponentially. For this to materialise, integration of logistics is required. There is an estimated loss of nearly Rs 300 crore per year in Indian ports because of connectivity issues.

The Government of India and Government of Kerala along with Cochin Port Trust is trying to make charges more competitive as compared to Colombo through Vallarpadom. Another thing to be considered in this regard is that the inland water ways which offers low cost connectivity as a key advantage is not currently utilised in the State. About 85 per cent of the connectivity to Vallarpadom can be ensured through inland water ways. Hence it is recommended to enhance the infrastructure of minor ports. The tranship mode and incentivising the inland water ways has to be enhanced. Yet another aspect discussed by the speaker was with regard to the cold chain logistics especially for the food processing industry. The Middle East countries rely largely on India for frozen foods.

He assured that DP world can be the first free zone which can ensure free trading for handling value added services through Vallarpadom. Kerala can thus emerge as the trading and transhipment hub. UAE and Kerala has deep associations rooting back to many years and free zones in Jabal Ali and DP world can promote the export from SMEs in the State by offering nearly 60 million sq ft of free zone area to house nearly 20,000 traders especially the Small and Medium Enterprises in the State which will ensure all potential advantages. The global customers will buy their goods warehoused there.

On a concluding note the speaker noted that SME products can be showcased through digital platform in free zones and DP world and the State will have to evolve strategies to ease the operations in supply chain and logistics. He concluded saying that DP World is bound to modernise Kerala's economic platform revival through upcoming entrepreneurs.

Entrepreneurship nourishment and industry focused research in academic institutions, particularly the experiences of IITs: Prof.V.Ramgopal Rao, Director, IIT Delhi

Prof Rao started the session by analysing the current status of India's Research and Development activities. He highlighted the following points.

- 1. India ranks 3^{rd} in the world in terms of research output.
- 2. India's share of scientific publication is 5.31 per cent as compared to 20.67 per cent of China and 16.54 per cent of USA.
- 3. But the growth rate of India has risen by 11 per cent in scientific publication as compared to the world average of 4 per cent. India is ranked first in terms of "paper written"/"dollar spent".
- 4. In areas like Nanotechnology, India is ranked 3rd in the world. We need to focus on the impact and transaction of this knowledge into wealth and that's exactly where we are lagging behind.

He discussed about Indian academia's 'Morrill' moment. It has been noted that in the last ten years, our Higher Education Institutes (HEIs) have become more research oriented. Indian R&D is still driven by North American and European models. In mid 1800s, good colleges in the US followed England and Germany model oriented towards classics, theology and natural sciences. Land Grant Universities in US under the Morrill Act of 1862, focus on "such branches of learning as are related to agriculture and the mechanic arts which created centres of research that mattered to the country.

The speaker noted that we are now in the Morill moment. Our research has top-down approach, ie, solution to a problem rather than solution looking for a problem.

The National Education Policy is a step in the right direction. We actually need funding agencies that match problems, grants and talents. Looking into the academia in HEIs, he noted that education ensures knowledge dissemination and R&D ensures knowledge generation. But innovation is missing. We need ministries directly linked to academia to look into problems in the society. Innovation is applying knowledge to real problems for wealth creation. R&D has to lead to innovation. That is how knowledge becomes wealth. We need relevance and delivery (R&D) to create wealth through knowledge.

There are lots of problem in India. More than half of Indian population is under age of 25 years, and one million people a month are expected to join labour force over next decade. There is security, energy and huge water crisis and problems in agricultural sector as well. Hence choosing research problem in academia in India has to be analysed in depth. It is noted that 70 per cent of the research problems originate in libraries and end up in library. There should be rural internships for practicing doctors, engineers, and technocrats which will help them in identifying societal problems.

The industry has sufficient R&D problems. They also possess infrastructure and funding. It is essential to bring research in industry and education closer. What we need are POPs who are Professors of Practice. The experts from industry can take sabbatical and join academia even without being a PhD scholar as he has ample years of industry experience which will help other research scholars and new start-ups.

There should be interactions with strategic agencies like DRDO, ISRO, DAC, ICAR, and security agencies. This will help in choosing research problems relevant to the society and coming up with practical solutions for the same. The speaker mentioned about 5 Platform Technologies as Information Technology, Bio Technology, Nano technology, Cognitive Technology and Quantum Technology. He went on to analyse the changes required in academic institutions.

It is noted that there are a lot of research happening in the academia, but we actually need to strengthen the Relevance and Delivery aspects. Academia is in fact good at research, bad at development and poor at delivery. A lot of good research is happening in academia needs to strengthen relevance and delivery aspects.

Institutions are like idea factories. Our job is to bring unlike minds together, create the right atmosphere and structure the interactions. Unlike minds can be brought together through joint degree programmes, international students and faculty which will bring together people from different cultural backgrounds. There should be different disciplinary training through SIRe, SOPP, and DMSM and different attitudes through research parks, industry collaborations, POPs, and City Knowledge Clusters. There has to be start up push through Faculty Innovative Research Entrepreneurship (FIRE) as in IIT Delhi, student start up action plan, rural internships, alumini connect, and angel investments. Through FIRE, the faculty can avail paid leaves with sabbatical or become entrepreneurs with grants. There are incubators with facilities for prototyping and support for manufacturing is also ensured in IIT Delhi. In IIT Delhi, research funding is gone up and there are nearly 60 per cent faculty engaged in funded research projects. With these words the session was concluded.

Dr.K.Ellangovan mentioned the session as excellent for industry promotion with respect to identifying the disconnects and how to revive it. He specially congratulated IIT Delhi for their FIRE initiative.

The possibilities for industrial and economic development in rural and semi urban areas on account of changes in communication technologies: Ms Daisy Chittilapilly, MD, Digital Transformation, CISCO.

Ms Daisy Chittilapilly started the session noting that Kerala is a State full of unique opportunities. Cochin International Airport Ltd was quoted as a perfect example for PPP model development phase in Kerala. But the water logging issue in CIAL noted during two major floods in the State proves that there needs to be balance between the opportunity and sustainability. There are lots of opportunities in the State but at the same time, sustainability issues remain unattended.

She noted that there are highly skilled talents in the State spread in different parts of the world, but there is a need to take care of the reverse migration as well. The State has highly literate women population. More than 92 per cent of women in Kerala are literate and more than 40 per cent of them are digital savvy which is above the national average.

Another aspect is that Kerala is a large consumer State which depends largely on other States for essential goods. This has to be borne in mind when we talk about the opportunities. The pandemic has made us to think about the gap between the opportunities and sustainability. The pandemic

situation is in fact reshaping the new world through rebuilding trust, where digitalisation takes the centre stage. There is an emergence of new business models as there is a change from physical world operations to digital world operations.

She quoted the example of having online medical consultation in the State during the pandemic situation. Banks are now asking for fewer papers for processing. There is an increasing transparency in business operations. So what does this mean for the State of Kerala;

- 1. Rise of the digital consumer and work force.
- 2. Distributed and balanced economic growth.
- 3. Globalisation of the talent
- 4. Localisation of businesses
- 5. Reinvention of supply chain activities.

Kerala is the first State to recognise work from home option. So in life beyond Covid too, companies like TCS are assuring more than 80 per cent of its workforce to work from home. The jobs are getting digital and hence can be performed online which makes globalisation of talent across national boundaries. The reinvention of supply chain leads to more localisation of business.

There is an impact on the manufacturing sector as well. It is now more of value addition and enhanced technology as the degree of automation is now high. Kerala, unlike other States that do not have the legacy to deal with workforce, gained advantage through changes in the manufacturing sector. Hence value addition was a boon for Kerala in manufacturing sector. Multimodal logistic hubs have to be developed in a conducive manner in a State like Kerala. This is possible only through knowledge supply chain.

The future-proofing Kerala includes the following.

- 1. Digital literacy
- 2. Local innovations push for ecosystem development.
- 3. Centre of Excellence
- 4. Sustainability everywhere
- 5. Rise of digital Kerala

Ms Daisy put forward the idea of future-proofing Kerala which denotes digital literacy and local innovation push for ecosystem development. This would help Kerala to emerge as a Centre of Excellence. There will be sustainability everywhere and will pave way to the rise of digital Kerala. The ecosystem should lead to growing entrepreneurs in the State. She quoted the example of Byju's app created by a Keralite but he had to switch it to a city like Bangalore due to less support from the State ecosystem. Industries are looking for the rise of new digital skills. Kerala has a lot of superpowers with respect to its diaspora, greenery, Ayurveda, natural resources, and highly skilled human resource. Technology will be Kerala's new superpower. With these words she concluded the session.
South Korean experience in promoting industrial development and the economic growth possibilities for Kerala in the emerging global order: Prof M. Jae Moon, Director, Institute for future Government studies, Yonsei University

Prof Moon noted that the State should focus more on digital technology and digital Government for development of the State. He started off by comparing the per capita income of South Korea and other countries over years to show the growth. He also showed images of massive infrastructure development that South Korea undertook. The initial projects were futuristic in approach. Initially people thought it was a crazy idea to build highways. There were only limited cars in the country at that time. However, the nation reaped the benefits years later. South Korea didn't have much of the natural resources. So they imported natural raw materials and exported finished goods for which they required better infrastructural facilities.

He then mentioned about the chronology of the State and industrial policies and portrayed how the underdeveloped closed State changed to the developmental State during 1970s and 1980s in Korea.

He then discussed about the initial strong interventionist policies. There was a strong industrial policy in the country. He quoted the example of Samsung in the electronic industry sector. The control of finances were managed through Government and they called it Gwanchi financing. There were State planning for industrial policies and export targets and there was strong role of economic planning board and there was maintenance of low wage policies and protection of domestic market as well.

There was a new push in Korean economy in 1960s and later in 1970s for heavy and chemical industry from the 3rd economic development plan. There was readjustments and catch ups in 1990s which paved way to knowledge based economies and changes in industrial policies. There was a blend of export oriented policies, Government driven industrial policies and low income but good quality of labour with education policy. The upgrading of Korean industries were analysed by the speaker. The light industries gained push during 1960s, making way for heavy industries in 1970s, initiating digital industries in 1990s and advancing digital industries in 2000s. South Korea also succeeded in joining efforts of government officials, government think tanks, business federation, research organisations, and educational institutions. Thanks to the growth of the private sector, the five years economic development plans were replaced by a longer term economic strategies.

The new industrial policies by the Korean Government to deal with the new post covid era were also analysed. There is a Digital New Deal as DNA (Data, network and AI). South Korea is creating a digital ecosystem based on DNA and the Government is investing \$ 50 billion USD. This will create smart factories, digital twins, Education and Trance Infrastructure, Non-contact industry like telemedicine, and digitalisation of smart cityc. Another deal is Green New Deal which deals with Green Energy and Bio industry.

The critical shifts in South Korea were also analysed. The strong industrial policies were changed to smart industrial policies. There were Government initiatives and regulations to corporate initiatives. He analysed issues and recommendations based on his work in India with ADB. There were mismatches in economy, education, innovation and ICT. There is mismatch between industry and labour with respect to labour supply and demand. R&D and industry need entrepreneurship and support for entrepreneurship.

He recommended that the State of Kerala needs to establish industrial policies that support strategic manufacturing and green industries. He illustrated pictures of railway track having a width of 1.5 m, horse wagon with wheel width of 1.5m, roman chariot with wheel width of 1.45m and the diameter of rocket engine with 1.45 m width. All these denote that we still don't wish to change it. We are still wandering in the roman and horse wagon era. What we need to change, is the capacity of the State and the economy.

The need of building a modern and technologically vibrant industrial sector in Kerala: Mr Tony Thomas, former CIO, Nissan Motors

Mr Tony started off by mentioning that Kerala can be a leader in digital economy. There are maimly 3 types of economy-the Agrarian economy, the Industrial economy and the Digital economy were mentioned. He noted that Kerala has been the spice capital of the world. Kerala has been the leader of the global spice trade for ages. Kerala had one of the first airports in the country. Kerala encouraged maritime trading. Analysing all these aspects, Kerala should have been an economic leader which never happened and that needs to be analysed further.

Kerala is currently living with borrowed resources. Most people spend their prime age in countries like Middle East. Kerala never gave enough care for economic development through industrial development. The digital economy has to be enhanced through horizontal and vertical integration and connectivity. He quoted the example of Uber which did not own a single vehicle, but became the largest cab service in the country because of its connectivity. Digital industry is developing fast. Connectivity is expanding. Industries can go digital now.

India will be the preferred destination for digital operation of industries. Kerala lacks in corruption which is an added advantage. The companies will reskill and upskill the human resources. Hence companies will choose to opt to a location with skilled talents. Digital skills require more than programming to include leadership, coordination and other analytical and cognitive skills.

We need more entrepreneurs, need more social structures like good transportation, health and safety measures, hygiene and related measures. Proper air connectivity has to be enhanced. Kerala should have a crisp story, good home rapport with investment promotion policy and brand ambassadors for digital industrialisation to attract investors from across the globe.

Dr Ellangovan analysed the summary of the presentations and noted areas of action on digital economy and connectivity, how to make use of digital talent, social infrastructure development, consensus on air connectivity and the need for empowered investment boards which will give power to give approvals at a very short notice.

Dr.K.Ellangovan introduced four discussants who were Mr.C.Balagopal IAS (Rtd), Mr.Alkesh Kumar Sharma, MD of Cochin Metro and CEO of Cochin Smart City, Mr.Robin Alex Panicker, Partner of Unicon Venture and Mr Noushad from VKC Group.

The discussion started with Mr.C.Balagopal. He said that one thing that passed unnoticed in the session was that the manufacturing sector in Kerala has been restructured from the traditional sector to technology build up which has enhanced the level of manufacturing companies in Kerala. He noted that the Triple Helix concept has to be taken up seriously and this has to be developed as a platform where the synergy can be truly worked upon. He posted a question to Director IIT Delhi Prof Ramgopal Rao on how we can formalise Triple Helix concept to a platform structure to enable this to happen at the shortest time.

Mr.Alkesh Kumar Sharma congratulated the initiative of the Planning Board and Mr.Jayan Jose for the choice of the speakers as well. He noted that the Korean model inputs have to be studied and we should infact look at the value and not at the volumes. Skills should meet demand. Academia and industry interaction should be more. We have to identify sectors and focus more on that. He also noted that the port based logistics as put through by Mr. Rizwan of DP World will help the State to be more export competitive. Kerala has put up good infrastructure in past few years. We are part of industry corridor activities. The investors want their investment to be safe and procedures are less cumbersome. This will lead to more investment opportunities in the State. MSME is becoming the backbone of the State economy. At the same time, the manufacturing sector has to be revived as well.

Mr.Robin Alex Panicker mentioned about start-ups in the State which is not only about IT start ups. Start-ups need to come in other sectors like food technology, education, health care etc which has to be considered for start-up policy. The start-up policy has to be broadened to incorporate these aspects. He shared that it's easy to start up a technology start-up in Kerala as compared to starting up a Chicken farm, a problem that has to be seriously reviewed. Other sector start-ups should also be initiated. Kerala is still focussing on companies formed by natives. We should give more focus on entrepreneurs from other States as well. We need to have policy direction to attract entrepreneurs in health, education sector etc from other States to set up their start-ups in Kerala.

Mr Noushad from VKC Group appreciated the initiative of the Planning Board for organising such an event. He worked in the MSME sector and hence started off with the footwear industry. VKC is one of the leading in hawai chappals. But technology has changed and though the raw material rubber is available, hawai chappal in Kerala is being pushed back by companies from other States. Hence he noted that a handholding is necessary for such industries. New technologies are coming up in footwear industry. Lots of innovation is happening. Kerala needs to move faster and the thought process of knowledge based and innovation industries has to be enhanced not just in foot wear industry but to other consumer goods industries as well. We need to hand hold the MSME industries. Service level industries also require a lot of hand holding. He mentioned that they approached Central Footwear Training Institute to open a training centre in Kerala. Such training and educational institutes should come to Kerala and educate us more to take the industry to next level. There is still plenty of land available in Kerala and there is no scarcity of land and the cost of the land is also not that high in Kerala. But we need more of industrial parks which will help the industries to flourish in a faster pace. With this the panel discussion ended.

Prof Ramgopal Rao answered the query raised by Mr.C.Balagopal. He mentioned the activities being done at national level in IIT Delhi which is working decently now. He explained that PhD

fellowships from industry are required. The industries can offer at least 50 per cent of fellowships where the industry can highlight the problems which require research solutions. He also mentioned about the CSR funds which the corporates can spend certain percentage in academia for research. Local industries can put in money for local academia, which will yield more results. This will go a very long way as the barriers will be slowly diminishing between the academia and the industry. He also mentioned that Professors of Practice (POP) wherein the industry expert having deep knowledge in the industry without a PhD can come to academia and help the scholars in the research part. Development of tech parks with innovation and research parks has to be made in academic campus as well. IIT Madras has taken a lead in this. The companies need to work with the students and faculty. They need to deeply engage with them and they can survive in the campus with less rentals.

Dr K.Ellangovan viewed that in contract manufacturing in footwear industry, the designing is made in Italy and the product is made in India. Hence there is always a wide gap between the design phase and the actual production phase. He noted that the industry academia interface needs a prototype which will help to commercialise later through handholding of universities. He noted that many of the universities in Kerala were approached for this but nobody responded. Handhold of the start-ups will help in commercialisation. He noted that latest budget has huge allocation for start-ups and innovations. Industries can develop prototypes to commercialise by joining hands with Government of Kerala. Hence to start this initiative in Kerala, first we will have to try to handhold national institutes to start with. Huge manufacturing clusters are initiated and logistics and innovation parks are in pipeline. Government funded research and innovation centre should be there in Industry Park. The planning board can keep this in mind. R&D should be undertaken by collaborating with industry and academia. The customer has the highest expectation as they are customer centric and the business activities should focus more on customers. It is been said that every one hour time spend by the manager with his employees will lead to manifold results in overall productivity. Dr.K.Ellangovan mentioned about his visit to Switzerland wherein he analysed that the MSMEs therein are almost at par with MSMEs in Kerala. Kerala has skilled resources with excellent connectivity and ease of living with a moderate climate and natural resources. Kerala will be the best living destination in the near future. He noted that all the presentations were excellent in knowledge dissemination and this treasure of information will have to be put back on policy formulation. With this, Dr.K.Ellangovan concluded his words.

Mr Joy N R, Chief, Industry and Infrastructure Division, Kerala State Planning Board to delivered the vote of thanks. In his vote of thanks, Mr Joy noted that all the sessions will help the Government to gain a better understanding of what needs to be focussed in coming days. He extended his gratitude to Dr.K.Ellangovan for introducing the session and leading the sessions. He thanked Mr.Jayan Jose for designing the session. He thanked all the invitees, attendee's, event managers, the anchor and all those associated, for making the session truly grand.

Key ideas and recommendations emerging from the discussion

1. Kerala's future economic growth should be led increasingly by knowledge-based, high technology, and innovative industries and sectors. Chemicals and petrochemicals, port-based industries, industrial corridors, and big infrastructure projects are the new anchor industries

for Kerala. Other key areas include electronics, life sciences, medical equipment, and other knowledge based industries.

- 2. Kerala's distinctive advantages include workers and entrepreneurs in the State who are educated, with many of them professionally qualified and having exposure to new technologies and the wider world.
- 3. Another advantageous factor is the large domestic market in the State. With a population of close to 35 million (in 2012), and one of the highest levels of per capita consumption in the country, Kerala is a large market for a range of new-technology products, including electronics, IT, and health-related products.
- 4. Industrial growth in Kerala could be led by small and medium enterprises enterprises that are innovative and high value adding. The promotion of small and innovative firms should become a distinctive aspect of Kerala's industrial policy.
- 5. As a key aspect of industrial policy, Kerala should adopt the "triple helix" model of University-Industry-Government interactions to foster innovation and industrial growth. Universities and academic and research institutions in Kerala should take the initiative to promote the growth of start-ups and innovative industries.
- 6. Kerala should aim to create new infrastructure that is conducive for industrial growth. In industrial parks that have been set up across the State, promotional agencies should evolve policies that reduce the initial cost to be borne by the entrepreneur on account of land and buildings. This will be a good route to facilitate entrepreneurship in the State.
- 7. Multimode logistic parks and access to port facilities are important to tap the industrial growth opportunities in the State. Multimodal logistic hubs have to be developed in Kerala.
- 8. Given the State's long coastline and with the establishment of the two major ports in Vizhinjam and Vallarpadam, Kerala has the potential to emerge as a major player in port-based industries, logistics, and in activities related to international trade and distribution.
- 9. Kerala should take steps to improve infrastructure in minor ports across the State and to promote the use of inland waterways. An effective inland water transport system can go a long way to reduce costs associated with the transport of industrial goods, including cement and heavy chemicals, in Kerala.
- 10. For the promotion of the food processing industry, Kerala should set up cold chain logistics across the State.
- 11. The State should take steps to bring research in academic and research institutions and industry closer. Universities in Kerala could learn from the experience of Faculty Innovation and Research-driven Entrepreneurship (FIRE) in IIT Delhi.
- 12. Startup policy in the State has to be broadened to incorporate sectors other than IT, including food technology, education, and health care. There has to be a push to encourage startups across the State. There should be specific measures to encourage startup plans of students and startups in rural areas. Angel investors and alumni investments need to be encouraged.
- 13. Future-proofing of Kerala is important. This refers to the promotion of digital literacy and local innovation and the creation of an ecosystem for development. These steps will help pave the way for the emergence of digital Kerala.
- 14. Kerala needs to have industrial policies that support strategic manufacturing and green technologies. In the evolution of industrial policy, Kerala could learn from the experiences of South Korea and other East Asian countries.

Session VIII Tourism

The session on tourism was held on February 2, 2021. The session was chaired by Dr Venu V, Member Secretary, Kerala State Planning Board. The Honourable Minister for Tourism, Shri Kadakampally Surendran gave the welcome address. There were five speakers in the session. They were Mr Suman Billa, Director, Technical Cooperation and Silk Road United Nations World Tourism Organisation (UNWTO), Madrid; Ms Christina Beckmann Vice President, Global Strategy for Adventure Travel Trade Association and co-founder Tomorrow's Air; Dr Nimit Ranjan Chowdhary, Professor Department of Tourism and Hospitality Management Jamia Millia Islamia; Dr Harold Goodwin, Founder Director, International Centre for Responsible Tourism, United Kingdom, and Mr Dipak Deva, Managing Director, Travel Corporation India Limited. The session discussed changing trends in international tourism, Responsible Tourism, segmentation in domestic tourist arrivals, Government investments in tourism, and skill development in the sector.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

International tourist traffic has grown consistently growth over the years, reaching a figure of 1.4 billion arrivals in 2018. In the wake of the Covid-19 pandemic, international tourism has been hit significantly, with estimates of the recovery period varying from one to several years. United Nations World Tourism Organisation (UNWTO) estimates that international tourist arrivals could drop 60 to 80 per cent in 2020, with revenue losses of up to 1.2 trillion USD.

The tourism industry in Kerala is characterised by its world-renowned brand, consistent growth, diverse products and multiplicity of local enterprises. Although international tourist arrivals and domestic arrivals have shown steady growth over the years, growth was affected by the natural disasters faced by the State in 2018 and 2019, and hit severely by the pandemic.

We draw attention to certain specific characteristics of the tourism sector in Kerala:

- 1. Over 90 per cent of tourist arrivals are domestic tourists, that is, from other parts of India.
- 2. The sector provides foreign exchange earnings of Rs 8,746 crores and earnings from domestic tourists of Rs 19,475 crores a year
- 3. The districts of north Kerala account for only 5 per cent of total international arrivals.
- 4. Over 80 per cent of enterprises in the tourism sector are small and local enterprises.
- 5. Official figures show a substantial impact in terms of contribution to State GDP and employment; at the same time, the impact of tourism on the economy needs more detailed study.

The session on tourism will consider the following themes:

Changing trends in international tourism: this theme will examine international trends in tourism, drawing on studies on changing preferences of international travellers. Experiences of similar and competing destinations will be analysed in order to gain insights into new markets and segments that need attention.

Responsible tourism: Kerala has taken the lead in implementing the concept of responsible tourism in selected destinations, and is seen as a world leader in promoting equitable tourism, providing benefits to local communities and inculcating values of environmental and cultural responsibility. This session will examine how to broad-base responsible tourism, and the future economic impact of the programme.

Segmentation in domestic tourist arrivals: The growth of tourism in Kerala depends on its position as an attractive destination for domestic tourists. Outbound tourism pushing travellers to destinations abroad will be the biggest competition for Kerala. This session will examine the strategies that the State needs in order to become a destination of choice for various types of domestic travellers, particularly the young professional, the adventure tourist, and the nuclear family.

Government investments in tourism: India – and Kerala – has followed a peculiar public investment model, with government funds being channelled to build infrastructure in destinations. This is in contrast to other parts of the world, where such investments are made by local governments with a view to attract more local investment.

Skill development in the tourism sector. This session will look at human resource requirements in tourism in different parts of the world, and examine how the youth of Kerala can be better skilled to take advantage of emerging opportunities both within the country and abroad.

Towards sustainable growth: Global tourism, before the pandemic, grew 4 per cent annually. South Asia registered a higher growth rate (5 per cent per year), while India was one of the high growth destinations in the region. After strong growth in the first decade, Kerala has seen a declining trend in the growth rate over the last eight years, with 1.1 million foreign tourist arrivals in 2018, an increase of 0.4 per cent over the previous year. On the other hand, domestic arrivals have registered a consistent trend, growing 6 to 7 per cent annually, with 15.6 million arrivals in 2018 (a year-on-year growth of 6.35 per cent). We should aim for a target of 10 per cent per annum growth in foreign arrivals, while maintaining 7 per cent growth in domestic arrivals. The session will examine the strategies and programmes that are needed to meet these targets.

Summary of Discussions

Welcome Speech by Dr Venu V, LAS, Member Secretary, State Planning Board

The session on tourism started with the welcome address by Dr Venu V, IAS, who was also the Chair of the session. He welcomed the speakers and participants of the session. He stated that Kerala brand is well known. Kerala tourism has been recording consistent growth. Tourism industry in the State is characterised a preponderance of local enterprises. He remarked that Kerala tourism is going through one of the biggest challenges that the industry has ever faced over the

last few years with several enterprises closed and thousands becoming jobless after the onset of Covid-19 pandemic. Kerala had to face natural calamities in 2018 and 2019. The tourist sector has slowly started rebounding but 2020 has put tourism back by decades. He remarked that there is always an end to the pandemic and that is the opportunity where the tourism sector should look into. This conference seeks to gain the right guidance and inputs on future of responsible tourism in the State, segmentation of tourists, and the type of skills required.

Introductory remarks by Sri. Kadakampally Surendran, the Honourable Minister for Tourism

The Honourable Minister for Tourism stated that Kerala has put a mark in the global tourism scenario and is a model for other States in India. He said that 10 per cent of the total GDP of the State comes from tourism and the sector employs around 15 lakh people. He also highlighted the Responsible Tourism initiative by which local people are benefited and tourists are given an experiential trip. He said that the Tourism Policy of the Government has given focus to adventure tourism, promotion of Malabar region with the River Cruise Tourism Project, Kochi Biennale, heritage tourism focusing Thalassery and Alappuzha, Chalai market, and SM Street. He pointed out that the Covid-19 pandemic has affected lakhs of people in the sector making them jobless. The Minister pointed out that the Government has come up with a scheme of providing low interest loan of up to Rs 25 lakhs for the tourism industry. He remarked that crisis is temporary and the sector will recover soon.

Future of Tourism in Kerala, Mr Suman Billa, Director, Technical Cooperation and Silk Road, UNWTO, Madrid

Mr Suman Billa said that UNWTO has officially announced that 2020 is the worst year in the history of tourism. International tourist arrivals are less by one billion and 120 million jobs have been lost globally. Experts think that tourism will reach pre-pandemic levels only by 2024. It is believed that the sector would kick start in the third quarter of 2021. He pointed out that it all depends on the efficacy of vaccines and the speed at which it is produced. He said that it is important to have co-ordination of health protocols and develop principles of trust so that people would travel. According to him Kerala has the following advantages.

- 1. Authentic tourism products and experiences based on consumer trends and changes.
- 2. Leader in Ayurveda and holistic health care
- 3. Houseboat and their self-isolating nature.
- 4. Less crowded destinations where there can be social distancing.
- 5. Homestays

The State needs to work on international health protocols and branding the same to win the customers heart. Kerala needs to focus on domestic tourism. He pointed out the need to focus on digital marketing as well as depending on online travel platforms. There is a change in demography of travellers and now the tourists are going to be youth. Tourism products have to be developed keeping view of this change. Another point he raised was the need for retaining tourism talent within Kerala. There is the Kerala Institute of Travel and Tourism, a leader in training. The industry has a big responsibility for retaining the talent.

He suggested deepening engagement with market – Kerala needs a compelling story. Kerala should work and create a new story on "Spice Tour." Kerala is a melting pot of cultures, traditions, and history and has historical linkage with many countries. Tourists from these countries can come to Kerala and find traces of their heritage.

Future of Active Holidays, particularly for destinations like Kerala Ms Christina Beckmann – Vice President, Global Strategy for Adventure Travel Trade Association and Co-Founder Tomorrow's Air (Recorded)

Ms. Christina Beckmann explained the future of active holidays, particularly for destinations like Kerala. The desire for natural destination, sustainability, and understanding emissions are the reasons for the visitor's returning to a destination.

On basis of a study, US Adventure Traveller Sentiment, June-July 2020, conducted with the support from Euro Monitor International and Travel Trade Association, she reported that 53 per cent of the travellers intend to vacation abroad. She also noted that adventure intensive, experience based, and cultural explorations are the key factors for Kerala.

Another survey conducted in 2019 with 2500 respondents from USA and Australia on the subject "shaping the future of adventure and cultural travel" included 3 key personal favourite activities of her of Kerala – adventure intensive, experience samplers and cultural explorers. These activities can be broad based as immersive local community experiences, culinary and food focused holidays, camping, backpacking, hiking, snorkelling, horseback riding and bird watching. The possibilities of planned itineraries mixed with cultural heritage and outdoor activities, visiting heritage sites, emphasising independent and self-guided tours could be explored in Kerala. Keeping sustainability in mind, the use of local supplies and materials, using eco-friendly modes of transport, educating visitors on how to identify local suitable products should be taught. The study also stated that carbon emissions results from all aspects of tourism experience. There is no single entity that is responsible for the emissions being driven by global tourism. Emissions are driven by all players in the supply chain at different levels. Ms. Christina Beckmann was of opinion that excellent world class training should be given in skill development in the sector. All forms of tourism, especially heritage and spice tourism are required to be promoted with responsibility and it will be a reality check when the industry emerges.

Tourism Marketing in a Post-Covid Scenario, Prof Nimit Ranjan Chowdhary, Head of the Department, Department of Tourism and Hospitality Management, Jamia Millia Islamia

Prof Nimit Ranjan Chowdhary, Head of the Department, Department of Tourism and Hospitality Management, Jamia Millia Islamia explained the role of effective tourism marketing in the post-Covid scenario. He explained two important factors influencing tourism – qualifying factor and vantage factor. Qualifying factor implies the bare essentials that are required at a minimal level, if not it will grossly dissatisfy the customer. It includes health and hygiene protocol, safety and security along with modern technology with digitisation. In vantage factor, even though the absence of them does not dissatisfy the customers, its presence excites the customers.

Mr. Nimit also added the importance of transformation in this period. He said that commodity,

product, service, and experiences are the inputs whereas the outcome will be transformation. All travel is transformational and there is distinct shift from destination attractiveness to travel motivation. Only the feel of experience is not transformational. Transformation is elevation to a higher level, physically fit, mentally agile and spiritually elevated. Transformation travel means making time for unplanned exploration, restorative wellness activities or making efforts to learn about native flora and fauna. Tourists want to be with nature most of the time, so interaction is required with local community to create moments of awakening, deeper human connectivity, and creating soulful bonds that may have long term transformation effect. He concluded that transformational travel is a life changing experience and it will pave way for personal growth and challenge, accomplishment, achievement, gratitude, and mindfulness. He also emphasised that conscious efforts are required for facilitating transformation by survival and revival in this Covid scenario.

Responsible Tourism, Dr Harold Goodwin, Founder Director, International Centre for Responsible Tourism, United Kingdom

Dr. Harold Goodwin, Founder Director, International Centre for Responsible Tourism, United Kingdom described the responsible tourism initiatives of Kerala. He pointed out the critical difference between sustainability and responsibility. He narrated the importance of responsibility which is to respond, to act and to create change in acknowledging and owning up the problems for making changes. He also added that responsible travel minimises negative environmental, social and cultural impacts and it generate greater economic benefits for local people and enhances the wellbeing of host communities by improving working conditions and access to the industry. Dr. Harold said responsible travel involves local people in decisions that affect their lives. It makes positive contribution to the conservation of natural and cultural heritage and to the maintenance of diversity. He added that responsible tourism provides more enjoyable experiments for tourists through meaningful connections with local people and a greater understanding of local, cultural and environmental issues. It provides access to persons with disabilities and socially disadvantaged people. In 2008, in the second international conference on Responsible Tourism destinations, that came out with the Kerala Declaration, the major issue of discussion was 'over tourism'. He added that village experiences in Kerala engaging with panchayats, local producers of crafts, soft furnishings and food and the private sector business in Kovalam, Kumarakom, Thekkady and Wayanad are commendable. He appreciated Kerala as a leader in Responsible Tourism initiatives, in tackling over tourism and in maximising local economic development inclusive tourism.

Future of Tourism in Kerala, Mr Dipak Deva, Managing Director, Travel Corporation India Limited

Mr. Dipak Deva, Managing Director, Travel Corporation India Limited narrated the future of tourism in Kerala. He said the earlier bed and breakfast should be replaced by B and E (Bed and Experience) where the tourist should carry a great experience. New tourist destinations should be created. He mentioned new possibilities like honeymoon tourism, Fort Cochin-Jazz festival, coastal tourist train connecting Kovalam to Cochin and promoting food and wine tourism as Kerala could be recognised as Food and Wine capital of India.

He also pointed out that Kerala should aim for the following by 2025:

- 1. Increase GDP contribution from 10 per cent in 2019 to 20 per cent
- 2. Increase tourism employment from 23.5 per cent in 2019 to 40 per cent
- 3. Increase expenditure on tourism from 1.27 per cent in 2019 to 5 per cent
- 4. Increase foreign exchange earnings of Rs 10,271 crores in 2019 to Rs 15,000 crores

Discussions in the session

The presentations were followed by remarks of Mr. Jose Dominic suggesting different styles for marketing Kerala products globally. He said that new products that are authentic, real, inclusive and immersive needs to be developed. There is potential for developing homestead farming as a new product for tourism.

Mr. George Scaria suggested that enhanced Government support should be provided for the entrepreneurs in the sector.

Mr. E M Najeeb pointed out that compared to Kerala, other States are coming up with many new products and Kerala should come over this crisis by developing new destinations and products. He said that developing products like medical tourism, film shooting tourism, honeymoon tourism should be seriously considered.

Mr. Pradeep Murthy, Managing Director, Muddy Boots pointed out that the idea of promoting experiences by the top management should translate down to employees so that they stop thinking about how many room nights have been sold. Only translating these ideas to the grassroots would help for sustainable tourism development in the current scenario.

Dr. Rajashree Ajith, Director, KITTS raised a question that, in the situation where job options and employment in tourism and hospitality are severely affected, what major steps should be taken to keep the interest alive and draw and retain youngsters to tourism education. As a reply Mr. Dipak Deva, pointed out that the demand for human resource is diminishing, the industry will emerge only after two years. So in the meantime the students should be educated with required skill development.

Dr Venu V and Mr. Suman Billa discussed whether is it mandatory to have a national branding for tourism or State specific branding. It was finally concluded that for a large country like India, it is better to have a national level branding.

The meeting concluded with vote of thanks by Dr Venu V IAS.

Key ideas and recommendations emerging from the discussion

- 1. Experts think that pre-pandemic level in tourism will be attained only by 2024. It is important to develop health protocols and principles of trust so that people start travelling.
- 2. Kerala needs to focus on domestic tourism sector.

- 3. There is a change in demography of travellers. Youth would comprise the major proportion of tourists in the coming years. Products have to be developed keeping view of this change.
- 4. Need to retain tourism talent in Kerala.
- 5. Deepen engagement with market. Kerala should work and create a new story on "Spice Tour."
- 6. Planned itineraries mixed with cultural heritage and outdoor activities, heritage sites, emphasising independent and self-guided tours could be explored in Kerala.
- 7. World class training should be given in skill development.
- 8. Focus on transformational travel which would be a life changing experience.
- 9. Bed and Breakfast should be replaced by B and E (Bed and Experience) where the tourist should carry a great experience.
- 10. New tourist destinations should be created.
- 11. New possibilities to be explored like honeymoon tourism, Fort Cochin-Jazz festival, coastal tourist train connecting Kovalam to Cochin and promoting food and wine tourism.
- 12. Kerala should aim at the following (i) increasing GDP contribution from 10 per cent in 2019 to 20 per cent by 2025, (ii) increasing tourism employment from 23.5 per cent in 2019 to 40 per cent by 2025,(iii) increase expenditure on tourism from 1.27 per cent in 2019 to 5 per cent by 2025, and (iv) increase foreign exchange earnings of Rs 10,271 crores in 2019 to Rs 15,000 crores by 2025.
- 13. Develop products like medical tourism, film shooting tourism, and honeymoon tourism.
- 14. It is better to have a national level branding than State specific branding.

Session IX Higher Education

The session on higher education was held on February 2, 2021. Dr K T Jaleel, Minister for Higher Education and Minority Welfare, Government of Kerala gave the opening remarks. Dr Rajan Gurukkal P M, Vice Chairperson, Kerala State Higher Education Council chaired the session. The panellists of the session included Prof Gopinath Ravindran, Vice Chancellor Kannur University; Prof Ronald J Herring, Professor Emeritus, The Department of Government Cornell University, New York; Prof N V Varghese, Vice Chancellor, National Institute of Educational Planning and Administration; Prof Shyam B Menon, Central Institute of Education University of Delhi; Prof Daniel Little, Sociology and Public Policy University of Michigan; Prof Devika P Madalli, Documentation Research and Training Centre, Indian Statistical Institute Bengaluru, and Prof Sukhadeo Thorat, Professor Emeritus Centre for the Study of Regional Development Jawaharlal Nehru University. Prof K P Sudheer, Ex Officio Principal Secretary, Science and Technology Department and Executive Vice President, Kerala Science Council for Science, Technology, and Environment was the respondent of the session.

The concept note for the session, summary of discussions, and key ideas and recommendations emerging from the discussions were as follows.

Concept Note of the Session

Though the State of Kerala exceeds the national average GER in higher education (HE), the State is still to establish itself as an outstanding location for higher learning and research, making this a priority area in urgent need of fresh ideas for rapid development in the years to come.

The broad themes that are of immediate interest to us are:

Curricular innovations. Strategies to strengthen the student's specific disciplinary knowledge while simultaneously introducing relevant methodological developments from other disciplines to enable truly transdisciplinary research at the research degree level.

Explore how new technologies of instruction, such as MOOCs can best be introduced in colleges and universities and set up inter-university groups for developing online courses.

Institutional innovations. Learn from successful institutional innovations from outside the State to develop flexible administrative regulations that are transparent and responsive to the requirements of teachers and students. Sharing the experience of setting up Centres for Excellence, as resources for furthering research and teacher development would be a useful input for us in planning ahead.

Networks for teaching, research, and student exchange: Kerala looks forward to substantially expanding national and transnational networks for teaching, research, and student exchange. In this context, suggestions for developing a pool of experts from different disciplines, who would be willing to mentor and provide advice, will be most helpful in the future.

Innovations in library and information availability. We are particularly interested in learning more about the ways in which libraries have been in transformed in the context of increasing use and sharing of e-resources and social spaces between institutions on different campuses.

Social inclusion: Issues of safeguarding and extending the socially inclusive character of higher education today.

Summary of Discussions

Dr B Ekbal, Member, State Planning Board

Dr B Ekbal, Member, State Planning Board welcomed all the delegates and participants to the session on higher education. He gave a short introduction on the higher education scenario prevailing in the State. He mentioned that Kerala, with its remarkable achievements in education, attained total literacy much ahead of other Indian States. The State has high enrolment rates in education with very low drop out ratio. During the last five years, Kerala has taken several steps to revamp the education sector. Through the Education Mission, school education in Kerala has been completely revamped. The State has taken special initiatives to introduce IT-enabled teaching and to provide smart classroom and other infrastructural facilities in government schools. More than 6 lakh students have shifted their education from private unaided schools to public schools indicating the vibrancy and social acceptance of the public education system.

As far as higher education is concerned, the State has 15 State Universities, 2 Central Universities and 2 Deemed to be Universities; in addition, Kerala recently started a Digital University and an Open University. The public universities are mostly affiliated ones with large number of colleges operating under the university. For example, around 2,500 colleges are affiliated to the University of Kerala. Kerala has one of the largest numbers of research institutes both under the State and Central Governments. Thus, the State is eminently suited for advance knowledge production and research. However, these opportunities are yet to be utilised to the maximum capacity in order to achieve academic excellence in higher education commensurate with the global standards. Therefore, this session seeks suggestions from scholars within and outside India for making positive changes in higher education sector. This session is an attempt to create a road map for the further development of higher education sector in Kerala in consonance with this objective. Dr Ekbal welcomed the Honourable Minister for Higher Education Dr K T Jaleel to inaugurate the session, Dr Rajan Gurukkal Vice-Chairperson of Kerala State Higher Education Council to chair the session and 7 erudite scholars in various fields across the world to present their papers.

Dr K T Jaleel, Minister for Higher Education and Minority Welfare, Government of Kerala

In his inaugural speech, the Honourable Minister for Higher Education mentioned the impact of Covid-19 pandemic in various fields especially in education sector and explained various steps taken by Universities and other educational institutions in the State to tackle the situation. The post-Covid era, according to him, envisage a high-end education through technological innovation and digital transformation.

Dr Rajan Guruk kal, Vice-Chairperson, Kerala State Higher Education Council

The future of Kerala's higher education is in attainment of excellence. We have been adopting various ways to forge ahead, but are still long away from the goal. He raised concern as to what do our universities lack compared to a world-class university. According to him, the Stats lacks critical mass consisting of national and international diversity among teachers and students, multidisciplinary character, interdisciplinary programmes, network of world-famous universities and experts, intellectual property contribution, heritage of globally entrenched academic conventions making the university a demanding institution — both by teachers as well as students), and the institution's local rootedness.

We should double the intake of students and faculty positions ensuring worldwide representation to reach the critical mass of diversity. Our universities are mostly multidisciplinary but are lost disciplinary silos and hence least interdisciplinary. Our institutional network is bad and intellectual property contribution abysmally poor. Heritage cannot be built up overnight. Nevertheless, our universities must lay down ways and means of turning them into demanding institutions. Each university should design, implement, and entrench inviolable routines to turn themselves into institutions of high academic demands from their clientele.

We must strengthen our academic practices by debureaucratising and decentralising them. This alone can ensure the institutional environment for quality teaching and learning, enabling teachers and students to maximise their academic ingenuity. This effort of genuine and committed involvement alone can enhance quality and standards, lead our universities eligible for international collaboration in the field of research in emerging areas, and will enable us to produce new knowledge and facilitate intellectual property contribution.

We talk a lot about knowledge society. Knowledge society is primarily knowledge consuming society. We have to grow as a knowledge economy – an economy producing intellectual assets or intangible assets and exchange them. We can be participants in knowledge economy only if our universities and research institutions generate exchangeable intellectual property.

Curriculum innovation and reforms: Prof. Gopinath Ravindran, Vice-Chancellor of University of Kannur

Kerala has a successful record of public action which made it possible to achieve excellence in the fields of public health, poverty alleviation, education, decentralised government, and social equity. The State Government's support to schools as well as for higher education sector far exceeds the support from Central Government in Kerala. The State's public funding for higher education is higher than many larger States, funding for scholarship in Kerala is amongst the highest, and female enrolment in higher education is also highest in Kerala when compared to the national average. Though the State is known for excellence in education arena, Prof. Gopinath called for a framework for higher education. He said that at p resentKerala has no world-class universities or advanced centres for research. No University in Kerala figures in the top 10 in the national level and A+ grade in the National Assessment and Accreditation Council of India.

Prof. Gopinath shared his experience of conducting interviews for academic staff in Kerala. According to him the frontline candidates applying for the job are those who return after studying in colleges or universities and research institutions outside Kerala. In the context of declining remittance from the GCC countries and increasing use of digital tools based on artificial intelligence, the need for reforming and renovating higher education has become an immediate task and necessity. There is a situation where students' cost tends to be increasing in public universities because of downsizing of fund. Also, in the context of the Covid-19 pandemic, online teaching and use of Massive Open Online Courses (MOOCS) has increased. This may lead to a situation where the need of teachers may decline. Now with the rise of virtual campus, social sciences and liberal arts face the threat of being delegated through online. Today's challenge is to mitigate the economic impacts of the pandemic where universities have a central role to play. In India, the direction and speed of change has been dictated by the States, by national education policies, and administrative reforms of regulatory bodies. In Kerala, Government is putting a lot of money for infrastructure, appointing teachers, and introducing new programmes for study. Despite all of these, if we do not think of curriculum changes, then all the investment in higher education will be futile. Two-third aspects of curriculum/syllabus has to be modified. Syllabi of most of the universities in Kerala are given just in the form of a long list of topics and in majority of the universities the syllabi are not published in the website. The course plans with objectives and outcomes are not clearly stated.

These are several things that universities should think about while preparing curriculum. Similarly, in Kerala, for the same degree different syllabus and evaluation patterns exist. Another important aspect is related to evaluation and assessment. Students in Kerala are compelled to answer a very large number of questions in the examinations and grade marks are allowed for extracurricular activities. In Kerala, as per UGC regulation, absolute marks were replaced by grade, but marking is done in old way and then converted to grades. Plagiarism check should also be introduced in all places. Social science courses are facing more problems than science disciplines in terms of curriculum/syllabus. An interdisciplinary curriculum and critical thinking and learning should be made for fundamental research in science is not going well in Kerala, provision should be made for fundamental researches in science fields. Since finance of universities are declining, higher education institutions should be encouraged to conduct MOOCs as the solution. He suggested a radical change was necessary to elevate the status of higher education in Kerala to make critical knowledge creation possible.

Institutional innovations in higher education: Prof. N V Varghese, VC, NIEPA, New Delhi,

India, like most newly independent countries, initially adopted public funding and State control as the framework for higher education development. The sector moved away from this model to market-friendly reforms and non-State funding of colleges from the 1980s and private universities in the 2000s. The country's higher education sector experienced massive expansion in this century and reached a stage of massification in the 2010s. The National Education Policy of 2020 (NEP 2020) envisages further growth of the sector to reach a stage of universalisation by 2035.

These policy changes fuelled major reforms in three domains: a) reforms to expand the system – privatisation of public institutions and promotion of private sector; b) reforms to improve quality

- accreditation and ranking; and c) reforms to improve relevance - skill formation and National Skill Qualification Framework (NSQF). These reforms are mostly top-down based on external pressures and they entered in to the institutions of higher education through national/State-level initiatives.

These reforms redefined the relationship between the State and higher education institutions and posed challenges for institutional changes and innovations. The institutional innovations emerged from the challenges posed by: a) increasing student diversity; b) changing parental priority on returns to investment; and c) changes in the financial model and operating principles of institutions. The innovations broadly took the form of institutional restructuring either for "doing new things" or "doing existing things better" or "doing things differently." The expectations from innovations were improvement in the operational efficiency of institutions, enhanced learning outcomes, and reduction in the gap between potential and performance.

The institutional innovations have mainly been in three areas of: a) curriculum and teachinglearning; b) resource mobilisation; and c) governance and management. Many institutions introduced new and market-friendly courses which helped to mobilise higher amount of fees from students. Teaching-learning activities moved away from traditional lecture modes to personalised learning models. Blended learning and flipped classrooms emerged where students watch video lectures online at home and then spend class time solving problems and maximising the discussion time with professors. The student assessments based on annual examinations were replaced by semester and credit systems.

Higher education institutions diversified their sources of funding through cost-saving, costsharing, and income-generating activities. Student fees were introduced/enhanced and loans became widely accepted mode of student financing. Higher education institutions became autonomous and internal governance structures became more centralised. Many of the non-core functions of the institutions were out-sourced or sub-contracted, part-time teachers became common, and performance contracts were introduced. These innovative initiatives led to a strengthening of the power of the executive authorities within the university, increasing participation of outside experts, and loss of power of the professoriate. Interestingly, the Covid pandemic has further reinforced centralisation of decisions at the levels of the Government and regulatory authorities.

Importance and possibilities of MOOCs-Massive Open Online Courses: Prof. Ronald. J. Herring

Professor Ronald J Herring spoke about the importance and possibilities of Massive Open Online Courses (MOOCs) which is now a trend in higher education. He explained the advantages and disadvantages of MOOC. He shared his experiences in Cornell University. It is massive because a large number of students are participating, Cornell University had students from 144 countries. These courses are open and free. These online courses require high-speed internet connections. The aim is to ensure that every learner can access education to unlock their potential, without the barriers of cost or location. 5,10,750 people are learning on Edx today. As a first step, Cornell University selected almost a dozen courses in a year from selected proposals and decided on aspects such as faculty time, remuneration to outside speaker, and technical assistants (TAs). First

such type of course was "The GMO Debate – Science and Society." Cornell supports MOOC team in terms of faculty, money, specialist support to videographers, technical assistants, and visiting experts. The main advantages of MOOC are:

- 1. Permanence
- 2. Interdisciplinary in nature
- 3. Diverse audience with wide experience
- 4. Forces precision in presentation and documentation in classrooms, and
- 5. Constructing tests in line which allows teacher correction.

The main limitations of MOOC are:

- 1. Widely differing background/problems with the knowledge of students
- 2. Problems related to language since the courses are in English
- 3. Evaluation of individual learning is hard though partially correctable with technical assistants, but still, it seems to be difficult
- 4. Promotion-related problems
- 5. Embarrassment of marketing

MOOC requires enormous commitment of time and resources, varying levels of student knowledge/expertise, and active participation of students. He concluded his presentation by saying that in his experience MOOC, is the best teaching system he ever had and the future of any University remains with adopting and practising MOOC.

Institutional innovations in higher education: Prof Shyam B Menon

Though Kerala has got high density of population, we can demonstrate our human resources as the greatest wealth of the State. The State Government has made large public investment in social sectors such as education and health and the participation of local governments in these sectors is appreciable.

Kerala has achieved remarkable growth in basic education in qualitative and quantitative terms. For the last two decades, Kerala has demonstrated unprecedented mass aspirations for higher education. Though Kerala has large number of public funded higher education institutions, the diaspora of students has been increasing every year. According to him, there has been a flood of students from Kerala for postgraduate and certain undergraduate courses in renowned institutions in Delhi. There is an increasing need for investment in higher education in both private and public institutions for strong edifice in higher education. Higher investment is needed for the upgradation of higher education to new standard of excellence.

As stated by Prof Joseph Stiglitz, the future of higher education is in the creation of higher-level skills and creativity since artificial intelligence is bound to replace routine jobs. Excellence and creativity can be nurtured only in an environment free from fear and insecurity. For Kerala, there is a historical necessity to create, nurture, and preserve free and fearless engagement with creative critical ideas. This is an important prerequisite for excellence.

From the experiences in Ambedkar University, he opined that the affiliation system seems to be outdated since it affects the democratic nature of the universities. The optimal intake of the university should be within the range of 10,000-15,000. University should be a self-governing community of aspiring practitioners. Practitioners include faculty, students, and scholars.

An ideal way of developing a programme is to find the best group of faculty and then construct the programme accordingly. There should be a proper balance between theory and practice. The ever-changing nature of knowledge, interdisciplinary approach, structure of programmes, selfgoverning teachers, and method of evaluation are the major challenges faced by the higher education sector in the State. Public institutions of higher education are not supposed to be under the government departments. Though the institutions receive financial grants, there should be financial autonomy at all levels of the institution.

As far as the administrative structure of higher education is concerned, he argued that there should be an ideal way in which the governing body meets regularly and gives recommendation and new direction. He recommended that a complete dependency on government grants is not healthy for a public university. The public universities' dependence on State funding should not exceed 50 per cent and the fee collected from students should not exceed 20 per cent. The remaining 30 per cent should be met through consultancies, project works, publication royalties, and philanthropic contribution. Public universities have to retain their autonomy.

Since the job markets have been continuously changing, especially for the last two decades, reskilling and up-skilling the job aspirants through virtual platforms is important. Universities should be free from political and bureaucratic interference in order to have international recognition. Restructuring of existing traditional university to innovative institutional frameworks is also required.

Networks for Teaching, Research, and Student Exchange: Professor Daniel Little

Prof. Daniel Little, Professor of Sociology and Public Policy from the University of Michigan, USA spoke about the value of international collaborations of teachers and students among countries for academic development. He shared his experience as chancellor of a mid-sized public university and also the collaboration of universities in US with other universities outside the US and its benefits. In North America, there is a very high level of independence and decentralisation across institutions and organised system for establishing relationships. But more than formal and institutional links, personal connections across these institutions work better. International collaboration stimulates diffusion of good ideas, deeper criticism of existing theories, and discovery of unarticulated assumptions. Universities and disciplines get better through extensive collaborations. He also named certain major research centres such as Harvard University, Princeton, Wisconsin, Michigan, Berkeley, and the University of Pennsylvania in US where international collaboration is possible. Chinese Universities also welcome international visiting scholars. Many U.S research universities have substantial interests in India, and in research topics that concern both India and the US. US Universities are interested to have research ties with universities in Kerala in topics such as poverty alleviation, public health, Kerala's very positive experience with Covid-19 pandemic, and issues of population. Other areas of collaborative

interests are power of science and technology studies in different States, science and medicine – engineering, medicine and health, and high energy physics. In order to achieve this goal of international collaboration, faculty is the key that can encourage more extensive institution-to-institution relationship. As far as masters and PhD courses are concerned, international students constitute an important proportion of US research universities. Every doctoral university has well-developed outreach to prospective students from other countries, accessible through their website. In US these efforts and programmers are usually implemented at the programme level (eg. College of Engineering and College of Literature, Science and Arts) rather than at the university level. He also spoke about the decentralised structure of US universities. International collaboration usually proceeds from the level of the academic unit and the faculty group, rather than from a central administrative imperative. Administrators of every nation are often supportive of international collaborational collaborational collaboration is a certain level of desirability in it as it gives ample room for innovation.

Libraries Ahead-Innovation in library and Information Science: Prof. Devika P. Madalli

Prof Devika P Madalli explained the history of the library movement in India and its significance. Prof. S R Ranganathan, a world-renowned scientist, the father of Library Science in India had made several innovations for the library sector in India. Library and Information Science are interdisciplinary and diverse fields traversing several indicative domains such as

- 1. Knowledge Organisation and Management
- 2. Information and Data Management
- 3. Digital Information Services
- 4. Information Literacy
- 5. Behavioural and Usage Studies
- 6. Scientometrics

The first public library act in India, the Madras Public Library Act, was passed in 1948 to introduce legal provisions for offering services in public libraries, that is, libraries for the public and funded by the public. After that several State Governments such as Karnataka, Kerala, Andhra Pradesh, and Uttaranchal have also passed their own Public Library Acts. The achievement of these acts was the allocation of public money for public libraries and public library maintenance and development.

Prof Madalli also listed out certain significant initiatives and bodies for public library and information science in India

National Library-Kolkata, a designated library entitled to receive under the Delivery of Books and Newspapers (Public Library) Act, 1954 a copy of every publication published anywhere in the country and is a permanent depository of all reading and printed publications in India.

INFLIBNET, an Inter-University Centre set up at Ahmedabad, under the Ministry of Education is involved in modernising university libraries in India using technologies for the optimum utilisation of information. Raja Ram Mohan Roy Library Foundation (RRRLF) – RRRLF was set up under the Ministry of Culture, Government of India and one of its main objectives is to act as an advisory body to the Government on development for the library sector of the country and provide financial and technical assistance to libraries.

The National Knowledge Commission made several recommendations for India to move towards a knowledge society. The recommendations include NVLI (National Virtual Library of India) under the Ministry of Culture and NDL (National Digital Library) – a virtual repository of learning resource under the Ministry of Education.

National Mission for Libraries (NML) was set up under the Ministry of Culture based on the recommendation of the National Knowledge Commission. Four working groups were set up under NML with focus on a) upgrading existing public libraries and academic libraries b) library and information science education, training and research facilities c) setting up the National Virtual Library, networking and ICT application in libraries and d) National Census of Libraries. She also put forward some questions such as 1) Is our society really knowledge society 2) Can we realise a knowledge society without libraries and 3) To what level should libraries be able to serve the purpose of tomorrow's knowledge societies. She concluded the presentation with certain recommendations listed below.

- 1. Establish State Institute of Library and Information Science to foster scientific research and manage overall development of library sector in the State.
- 2. Policies for library sector; research and higher education guidelines for library capacity buildings, standards, and advisory; and monitoring library sector development.
- 3. Bring out a State of Libraries Report
- 4. Vision Libraries 2030

Issues of Strengthening the Socially Inclusive Character of Higher Education: Prof. Sukhdev Thorat

Prof. Thorat emphasised the importance of access and equity of quality education to all in higher education. He presented the recent data of the National Sample Survey on higher education, particularly in Kerala. Though in general, Kerala's education system seems to be better, unequal access to higher education exists among the poor. Disparity exists in terms of caste and economic class in higher education sector in Kerala.

Kerala has remarkable achievement in enrolment ratio when compared to other States. In 2017-18, Kerala had an enrolment ratio of 48 per cent in higher education. Above all, in Kerala, there is no disparity between rural-urban accesses to higher education. However, there is a gap exists in terms of access to higher education within economic classes and castes in the State.

Though the caste wise enrolment in higher education in Kerala is far better than the other States, the enrolment ratio of higher castes is more than double that of the Scheduled Castes and Scheduled Tribes of the State. In terms of gender, female students outnumber male students. This is a remarkable achievement of Kerala. Prof. Thorat also pointed out the other dimension of inequality created by the privatisation of higher education. Government and aided institutions in

the State are running well in terms of equity and access to higher education, while in self-financing institutions the picture is different.

He also brought attention to the fact that out of the total students in higher education in the State, 41 per cent are studying in self-financing institutions where there is a clear case of disparity in terms of access as well as quality. The share of backward students in private self-financing institutions comes to only 7 to 8 per cent of total students in higher education of the State.

Unequal access for low-income class and lower caste students exists in self-financing institutions in Kerala. The dropout rate is also high in these institutions. He suggested that a policy may be developed in higher education to provide equal access and subsidise fees for poor students and another policy exclusively for students belonging to the Scheduled Caste and Scheduled Tribe communities for providing more seats and reducing dropout rates.

Prof K P Sudheer, Ex Officio Principal Secretary, Science and Technology Department and Executive Vice President, Kerala Science Council for Science, Technology, and Environment

Prof K P Sudheer stated that the gross enrolment ratio of higher education in the State is higher than that of all India average. The quality as well as inclusivity of higher education is satisfactory in the State. Curricular reforms should necessarily begin with pedagogical changes. Traditional courses should be reformed by introducing changes in the curriculum and information and communication technology (ICT) should be a part of the curriculum. The possibilities of e-learning should be explored to the fullest extent to improve the quality and quantity of higher education. The institutions of higher learning have three important functions – teaching, research and extension. There should be synergies in these diverse roles and various institutions which perform these functions. The State has developed a good quality and network of school education system, especially in government and aided sectors. In line with the enhanced school education system in the State, Government envisages revamping the higher education sector. The universities and colleges are envisaged to be developed as centres of excellence and infrastructural development will be there so that the higher education institutions in the State will be destination centres for students from other States and countries.

Key ideas and recommendations emerging from the discussion

- 1. *Curricular reform and innovation.* Issues to be covered: Capacity-building in individual disciplines/subjects. Formulation of strategies for undergraduate and post-graduate education and academic research. Course design. Planning for departments of excellence and centres of excellence. Sharing experiences with national experts on centres of excellence. Teacher development.
- 2. *Institutional reform and innovation.* Issues to be covered: Learn from successful examples in order to develop flexible administrative regulations that are transparent and responsive to the requirements of teachers and students. Review the role of Syndicate and Senate in academic administration.

- 3. *Online course development.* Explore new technologies of instruction, such as MOOCs (Massive Open Online Courses) can best be introduced in colleges and universities and set up interuniversity groups for developing online courses.
- 4. *Networks for teaching, research, and student exchange.* Kerala looks forward to substantially expanding national and transnational networks for teaching, research, and student exchange. In this context, suggestions for developing a pool of experts from different disciplines, who would be willing to mentor and provide advice, will be most helpful in the future.
- 5. *Library development, IT on campus.* Kerala needs to learn more learning more about (1) ways in which libraries have been transformed (2) sharing e-resources between institutions on different campuses; and (iii) the use of information technology and data resources on campus.
- 6. *Equity.* Issues to be covered: Ways and means of ensuring and deepening the socially inclusive character of higher education. Ensuring regional balance in higher education.
- 7. *Microplanning*. Drawing up specific plans and programmes for individual universities, colleges, and related institutions as the need arises.

Special Industry Session

A Special Industry Session attended by the Chief Minister, Government of Kerala, and prominent industry leaders across the country was organised as part of Kerala Looks Ahead. The session was held on February 3, 2021 and was attended by Chief Minister, Sri Pinarayi Vijayan, Mr Ratan Tata, Mr Azim Premji, Mr Anand Mahindra, Ms Kiran Mazumdar-Shaw, Mr K Gopalakrishnan, Mr M A Yusuff Ali, Mr B Ravi Pillai, Dr Azad Moopen, Prof Jayan Jose Thomas, and Dr Venu V, Member Secretary among others.

The Special Industry Session of Kerala Looks Ahead conference started with the welcome address of Prof V K Ramachandran, Vice Chairperson, Kerala State Planning Board. Prof Ramachandran welcomed the Chief Minister, Sri Pinarayi Vijayan, Minister for Industries, Sri E P Jayarajan, Mr Ratan Tata, Mr Azim Premji, Mr Anand Mahindra, Ms Kiran Mazumdar-Shaw, Mr K Gopalakrishnan, Mr M A Yusuff Ali, Mr B Ravi Pillai, Dr Azad Moopen, Prof Jayan Jose Thomas, and Dr Venu V, Member Secretary to the special session on industry of Kerala Looks Ahead, a Conference and Consultation.

The summary of discussions and key ideas and recommendations emerging from the discussions were as follows. The discussions have been mainly presented in transcript form.

Summary of Discussions

Vice Chairperson, Kerala State Planning Board

The Vice Chairperson said that the extraordinary gathering at the special industry session of the Kerala Looks Ahead conference is a testimony to the fact that the perception that Kerala isn't interested in attracting industrial investment to the State has been banished entirely. The change is because of the leadership this Government has provided, the leadership of the Chief Minister Sri Pinarayi Vijayan, his cabinet colleagues, and the Government of Kerala.

In 2016, the Government of Kerala took a decision to broaden and deepen the concentration on human development indicators — health, education, and social justice — for which our State is justly famous. These achievements would be used as a foundation for new achievements in material production in agriculture, industry, income bearing services, infrastructure, and in order to create skilled employment, particularly for youth. The Government not only reduced the red tape, but also communicated to all levels of Government, whether at the State or the Local Government levels, the need to help doing business. This was a task that the Government took very seriously, as has been shown in a series of conferences and in actual practice. The success of Government policy has shown up in the consistent increase in the share of manufacturing in Kerala's State domestic product over these years and in the diversification of Kerala's industrial structure.

The Vice Chairperson noted that we are now on the threshold of a structural change in Kerala's economy, towards modernisation in terms of industrial and industrial services, services, infrastructural activity, and value-addition led agriculture. He added that per capita consumer

expenditure in Kerala is rising; it is almost 60 per cent higher than the national average. So, this makes it possible to create a domestic market for a very wide range of industrial products, and important aspect of the possibilities for industry.

He also said that there is a range of factors favouring growth in the area of industrial production. Kerala has a skilled, conscious, and digitally literate labour force. Kerala stands hugely to benefit from this, and for that reason this conference has had sessions not only on industry but also on e-governance, IT, and skill development to try and learn from international experience in these fields. Kerala is a State rich in natural resources including marine resources, but it is also a State with limited land space. We are proud that 30 per cent of our area are under forest. The kind of topographic and spatial conditions necessary for the old smokestack type industry simply do not exist in Kerala. However, the new technological possibilities opened up by what is often described as "Industry 4.0" makes it possible for Kerala to reap the advantages of the wide domestic market, of its natural resources – in fact, its location as a whole, and its extraordinary scenic beauty.

Professor Ramachandran said we can become, shortly, and, we hope, very quickly, the skilled labour hub of India. It is very much within the State's capabilities.

The Chief Minister was keen to have this conference to look into new areas of endeavour, economic development, and income growth that have been made possible by Kerala's history of human development and by the extraordinary changes in policy that have occurred over the last four years.

The conference also had another session on industry, on industrial growth and industrial possibilities in Kerala, where a large range of possibilities in the sphere of industry was discussed.

The Vice Chairperson stated that we look forward to further discussion on the latest developments in the areas of technologies, products, and industrial promotion policies that are relevant to the State of Kerala. He added that we look for advice and opinions from across Kerala, India, and the world. In this special industry session, the Planning Board is eager to hear the opinions of the galaxy of leaders of industry on the question.

In the first session at the inaugural session of Kerala Looks Ahead conference, the Chief Minister made it very clear that this conference is not convened to announce the achievements of Kerala to the world, but to learn from best practices and experiences, to try and distil their relevance for Kerala, and look ahead to a modern progressive future. In that effort, the Vice Chairperson said, he had no doubt that the special industry session, which reflected an extraordinary record of experience and contribution to the sphere of industry in India, would be a standout session. Professor Ramachandran thanked all for attending and for the overwhelming response to the Chief Minister's invitation.

The welcome address by the Vice Chairperson, State Planning Board, was followed by the special address from the prominent industrialists from Kerala and the rest of India.

Ratan Tata, Chairperson, Tata Trusts

Kerala is a beautiful part of India — its tropical fauna, a highly literate population, lovely backwaters, and beautiful beaches. The industrial development of the State may not have been as aggressive as it has been elsewhere, possibly driven by the desire to keep Kerala beautiful. It is therefore very timely that the issue of thoughtful industrialisation in the State be discussed so that a sensible industrial development policy both in the new industrial areas like information technology and the more traditional areas like tourism be added to the activities in the State without spoiling its beauty. I regret that I would not be able to be at the conference but wish the conference every success.

Azim Premji, Founder Chairperson, Wipro limited

Good morning. Thank you for inviting me to this occasion. I wish I could have been there in person. But, since I cannot, I am sharing a few brief thoughts with all of you. Over the past 10 months, our foundation has worked on the ground in over 400 districts to help tackle the pandemic. During this period the one State that we have always learned from is the State of Kerala. I do not think that the numbers tell the full story. The kind of deep community-based campaign for handling the pandemic that you have run can be a model for all the States across the country. But this is only one of the illustrations of how public systems in Kerala function effectively. Whether it be education or health or local governance we have a lot to learn from your State. I think this comes from the State's sustained commitment to human capacity development and empowerment of the local government institutions. It is also clear that on many aspects of economic development Kerala has had an excellent performance. I think that with this kind of base, which is almost like a developed country in many ways, Kerala's economic growth can skyrocket. I am glad that you have taken the initiative to organise these discussions. And I wish them to be very productive. Thank you once again for inviting me. I wish the State of Kerala and its people the very best.

Anand Mahindra, Chairperson, Mahindra Group

A very good day to all of you. And thank you Mr Chief Minister for inviting me here today. My first introduction to Kerala came not from travelling there or working there, but from the boarding school in Tamil Nadu that I attended as a child. Now many of my classmates in that school were from Kerala. So naturally, at the festival of Onam, the school would serve Payasam. And it was perhaps one of the only dishes that the school kitchen made which tasted really good. So as a result, the arrival of Onam and the delicious Payasam was something all of us hungry students looked forward to. So, from my childhood, my perception and image of Kerala has always been that it is a place with delicious cuisine. A land that is beautiful and stimulates the senses and I don't think that perception is wrong.

But obviously, that's not the only reason I am happy and honoured to be speaking to you all today. Throughout my career with the Mahindra Group, my connections with Kerala have grown dramatically and naturally are now much greater and much more varied. And speaking of the Mahindra Group it is really interesting how well our businesses fit in with Kerala's vision for the road ahead.

We seem to be operating in most of the areas where Kerala sees its present and its future. Firstly, there's tourism, which is a major attraction in what is known as god's own country. Well, Kerala was the birthplace of our holiday business. Club Mahindra has grown into one of the largest vacation ownership businesses in the world. But it started with just one resort here in Munnar and today we are probably amongst the largest investors in tourism in the State. The second area of synergy is electrical mobility. Kerala has been at the forefront of bringing the first mile and last mile electric mobility to all its citizens. The State's EV policy has been implemented at a speed that we are not used to seeing at government levels, to be frank. As one of the leading players in the electric three-wheeler market in the State, we are delighted to be partners in the cause of environment-friendly mobility. Thirdly, there's agriculture. It's so unusual and refreshing in these days of unthinking urbanisation to note that preservation of farmlands and the modernisation of agriculture are amongst your policy goals. And I am proud to say that the Mahindra Group is playing a big role here. Our businesses provide eco-friendly crop care solutions, soil-friendly nutrients, and bio-pesticides, particularly for cardamom plantations. We are also running community initiatives and irrigation that are going to benefit more than 2800 farmers. And of course, we always have our eye on the plentiful human talent in the State. Tech Mahindra, our technology company, has a development centre in Kochi through its acquisition of Cerium Systems. So apart from our presence in our traditional businesses like automobiles and tractors, we have invested significantly in Kerala in the businesses of the future.

And if I were to look ahead as the theme of this conference suggests, then I would say that the green businesses of the future is where Kerala's future lies. Why? Well, let me share my perspective as a business. There is a tectonic shift taking place in the way business engages with broader society. In a developing country like ours, there's always an on-going tension between sustainability on the one hand and development on the other. And very often the needs of the development of won over the needs of sustainability, which is why businesses until recently considered their main dharma to be the maximisation of profits. But this balance is changing rapidly. Firstly, there's an increasing global awareness about the need for businesses to grow sustainably, particularly in view of the evidence of the devastating effects of climate change. Bodies like the UN Global Compact are encouraging businesses to commit to social development goals and to use these as a springboard to profits. Secondly, businesses can no longer afford to prioritise profits over the planet. And for a very good reason, their consumers are demanding change.

The next two generations, the millennials and gen Z, all over the world have a much higher awareness of sustainability issues because it is their future that is at stake. And they are willing to put their money where their mouth is. And to use their consumer power to support only those businesses that conform to their expectations and they will boycott the ones that do not. Additionally, the power of the community to influence business – what is called community capitalism. It is emerging as a significant factor in influencing business directions.

I read somewhere that in Kerala some Panchayats succeeded in preventing the establishment of polluting industries in their areas and this is happening everywhere today. The upshot is that far-

seeing businesses understand that it is in their self-interest to align their business goals with sustainability goals and to the preservation of the planet. And this is not as paradoxical as it seems. I have often said and I truly believe that the drive towards sustainability offers the biggest business opportunity of the century and this is the opportunity that Kerala should seek to offer. A haven and a hub for the green businesses of the future. Kerala can be an ideal proving ground for this new bottle of business for many reasons. It has consciously followed a policy of prioritising human development over industrial development alone. As a result, it has excellent human capital which today has been substantially supplemented by the skills of returning expatriates who lost their jobs abroad to Covid.

It's also a State that is sensitive to ecological issues. Having experienced at first hand the ravages of climate change especially after the devastating floods of 2018. It sees the potential of sustainability friendly money-spinners like ecotourism, its sparkling waters, lush forests, and beautiful beaches are evidence that it has refrained from sacrificing its natural beauty to greed and over-development. It is committed to clean transport and clean energy. I understand that Kochi airport runs entirely on solar power. The State has a proactive Government, investor-friendly policies, and a very clear vision of the future. So, I would say to Kerala wake up and smell your own coffee. You can be not just India's hub but a global hub for green business. Think big, think ambitious, think green.

Kerala has a charming tradition for Vishu or the New Year festival. The night before a metal container called Uruli is carefully arranged with auspicious items like flowers, grains, fruits, coins, and books and often a mirror. On New Year morning, the family closes its eyes and opens them only when they reach the Uruli in the belief that the first things one should see at the dawn of the New Year are symbols of luck and prosperity. The mirror reflects all these items so that they will be multiplied throughout the year. I believe that Kerala's Uruli is filled with a multiplicity of bountiful blessings that can make it a profitable haven for sustainable business. And I also believe that the mirror of the post-Covid world will multiply these blessings in abundance. I want to wish you all a very fruitful discussion.

Ms Kiran Mazumdar-Shaw, Executive Chairperson, Biocon Limited

Namaskar. I am Kiran Mazumdar-Shaw. And it is indeed a great pleasure for me to speak at this conference called Kerala Looks Ahead organised by the Government of Kerala. Let me start by saying that education and healthcare are the two pillars that support a sustainable economy. Kerala is India's leading literate State and one that has the most efficient health care system in the country. In terms of access and affordability, it is in a unique position to drive strong and sustainable economic development. In fact, the pandemic showcased Kerala's ability to contain and manage the pandemic despite the surges of the infections that were observed in the second wave. Kerala also has a thriving startup economy led by software technology. Kerala is also a favourite ecotourism destination in the country. Tourists from all across the world seek its backwaters and its forests. And then let's talk about Ayurveda. Ayurveda is also driving a huge health and wellness economy for Kerala with its world-famous Kerala treatment centres. With all these opportunities, I am confident that Kerala can look ahead with strong resolve and clear confidence.

I will conclude by saying that I would like to see greater investment in the life sciences, especially in the areas of research and innovation. For example, CCRC in Ernakulam and RCC in Trivandrum are two great emerging cancer centres. And they have great potential in leading the world and leading the way in cancer research. And of course, using the skills in technology, I think MedTech can also be a very important opportunity for Kerala. And together with cancer research and MedTech, I am sure Kerala can take a premier position in the country. I wish this international conference all success.

Mr Kris Gopalakrishnan, Chairperson, Axillar Ventures

Good morning everyone and thank you for inviting me to share my thoughts on this occasion of Kerala looks ahead conference. You know we need to ride on the waves that are behind us and pushing us forward. So first let me look at the waves that we can leverage in order to take full advantage of the capabilities that we will create.

The first wave is the emergence of digital computing and technologies around computing. Over the last 60-70 years the digital computer has gone from a mainframe system to a mobile phone which empowers every single individual. So computing is now personal, it's affordable, and it's available to each one of us. Second, the trend continues now to have computing in everything that we can think of, pervasive computing or invisible computing, which means that we can embed computing in all objects all things that we want to control and manage, I'm talking about the internet of things. From a technology perspective it is about access to data, access to information, access to services over the internet, and emerging technologies such as 5G.

So, my first point here is that Kerala should become the testbed for 5G implementation; one of the first States in the country where 5G will completely get rolled out. Now continuing the technology roadmap, the third is cloud computing. Clearly, this makes infinite storage and infinite processing accessible to all the user devices. So, again democratising computing for all people. The fourth is the availability of AI and ML, artificial intelligence, and machine learning. This allows new capabilities to be created and automating tasks that typically were done manually, and these are tasks that require intelligent decision making and using all the data that is available.

I can go on 3D, augmented reality, virtual reality, genomics, and the whole area of biotech and all these are captured when we say that we are at the beginning of the fourth industrial revolution. Now, what is common about the fourth industrial revolution? What is common is that it has democratised technology, it has democratised access, it has reduced the middlemen in the system and connected the providers of products and services to the users of products and services and it has disrupted various industries and will continue to disrupt various industries. The opportunity here is for us to think about world-class products and services. In every field, we will not be able to become the best, but we need to identify a few areas where we can become the best taking advantage of the strengths of Kerala. I'll give you some examples here. It changes the business models, it creates new business opportunities, and it empowers the individual and small and medium enterprises, and these are all strengths of Kerala with the high literacy that you have a State where you know the large industries are typically missing it's the small and medium enterprises that are thriving. Let's look at education itself. The traditional model of education is a model where you have campuses, universities, and schools where students and teachers come, and education happens. Now the new model of education is where you have virtual university and virtual school, students can participate from anywhere in the world, provided you are world-class, you make that available, and you provide the education in the language in which they would like to learn. So, can you now think about new forms of schools and universities which then allows you to reach the entire world? Second, we have one of the best ecological and environment-friendly and green State. It's an attraction for tourists around the world. Can we create a platform where every single room that's available in every single hotel and resort are listed such that we can maximise the utilisation of these facilities? Of course, the larger resorts and hotels have their own mechanism to do that. It's the smaller ones that will require support in this case. I am talking about the model that Airbnb has popularised. Can we create such a platform where we can maximise the utilisation of every single room that's available?

Similarly, in agriculture, the trend is about value addition. The trend is about creating crops that are unique to a particular micro-region or microclimate without losing their distinct identity. People talk about traceability, organic or biodynamic agriculture. The value will be lost if you blend it with other products. Every product that's sold from Kerala must have a label that talks about which farmer, which plantation, which piece of land, and on which date this crop was harvested. This will increase the value of the product; the value can be further increased by value-addition. The traditional model of creating a food product industry is again through a factory. In the new model, people can sit at home and make smaller batches of these food products. Combined with technology this can be marketed under a single brand if possible or you can create small and medium enterprises which will look at marketing these things. Again, a new model enabled through technology where every single household in Kerala can participate in this because they all can create some products or services.

Regarding healthcare, Kerala has probably some of the best hospitals. Again, we can make sure that they come on a common platform. During the Covid-19 period we have tried this to list all the beds that are available across the State. Can now this be sustained so that there is a new model where nobody has to find out where to get admitted, automatically based on your condition you get directed to a particular hospital where a bed is available at the cost at which you are able to afford that service. So, matching the consumer with the provider of the service. Automate the complete process of the payment and tying in with philanthropic organisations such that the payments get completed. Again, leveraging technology to enable this to happen.

I can go on and on, but the common theme here is every business will change, every business will be reimagined, every business will now comprise hundreds and thousands of small and medium enterprises or individual businesses. Remember in this budget the Government has now come up with this concept of one person company, so the Government is also realising this.

The employment exchange can also be reimagined. Employment exchange lists people who are seeking jobs. We can flip it around and say that the employment exchange will give you gig workers. So, people and companies around the world can go to the employment exchange and get the

people that they need. Today, they can work from home or they can produce from home, each home becomes a services organisation, or each home becomes a small factory for products that are relevant to the people. This requires us to re-imagine how we connect all these businesses; create new marketplaces, create new platforms.

Why am I optimistic about this? We just look at the fintech revolution that has happened in India. We completely changed how people transact today. You can use your mobile phone as your payment instrument. You can link your mobile phone to the bank account and it's completely disintermediating all the intermediaries. You have real-time transaction happening with zero latency and almost zero cost. We have done this, so this can also be done, I believe. This has been demonstrated by the models like Uber, which aggregated taxi services, by Airbnb or OYO rooms, which aggregated rooms. We can now think about aggregating individual businesses, including small businesses.

What is it that we need to do as a Government? One, there will be regulatory challenges; the Government must change the regulations and create sandboxes such that these can be piloted tested, and implemented. Second, as a society, we must empower every individual through education and skilling. Education and skilling should be of world-class levels, not just India anymore. We need to think about world-class. How do you prepare a world-class food product at home? Are our pickles meeting the requirements for export purposes? Can it be exported to the developed markets? Can our ready-made dresses be manufactured in such a manner that it meets the design aspirations of a Parisian woman? That kind of empowerment, education, and skilling must happen across the State. The funding requirements in order to do these things should also be addressed. This provides Kerala to come out with, what I believe to be, the 21st century model for business, industry, government, and society.

The 20th century model of consumption-led capitalism is failing all of us. It has created pollution, it has created climate catastrophe, has not created a sustainable world, it has increased disparity, it has not included everyone and wealth aggregation. The 21st-century model is, what I believe to be, from a technology perspective, digital and inclusive, so all individuals, small, and medium enterprises can participate. It is equitable in terms of if you have the capability you can earn, you can lead a good life, and you can be a middle-class Indian. That is the world that we need to create. Kerala has demonstrated this in several sectors, for example, healthcare and education. We need to demonstrate this now in the areas of wealth creation, wealth accumulation, and wealth distribution. It can be done if we empower the individual and small and medium enterprises leveraging technology to sell to the entire world and create the capability, capacity, and skills that are required. In order to do that we need to develop technology platforms and a regulatory environment. A simple thing like if you sell to the United States of America what are the regulations that you need to comply with. There has to be a mechanism through which the State provides some of these knowledge services and capability building. That is what I would like to do when we think about Kerala looks ahead. This will completely transform Kerala. It also creates a situation in which the brand Kerala will be known not just for Ayurveda or tourism but it's world-class product and services

Yusuff Ali M. A, Chairperson and Managing Director, LuLu Group International

At the very outset let me take this opportunity to thank the Government of Kerala for organising this international conference, Kerala looks Ahead. I am very happy that this is being conducted to discuss the prospects for Kerala in different areas and to showcase State initiatives. I am sure this event will help to showcase Kerala as an ideal investment destination. I sincerely thank the honourable Chief Minister for inviting me to this conference and this session. We are one of the largest investors in the State of Kerala. At present, our investment in the State stands at Rs 15,000 crore. We also have plans to invest over Rs 8000 crore more in Kerala. If I speak about the opportunities in Kerala, I should also be able to show the investments I have made to potential investors especially senior business tycoons such as Ratan Tataji, Kumar Mangalam Birla, respected Azim Premji, Anand Mahindra, Madam Kiran Mazumdar-Shaw, Kris Gopalakrishnan, and other business tycoons. We have constructed one of India's major shopping mall and one of India's largest convention centre in Kerala which can accommodate 10,000 delegates at a time. We have also made a lot of investment in other sectors including information technology and logistics.

When we are discussing the possibilities and opportunities in Kerala, I would like to say that today Kerala, the most socially advanced State in India, is on a very strong foundation be its industrial infrastructure, law and order, connectivity, landscape, human resources, or healthcare. Today the State is not only known for its natural beauty, god's own country, it is also getting noted for its range of top-class infrastructure, some of which are unparalleled. Not many States can match the facilities Kerala offers for industries that operate in the knowledge sector. The State has some unique advantages and facilities when compared with other States. The Government under the dynamic leadership of our Honourable Chief Minister is giving top priority to the development of infrastructure including roads, bridges, high-speed train, urban infrastructure, industrial parks and corridors. Most of the projects are developed in a public-private partnership model providing huge investment opportunities to investors. Kerala has a history, with its first Private Public Partnership (PPP) project, the Cochin International Airport which was also the first greenfield airport in India built with public-private participation. It was constructed when people were not even discussing private-public partnership projects. The Honourable Chief Minister is the chairperson, and I am very much honoured to be a director board member of this airport, invested director board member, for the past 25 years. I have also invested in this project.

To encourage the new investors, the Government of Kerala has introduced the single window clearance system. The State has consistently moved up in ease of doing business ranking. To simplify the clearance procedures, to remove unnecessary regulations, and to ensure time-bound, the Government has amended several acts and rules from time to time. The presence of the Honourable Chief Minister in this session clearly shows the Government's commitment to the development of industry and to attract more investments. Kerala has great possibilities and opportunities in information technology, as my friend Kris mentioned, healthcare, hospitality, food processing, medical equipment, electronics, and a range of other knowledge industries. State's highly educated and skilled youth is its greatest strength. Our dedicated boys and girls, that is our greatest strength. There has also been a steady increase in the State of Kerala's manufacturing sector, especially the manufacture of IT and electronic components. To encourage the investment, I think, the Government of Kerala is relaxing the 50-acre ceiling on owned land because if

industrialists come within 15 acres limits, we could not start any big industry, so the Government is looking to change the 15-acre ceiling on holding. As per the norms of the Government of India, there are also opportunities in the agriculture sector.

Every year we are also exporting fruits, vegetables, and snacks worth crores, almost worth Rs 400 crore last year, from Kerala. There is a lot of export opportunities. I recommend an Export Promotion Council should be there, to oversee Kerala's export to other countries. As an investor, I can say without a doubt that Kerala's future industrial prospects are very bright under the dynamic leadership of our Chief Minister, we should try to capitalise on the opportunities Kerala offers to investors all over the world. I encourage everyone, including my friends, to become strategic partners in this prosperity. I once again thank you for inviting me to this session thank you very much. Namaskar.

Dr B Ravi Pillai, Managing Director, RP Group

We are facing one of the major crises in the history of the world. I thank the Chief Minister for the efforts

It is the right move to form a road map for the future of investment even in the context of continuing the Covid-19 pandemic. We should take Covid-19 as an opportunity. India is the only country that received investment during the Covid period. Many foreign companies shifted their operations to India. As per the new policy in the recent budget, many foreign companies started their operations in India.

The financial cost is very low now, this a good time to start businesses. We are facing the lowest interest rate in the last 20 years now. It is lower than the interest rates around the great recession in 2008. I have visited China multiples times and have relations with many companies there. If we apply for a business there, within a time frame we get full permission. It would be good if we can get full permission within one or two months in Kerala too.

Due to the long coastline and density of the forest, our State is an environmentally sensitive zone. We must plan for industrial development within the contours of this limitation. We should be able to utilise Kerala's young and dedicated manpower, a long coastline, and urban market. There are four sectors that we can consider; Knowledge-based business, healthcare, tourism, and rubberbased industry.

We are living in a new IT age. We have seen more advancement in IT in the last 10 years than what we have seen in 200 years before it. This revolution in Kerala has provided India and Kerala with a substantial advantage. Unfortunately, most of the IT organisation are doing back-office IT works. Kerala doesn't have many companies that do real IT work. Kerala can become the hub for artificial intelligence and mobility solutions. The entire world is moving very fast towards clean energy solutions and storage systems. Tesla, the electric car manufacturers, are setting up one of their bases in Kerala. They are planning to set up a space launch centre and large-scale storage solutions. This will bring many technologists to India. This brings with it the possibilities of starting many technology-related companies in India. The Government of Kerala can form a fund to find capital for this endeavour. This can be done with private collaboration.

Kerala has substantial possibilities in forming herbal medicine clusters. The thrust should be given to provide high-end food processing clusters. More aquaculture farms and processing units should be started in the State. We need plant and agriculture-based processing units. The Government should identify the forest products that can be made into herbal medicine.

Kerala is the State with the highest life expectancy in India, because of this, there are also more cases of old age related problems. There is substantial investment potential in the area of health care for the elderly. Kerala's Ayurveda and traditional treatments are world-famous, but we are yet to fully utilise its potential.

Kerala has substantial potential in tourism. The Government is trying its best to improve the tourism sector. Tourism can create more jobs and give more tax money to the Government. In 1959, the Government of India appointed the famous French company Club Méditerranée to identify the best location in India to start a beach resort. After studying the situation in the different States of India, they selected Kovalam as the best location. In 1981 New York times included the Kovalam beach in its list of finest beaches in the world. Once's Hawah beach was world-famous, but the condition now is bad. The tourists come only in a limited manner. There is no other place in India with backwaters, beaches, and rivers like Kerala. Therefore, Kerala is called God's Own Country. We have not been able to fully utilise our potential. To address this issue the Government of Kerala should undertake an international level marketing campaign. We are facing stiff competition in the tourism sector from the countries in the neighbourhood. In recent times, many Indian tourists are travelling to Srilanka, Maldives, Thailand, and Malaysia. This is having adverse effects on Kerala's tourism. The flight charges to Bangkok, Malaysia, and Singapore from India are very low, but the travelling charges from the rest of India to Kerala is high. If more airport connectivity and flight frequency are allowed there will be price competition and there will be an automatic reduction in the flight charges. To attract more tourists from other countries and States more facilities and a special entertainment zone should be allotted.

More than 80 per cent of the rubber in India is being produced in Kerala. The number of rubberbased industries in Kerala is relatively very less. We need to have more rubber-based industries in Kerala. A tyre manufacturing company can be started in Kerala in association with Japan and South Korea.

More funds and assignment should be given to the MSME sector for the enhancement of productivity. To enhance the exports from Kerala, measure should be undertaken to develop coast-based logistics. Technological upgradation in the traditional industry is required to improve them.

I thank our Honourable Chief Minister Shri Pinarayi Vijayan, and the Planning Board, and the Industry Department for giving this opportunity and wish you all the best.

Dr Azad Mopan, Chairperson and Managing Director, Aster DM Healthcare

The Honourable Chief Minister Sri Pinarayi Vijayan, Industries Minister Shri E P Jayarajan, Vice Chairperson of Planning Board Professor V K Ramachandran, stalwarts of Indian industry Sri M A Yusuff Ali, Sri Kris Gopalakrishnan, Dr Ravi Pillai, other panellists and dear friends. First of all, let me congratulate the Honourable Chief Minister Sri Pinarayi Vijayan, his cabinet colleagues, State Planning Board and State's top officials for organising this epoch-making initiative. It is my proud privilege to participate in this special session on the industry of Kerala Looks Ahead conference. Thank you, very much the Honourable Chief Minister, for giving me the opportunity to speak to this distinguished audience. The participation of business leaders of the country who represent the who is who of the Indian industry shows that Kerala is on focus now as a destination for investment. We have heard the appreciation and words of confidence from stalwarts including Ratan Tata, Azim Premji, Anand Mahindra, and Kiran Mazumdar-Shaw. Kerala is at the top in aspects such as education, healthcare, governance, and social justice. We have the highest literacy in the country, the highest physical quality of life (PQL) index, and the highest public affairs index. Kerala is one of the top three large States in the country even in per capita income and has a very high purchasing capacity. The opportunities are galore in various sectors in the State, these have been discussed in the designated sessions of this conference and this meeting. My friends have discussed it. I am hopeful that the top business houses in the country and the other participants in the conference shall take up these opportunities leveraging the availability of human and physical resources of this welfare State.

I want to point out a couple of opportunities in the State and one of them is the 42 freshwater rivers which carries trillions of litres of water to the sea. Most of these rivers are perennial too. There is a potential for treating this water and bottling it at different points across the State. This could be a major business and employment opportunity. This will also be a source of income for the Government through royalty. More importantly by doing this we are fulfilling the duty of supplying water to the world. We know water is likely to be more precious than oil in the future, looking at the speed at which global warming is taking place and the global water plate is getting depleted. I look forward to seeing 'Kerala Water' from god's own country in all corners of the world through this initiative.

I also like to recommend that we start a Non-Resident Keralites (NRK) smart city. This can be a well-contained city build based on a master plan, where we can have residential businesses such as non-polluting industries, IT and related areas, recreational clusters, and educational clusters. The requirement for education for the children is a big part of the pain of all the NRKs because many of them live in a different country and have to send back their children to our country for education. An NRK university in that cluster to cater to that this requirement will be a great service towards NRKs. The investment for this can completely come from the NRKs, who will be very happy to invest into this by way of their commitment to the State, the return on that, and as well as it is something where they are directly participating. The Government need to only acquire the land and be the sponsor for the project. I am sure that if this is done somewhere in Kerala, preferably in middle Kerala so that all the NRKs can have access to it. I am sure that it is going to be something that will stand forever as a testimony of the Government's commitment to the NRKs and in the development of the State.

There are significant opportunities in various sectors such as infrastructure, IT, tourism, and agroindustries in the State. I am not going into that. Unfortunately, there was a negative perception about the industrial climate of the State, this is history and Kerala of today is different. We have to convey this message and it is our duty, me and our friends, that this happens. While the Government, bureaucracy, and political leadership at the top of the State is fully aligned and is highly supportive of setting up the business, it is a sad reality that there is a requirement to ease this at the bottom level of the government machinery, where there are still a lot of delays. I am sure that this will be addressed as we go forward. The situation is improving very fast. As a person with businesses in five States in India, I can vouch that Kerala is one of the most business-friendly States now.

We have invested over Rs 4,000 crores in Kerala starting from 2001 and employ over 6,000 people and with not a single day of job loss during the last 20 years. We have been supported to the hilt by the various governments, the officials, and the people of the State. Everyone agrees that Kerala has the potential to become the most prosperous State through industrial development. A change in the mindset of the people of the State and a proactive Government was all that was required for this transformation and it is there now. I am very happy that this is happening with renewed vigour and the State is on the threshold for a take-off. The effective discussions that happened in the last three days and the participation of the topmost industry leaders in today's conference underlines the fact that Kerala is getting the focus it deserves.

Once again let me congratulate the Honourable Chief Minister for the visionary step of doing this conference. I foresee the State catapult to the centre stage of the most industrialised and prosperous State in the country very soon. Jaihind.

The special addresses were followed by a discussion moderated by Dr Venu V, Member Secretary, Kerala State Planning Board.

Dr Venu V, Member Secretary, Kerala State Planning Board

Distinguished members attending this special session of the international conference and Consultation, it is my privilege to moderate the discussion that arises following some extremely thought-provoking and stimulating interventions and comments that we have heard today. First of all, we are honoured by the statements of confidence and the strong sentiments expressed by the leaders of Indian industry regarding the future of the industry in Kerala but we are also obliged to them and to all those distinguished speakers, the homegrown industrialists, our proud Keralites who've spoken, who have given us very important pointers on the areas to concentrate, the aspects to consider, and matters to be settled.

To kick start the discussion may I now call upon Dr K. Ellangovan, the captain of the officials in the industry sector who was our chair yesterday and who's been listening in to this session although he has some pressing domestic issues. We are thankful to you Dr Ellangovan for making the time. I would now request you to make your intervention thank you.
Dr K. Ellangovan, Secretary, Department of Industries

Thank you very much, Dr Venu. Thanks to Planning Board, Vice Chairperson, and Member in charge of industry and everyone involved in this conference. It's been a fantastic learning experience for me to listen to the industry leaders from India who are distinguished and done so well now. I want to make a clear quick observation to start the discussion. From whatever the distinguished leaders have spoken today morning about Kerala and the prospects for the industry in future there are four broad ideas have arisen.

One is about where do we draw the balance between industrialisation and sustainability in Kerala. Which means what? Kerala being such an eco-sensitive State, with a dense population, with a very scant land available for industrialisation of large sizes, yet having a highly skilled pool of youths, and a huge list of entrepreneurs trying to invest in the State where do you draw the line? Where do you balance it out? What is the future strategy for us when it comes to thinking about development and sustainability or industrialisation?

The second point that has come out in the discussion is, where do you draw again a balance between providing a large number of employment opportunities to the youth versus switching over to automation and other information technology-driven services that may not provide as many numbers of employment as one would like to have? There is always a trade-off between automation and embracing technologies that reduce especially skilled and semi-skilled workers. So, are we ready to go to a situation where only cognitive functions can be left to the human resources and all non-cognitive functions can be relegated to automation and industry?

The third important point, I think was made by more than one speaker in the morning, is about the triple helix mechanism. Time has come now for industry, academic institutions, and the Government to sit together and see how human resources can be harnessed. What exactly it means? According to me, this is about creating a synergy of three important stakeholders in terms of making the human resources ready for tomorrow. Is our academia or the universities aligned to the industry requirements? Are youths employable? To what extent people are employable as soon as they finish graduation? It's a huge question mark. Does our curriculum represent the need of the industry? I don't know. Do we have flexible learning now? As Mr Kris Gopalakrishnan very rightly pointed out there are so many disruptions today taking place. Are we ready to do a sort of flexible learning where you can create people for the next century or even for this century in a different set of a thing?

The last point, which is the fourth observation, is the overarching importance given by all the speakers to aspects such as eco-tourism and the sustainability of the environment. Therefore, what kind of industries, what kind of strategies should we adopt to attract investments? We in the Industry Department have taken a clear stand that Kerala cannot invite investors of every kind. We have to have pollution-free, high value-driven, and highly skilled knowledge-based industries. We have identified five important sectors. These are the sectors we go to and talk to all investors wherever we go. IT and ICT technology-driven industries, space technology, aviation, defence, and food processing. This is not an exhaustive list; this is only a indicative list. Therefore, should

we now develop an investment strategy around these six or seven core areas, or do we also need to add more sectors and dilute them and do it?

These are my initial comments. I will be very happy to clarify my points as the discussion proceeds and also about what the department thinks about these issues and what we plan. Thank you, Dr Venu, I look forward to the discussions.

Dr Venu V, Member Secretary, State Planning Board

Thank you Dr K. Ellangovan, I think you have summarised the main points raised by the distinguished speakers. My memory goes back to what Mr Mahindra reminded us, that we need to be aggressive about the new areas and new technologies that could find a home in Kerala. Now speaking of these matters, I think, the best person to respond to such ideas, after Dr Ellangovan of course, will be my colleague Shri M G Rajamanickam IAS who is the Managing Director of the Kerala State Industries Development Corporation. Over to you Rajamanickam.

M G Rajamanickam IAS, MD, Kerala State Industries Development Corporation

Good morning and thank you, sir. Respected chair and other dignitaries. It's indeed a great privilege to talk in the presence of this august forum. Principal Secretary, Industries summarised Kerala's possibilities and opportunities. As far as the Industrial Development Corporation and Industries Department of Government of Kerala is concerned, we have made a concerted effort to take the industry sector to greater heights. As a part of this initiative the State embarked on the multi-pronged framework and has drawn up a blueprint of an integrated infrastructure development strategy, in terms of policy reforms as well as a business re-engineering process in many sectors under the leadership of the Honourable Chief Minister, Minister for Industries, and Secretary, Industries Department.

Kerala is the very first State to enact legislation to put in place a single-window clearance system for industrial licensing. Kerala industrial single-window boards and industrial township area development act 1999 which has brought single-window clearance board at the district and State level is one of the pioneers as far as India is concerned. As far as single-window boards are concerned, nowadays every industrial park has a single-window board. Many industries are part of the single window system. Up to certain amounts say for example 10 crores, District-level board will take care of and above 50 crores will be taken care of by the Board headed by the Chief Secretary. Very recently Kerala has brought in the Industrial Investment Bureau. The Principal Secretary is the chairperson of the Bureau and Managing Director of KSIDC is the CEO. In 2020, the Government of Kerala brought in Kerala Micro Small Medium Enterprises Facilitation Amendment Ordinance. It ensures that any large business investment if they are trying to come into Kerala the Bureau shall meet in a week to consider the application and within a week provide all necessary approvals under the purview of the State, given that everything is in order and does not fall under the red category as per the pollution control. It means that the Bureau will ensure that for large investments all aspects will be cleared within a week with the affidavit that they can comply with all the clearances within one year. Till one year there is no need for any approval for any of the larger industries. They can simply come and once the Bureau clears their application, they can start functioning. The validity of this approval is for five years. Kerala has taken a lot of initiatives and is a pioneer in terms of eliminating redundant regulations, simplification of clearance procedures, timelines for clearances, established standardised operating procedures, increasing the validity of a period of licenses and permits by the various departments. All these have been brought into a single web-based application named K-SWIFT, Kerala Single Window Interface for Fast and Transparent clearance. This is a platform through which any industrialist or anybody who wants to invest in Kerala can go to the website apply online. All the applications are made online. The Honourable Chief Minister in the "Ascend Kerala 2020" inaugurated that the platform. Renewals will also be made available in the K-SWIFT.

As far as Kerala is concerned, dramatic changes have taken place in the industrial atmosphere. In India, Kerala is one of the pioneering State for various reasons. We have a geo-strategic and locational advantage in terms of knowledge-based industries, skilled workforce is available, we have international seaports, international airports, technical manpower, and research institutions all of them in one basket. Along with that the Government regulations and procedures are now being simplified and a web-based platform is available. As far as Kerala is concerned, we have to go a long way but whatever the start which has been taken place for the past four-five years and in the previous years Kerala is looking ahead to invite a lot of investment in the sector mentioned by the Principal Secretary and that is not an exhaustive list so all of you are welcome.

We look forward to meeting you all here. Thank you so much Venu Sir, Planning Board Vice Chairperson and other members for inviting me to this function. Thank you.

Dr Venu V, Member Secretary, State Planning Board

Thank you, Mr Rajamanickam, I think we have to give a lot of credit to the wonderfully dynamic team in the industries department led by the Honourable Minister for Industries. Dr Ellangovan, Mr Mohammed Hanish, and Mr Rajamanickam assisted by some very enthusiastic young officers, who have been working over the last two years to create an investor-friendly climate, which is enabling, and which changed the whole ecosystem of ease of doing business in Kerala. It is a testament to the hard work that today we have a system and infrastructure which was elaborated by Mr Rajamanickam in his intervention earlier. I also hope to hear from Mr Mohammed Hanish who is expected to join us any moment, but there is a question which I would like to post to Dr Azad Moopen if he is online. He happens to be my former teacher as well. Sir, it's a pleasure to talk to you. You mentioned, and I think yours was the only intervention that talked about investments in the education sector, that NRKs will be happy to invest. When we talk about the future of Kerala you would have noticed that over the several documents in the official realm, particularly in the budget the finance minister had very clearly mentioned that we have to move into a knowledge economy making significant investments into creating centres of excellence. So do you think that this city which you are talking about has synergies with this idea of an overarching ambition for the State to emerge as a knowledge economy and to develop specific centres of excellence which will be known globally for its quality?

Dr Azad Moopen, Chairman and Managing Director, Aster DM Healthcare

Thanks for giving me this opportunity as well as of course recognising me as your teacher that was long back, I am so happy that I have such students in a very high position. I feel proud of all those students who are around. So, coming back to this question which has been asked, I think that this is the opportunity. Apart from the infrastructure, which is being created, the NRKs can bring in the investment to create an NRK university if it can be taken up as a private university by the Government of Kerala. The other part is that NRKs from all the countries including the US, UK, and every other place are going to bring in a lot of knowledge. We have eminent people all over the world who are in the top positions in universities such as Howard. We will get them all involved. This won't be just a college, it will be professional, it will be a research-led university and there will be a lot of innovation happening. I feel that this is going to be the opportunity for us to start this journey which has been already started but to give a lift to that. So, I agree with your observation that this is going to be a golden opportunity to do this along with NRK university.

Dr K. Ellangovan, Principal Secretary, Department of Industries

This is an excellent review. I want to tell the audience that here under our department we have a plan to create an NRK enclave in one of the districts, mostly in Kannur, we are acquiring 500-acre land. Second generation NRKs can come to this enclave. These will have world-class schools, world-class hospitals, and housing facilities along with industries. Now we are fine with it conceptually, we need to work out some sort of a bankable project, an investment model, a legal framework, and what kind of a company it should be. I think the Honourable Chief Minister is more than happy to discuss this with all parties. He is committed to this. So, this is the information I want to give to Dr Azad Moopen and everybody. Thank you.

Dr Venu V, Member Secretary, State Planning Board

Thank you, Dr Ellangovan. The questions are coming in quick and fast, so I would like to first call upon Mr Mohammed Hanish, Principal Secretary, Industries for his intervention but I would request Mr Kris Gopalakrishnan, Mr Yousuf Ali, and Dr Azad Moopen to stand by because there are some questions from the audience that I have collected here which I will come to after the intervention of Mr Mohammed Hanish. Hanish, the floor is yours.

Mr Mohammed Hanish, Principal Secretary, Department of Industries

Respected journalists, my peers, our friends from academia, industry, commerce, and trade there is a great deal of churning process that's going on across the world and that happens not just in terms of technology that's being used. It's more in the case of the processes that have been initiated over different spheres and different spectrums. Naturally, the processes happen to be both intellectual as well as mechanised. Intellectual processes should be harnessing the intellectual capital and it calls for the creation of new schools, universities, and technical institutes. In terms of the mechanical devices that have been put forth by way of the introduction of modern technology, we are going for miniaturisation. We are going for optimisation of the financial resources as well as the technical resources. Also, putting in the right person in the right place at the right time becomes extremely important in an economy.

In a global economy that's shaping up, we are trying to weed out the undesirables and trying to focus upon the essentials. In this regard, what can Kerala do for the country? What can Kerala do for the nation? What can Kerala do for the world? What we can offer is that first and foremost we need to go in for a great deal of re-engineering process. The restructuring process of not just the human resources, but also of the processes that determine the contours of the industry, the trading activity and the productive activity in all sphere that we are indulging in. In this regard, the NRIs and NRKs who are situated across the world would become extremely critical in terms of their inputs towards whatever we can do. There are three non-negotiable aspects. One is the half opportunity that's present for every person should be converted to a full opportunity. Second is the kind of "snatch the technology" as it comes and try to be the leader in it. It's a non-negotiable process. Thirdly, ultimately, it's about the re-engineering that can be done to a human being, to a person as such, with the kind of intellectual crystallisation and intellectual inputs that can be provided to a person. These three together, beyond the traditional confines of labour, land, and capital become extremely important in the world wherein a major industry can be planned within your drawing-room. That's most important, therefore I would suggest that in our discussions the kind of industry that can come in frontier technology, cutting edge technology, and ultimately technology that has a consumer edge becomes most important. Along with it, the lifestyle-based industries have also been to be given added freedom. We need to harness all these things together. Therefore, what is needed? One needs to be selectively intensive; I would state. Selective in the sense that some of the sectors that are very much in tune with the realities of the State of Kerala can be introduced. Those sectors cannot be introduced in this State because of the paucity space, because of the paucity and dearth of finance that cannot be brought in here. Secondly along with it, we also need to go in for a great deal of application of the latest form of technology into it. Theme-based paths are a step in the right direction. Apart from that, it's a creation of an amicable ecosystem. An ecosystem that will range straight from the top till the bottom where a conducive harmonious environment is created as far as the industry is concerned. This would be my kind of general remarks about the way in which our systems, our industries, have to progress. Ever so many NRIs and NRKs are waiting for good things to happen. I know for sure that my good friend Dr Azad Moopen sitting over there has had quite a few brushes with some need or problems in Kerala for late, but at the same time, these are problems that can be certainly tackled provided a great deal of re-engineering process is brought about. That is the answer which has to be provided. These are my initial words; I would certainly listen to the valued collective wisdom of all the brilliant personalities over here. Thank you very much.

Dr Venu V, Member Secretary, State Planning Board

Thank you Hanish, for your very pinpoint intervention. I have a question from the audience for Mr Yusuff Ali. You are online I am sure. "Sir, we are quite proud that the State has given rise to someone who leads a transcontinental giant in the retail sector and that there is a considerable investment in the same retail sector coming from the same source to Kerala as well, however, the Covid pandemic has changed things across the world" the question to Mr Yousuf Ali is, "in the

post-covid situation what are the specific challenges in the retail sector? and how do you see it growing, particularly with reference to your investments in Kerala?

Mr Yusuff Ali M. A, Chairman and Managing Director, LuLu Group International

At the moment everybody knows that the situation is not that much good because of the pandemic. We never expected or the world never expected that this will happen, but within one-to-two-month, it's happened. So, we were not prepared to take this challenge, because our e-commerce division was not doing well before, because we were not prepared, and we were not concentrating on it. Now we understand that e-commerce is necessary, so now we are increasing our platform and our delivery area. So, within six months we will bring our own platform to cater to our community. This lockdown, everybody knows, affected our business. Four to five months locked down. Our capacity is 80,000 customers a day, but now we cannot allow more than 20,000 customers a day because of the need to maintain social distance. According to the protocols, we hope that this situation can be overcome and our projects which we finalised including those in Trivandrum, Calicut, and Kottayam are on right track. We have to wait, and we have to face the loss, especially in hospitality. We have our Hyatt hotel in Kochi which was not running for five months. Our hotel chains are not working. So, we have to face the challenge not only in India but also all around the world. Thank you.

Dr Venu V, Member Secretary, State Planning Board

Thank you. Mr Yusuff Ali, that was quite candid, but you put the spotlight on the necessity for ecommerce, even for giants like you. You are changing the way you did business. I think it is an important takeaway for entrepreneurs and industrialists attending this session. I have a set of three questions for Kris Gopalakrishnan.

I will start with one on the policy. "Yesterday during the discussion on industries in the industry session an academic from South Korea discussed smart industrial policies in the context of that country. Smart industrial policies to aid the growth of knowledge and technology-led industries. What in your view are the smart components in an industrial policy that can help aid or aid the growth of digital technologies in the State? What should we be looking at from a policy point of view?"

The second question is a little personal, I think, "Is 'work from home' culture here to stay, particularly in IT? How does this affect education and probably technical education in the current scenario?"

Third, "you mentioned that India mostly has only backend processes in information technology. How can we change this into having businesses and companies that are looking at cutting-edge real technology work in Kerala? Mr Kris Gopalakrishnan, please.

Mr Kris Gopalakrishnan, Chairman, Axilor Ventures

Thank you. The Government has mainly two roles when it comes to regulation and policy. One is an enabling role and the second is an enforcing role. In the enabling role, the Government has to look at capacity creation — which is education, skilling, capability building, and even providing know-how. When I say the Government has to enable this to happen, the Government may not directly get involved in the delivery of these services, but the Government has to enable the delivery of these services on the skilling side. The second is to create pilot opportunities. In many cases, the Government can enable the pilots to happen by becoming a consumer for those products or service. Pilot opportunities such that these new ideas can be tested in a safe and secure environment without creating havoc or harming the stakeholders. The third is, based on that pilot you need to go back and revisit your assumptions and enable the change in whatever is required to be changed. Fourth is resources. Making resources available, including looking at ease of doing businesses, because many a time these businesses will require either change in existing regulations or new regulations to be created. Last but not the least, the full rollout of this very quickly because the business has invested in creating a new product or a service so you need to ensure that this product or service will yield returns for the business. So that they can invest more and they can have confidence in the State. Let me now explain by a concrete example. Taxi aggregation services by providers such as ola and uber is a disruption to the existing model of taxi services. It is beneficial to the consumer; it changes the way you engage with the taxi driver and the ownership of the vehicle. There are so many aspects to this. How do you enable something like this to be piloted, tested, and capacity created such that something like this ultimately benefits all stakeholders to the best of possibilities? That is what I mean by smart regulations. This is now required. If you want to enable a service like a homestay, how do you enable this to happen? You need to have a lightweight set of regulations because these homestay people cannot be considered to be equal to a very large hotel chain. What is the lightweight set of regulations that are required to do that? If you do that it is possible that every home becomes a homestay also in the future and homeownership changes. These are the transitions that are happening in society and the Government must enable this to be piloted in a safe and secure way. If there is a benefit to a majority of the stakeholders, how can this be rolled out very quickly?

On the second question about work from home. I believe that in the future our work patterns are going to be hybrid, a certain percentage of people are going to stay at home and work. This may be rotated; the same set of people may not continue to work from home in the next week or the week after. A different set of people may work from home. There are many benefits to this. One, women participation increases. Second, flexibility and timing. You can offset vacation time and you can work from anywhere.

In my speech, I talked about how we can flip this whole idea of employment generation by enabling every single person of working age in Kerala to be an employee of businesses anywhere in the world. Our employment exchanges becoming a platform for people to find work, but more importantly for the industry to sign up gig workers. This may require regulatory change, but the bottom line is "work from home" is here to stay. How much of that will happen will depend on the industry and the business. We will have a hybrid model going forward. Last is about the IT industry and back-end processes. The industry has moved away from backend processes a long time ago. IT services is a specific industry. We are the best in the world for that. Don't confuse that with any other part of the IT industry. IT industry consists of hardware development, selling of hardware, products, and services. What Indian companies have done extremely well is to demonstrate the ability to provide services to businesses in the world. We have become the best in the world for doing that, in fact out of the top 10 companies in the sector across the world 5 are Indian companies. Now we will need to create IT product companies. We are doing that, in fact, I briefly saw V K Matthews there, one of the best companies providing logistics and services to the transportation industry sitting in Trivandrum. IBS and SunTech are companies that are providing several services to the financial industry and telecom industry, again sitting here in Kerala. There are many examples of product companies that are there. You will find many more. Some of the better-known ones are Zoho and Freshdesk. We should also popularise companies such as IBS and Suntech, Kerala grown companies in the electronic, digital computing, and hardware. There are different parts of the industry, in every part, we must try to become worldclass, top class, and the best in the world. We have done that in the IT services industry, industry has progressed to now support every aspect of the business that can be created as a service including engineering services, research and development services, design services, software development services, maintenance services, remote infrastructure management, and business process management. It is huge now and we are the best in the world in doing that.

Thank you, Kris. It's always refreshing to get such clarity. A question is asked and the question has been put to rest, put to bed. Thank you very much for those views. I have a couple of questions from the tourism side. Yesterday I had the honour of chairing the very lively tourism session. One of the things that came up repeatedly was the trauma that the industry is going through, the absolute devastation of the tourism business across the world and also in Kerala. In this dreary situation itself, there are some rays of hope. One of the questions I have received focuses on that, but there is a personal element also to this. My son, one of the young professionals across the country, had spent several months with his parents, he got bored, then again like thousands of young professions decided that they will rather have the risk of contracting Covid-19 than live with their parents and left home. What is interesting is that before he left, he realised that several of his friends and old classmates particularly from the north had camped in places such as Varkala. Varkala is running full, I am told, many of the budget hotels and homestays are running full because of young professionals working away from the office but also away from home. Now, this brings me to this question, which probably Mr Yusuff Ali with his extremely astute knowledge of our State and about the tourism sector can perhaps throw light on. It is about work from home and about the hundreds, perhaps thousands of houses and room inventory, that we have in our State. Several houses and apartments that have been purchased by NRKs are lying empty. Is there a potential for us, not as a vacation destination, but as a stay-cation, as a work from or work near home, kind of a new normal that has been imposed upon us? Do you think that there are possibilities that we can exploit? If so, the tourism department should look at this carefully. Your views please, Mr Yusuff Ali.

Mr Kris Gopalakrishnan, Chairperson, Axillar Ventures

This is where a platform needs to be created, a technology platform needs to be created, where these can be listed and consumers can access them. This is an opportunity for a startup to come up to list such facilities and optimally use those facilities. Regarding the question about, what are the opportunities for Kerala? The opportunities for Kerala are in leisure travel, that's what is going to come up faster than business travel. Personal travel and leisure travel will come back faster. Whoever I talk to, wants to get out of the home. If you can ensure that you are creating a safe environment, they are willing to come. I am already seeing talk about Varkala being full. It is just not Varkala, but every leisure location is becoming full. It will be domestic tourists first, tourists using cars to reach there. I think that will happen first. We should take advantage of that.

Dr Venu V, Member Secretary, State Planning Board

I think that also puts the matter succinctly. I think there is a place here for a wonderful technology innovation just waiting to happen. Dr Ellangovan, if you are here can you respond to these questions. I have two points. One is the general point about MSMEs. Can you throw light on the recent innovations or recent facilities that the Department of Industries, the Government of Kerala, has extended? Second is, there is a question about research and development facilities in partnership with private sectors, with private sector players in the State, if there are any new initiatives can you throw light on them?

Dr K Ellangovan, Principal Secretary, Department of Industries

Thank you. Both are very relevant. Regarding MSMEs, the Department is of the firm view that the definition of MSMEs getting changed, from a limit of 10 crore investment to 50 crore investment, categorises virtually every institution in Kerala as an MSME. My assessment is close to 90 per cent of the industry lots are all MSMEs. Keeping this in mind the Government has very carefully enacted legislation called Kerala MSME Facilitation Act 2019. What does it mean? This act means that automatic approval will be given to people for industrial licensing. It is pathbreaking legislation. Maybe the first time in India that the State has gone from a questioning model to a trust model. When an entrepreneur applies online, certifies that he has not violated any laws, acts, or rules, certifies that the land use pattern is not violated, and certifies that it doesn't fall in the red category of the State Pollution Control Board order, the entrepreneur is eligible to get what is known as an acknowledgement letter, which entitles him/her to start an enterprise right away for three years. In these three years and another six months of the grace period, the entrepreneur can apply for formal industrial licensing and get it. No inspection will be conducted in the first three years. Up to 20,000 square feet of buildings can also be constructed. This is one legislature that enables an instant start for MSMEs. Number two, now we focusing on MSMEs in KSIDC and also in Kerala Financial Corporation (KFC), to ensure that a greater number of people are assisted by the State financial institutions, rather than giving a huge amount of loans. For instance, close to Rs 3,000 crore worth of loans has been given so far by KSIDC to more than 4,700 units in the State over the years. To be specific in the last four years we have distributed Rs 223 crores for 4,700 units. Point number three, the MSMEs have a huge issue of the land cost being the frontloaded cost. So, to deflate the cost we have done a series of reforms in the rules. They don't pay

the entire cost at one go, pay 20 per cent first and the remaining 80 per cent can be paid within the next four years without any interest. The interest on capital of these four years we will be borne by the State Government. I am thankful to the Vice Chairperson State Planning Board and others who have given a provision of 10 crores last year as a startup process. Regarding land cost, a system of deferred payment is being adopted. It has reduced the burden of MSMEs to a very great extent.

Four, we are now basically upgrading an institute called Kerala Institute of Entrepreneurship Development into a State-level institution modelled on Entrepreneurship Development Institute of India, Ahmedabad. The Planning Board and the Department of Industries are very keen to pump in more money and create a state-of-the-art centre basically to develop entrepreneurs. This will give a much-needed link between a graduate student and an employee. This is going to make them more employable. This is one of the major initiatives of this Government. The KID in Ernakulam will be a State nodal office of national standards.

Number five, MSMEs have become the focus of the department, rightly so. There are financial and other incentives that are being given to MSMEs. Coming to research and development centres for MSMEs, this is where I want to mention yesterday's session on the modern industries possibilities. It is high time that the industry, academia, and the Government sit together and create a synergy for making research and development a part of the industrial promotions. In the session on the modern industries possibilities, we have said that in all the industrial parks minimum of five per cent of the area should be given for research and development centres. I call upon all the industry leaders and industrialists here to join hands with the department to create a culture of research and development on industrial development. We are going to have as exclusive MSME Micro Finance Corporation that will be launched soon by the Honourable Chief Minister. It will have a 100-crore equity, 100 crore corpus funds, exclusively for assisting MSMEs.

Dr Venu V, Member Secretary, State Planning Board

Sorry to intervene Dr Ellangovan. Thank you. Since the address of the Honourable Chief Minister will have to be scheduled immediately, I have one short question for Mr Yusuff Ali and then it will be the Chief Minister's address. Mr Yusuff Ali, there is a question about how we can expand our retail sector, particularly when Kerala is such a big consumer of garments and food, do you think that food and agro-industries and the garment industry can produce material that can be consumed by the State so that the production of such materials also can be done in Kerala. I appreciate it if you can have a quick response because the Honourable Chief Minister is ready to make the address. Thank you.

Mr Yusuff Ali M. A., Chairman and Managing Director, LuLu Group International

In my speech, I mentioned that we export about 300 to 400 crores of fruits, vegetables, and snacks from Kerala. Kerala has a lot of potential for organised retail and export. In our case, we are going to expand our retail chain of hypermarkets in the State of Kerala, which is coming to Calicut, Kottayam and other places. Organised retail is required for the future generation in Kerala. A lot of international retailers visited Kerala and they saw a lot of potential products are available in the State of Kerala. One fruit to be bought from Wayanad, Durian, a special kind of jackfruit, that will

fetch five times higher price in Thailand and other tropical countries such as Indonesia and Malaysia. We can develop agriculture not only for the domestic market but also for export. One difficult problem that we are facing is the packaging. We can invite a lot of investors for food processing because the agriculturalists will benefit, the export will increase, and also for the local organised retail. I request the Honourable Chief Minister to form an Export Development Authority or Export Promotion Council under the Government of Kerala. They should oversee which all products can be exported from Kerala and how they can contribute to the packaging. The packaging is very important for the international market and our consumers in Kerala will also get the same quality and same packing.

The closing remark of the special industry session of Kerala Look Ahead, conference and consultation was delivered by Shri Pinarayi Vijayan, the Honourable Chief Minister of Kerala.

Pinarayi Vijayan, Chief Minister, Government of Kerala

Kerala's development experience has evoked keen interest among scholars at the international level. The top most priority of the present Government has been to consolidate and strengthen the gains of the State in different spheres.

Our Government is investing in new-generation public schools throughout Kerala, with the objective of making the best possible school education available to every child in the State. The State has also taken steps to make the health delivery system effective and inclusive.

Kerala's economy has been growing at a pace faster than the national average. In 2017-18, per capita income of Kerala was 55.2 per cent higher than the Indian average. The main engine of Kerala's economic growth has been the services sector. It is important to note that the services sector in Kerala has been riding on the State's achievements in human development, and also from the connections that Kerala has had with the wider world from historical times.

An important stimulus to Kerala's economic growth has been the large supply of skilled workers and professionals in the State – including nurses, engineers, doctors, media professionals, and a wide range of other creative and knowledge-industry workers.

The State Government is committed to the building of a strong and diversified manufacturing sector in Kerala that will derive benefits from the domestic market. The focus will be on environmentally friendly enterprises.

Globally, manufacturing is becoming more automated and knowledge-intensive, with the advances in what is described as 'Industry 4.0'. While this raises concerns about employment generation, Kerala is better equipped than most others in coping with the new challenge. A relative abundance of educated and skilled workers, a long history of entrepreneurship, and exposure to the wider world are our specific strengths.

Kerala has a thriving information technology (IT) sector. The Technopark was one of the first of its kind in India, and still one of the largest technology parks in the country. We now have at least

six more major IT parks across the State, including Infopark in Kochi, Cyberparks in Kozhikode and Kannur, and Technocity in Thiruvananthapuram.

We are confident of a major revival in the growth of food and agro-based industries in Kerala. Kerala produces a rich variety of agricultural products, including rice, coconut, rubber, pepper, cardamom, banana, pineapple, and, as Mr Yusuff Ali said, many varieties of Jackfruits. The State has substantial forest and marine resources.

We are keen to kick-start the production of pharmaceuticals in Kerala, and the public sector unit Kerala State Drugs and Pharmaceuticals Limited (KSDP) is making advances in this direction. We believe in the importance of improving the availability of good quality generic medicines at affordable prices for the poor.

Kerala is confident of making big advances in biotechnology and life sciences over the coming years. The recently inaugurated Life Sciences Park in Thiruvananthapuram offers world-class infrastructure facilities for biotechnology and life sciences-based industries. Kerala aims to emerge as a significant player in the medical devices sector.

Kerala State Industrial Development Corporation (KSIDC) is setting up a petrochemical complex at Kochi. The petrochemical complex will benefit from its proximity to BPCL-Kochi Refinery.

Steps have been taken to implement the Industrial Corridor project in Kerala that extents between Kochi and Coimbatore. We are determined to significantly improve Kerala's position among Indian States with respect to the ease of doing business. We have enacted laws to make the process starting business in the State simple, easy and transparent.

The growth of the productive forces in Kerala will be based on the application of science and technology to agriculture, industry and other sectors. Over the next five to ten years, our task is to ensure sustainable, environment-friendly economic growth, and high levels of skill development and decent employment.

One of the objectives of the international conference 'Kerala Looks Ahead' has been to help chart a future path for industrial growth in Kerala. This conference has also been an occasion to announce to the world Kerala's resolve to build a modern industrial sector, harnessing the skills and enterprise within the State. The Government of Kerala is committed to transform Kerala into a knowledge society. We have a specific road map for this.

We invite you all to be our partners in this exciting process of building a modern economy and society in Kerala. As I already mentioned, there are many specific areas in which we would like you to cooperate with us. Our Government will always be happy to listen to your ideas and to attend to your concerns.

Let us work together for a better and prosperous Kerala.

The vote of thanks was delivered by Dr Jayan Jose Thomas, Member, Kerala State Planning Board.

Dr Jayan Jose Thomas, Member in charge of industries, Kerala State Planning Board

Friends, it is indeed a privilege to offer a vote of thanks on behalf of the State Planning Board for what has been an exciting session on Kerala's industrial future. Of course, this session has been part of the Kerala Looks Ahead conference and one of the objectives of this conference has been to evolve strategies to think about a future industrial and economic growth for Kerala which is inclusive, ecologically sustainable, and above all driven by technology and innovation. We have had very good discussions today. We believe that this conference would turn out to be a pathbreaking event, providing a clear road map for Kerala's economic and industrial future. First of all, I would like to thank the Chief Minister for his continued support and also for his stress on technology-led growth for Kerala. It has been very heartening that we received words of encouragement from the captains of Indian industry so we would like to thank in particular Mr Ratan Tata, Mr Azim Premji, Mr Anand Mahindra, Ms Kiran Mazumdar-Shaw, Mr K Gopalakrishnan, Mr M A Yusuff Ali, Mr B Ravi Pillai, and Dr Azad Moopen for their valuable comments and also for taking part in the discussion. From the Planning Board we would like to thank Professor V K Ramachandran who also offered the welcome remarks, he was also involved in the detailed planning of this event. I would like to thank the Member Secretary Dr Venu V for chairing this session. We received help in organising this session from Chief Minister's Office and from the Department of Industries, Dr Ellangovan, Mr Rajamanickam, Managing Director, KSIDC, and Mr Hanish Muhammad joined the discussion. We thank all of them. Finally, we would like to thank the Planning Board officials who were very active in organising this session including especially Mrs Gayatri, Mr Harshan, and also Mr Dinesh Bhaskar from the Chief Minister's Office. Thank you all, thank you so much.

Concluding Session

The concluding session of the Kerala Looks Ahead conference was held on February 3, 2021. Nobel laureate Prof Amartya Sen gave the special address at the concluding session. Summaries on each technical session of the conference were presented by Members, Chiefs, and members of partner organisations. The main discussion points of the session and key ideas and recommendations that emerged from the session were highlighted. The Honourable Chief Minister gave the concluding remarks of the session.

The transcript of the concluding session is presented as follows.

V K Ramachandran Vice Chairperson, State Planning Board

Welcome to the concluding session of the international conference and consultation titled Kerala Looks Ahead.

As I have had occasion to say over these last few days, when this Government came to office in 2016, it was committed to a policy of planned development and to a policy of economic development that built on the foundations of the policies that have made Kerala well known in the national and international arenas. The Government of Kerala decided to continue with the process of economic planning. It also decided that it would deepen and extend our achievements in human development in social justice, in gender empowerment and in health and school education *and* that it would use the strengths thus built to catapult the State into a new stage of development – to strengthen our productive capacities, to expand employment, particularly for our youth, to strengthen physical infrastructure and to enhance income-bearing services in the State.

Four years and a half later, we have made substantial achievements and these have been made despite the setbacks that we have suffered in terms of natural calamities. We had cyclone Ockhi, we had the extreme rainfall events for 2018 and 2019. The Nipah virus affected two districts, and we have had the Corona pandemic. We have also had economic setbacks from demonetisation and other policies.

Nevertheless we believe that over this period, we have made substantial achievements. The most enduring contribution, the lasting legacy of this Government, I believe, is that today in development terms, Kerala is on the move and is poised for a new leap into a new economic future.

It is in this context that the Chief Minister Shri Pinarayi Vijayan instructed the Planning Board some months ago to organise an international conference and consultation on the ways forward for the State. As I have said earlier, the objective of this conference is not to teach the world or to tell the world of Kerala's achievements, but to learn and to learn about the best practices and achievements all over the world and their relevance to Kerala in a diversity of fields. The topics on which we would have discussions were discussed and recommended by the Chief Minister to us. They are the following: modernising agriculture, fisheries and animal resources; information technology; the third was e-governance; modern skill development; modern industrial possibilities; tourism; and higher education. We also had sessions in two other areas, on development finance looking at Kerala's contributions in this field and on Local Governments.

Although we were ambitious in our planning, we were unprepared for the extraordinary response to our effort; we are humbled by it. We have had about 22 sessions over nine themes. We have had three special sessions on local governments, on development finance and fiscal federalism, and a special industry session attended by India's most eminent industrialists.

The discussions and the quality of the contributions have also been extraordinary. We are indeed very grateful to the speakers, participants, discussants and those who joined us from the floor for giving us a whole new set of ideas and stimuli and for recommending a series of changes of methods that can be used by us in charting a path to a modern progressive Kerala.

Let me now not come between you and speakers we have at the end of these sessions. We have requested one of the leading persons from each session to summarise to the extent possible, the proceedings of that session. That is a difficult task, because the discussion in each session was so rich that it is difficult to summarise their main points in 10 minutes. I am sure that my colleagues who will make the presentations will collectively give us a flavour of the exciting three days that we have spent in this consultation and conference. May I request that we begin the programme of summaries of the sessions that we have had.

Thank you very much; and thank you, all participants, for the support that you have given us over these two days.

Professor R Ramakumar

Summary of Session on Modernising Agriculture, Fisheries, and Animal Resources

Thank you Vice Chairperson.

The task of organising sessions on agriculture, animal husbandry, and fisheries over a short period of one day was a very difficult task for all of us, that required us to focus on one or two major ideas in each theme and not more than that and for agriculture, animal husbandry and fisheries and particularly in animal husbandry and agriculture what we chose was the need to increase productivity in those sectors. Let me start with the agriculture that is crop production, it is clear that Kerala has to focus on a rapid increase in production of its major crops over the next five years or ten years given that more area cannot be brought under cultivation. Focus has to be to raise productivity. Rise in productivity requires a serious reliance on modern agricultural science and a firm rejection of traditionalist methods that keep productivity levels low while at the same time, with no concomitant benefits to the environment.

One of the important weaknesses of agriculture in Kerala is the low productivity of most of its major crops. Productivity levels are low both in comparison with other States as well as with the

maximum attainable productivity under scientific conditions which is what we call as the yield gap. Productivity levels of many crops in Kerala have also declined. If you see the period between 2011-12 and 2019-20, of course natural disasters and all have played a very important part but the primary task of agricultural policy nevertheless over the next decade or so has to be a focused programme to raise crop productivity. Only if productivity improves, can incomes be raised, studies show and this was reported by many scholars in the pre-conference sessions as well as in the conference sessions, rain fed regions of Kerala, they see, yield gaps can be closed with the existing technologies itself. Policy and in particular the extension machinery has to focus on better management of soil and water, wider adoption of improved varieties, availability of good quality certified seeds, balanced fertilisation and balanced nutrient management. These presentations also showed that higher yield gaps are broadly correlated with poor adoption of technologies. For instance, the absence of or poor application of lime, chemical fertilizers, insecticides and fungicides were found to be common in regions and crops with higher yield gaps. The more recent introduction of planning for agroecological zones by the Agriculture Department is a welcome step. We hope that this will ultimately lead to improved and scientific formulation, design and implementation of schemes of the Department. It is only through application of more and better science that agriculture can become sustainable. In Kerala, often a common understanding propagated through sections of the media and unverified sources is that zero application of fertilizers and pesticides is the singular way to attain sustainability. Nothing as many presenters repeatedly underlined, nothing can be more wrong and irrational.

We have already seen that the consumption of fertilizers on a per hectare basis is the lowest in Kerala compared to all Indian States and it has declined drastically, in fact dangerously over the last decade. This is something that many speakers in the agricultural session tried to focus on and they insisted that they should receive immediate attention. Kerala's consumption of NPK fertilizers was 36 kg per hectare which was the lowest among Indian States. Corresponding figures are 186 kg per hectare in Tamil Nadu, for example. That is a kind of difference that you see. The implications of this decline in fertiliser consumption in the soil for the sustenance of soil health, also has not been adequately studied. Agronomists made it a point to underline this particular point. Globally experiences show that reduced application of chemicals in agriculture can be achieved only through better research in the breeding of new crop varieties resistant to pests and diseases. Only if you have such new varieties and hybrids can you think of a long-term policy or a sustainable policy of reducing application of chemicals in agriculture. Advanced research in plant breeding should help us to develop varieties and hybrids that systemically require less application of chemicals.

New applications of cutting-edge areas of research such as biotechnology, gene editing, CRISPR and nanotechnology, promise not just to reduce the use of chemicals but also make high yielding crop varieties resistant to viral diseases, acidity, alkalinity, salinity, flooding and temperature variations. The State's agricultural research system needs to be geared up to meet this challenge. These were very important questions discussed where the one particular session discussed three particular instances of this new technology, nanotechnology where introduction of nanodiagnostics, nanoagri inputs like the small tablets of fertiliser, pesticides and bioinoculants can be used, nano stickers, nano pellets, nano films that help in fruit preservation to help extend shelf life of fruits and vegetables by six weeks and that would be highly favouring export orientation, long-term transport possibilities and preservation and storage during times of glut in the market. So, the session on nanotechnology was a big hit among the 200 odd participants in the zoom room and many wanted to pursue that task much more intensively in the Kerala context. Professor Kathleen L Hefferon from the Cornell University spoke in extensive detail about Gene editing and CRISPR. She pointed out that this is a highly accurate, fast and low cost technology compared to the present focus on GM crops. Stimulation of growth, manipulation of flowering time, stimulation of sucrose, increased uptake and transport of nutrients within the plant system, pest resistance, herbicide tolerance, photosynthetic ability, resistance to temperature stress, drought resistance, tolerance to salinity, changing fruit, grain, size, shape, number, all these are multifarious possibilities that have been opened up by the gene editing technologies. Kerala should be able to use these technologies having an early start in research and dissemination. Other technologies as the ICAR Director General pointed out, internet of things, artificial intelligence platforms, and precision agriculture also were discussed in great detail in the context of Kerala's agricultural growth.

Changes in production organisation were also focused on. As Professor Sukhpal Singh from IIM, Ahmedabad pointed out we have to learn from Thailand in how to use contract farming towards a State regulated, farmer-centric approach to agricultural growth how to leverage contract farming to ensure economies of scale, how to ensure the role of the State in coordination support, provision of institutional, physical and infrastructural support providing tax relaxations, providing incentives to farmer groups, collectives, cooperatives that is the way and not the path laid out by the three farm Acts of the central Government. An alternative path of contract farming was pointed out drawing from the Thailand example by Professor Sukhpal Singh. Now if this is in production and immediate sales, we also need larger cooperative network building in the retail marketing sector. There was an excellent presentation from Switzerland, where three cooperatives were discussed, Fenaco, the biggest agricultural cooperative in Switzerland as also Coop and Migros. Talking of Fenaco for example, Government has been providing subsidies for quality products for over 20 years now. 80 companies are there belonging to Fenaco, they are engaged in retail, energy, food, agribusiness linking about 45,000 farmers in Switzerland to the market providing higher price to the farmers at very low margins and they are one of the leaders in swiss fruit markets. So these examples were case studies discussed in great detail which have major implications for policy adoption in Kerala. The third item that was discussed in crop production was value addition where there was an excellent presentation by the Tropicana oil company executives in Thailand which produces different products of coconut and exports into 20 countries. The pathways to an export-oriented path in value addition and processing in coconut products was discussed. There were also discussions on the possibilities of processing in rubber and also very importantly something that Kerala has already begun, the Araku model of coffee transformation in Wayanad where farmers are aggregated into a collective for certified production traceability and marketing advantage, diversified shade coffee landscape is promoted with multiple income sources for climate change resilience. There is selective quality harvesting, professional procurement and primary processing of coffee cherries, all these were lessons from the Araku valley model of coffee farming that was suggested for Kerala and Kerala has already started steps in this direction.

Moving to animal husbandry, one of the most important features of dairy production in Kerala over the last four years has been that Kerala has moved very close to self-sufficiency in milk production. We used to import something like 9 lakh litres of milk on a daily basis in 2015-16. We today import only about 3 lakh litres of milk. We are very close to food self-sufficiency in in milk production soon by 2023 or 2024, we are likely to reach a surplus State in milk production. What is to be done with the surplus? How should Kerala be prepared for an era of surplus milk production. What are the possibilities of diversification, value addition that we need to be ready, establishment of milk powder factories for example evaporator how should Kerala be ready, Amul Chief, Dr R S Sodhi advocated a new programme of Operation Flood Kerala which should hasten the process of achieving self-sufficiency in milk production. He underlined the need for expanding the average herd size in dairy farms of Kerala today to at least 60 in number per farm which will greatly allow you to expand employment possibilities as well as increase incomes in the sector. How do we do that? We have to intensify our use of dairy cooperatives where we are already a leader at the all India level about 25 per cent of milk produced in Kerala is already procured by cooperatives. We need to raise it to 40 to 50 per cent that is the path ahead but how? Using technology induction, a digital platform for cooperatives, automated milk collection possibilities, genetic improvement of the cattle population, insurance, value addition, diversification of products, introduction of premium products ensuring credit, these were the components of a new 'Operation Flood Kerala' laid out in these sessions.

Focus was also on the need to develop a sector where Kerala has immense potential but it is hugely under developed which is the meat sector, poultry chicken and eggs, beef, piggery, the need for more slaughter houses was underlined, and the need to modernise and convert the currently unhygienic slaughter houses into hygienic slaughter houses was advocated. There was a need for branding Kerala's meat products, need for export orientation particularly into the middle-eastern regions. All these were possibilities that were underlined in the session on meat sector in Kerala. In piggery, one particular sector discussed a lot. We can be the leaders it was argued but at the same time we are underdeveloped in its potential. We need something like three hundred thousand pigs but we have only sixty thousand pigs but we do not have at the same time a breeding policy or an artificial insemination policy, we need compulsory vaccination of our pigs. Our slaughter houses are unhygienic. We need investments in waste disposal, rendering plants, composting units and there is also a huge scope for development of micro entrepreneurship in piggery that was underlined by many speakers.

Coming to the last session, that I want to speak about which is the session on fisheries, the most important focus of the Planning Board that has been over the last four years and which was advocated in the sessions was to focus on the development of inland aquaculture. Kerala's potential for development of inland aquaculture, in the increase of rural incomes in the expansion of rural employment, was repeatedly underlined by many of the speakers but Kerala has a lot of disadvantages as well. It does not have a focused policy as yet to expand. Inland aquaculture, fish seed production is very inadequate. We have only about five crore seeds in production as against the requirement of about 12 crore fish seeds that means we have a deficit of about seven crore fish seeds. Great possibilities of employment expansion exist in this sector. The session from Andhra Pradesh, drawing from the experiences of Andhra Pradesh value chain development in fisheries, showed that extraordinary employment possibilities exist in the development of hatcheries, nurseries, seed trade, pelleted seed trade, small boats, fish trade, ice factory, mechanical excavator, and trucks for hire. So, there are multiple linkage effects that these fisheries growth will create in the economy with concomitant expansions in employment, particularly for women. The need for clusters, identifying farm and business clusters and fisheries and supporting their development with incentives and subsidies were underlined. Along with all these possibilities, some cautionary notes were also made in particularly with respect to regulation and environmental implications of rapid fisheries. Expansion, rapid and unplanned development of fisheries can sometimes cause conflicts and environmental difficulties. Yet another point that was made was that planning that is too stringent can be restrictive and often ineffective. So you need a balance between what is to be regulated and how much is to be regulated. There is a need to strike a balance. Experts underlined that point as well with great importance. Possibilities of coastal aquaculture, mariculture, reservoir fishing, cage culture, ornamental fisheries, all these were possibilities laid out for Kerala given Kerala's large presence of ponds, small water bodies, which can be used extensively and intensively to increase fisheries production in the State. This is a short summary, I know this summary is inadequate to capture the richness of the discussions that were held over the pre-conference sessions and the conference sessions, but I have only 15 minutes and I need to stop now, thank you very much.

Professor Jayan Jose Thomas Summary of Session on Modern Industrial Possibilities

Friends, we have had two sessions on industry. There was a session yesterday on modern industrial possibilities and today we had a meeting with the leaders of Indian industry so I would like to report the main findings from the two discussions.

One major point that came up in the discussions is that we should plan for the future of Kerala's industry taking into account the unique strengths as well as challenges that Kerala faces, so it is very clear for Kerala, cheapness of land or labour, is not one of Kerala's strengths so in that way it is also difficult to compare Kerala with many other States as is often done in the ease of doing business comparisons. Kerala's unique strengths it was emphasised in by each of the discussions is skilled labour. We have professionals, nurses, doctors, engineers working all over the world, 1.4 million as per the estimate in 2011. So we have skilled labour, second is natural resources, the kind of agricultural products that we produce, our rich marine resources, our forest wealth and third of course, is the large domestic market that Kerala has, which actually offers a very mature and diversified market for a range of industrial products, consumer goods food products and so on. So, given these advantages, it is quite in fact many of the discussants pointed out that Kerala is in fact ahead of other States, when it comes to technologically advanced industries, industries which are sometimes referred to as Industry 4.0. Also, the other trend is to go for industries and technologies which are more environmentally and ecologically friendly so called green technologies. Kerala has an edge over other regions in the country.

A theme that has appeared in almost all the discussions that we have heard of the two days was the importance of technology and value addition so the way to transform Kerala, the way to build an industrial sector and industrial growth which is inclusive and ecologically sustainable, the way to do this is to emphasise on technology and value addition. Before we move into further details on the way forward, a few things need to be clarified and these were points that came up in the discussions. One is a myth that Kerala is not advancing fast enough when it comes to industry, in fact in the discussions it was pointed out that this is just a myth: Kerala is actually according to many of the discussions, one of the most exciting places for industrial growth as of now. In fact this is also showing up in the official statistics. Our per capita income is almost 60 per cent higher than the national average and it is also growing faster than the national average. The share of manufacturing in Kerala's GSDP growth has increased from around nine per cent in the early 2000s to 13 to 14 per cent now. The very interesting and remarkable thing about Kerala is the industrial growth, in fact over the last three decades or so, is the emergence of relatively small and medium enterprises; enterprises that are innovative, that work on new technologies, new industries; think of medical equipments, blood bags, dental instruments, electronic components, so these are some of the industries that have grown very fast over the last three decades. If you look at the official statistics again, in the case of the non-agricultural establishments, Kerala has a share of almost six per cent in the country, much higher than Kerala's share in India's population. It is not just in the small and medium industries that Kerala is doing very well, we have another set of what may be described as the anchor industries. We have chemicals and petrochemicals. In fact, Kerala's industrialisation began with chemicals, but we also have two major ports and a number of minor ports according to latest Economic Survey. Kochi is the most efficient port in the country now. Kochi is going to benefit from the large expansion of BPCL Kochi refineries which actually opens up opportunities for the petrochemical industry. The State Government is setting up a petrochemical complex in Kochi which will provide opportunities for the private sector players to start industries in a number of petrochemicals and paint industries and a number of industries that are linked to chemicals and petrochemicals. Building on the Kerala's success in the health industry sector, the State is also planning to build a pharma park in Kochi.

Another point to note here and this came up in the discussions is that why land is not one of Kerala's big advantages. But over the last few years there has been a large increase in the availability of land for industrial purposes. Our Industries Department as well as our institutions KSIDC and KINFRA have set up a number of food parks, a number of industrial parks across the State and as a result in fact one of the discussants pointed out yesterday that Kerala does not really have a disadvantage when it comes to the cost of land. So that was another feature that came up. Now second set of industries which we mentioned, the anchor industries, the large expansion in petrochemicals, also the industrial corridor which is coming up connecting Kochi and Coimbatore along with a number of other infrastructure projects which are coming up. But the second set of industries in which Kerala has a big advantage are food and agro-processing industries. Textiles and garments are industries which have traditionally employed a very large part of Kerala's industrial workforce. Also these are industries which can gain hugely from the large domestic market within the State. One point which came up in the discussions is how small and medium enterprises can do very well in this sector because this is a sector where our consumption is very high. Consumption within the State itself is very high and of course Kerala's industries can also look for markets outside the State and outside the country but even within the State there is a huge market possibility. How to make use of that? So, one suggestion which came up from some of the commentators is how Government should provide assistance to small and medium enterprises and this can be mainly in the form of assistance in technology, assistance in marketing. An example that was brought up in the discussion, Kerala produces 8.4 billion coconuts every year which is

almost 35 per cent of the national production which means a huge possibility for Kerala in the soft drink business and of course this is a time and coconuts' value, health benefits have been widely recognised across the world but what is missing there again is assistance for continuous innovations by the small and medium enterprises because in soft drinks firms, they have to continuously respond to customers' changing tastes and preferences and so on.

The third main area where Kerala has a big advantage is the knowledge industries which include electronics, biotechnology, life sciences and a range of other new innovative industries. Kerala is already doing well in this. It is well known that startups in Kerala have been doing quite well over the recent years. It must also be mentioned that we have one of the first entrants in this sector — KELTRON was established in 1973, was the first agency perhaps not just in India but even across the developing world, first agency for the development of electronics. So we can really build on this and in fact one advantage now Kerala has and especially in the post-Covid era is the remote working possibilities and knowledge workers who have digital skills, they can work across the length and breadth of Kerala, this is one industry which can be specially distributed across the state. Some of the points which came up in the discussion was that while we do have these advantages very clear, we also need to really hunt for more talent, more entrepreneurs, more knowledge workers, more professionals, to come and work in Kerala and that requires changes at every level. We probably need to create more spaces for work closer to home, remote working possibilities, it also might mean living standards in Kerala will be very high but probably we also need to make improvements when it comes to living conditions for younger workers.

The final and very important point that came up was the role of industrial policy and we had a very important discussion from South Korea, in this, it is notable that across the East Asian countries and South Korea, in particular, the Government played a key role in shaping industrial policies. It's not the market, but the State has played a very important role and in fact the speaker mentioned the smart industrial policy in South Korea. When it comes to knowledge industries, how South Korea has been promoting these new technologies, Kerala has much to learn on this and one area where Kerala can really go forward is industrial promotion which also combines the strengths of University, industry and Government, the triple helix interactions which is often described in the innovation literature, so we had discussions on how academic institutions, universities and research institutes in Kerala can play a big role in taking the State forward when it comes to knowledge industries. In fact, there should be changes both from the industry as well as in the university system, there should be greater incentive for researchers and professors and students to take up industry relevant projects and also to startups. These are some of the main points that came up in the discussions. It has been really good, these two days of discussions on the future for Kerala's industry, how we can build an industrial sector. How industrial growth which is inclusive, ecologically sustainable and above all, driven by innovation and new technologies. So I will end here thank you. Thank you so much.

Professor T Jayaraman Summary of Session on Information Technology

Good afternoon Vice Chairperson and participants in the concluding session, I have a presentation. We had very productive sessions on information technology. I will present the brief

summary of a very intense and rich discussion. So we had the benefit of a very active partnership with the Kerala University of Digital Sciences, Innovation and Technology through Dr Saji Gopinath in person, the Vice Chancellor with the ICT academy of Kerala with the CEO Mr Santosh Kurup in person, with the CEO of the Kerala State IT infrastructure Limited Dr Jayashankar Prasad, the CEO of Technopark Mr P M Sasi and last but not least the Additional Secretary, Mr Mohammad Safirulla of the Department of Electronics and Information Technology of the Government of Kerala. As I said earlier, thematic session each on software and hardware were held. These were intensive and the final session was held yesterday. The general format of the session had panellist remarks and presentations, panel discussions, very active question and answer session and general discussions. Thanks to the efforts of our partner institutions we had experts drawn from all over the world if I must say so consisting mainly of global, national and regional business leaders and the academy typically with very particular and specialised knowledge also of Kerala apart from their experience in the field of information technology.

The sessions were marked by very constructive engaged and spirited contributions and discussions. We are not speaking today as if we are on a blank plate. We have four ways in which we have already a basis for moving ahead. Since some of this is familiar we will not proceed with this. Though this was a very important part of the background to our discussion and was acknowledged very actively by the participants. We also have a network of infrastructure and institutions for moving ahead in information technology and this also stands up in good stead for the future. So what about the road ahead and what is the future of fighting and what is the future in information technology as a sector. Now this was pointed out very firmly by many particularly by Mr Shibulal, one of the co-founders of Infosys, that IT is one of the few sectors that continue to move ahead steadily during the pandemic. The sector as a whole continues to move ahead and we are more and more witness to the all encompassing role of IT. It was emphasised by Mr Shibulal and several others that digitisation will continue and indeed will accelerate.

The other point emphasised was that barriers to digitisation in different sectors will drop further as a consequence of recent experiences as of course due to the overall trend. But there are important shifts in the way the business is part of so that is is no longer about IT services, it is no longer about single products but the real focus increasingly is to IT solution. Very often one thinks of it in an integrated fashion and very often firms and enterprises that provide solutions are trying to position themselves successfully as one stop solution and this is the important thing to bear in mind. As far as strategy is concerned it was emphasised quite seriously why it should not be about catching up, catching up means that you have to chase leaders who well may be far ahead but one must leap frogs when possible. Looking ahead has another dimension that is not simply satisfying customers and clients to offers that will be important in the short run but indeed one should ask what your future customer or client should be and with that in mind how do you design what you are going to do. When talking of the IT sector in Kerala, it is well known and it was the subject of serious discussion that our major gaps are in the hardware ecosystem. We need to pay serious attention to basic infrastructure facilities and hardware is a major lacunae, the real weakness is the absence of common testing infrastructure. The burden need not be entirely that of the Government. PPP models are possible. There are players who are ready. Kerala lacks an adequate level of printed circuit board manufacturing facilities. To go ahead in hardware we need a clear policy and facility for handling e-waste. Big players in the field who you may seek to attract need clarity on access to alternate energy sources. Launching hardware parks and sustaining them is an important challenge. Of course there are many sectors, in medical electronics, electric vehicles, the two of them we have moved, but of course the other possibilities exist in solar energy, and the great connectivity of renewable energy power electronics.

We need to build on the successful example of COCONICS and I think this as the participant pointed out has some very important learning. One is of course the need to ensure that your product has quality, without quality of production, we go nowhere. We need to develop a complete component ecosystem and Government incentives are a key especially in the hardware sector what they is scope. It is also important especially that all these sectors need both software and hardware that you may start local, driven by local markets and demand but wherever feasible one must constantly think of how to go national and global. This was emphasised by several experts. What are the new domains in software and hardware? So potential domains for growth in IT solutions were listed, some of them familiar, others perhaps new like marine sciences, AI and data science applications for SDGs and there are several others which are on the horizon. In the case of Industries 4.0, as has been referred to internet of things, autonomous robots, additive manufacturing, augmented reality were suggested.

It was emphasised that there are new opportunities because both major players in the industry as well as the Government of India and other stakeholders are anticipating and trying to push new growth in the hardware arena and this will provide opportunities for Kerala as well. Specific models of technology development are available from many parts of the world and there were several interesting presentations. The details would be communicated in the final report. There was an intense and very active discussion on industry academic linkages. Therefore I think I'm going to focus only on this, specifically how do we inculcate an innovation culture at the undergraduate level in every degree programme, the importance of teaching knowledge of real world problems by inviting or incorporating industry professionals in regular engineering education, promote faculty to go on promote meaning you know facilitate faculty to go on deputation to startups and industry. An appropriate balance of real-world problem oriented research and research programmes is required, and even then there are research but there is research which is not obviously applied. There are a lot of programmes of this kind across the world from which we can learn. Skills and employment and the very important condition was to look at skills as a multi-tier skill development story. Another gap of course in the skills and employment issue is the fact that there is a lack of middle level management in the IT sector in Kerala, there was some discussion about the ways in which this could be promoted.

There are new methodologies in software development that has potential for developing microapplications and new employment opportunities. It is very important that IT policy is not left static but revised and promoted to industry on a regular basis. There are many pointers to an immediate agenda to carry forward this momentum and information exchange portal to promote collaboration and partnership. We urgently need a test lab for hardware, curriculum review and redesign in IT related areas can be immediate and the industry academic partnership can take off sooner than later and as I end, let me once again put forward three programmes, the experts suggested, that is, leverage our strengths, set audacious goals and dream new frontiers.

Thank you.

Dr Amit Prakash Summary of Session on E-governance

Thank you, it has been a pleasure to be involved with this conference. The entire Planning Board where the Vice Chairperson was himself involved and all his colleagues at the State Planning Board were involved in the conference. Thank you. Just as we had summary of other sessions we had very extensive discussions during the three sessions on e-governance conducted yesterday. I will try to present the summary over the next eight to ten minutes. So, just to set a background, egovernance has traditionally not been a very clear-cut sector as agriculture or industries has been and it has been spanning disciplines, it has been spanning sectors and that is something that was evident in the kind of discussions we have had over the three sessions on e-governance. If you look at how e-governance has evolved over the last 30-odd years and when we're looking at egovernance we are broadly concerned with the design and use of information and communication technologies, are now digital technologies as they are more widely known by, for better governance outcomes. So we have always been concerned with this intersection of technology and governance in matters related to e-governance. It has evolved from single function process automation, some of you may remember it was largely restricted to say payrolls or single function process automations and static department websites to inter-organisational and real-time citizen facing systems. So now we have very elaborate and extensive systems on a national and State scale like the one we use for managing our Employment Guarantee Act, the one we use for say biometric enabled Public Distribution System. So these are much evolved, they are much more complex than what e-governance applications were earlier. In general, e-governance has been seen as contributing to efficient department operations and faster turnaround times for citizen services. So we see for example property registration documents getting returned to the parties in 30 minutes from the two months, three months that were there earlier. Now having said that what we are experiencing today based on a lot of studies and analyst reports that have been conducted on various kinds of e-governance applications, we notice concerns around access, concerns around inclusion, concerns around representation and voice of different types of social groups that are considered marginal and that the policy makers and the development planners, would like to reach more to through adopting information technologies. There are demands for focus to shift to technology design approaches and methods that align better with the governance ethos of a particular country or region and with that current state-of-the-art understanding of where egovernance is and where it should be moving.

The e-governance sessions at this conference and consultation were divided into three thematic areas, the first one had a focus on citizen access to services and empowerment and when we refer to access, we are not only looking at availability of physical infrastructure and ownership of digital devices it's not restricted to high bandwidth availability or availability of a smartphone or a laptop computer but it's also the ability of different sections of our society to benefit from the use of these digital services and therefore when it comes to looking at these aspects, capacities entitlements, the kind of applications and the features that are present within these applications, they become important.

Our second session focused on decision support systems and analytics. With this growing generation of digital data all across for various purposes some sort of a datafication of citizens and governance say methods, mechanisms for digital data sharing for suitable use in decisions concerning public services and other governance functions becomes important looking at the emerging artificial intelligence and machine learning technologies and how do we keep pace with them and how do we ensure that these technologies are used for the public code and not otherwise becomes important. The second session was devoted to discussions around these themes and then our final session was looking at legal and policy dimensions and the focus here was on engagement with the regulations pertaining to data security, privacy and use, and implications for algorithmic and automated decision making applications that we increasingly see when it comes to matters of facial recognition, when it comes to matters of say identity systems. We had experts drawn from across the world just as they were experts in other sessions. We had experts from the United Nations, from our industry, indigenous C-DOT talking about physical infrastructure and affordability of digital infrastructure. We had a very interesting case of Korea where Dr Chan was talking about how the digital infrastructure that has been created has been used to engage the public in Korea during the current pandemic resulting in certain kinds of decision making processes. We had Dr Shirin Madon from London School of Economics talking about local practice and its importance in e-governance designs. Dr Joyojeet talked about threats of misinformation in social media platforms and Dr Anju Mangal and Mr Osama Manzar of the World Wide Web foundation talked about affordability and meaningful access when it comes to internet for the last 50 per cent or those who don't have that kind of connection at this point in time. If we were to look at the summary of discussions and key takeaways from this session, these are some of the points that I put together. I understand all the sessions have been recorded and it is not very easy, it's actually very difficult to capture their sense in such a short time say in four or five points but I will still attempt. So the discussions did bring about this need of attending to local production capacities and sensibilities if the attempt is to make digital technologies available to a wide range of social groups. So local production capacities need to be attended to, need to be created and efforts need to be made to ensure software applications, digital devices are produced in local settings, it may be Districts, Taluks, and Panchayats. There has to be some sort of a capacity created because it's when their capacities are enhanced and developed, applications that are more suitable to their requirements will get done. There was this discussion around changing design approaches and design of approaches incorporating flexibility to cater to variations in local practice and therefore a need to move from rigid plant driven methods to more agile methods as we see much more in the industry today. E-governance project should be evaluated more on positive governance outcomes using criteria such as accountability, equity and inclusion and not only on efficiency measured as turnaround times which we have been using for most part over the last 20 years. State agencies should work towards building trust on data collection and data handling practices, example, the Korean Government that allowed them to provide data without any apprehensions during the current pandemic management. There are threats of misinformation on social media platforms these need to be acknowledged and suitables including proactive and continuous engagement with citizens need to be carried out. Another interesting example from the Kerala Police was cited towards attending to these kinds of aspects. In the second session on decision support systems and analytics looking at data practices, we had experts from the Indian Institute of Management at Bangalore, Google Research University of Oslo, we had Ms Gabrielle from Thailand and Mr Mohana Dhas from NIC, and they covered topics ranging from open

source to artificial intelligence to cross-sector dialogue and learning when it comes to matters related to leveraging inter operable frameworks across State departments and their computerised setups. The key takeaways from session two, if I were to list them down interoperable technical architectures are important, they are important to ensure efficiency in data handling across departments. However interoperability also requires continued dialogues across organisations and this need not always be left to computers and computing systems. People need to get involved there, so that it continues to remain important. While artificial intelligence can enhance quality of decision support systems especially when human expertise and availability is a concern, issues of bias and discrimination will have to be explicitly attended to. So ethics, questions of ethics, values that get embodied into artificial intelligences attended to if we were to leverage the potential that AI offers to us. A free open source software should continue as Kerala has shown to the country and may be other regions in the world. It should continue to be encouraged. Free and open source software is another way to bring in more transparency and explainability to the AI and machine learning algorithms that we would want to use more and more when it comes to matters related to health care delivery or related to educational and what is being done by the data that is being provided and in matters of data capture, in matters of data handling, in matters of data use, justice is important especially because we see an increasing datafication of citizens and attending two matters of data justice is important to ensure inclusion and equity and preventing harm.

We had in the last session on legal and policy dimensions, discussion around regulation, discussion around constitutionality and the matters discussed from the domains of identity management, facial recognition, emotion detection, automated decision making and those discussions brought out the need for privacy and data protection. There was this consensus that Governments have to play an active role in safeguarding privacy and security and this needs to be done proactively and excellently and not exposed and it's not only consent based mechanisms through which this should happen, there should be accountability based frameworks also that Government data controller should put in place. Freedom of speech regulations such as shutting down the internet or blocking websites has to be much more transparent, has to attend to issues and matters of procedural justice and we all ended with this hope that there will be much more public consultations because they are considered useful when it comes to matters related to technology design features and data practices that should be considered essential while we go about our e-governance practices, Thank you very much.

Dr K Ravi Raman

Summary of Session on Modern Skill Development

Thanks, dear fellow participants, our session on modern skill development was very interesting, it was informative and very creative in terms of policy and practice. We had two ministers (Mr T P Ramakrishnan and Ms K K Shailaja Teacher) making their opening remarks and our Vice Chairperson, Professor V K Ramachandran also made a few remarks on the relevance of this session. He stated that Kerala has the potential to be India's skilled labour hub. He also pointed out that the Government of Kerala recognises that skill training and development play a crucial role in promoting economic growth and Kerala's strengths with respect to school and higher education make it better equipped than most other Indian States to deal with the emerging challenges. The welcome address was given by Dr Mridul Eappen, Member of State Planning

Board.

The core part of the session was taken up by excellent presentations on various themes related to skills and employability.

Of the six papers presented, three were on the ILO perspectives on skills, employment and labour market, presented by experts from the ILO and the other three dealt with country experiences – i.e. the best practices – with a focus on Korea, Germany, and south Asian countries, particularly Bangladesh and India.

While Ms Sukti Dasgupta, Mr Srinivas Reddy and Mr Gabriel Bordado explored the ILO perspectives, Professor Ju Ho Lee, Mr Atul Kumar Tiwari and Mr Peter Rechmann spoke on Korea, India and Germany respectively.

We had two discussants, Prof Santhosh Mehrotra from JNU and Prof Jeemol Unni from Ahmedabad University who offered their critical comments and policy suggestions.

I began my introductory remarks by making the point that this is a time when the 'future of work debate' is at its peak. This is largely because of the very change that has been taking place in the larger context of work and work culture. The first major shift that has been taking place is the transformation of workplaces into workspaces, implying that work could be done irrespective of physical places. The second major shift is in terms of time, with fixed time gradually fading away to flexible patterns. The third major shift is in terms of gender, with gender neutrality becoming the order of the day. Fourth, we have already entered into the Fourth Industrial revolution (Industry 4.0) as articulated more in terms of the fusion of various spheres and the application of digital technologies, artificial intelligence and machine learning. There is a strong need for a comparative cross-national national knowledge sharing and exchange of ideas.

I also pointed out that Kerala society is a knowledge society and the task now is to transform the knowledge society into a knowledge economy. This necessitates the identification of skill gaps and acquisition of new age skills in every critical sector. How skilling and reskilling are possible and how best Kerala could reap a premium on skills in a short time. This is important as there is a huge shift taking place in the global division of labour and Kerala being a historically externally integrated State, the State has to keep pace with it.

There are several takeaways from this session. I propose to take up only a few.

One major takeaway is what Prof Ju-Ho Lee has suggested, the High Touch High Tech (HTHT) approach in education. This implies two things: first a transformation of mass standardisation to mass personalised education and second, the increased application of Artificial Intelligence as a method of learning.

This would involve the combination of deep learning, higher order thinking and its application, and intelligent tutoring through what he calls AI Tutoring. It is worth noting that Kerala has not yet seriously addressed the role of AI in higher education. This is something that needs attention

particularly at a time when Kerala aims to transform itself into a knowledge economy. Yet another aspect that one should certainly think about is joining the larger network of HTHT University Consortium of ECA (Education Commission Asia) which could be an excellent aggregator for high touch high tech skilling programmes. We certainly need to integrate or graft ourselves into the larger global network.

A significant takeaway is with respect to VET system and the question how best we could reform VET system of education. The VET system in Germany has drawn praise from the rest of the world. It is time for Kerala to explore the German model of duality in our educational system. In Germany, a 'duality principle' is followed, in which students work in the factories most days of the week, and spend the remaining in classrooms, thereby combining professional and technical knowledge with practice and application. Mr Peter Rechmann was giving importance to BBB and they invest in research and innovation – which we need to learn and think of starting a new research centre on skills and skills training. A particular portion of the budget may be allocated for skills training.

We need to strengthen linkages between educational institutions and enterprises and develop more flexible learning and delivery mechanisms as highlighted by almost all scholars. Well, this is an area which we have already begun; we have taken a few steps towards this but it requires strengthening with new forms of governance.

Two major considerations which call for policy challenges, relating to women are of importance. First, women should be given utmost priority in skilling towards higher-end jobs, and should not be confined to traditional or sunset industries alone. This would help them participate in the labour force and empower them economically and more importantly help strengthen the care economy which is in crisis the world over in the times of Covid-19. Second, the very understanding of skilling should go beyond the conventional definition of skills as it is often conceived in terms of technical, digital, or engineering alone. Instead, it should go on to include various other skills such as caring skills in particular, which are not often counted as skills in many economies. The observation made by Ms Sukti Dasgupta that women confront the choice between unemployment and risky jobs, is to be taken with utmost importance. Given the fact that the female labour force participation is low, it is important that we start a skilling programme dedicated to women. Various categories of skills could be brought under this scheme. We need to know, as in other countries, whether we also miss the middle skills? Equally important aspect is the diverging nature of wage share and labour productivity. Kerala should be able to address the gender divide and digital divide as part of the same problem. In my opinion, we need to bring in intersectionality approach in planning skilling programmes.

The gender perspective was very much there in almost all the presentations, particularly in the presentation by Ms Sukti Dasgupta and Professor Jeemol Unni. As we are much ahead in allocating funds for women-related projects, we are not sure how much importance is given to the skilling of women. As women entreprenusheship is to be promoted, we should think of suggesting Kudumbasree and other such organisations to earmark more funds exclusively for training and skilling of women for the emerging economic activities. It is to be recognised that apart from skill gaps in terms of skills per se, it also exists in terms of biological and social

identities such as caste and gender. This necessitates an intersectionality approach while prioritising skilling programmes.

The very idea of triple LLL paradigm – the lifelong learning paradigm – is yet another takeaway from the conference. Gabriel H Bordado explained this. Though not something new, the idea has interesting features we need to share with other Asian countries. In this context, a regional framework for skills was suggested as a strategy of convergence. Second, how best we could go for a convergence strategy as we find there more than two dozens of departments undertaking skilling programmes in the State.

The challenge is how to address the disparity between the education system and the workplace requirements, often called a skills gap or mis-match. This requires continuous skill mapping at one level and a constant updating to the requirements of various stakeholders.

Government of India has been implementing the National Policy on Skill Development and there are various central schemes (PMKVY, PM Kaushal Kendra's, *Aatmanirbhar* Skilled Employee Employer Mapping (ASEEM) being implemented by the Ministry of Skills Development and Entrepreneurship (MSDE). Mr Atul Kumar Tiwari, in his presentation stated that Kerala stands second in skills index which is highly encouraging for the efforts we have taken in the skill development programmes in the State. He gave us specific information about the potential of various districts in terms of sectors and skills and I am sure we would be able to incorporate such inputs while designing developmental projects in the State.

Almost all scholars have acknowledged the activities we have taken up in Kerala with respect to skills and training.

He also listed the districts and the kind of industries in which we have maximum skills potential, for instance, Ernakulam is the leading district in transport and logistics followed by rubber and petro chemicals. We have the maximum potential for skills based development. We can be more serious about the skills index they have worked out and obviously we can have our own index, if that is good for policy planning. This is valuable information that we could use while planning for our industrial policies.

Building State capacity would require a scientific labour market information system, a subject of debate in almost all discussions on labour and skilling. We need to work out how best we could strengthen our data base on labour, the various categories of labour in particular – their number of days, wages, income, social security measures and so on and the shifting nature of regional and global division of labour.

Last but not the least, how do we fund the State level skills programmes? Several countries have formed Trusts with joint funding from various stakeholders; in India too, we have the National Skills Development Fund under the Indian Trusts (Amendment) Act 2016. A State level Trust Act in its renewed form is necessary and we must be able to design. In fact when I was working with Professor Santhosh Mehrotra at the Institute of Applied Manpower Research, the think tank

of the then Planning Commission, we have suggested this as part of wider study done on vocational education in India. But no progress has been made.

New curriculum design is important, which however, should be a combined product of various stakeholders – the academia, policy experts, industry representatives and so on, who could exercise some amount of autonomy in designing the curriculum orienting to a variety of skills and occupations. Skills should be treated as flow variables in educational system so that they could be understood as entitlements that could meet the tasks assigned based on the job description and hence need to be improved constantly. Third, it is important to re-examine the whole school education system and decide how to divert our students more and more to vocational education training and at what age it should be done, instead of filling tertiary education with them. This would also strengthen the institutional adaptability of the new skills.

The crisis such as the Covid and the technological advancements in fact compel households – from little toddlers to elderly grandparents and great grandparents to embrace technology driven learning. There has been no concerted effort to formalise this kind of education across the generations in a way that benefits all generations. Kerala would do well to be a trail blazer in this respect.

Fourth, while acquiring skills, the students or workers should also have the opportunity to innovate – to creatively apply their skills and improve their capabilities. In China, an early direction to the students helps, apart from adequate infrastructure and training facilities.

India is among the countries with the lowest proportion of formally trained youth and skilled labour force in the world. Even worse, vocational education in secondary schools has received very limited attention. Kerala, however, is an exception. This is a fact that was acknowledged by most of the speakers in the conference. India adopted a National Skills Development Policy in February 2009 which aims to guide skills development strategies and initiatives of all stakeholders and which has set the ambitious target of skilling 500 million people by 2022. In another estimate, the number of people to be skilled by 2022 in the working age group comes to around 291 million. The common concern expressed by policy planners and industrialists is that there is a pronounced 'skills gap' in India both in terms of quality and quantity. This necessitates a radical restructuring of Higher Education and Vocational Education and Training in India with a long term perspective. As the Vice Chairperson of the Planning Board Professor V K Ramachandran has pointed out in his opening remarks, Kerala's strengths with respect to school and higher education make it better equipped than most other States to deal with the new challenge.

As we enter the age of fusion of technologies, particularly in the sunrise sectors (knowledge production, health and psychological care, biotechnology, nanotechnology, logistics and supply chain, 3D printing, Artificial Intelligence and Machine Learning in almost all services etc.), what we need to adopt is a new conceptual framing; a multi-pronged approach to modern skills education with intersectoral and intersectional concerns and thereby make Kerala the Skill Destination of the World in near future.

The involvement of private sector in skill training – and we need to re-organise the vocational educational system along the lines of German system based on duality principle.

Overall, I must say that in Kerala we have already taken up some of the ideas that emerged in the conference; but much more needs to be done.

This is just a brief presentation. All the sessions are video recorded and detailed presentations can be viewed later on State Planning Board website and You tube.

Overall the conference has surpassed my expectations in terms of its relevance and utility in preparing the 14th Five-Year Plan. It has been a privilege to be involved in such an illuminating discussion and I am personally thankful to my colleagues for making this conference a huge success.

Thank you so much, thank you.

Professor K J Joseph Summary of Session on Federalism and Development Financing

Good afternoon colleagues, I must say that it was a great privilege for Gulati Institute of Finance and Taxation to join with State Planning Board to organise this particular session on federalism and development financing. The international conference and consultation on Kerala Looks Ahead emerged in the context wherein there has been remarkable changes in the India's fiscal context and the debilitating fiscal conditions of the States, further deteriorated because of the Covid induced economic recession, so in this context, the particular session on federalism and development financing dealt broadly around the following issues. The relevance of the session on federalism and development financing in the international conference and consultation on Kerala Looks Ahead could be seen in the context of emerging trends in the India's Fiscal Federal context and COVID induced economic recession. This include;

- (a) the unfavourable fiscal federal relations and declining fiscal autonomy of the State.
- (b) The issues that emerge in the context of in manner in which GST has been implemented
- (c) Reduced flexibility of the States in the context of FRBM Act, and
- (d) finally, the relevance of resource mobilisation outside budget through special purpose vehicles.

The State Planning Board along with GIFT lined up a galaxy of eminent scholars to deliberate on this issue. Dr T M Thomas Isaac, Minister for Finance and Coir delivered the inaugural address. Professor M Govinda Rao, Honorary Professor, GIFT chaired the session. The panellists included Professor C P Chandrashekhar, JNU, Mr Rajesh Kumar Singh, Additional Chief Secretary, Department of Finance, Professor D Narayana, Former Director, GIFT, and Professor Pinaki Chakraborty, Director, NIPFP. Professor Sushil Khanna, IIM, Kolkata served as the discussant. I had the privilege of welcoming and setting issues for the discussion and on behalf of State Planning Board. Mr P Shaji, Head, Plan Coordination Division, State Planning Board expressed vote of thanks. The discussion was centred around the following themes.

Fiscal Federal Arrangements: There is a concern over the growing asymmetric treatment of union versus States. The centre had manipulated the taxation system so that due share of States in the divisible pool of the country is diminished, resulting in reduced fiscal autonomy of the States. The centre circumvents the recommendations of the finance commissions by introducing cess and surcharges which are not shareable within the States. In 2014-15, these cess and surcharges constituted 7.1 per cent of the Gross Tax Revenue whereas they constitute 20 per cent of the Gross Tax Revenue in 2020-21. In the face of declining resource flow from the Centre, and stringent rules on Fiscal Deficit there are no alternative to significant levels of off budget support for development in Kerala.

GST: GST was expected to give a boost to tax revenue of the States but it has been a major setback. The introduction of GST has reduced the buoyancy in the revenue collection of the States and has curtailed the fiscal autonomy of the States further. The GST rates are not revenue neutral. The current rates are 30 to 40 per cent lower than the pre-GST rates and this has seriously affected the tax collections. The need of the hour is that the States should be given flexibility in fixing rates of GST, and the rates should be set within a broad band. Further, the share of States in CGST should be increased to 60 per cent. GST collection efficiency should also be increased using the latest technologies. A lot needs to be done in terms of fixing the technical issues with the GST network.

Revenue and expenditure mechanism: The pandemic has increased the burden of the States, and migrant workers are one pressing issue. The large-scale return of migrant labourers from the Gulf region would be a major threat to the economy of Kerala as it adds to the fiscal burden of the State. The State needs to support them. Financing these activities will be a major challenge. Strategies are now required to increase resource mobilisation from the limited domain left with the State, particularly in the areas of petrol and diesel, liquor, stamp duty and lotteries and also to explore the possibility of increasing the non-tax revenue collections. The States need to spend more on infrastructure as it is the need of the hour. To ensure the long-term development of Kerala, capital expenditure should be at least 20 to 25 per cent of the Gross State Domestic Product within next five years, currently capital expenditure is only around 2 per cent of GSDP. For Kerala, the sustainable increase in revenue expenditure is 12 to 14 per cent. Therefore, we need to achieve a growth of 14 to 16 per cent in revenue collections. Almost 60 per cent of our borrowing goes for social sector expenditure and we need to keep this up, while achieving the transition to the knowledge economy. Kerala needs a sound strategy for financing its long-term development, while continuing the process of social upliftment.

The conventional view is that fiscal deficit should be for capital spending. But the relationship between fiscal deficit and gross capital formation is inverse in the Indian context. In the last decade, the combined gross fiscal deficit is pretty high, of which, more than 50 per cent is revenue deficit. So, we are borrowing to spend for our current expenditure. If you look at the Centre and States separately, in all the States, fiscal deficit is well below the FRBM targets and they don't run huge revenue deficits. Therefore, the increasing trend in Government of the bulk of fiscal deficit being used for covering revenue deficit is largely because of the central Government. Conversely, part of the capital expenditure of the centre is channelled to States through CSS. In the context of growing deficits, extra-borrowing is the only option but the question that merits attention is how

much extra borrowings States can make, especially in the context of the XV Finance Commission award.

Development financing: Development financing is an issue unique to a market economy. In a developing economy, individual investors may not be interested in investing money in long term projects with low returns. Hence, there was the need of a bond market. If there is no developed bond market, specialised institutions for development financial institutes are needed. India had such institutions; however, their presence was reduced after the introduction of liberalisation in the guise of setting up a level playing field.

In the present context of eroding State revenues and limited fiscal autonomy, the States cannot even go to the banks for borrowing. Therefore, they need to look for alternative solutions. Hence, off-budget borrowings have emerged as a viable alternative for financing development. Kerala Bank has mobilised Rs 60,000 crore as deposit and this would double in next 2-3 years' time. Finance is going to play the fundamental role in changing Kerala in the long run. In order to undertake fiscal consolidation and to boost the capital expenditure, the State has adopted innovative mechanisms like KIIFB. The panellists have supported KIIFB and similar SPVs are a viable alternative for financing development. KIIFB has a very intricate asset – liability management system where the borrowings are backed by part of States' revenue like motor vehicle tax and road tax. Though KIIFB has been lauded as a major financial innovation, the report of the C&AG is a major assault on the authority of the State.

In the context of greater centralisation of power one of the ways to mobilise resources is to make the State-owned public sector units vibrant and profitable. Since, Kerala has a large presence of State-owned PSUs, a few thousand crores could be squeezed from their profits. Centre has huge scope for infrastructure. More emphasis on harnessing efficient freight transportation like railways and ports can increase the revenue. Given that Kerala has many local ports, this could provide some revenue. To make the PSU's vibrant there is a need to improve governance of State-owned PSUs in Kerala. Drawing from Kerala's success in decentralised health-care governance, the PSUs in Kerala could introduce governance reforms by way of creating more responsible and professional boards soon. The whole panel made the case for drastic change in the existing Centre-State relations, reforms in the GST system and of course improving, finding ways and innovative ways of owned resources and especially our public sector undertakings. Thank you very much.

Mr N R Joy Summary of Session on Tourism

Respected chair of this session, distinguished speakers and officials, as part of the 'Kerala Looks Ahead' International Conference and Consultation, the session on tourism was held on February 2, 2021. The session started with the welcome address by Dr Venu V, IAS, who was also chair of the session.

The growing influence of tourism sector as an economic power house and its potential as a tool for development are undeniable. The role of Government in tourism development has to be that of a catalyst rather than a regulator, and this requires synergy and convergence with different stakeholders.

In the recent past the tourism sector has faced a crisis due to Covid-19 pandemic. It is seen that the loss in earnings in tourism is in the range of Rs 20,000 crore to Rs 25,000 crore for the last 10 months. As the travel restrictions started in March 2020, the loss is higher in second quarter –April to June, 2020 and in third quarter – July to September, 2020.

As per the estimates of Tourism Department, the number of foreign tourist arrivals and domestic tourist arrivals in the State from January to September in 2019 was 8,19,975 and 1,31,84,227 respectively. However, the estimated figures of tourist arrivals, foreign and domestic, in these months in 2020 are 3,49,575 and 39,31,591 respectively. The decline in arrivals as compared to 2019 is 57 per cent in foreign tourists and 70 per cent in domestic tourists.

The session focused on (i) Future of Tourism in Kerala (ii) Tourism Marketing and (iii) Responsible Tourism. In his welcome address, the chair pointed out some of the biggest challenges the tourism industry is facing in the post Covid scenario, with several enterprises closed and thousands becoming jobless. The chair expected new opportunities in the sector with the end of the pandemic.

In his opening remarks the Honourable Minister for Tourism, Shri Kadakampally Surendran, stated that, Kerala has made a mark in global scenario and served as a model for other States in India. He pointed out that 10 per cent of the total GDP of the State comes from tourism and it employs around 15 lakh people in the sector. He highlighted the Responsible Tourism initiatives of State in which local people are benefited and how tourists get the feel of experiential trip. The current Tourism Policy of Kerala Government focuses on adventure tourism, promotion of Malabar region with the River Cruise Tourism Project, Kochi Biennale; and Heritage tourism at Thalassery, Alappuzha, Chalai market, and SM Street. The Covid-19 pandemic has affected lakhs of people in the sector making them jobless. The Minister pointed out that Government has come up with scheme of providing low interest loan up to Rs 25 lakh for the tourism industry. He remarked that the crisis is temporary and that the sector will recover soon.

On the topic, Future of Tourism in Kerala, the first speaker was Shri Suman Billa IAS, Director, Technical Cooperation and Silk Road, UNWTO, Madrid. He said that UNWTO has officially announced recently that 2020 is the worst year in the history of tourism. He pointed out that international tourist arrivals fell by 1 billion and 120 million jobs were lost globally. Many tourism experts think that pre pandemic level in tourism will happen in 2024. It is believed that tourism would kick start in the third quarter on 2021 depending on the efficacy of the vaccines and the quickness of vaccine production. He stressed the importance of co-ordination for health protocols and development of principles of trust so that people would travel. According to him Kerala has following advantages:

- 1. Authentic tourism products and experiences based on consumer trends and changes.
- 2. Leader in Ayurveda and holistic health care
- 3. Houseboat and their self-isolating nature.
- 4. Less crowded destinations which is suitable for social distancing.
- 5. Homestays But they need to work on international health protocols and work on branding the same to win the customers heart.

Mr Suman said that Kerala needs to focus on the domestic tourism sector. He pointed out the need to focus on digital marketing as well as depending on online travel platforms. He also recommended that there is change in demography of travellers and now the tourists are going to be youth and the products have to be developed keeping view of this. Another point he raised was the need for retaining tourism talent within Kerala. He said that we have KITTS as a leader in training and other institutes like FCI. The industry has a big responsibility for retaining that talent.

He demanded the deepening of engagement with market – Kerala needs a compelling story. Kerala should work and create a new story on "Spice Tour". Kerala is a melting pot of cultures, traditions, history and has a heritage connection with many countries. Tourists from these countries can come to Kerala and find traces of their heritage.

Ms Christina Beckmann, Vice President, Global strategy for Adventure Travel Trade Association and Co-Founder Tomorrow's Air took up the topic, Future of Active Holidays, particularly for destinations like Kerala. The desire for natural destination, sustainability, understanding emissions are the reason for the visitor's return to the destination. In her report US Adventure Traveller Sentiment, June – July 2020, it is stated that 53 per cent of the travellers intend to vacation abroad. She also noted that Adventure intensive, Experience based and cultural explorations are the key factors for Kerala. The possibilities of planned itineraries mixed with cultural heritage and outdoor activities, independent and self-guided tours could be explored. Having sustainability in the mind set, the use of local supplies and materials, considering various eco-friendly modes of transport, educating visitors on how to identify local suitable products should be taught. Ms Christina Beckmann also put forward that excellent world class training should be given in skill development with global perspective, and all forms of tourism, especially heritage and spice tourism are required to be promoted with responsibility. It will require a reality check when the industry emerges.

Professor Nimit Ranjan Chowdhary, Head of the Department, Department of Tourism and Hospitality Management, Jamia Millia Islamia explained the role of effective tourism marketing in the post-Covid Scenario. He explained two factors like qualifying and vantage factors with tactical approach in health and hygiene. He also added the importance of transformation in this period, an outcome which is important for shifting from destination attractiveness to travel motivation. Tourists want to be with nature most of the time, so the interaction is mandatory with local rural community to create moment of awakening, deeper human connectivity and creating soulful bonds that may have long term transformation effect. He emphasised the need of conscious effort for facilitating transformation by survival and revival in this Covid Scenario.

Dr Harold Goodwin, Founder director, International Centre for Responsible Tourism, United Kingdom briefed responsible tourism initiatives of Kerala. He pointed the critical difference between sustainability and responsibility. He appreciated Kerala as a leader in Responsible Tourism initiatives, in maximising local economic development, and promoting inclusive tourism. He mentioned about the Responsible Tourism initiatives in Kerala especially in the places like Kovalam, Kumarakom, Thekkady and Wayanad.

Mr Dipak Deva, Managing Director, Travel Corporation India Limited spoke on the future of Tourism in Kerala. He said the earlier B&B (Bread and Breakfast) should be replaced by B&E

(Bed and Experience) where tourist should carry a great experience, followed by Inclusive Tourism. New tourist destinations should be created, for example, 14 new destinations can be developed in Kerala. He mentioned new possibilities like honeymoon tourism, Fort Cochin-Jazz festival, coastal tourist train connecting Kovalam to Cochin in day time and promoting food and wine tourism as Kerala could be recognised as Food and Wine capital of India. He also pointed out that Kerala should aim at the following:

- 1. Increasing GDP contribution from 10 per cent in 2019 to 20 per cent
- 2. Increasing tourism employment from 23.5 per cent in 2019 to 40 per cent
- 3. Expenditure on tourism from 1.27 per cent in 2019 to 5 per cent
- 4. Foreign Exchange earnings of 10,271 crores in 2019 to 15,000 crores

This session was followed by the remarks of Mr. Jose Dominic, suggesting different styles for marketing Kerala products globally. He said that new products that are authentic, real, inclusive and immersive need to be developed. He sees the potential for developing homestead farming as a new product for tourism. Mr George Scaria made an opinion that more Government support should be provided for the Tourism entrepreneurs. This was followed by the remarks of Mr E M Najeeb that, compared to Kerala, other States are coming up with many new products and Kerala should come over this crisis by developing new destinations and products. He said that developing products like medical tourism, film shooting tourism, and honeymoon tourism should be seriously considered.

Mr Pradeep Murthy, Managing Director, Muddy Boots pointed out that the idea of promoting experiences by the top management should translate down to employees so that they stop thinking about how many room nights have been sold. He suggested that translating the ideas emerged in the session to the grassroots would help for sustainable tourism development in the current scenario.

Dr Rajashree Ajith, Director, KITTS raised a question that, in the situation where job options and employment in tourism and hospitality are severely affected, what major steps should be taken to keep the interest alive and draw and retain youngsters to tourism education. As a reply Mr Dipak Deva, pointed out that the demand for human resource is diminishing, and that the industry will emerge only after two years. So in the meantime the students should be educated with required skill development.

The meeting concluded with a Vote of Thanks by Dr Venu V IAS.

As a way forward, based on the lessons from the session one authentic tourism products and experiences which are innovative, digital marketing and online travel platform, Kerala's spice tour initiative, adventure intensive experience based and cultural explorations, a shift from destination attraction to travel motivation, responsible tourism for tackling over tourism and maximising local economic development, translate new thoughts, ideas in tourism sector on a top-down approach are the main ideas that emerged. The session was a learning curve for the tourism sector and State Planning Board and Tourism Department will pick up valuable inputs of the conference and take it forward for creating more products and income in the sector. Thank you, thank you.
Dr Bindu P Verghese Summary of Session on Higher Education

Good afternoon to all.

The session on higher education was very insightful. The session was inaugurated by Minister for Higher Education Dr K T Jaleel and chaired by Dr Rajan Gurukkal, the Vice Chairperson of Kerala State Higher Education Council, and Dr B Ekbal, Member, State Planning Board welcomed the gathering. Seven papers were presented on various subjects by experts from various fields.

Now I am presenting a brief of the highlights of these presentations. Dr Rajan Gurukkal stressed the need for attainment of excellence in higher education. We must strengthen our academic practices by bureaucratising and decentralising higher education institutions to ensure the institutional environment of quality teaching and learning, enabling teachers and students to maximise their academic ingenuity. This effort of genuine and committed involvement alone can enhance quality and standards. This alone can lead our universities eligible for international collaboration in the field of research in emerging areas. We can be participants in knowledge economy only if our universities and research institutions generate exchangeable intellectual property.

Professor Gopinath Ravindran mainly focused on curricular innovations and he shared his practical observations about Kerala's university system. He suggested a radical change necessary to elevate the status of higher education in Kerala to match the global standards. A new network culture with all stakeholders collectively putting in efforts is very much required. Professor Gopinath also expressed his reservations on Massive Open Online Courses (MOOC). Teachers are increasingly being pressurised to offer more courses in a big way across universities while MOOC may be inevitable in the future causes of education. We should also work to making it a better system where professor explained the various dimensions of curriculum in higher education. He opined that the performance of research institutions in the State will be critically evaluated. He has also said that the social sciences disciplines are not given adequate importance in Kerala. Higher education and fundamental research is neglected and the trust is on applied research. Kerala has to follow more equitable and socially inclusive policies in higher education.

Professor Ronald Herring from Cornell University talked about the advantages and disadvantages of online education and pointed out the deficiency of teachers can be solved by online courses. While definitely limiting in terms of the interactions, MOOCs nevertheless allow people from a large number of countries to access the courses is also providing strong feedbacks, the kind of precision and documentation possible in MOOCs can never parallel what we see in conventional lectures. On the downside, however it requires large resources and time. We will have to go for more blended courses combining traditional teaching, learning with online education.

Professor N V Varghese stressed on institutional innovations. He explained the transformation of education pattern from 1980s to 2010. He also mentioned the national education policy and universalisation of higher education by 2035. He said in 1980s Kerala's higher education is turning more towards the financing mode of education. There is parental pressure for more courses with

employability potential and skill based training. Many students are leaving for other States hoping for better job oriented courses. The quality of education in the self-financing institutions is far below that of public institutions. The higher education institutions are suffering from lack of enough funds, even to pay the salaries. The role of State in higher education should be redefined and Kerala can be an educational hub for the country if we allow appropriate policies in higher education. Institutions should be given more autonomy and funding resources should be diversified.

Professor Shyam B Menon also talked about institutional innovations. He shared his remarks on the basis of his experience in Ambedkar University. He said that universities should be institutions of self-governing and aspiring practitioners, the public universities' dependence on State funding should not exceed 50 per cent and the fee collected from students should not exceed 20 per cent, the remaining 30 per cent shall be met through in consultancies project work, publication, and royalties. Multi and interdisciplinary courses should be introduced. Universities should not be treated as Government departments. Professor Daniel Little, University of Michigan spoken about significance of international collaboration, it should be nurtured between faculty to faculty. Universities are highly decentralised in US, scope for collaborative research in poverty alleviation, public health and with regard to the discipline of economic skills, he is of the view that the US academicians are more conservative with regard to their Indian counterparts.

Professor Devika Madally, from Indian Statistical Institute made a presentation on the topic of libraries ahead, innovation in library and information science. During her talk she explained the history of library movements. She also narrated online platforms of library like INFLIBNET, and National Digital Library. She also made recommendations for upgradation of libraries.

Professor Sukhdeo Thorat talked about the issues of strengthening the socially inclusive character of higher education. Dr Thorat pointed out the predominance of self-financing institutions in Kerala that results in the violation of equity principles. Economic and social disparities still persist in Kerala based on income and community. He suggested that Kerala should have a specific policy to address the educational backwardness of Scheduled Caste population.

Dr Sudheer, Executive Vice President of KSCSTE, responded to the presentation and said that there should be a link between higher educational institutions and research institutions in Kerala. These papers in general, point out the problems faced by higher education sector in Kerala while highlighting the immense possibilities in front of the State. A large number of comments from delegates have come during and after the session and the comments were focused on the need for curricular reforms and the deficiency of the State to equip students to an international level and the area to be focused to resolve the problems. I am sure that all these points can be better inputs while formulating and implementing the higher education policies, thank you.

Ms Josephine J Summary of Session on Local Governments

Respected chair, respected speakers and participants, Kerala, a densely populated State with vibrant social movements and civil society initiatives stands tall in various human development

indicators. The major catalyst for this achievement is the State was the process of democratic decentralisation by devolving power and finances. The decentralised three-tier system with village as the last tier is governed with representation of women and marginalised communities. The people's plan campaign further strengthened the three-tier decentralised system. The public participation in governance has deepened the understanding of public wealth and distribution of public goods among the population. Local Governments played a key role in containing as well as tackling Covid-19 pandemic. But unanticipated expenditure for crisis management is a great challenge for local governments whose revenue raising capacity is limited. To mitigate the impact of frequent natural disaster and climatic variation and to improve the disaster preparedness for the first time in the country, the local governments in Kerala have prepared the Disaster Management Plan in 2020. The Department was revived and strengthened by integrating the Local Self Government, various departments into the integrated Local Self Government Department. Not only that, for better service delivery to the people the integrated local governance management system, a comprehensive software developed by the IKM has been deployed in all local bodies. Now our 13th Plan Approach Paper stressed that local governments in Kerala would be raised at par to the ISO standards and we could materialise that now. The Local Government places special emphasis on the issues arising due to rapid urbanisation in Kerala. It recognises the importance of developing appropriate strategies and programmes for coping up with challenges and opportunities thrown up by the process of urban growth. Kudumbashree Mission plays an important role in the socio-economic development of the State and the four missions of the Government functions as strong pillars for decentralised development of the State. Another programme is Subhisha Keralam. It is an ambitious scheme started by the State Government in 2021 to combat food scarcity against the backdrop of Covid-19 pandemic. Now I am coming to the summary of the session on local governments. The session was motivational as it ascertained the strength of decentralised governance in Kerala. The sessions were enriched with creative and thought provoking discussions.

The Honourable Minister for Local Self Government Department, Mr A C Moideen, addressed the session in his opening remarks. The Session on best practices by local bodies organised by Kerala Institute of Local Administration (KILA) showcased the ability and focus of decentralised governance in Kerala. In this session a few local governments made presentations on selected innovative and model projects across various sectors. The session also discussed the major challenges faced and the innovative solutions to these challenges. Session confirms the set goal of local bodies towards sustainable and inclusive development. A presentation was made a presentation on the major initiatives effected during the Thirteenth Five-Year to improve the planning process and governance of Local Governments and the way forward.

The second session was blessed with renowned academicians and experts from around the globe. The session was chaired by Ms Sarada Muraleedharan IAS, Additional Chief Secretary to Local Self Government Department. Mr A C Moideen, the Honourable Minister for Local Self Government Department addressed the session and detailed the interventions of the Government in strengthening the local governments and stressed the need for disaster preparedness by the local bodies. Dr V K Ramachandran, the Honourable Vice Chairperson of Kerala State Planning Board gave the welcome address in which he appreciated the local governments for their role during the floods and the pandemic. The guidance and support by Dr K N Harilal, Member of State Planning

Board, also enriched the session. He focused on the loopholes and positives of local governance and the need for a focused attention to improve the governance. These reflections create a need for fresh outlook towards the functioning and structuring of the three tier decentralised system.

Dr Prabhat Patnaik, Professor, Emeritus of Jawaharlal University and former Vice Chairperson of Kerala State Planning Board, with his immense experience with the subject and the State, has suggested the need of futuristic planning of decentralised governance. He also discussed the socialist aspects of decentralised governance and need of increased State investment in local bodies and the need for local bodies to develop into production units. He also said that the Local Governments shall not remain as administrative and fund dispersing bodies, but also transform themselves to productive bodies that owned and controlled direct production, ie as in the case of China, the villages of Kerala should produce for local needs.

Professor Patrick Heller of Brown University specialised in Social Sciences highlighted the need of strengthening local bodies in urban cities with public participation. He focused on service delivery and pointed out that the urban issues are not given much importance across the world as they deserve and pointed out that there is significant variation in the capacities of cities to growth and inclusion. He pointed out that the emerging issues of rapid urbanisation in the State have to be addressed with high priority and for this urban local governments and cities should be provided higher autonomy in functioning. He also emphasised the need for strategic planning and land management in the cities of the State.

Professor Harry Blair reflected his insights of democratisation of decentralised governance in global context. He explained the reasons why Kerala is the only Indian State to adopt participatory budgeting at local level. He emphasised that the role of local governments remain significant for the realisation of people centred development despite the policy shift towards privatisation and globalisation.

Dr S S Meenakshisundaram IAS (Rtd), appreciated the State in the exemplary role of the State in handling disasters and the pandemic using the local government machinery and he expressed his views on the importance of decentralised disaster management systems. He also suggested the formation of localised response groups and administrative working group at local body level with much regulatory powers.

Dr Aruna Roy, social activist and founder of Mazdoor Kisan Shakti Sangathan, in her presentation appreciated the functioning and structuring of decentralised governance in the State. She also warned about the need of resistance to any move towards centralisation of governance and she cited the example of farmers protest against Farm Act. She emphasised the need for showcasing the achievements of local governments to counter majoritarianism.

Mr S M Vijayanand, IAS, former Chief Secretary to Government of Kerala and present Chairman of State Finance Commission, emphasised on the importance of ensuring social justice in decentralisation of State funding. He suggested the need of strengthening the involvement of local bodies in the development of marginalised communities especially the Scheduled Castes, Scheduled Tribes and the fisherfolk. Dr Devika in her presentation, spoke of the need for gender-inclusive development and suggested the creation of awareness for eco-friendly development at the lowest tier of governance and we should say that there are excess gaps in urbanisation, inequity and inclusion and also in governance. I conclude now I thank the chair and all the speakers for their valuable insights on local governance. Thank you all.

Dr Amartya Sen

It is wonderful to have the opportunity to talk on "Kerala Looks Ahead." It is rather nostalgic for me also, because when I came back to India after having been in England for a while – this was not long after Kerala had a new Government after the Communist Party won the election in 1957. From the beginning of 1963 onwards I was teaching in the Delhi School of Economics. Kerala was announcing some different plans about "looking ahead," focusing particularly on the quality of human labour. This has an ancestry that goes back to Adam Smith, in particular, but also to Karl Marx. The big thing was about how to judge the productive potential of an economy with a focus on the quality of labour. Maurice Dobb, who was my teacher in Cambridge, was particularly keen on that. So, "Kerala Looked Ahead" a long time ago.

Kerala was one of the three poorest economies in India at that time. There was a question, and I had some quarrels, or differences of opinion, within the Delhi School, on whether Kerala could afford to have education for all, health care for all, and social security for all, given the fact that the State was so very poor. And of course I told them to look at many factors, including the fact that being poor means that labour costs were also rather low. And on the one hand you need to spend more, but the spending was moderated by the fact that the wages were lower in Kerala.

I am talking about all that because I was then told that Kerala wouldn't succeed. Well, then it so happened that, within a couple of decades, Kerala had not only moved away from that position, but was competing for being one of the top three rather than the bottom three in terms of per capita expenditure, which is the subject on which we have data, but constitutes per capita income in fact. Therefore, in a while, Kerala also became the richest State in India in terms of per capita income.

So, what was happening there? There is a historical interest in this because of the labour theory of value – which has often been criticised on grounds that labour is only one factor of production among many others. But, as Maurice Dobb argues, there is a certain role of labour which cannot be replaced by anything else and which can actually generate a potential for expansion that nothing else can.

If you look at practical ancestry, I think probably the earliest credit you have to give here has to be given to Japan in the 1800s, in the mid-19th century when Japan had the Meji restoration and was ready to race ahead. Its big focus was going to be education for all. As Mr Tadayoshi, one of the great Japanese commentators said, why is it that Americans have higher productivity than we Japanese have? The reason is, he explained, is that the Americans are all educated, which wasn't quite true, but at least more true than it would have been for most countries of the world – whereas the Japanese were not. So, they decided that within 40 years or so, they would become fully literate

and they did. And then gradually they covered health care for all and so on. So it is not only a Marxian way of thinking – though Marxian thinking is very strong in this – but the Japanese have always differed a little from standard theory and were ready to go in that direction.

Now, the question is to what extent can Kerala look ahead, continuing the efforts of focusing on humanity rather than physical capital accumulation, which, of course, must be important. And [physical capital accumulation] is important even in theory, it's important in Marxian writing, it's important in Ricardian writing, and so on and, of course it is very much important in neo-classical economic theory. But the role of labour which is very central to that, and the scale of production, training, and learning, and generally skill formation, whether by education or by practice is really quite central to an understanding of economics.

But I would say that the possibility of expansion here remains very strong. This is partly because the mindset that focuses on humanity as opposed to physical assets is something that is well established in Kerala. This is an ancestral history going even earlier than in the period in which I started – namely the communist government coming to office in 1957 – but there was a discussion of that in the labour movement, anti-untouchability movement in Kerala, whereby education was going to be the means of progress. Similarly, there was discussion on the missionary educational focus. We have to take a broad approach and see what are the different tributaries to that force that developed in Kerala. I think missionaries clearly played a role there too and so did royalty in the two native States that formed the State of Kerala. You have to bear in mind that India emerged with 13 per cent education at the time the British left. Kerala was an exception. It came within, almost close to 50 per cent. But it needed to get to 100 per cent. But you can argue that 50 to 100 per cent is easier than 13 to 50 per cent because there is a tradition there, an attempt to understand how to proceed – and this is a very big part of what happened in Kerala.

Now, when we look at the successes and failures today, this focus on labour has to be seen as being very very important because of the fact that nothing is as important productively as what happens to the attitude of human beings to change, to progress. If we take a different kind of history, say Germany and Japan after the war, they were flattened. Germany had carpet bombing, Dresden and Hamburg were all reduced to rubble but then rapidly and within a short period they were performing at a very high level. And, why is that? Because in some ways, the focus was to recreate the atmosphere of productivity – of course, that went with terrible political theory in Germany during and before the war – but there was this desire and conviction that you can make use of human labour and go straight ahead. To a great extent, the same could be said about Japan.

So I would say that the successful use of humanity, the concentration on human reasoning, the particular focus on public discussion whereby we learn from each other and if there is a different view and then, we criticise each other for it – these are features that have been part of the Kerala economic strategy. This is not so much the standard economist's fare about whether you get one kind of industry or another, agriculture or manufacturing, or larger scale or smaller scale. These are all important, but they are subsumed by the role of human reasoning, human thinking and then ultimately human practice based on the formation of skill coming both from schooling and from practice and from discussion.

So I would say that I would be personally very optimistic about Kerala looking to the future. But optimistic not just because it has been successful in the past, but also because we can understand why it has been successful, what it is that made it different.

I was fortunate when I was in those early days in Delhi – when I was arguing with my colleagues in the Delhi School of Economics that Kerala could be a world-beater – when I was being told that I was being blinded by political prejudice. Now that proved to be not the case, but I also had the opportunity of talking with people who were great leaders and I have to say now that in India the Left seems to be in a sort of, for want of a better word I have to say, doldrums. It is nice to find people whose minds are open. I had the good fortune of talking with [E M S] Namboodiripad a lot. He lived not very far away where I was living in my first year and I had the fortune of getting together with him a number of times and shared what his thinking was and what the questions were. And I think there is, in my judgement, there is no substitute to an enquiring mind, a mind that has, as Rabindranath Tagore said, that has not been blocked off, by free flows being choked. In Kerala, the free flow has not been choked, and I hope it will not be choked. But in order to pursue the future with the same success and more than in the past, it needs to keep the mind open, to ask the question again and again: "Are we doing the right thing?" This reliance on humanity, reliance on reasoning and reliance on public discussion are central assets which I think Kerala will have use for in the future.

So, I wish I could be in Kerala at this time rather than sitting amidst snow in Boston. But life is like that; some day I will have a chance again to be back, and to have the delicious food and those great conversations.

Pinarayi Vijayan, Chief Minister, Government of Kerala

Distinguished speakers, Professor Amartya Sen, Vice Chairperson of Kerala State Planning Board, Professor Ramachandran, Members of the Kerala State Planning Board, delegates, officers and dear friends, the three-day international conference and consultation titled 'Kerala Looks Ahead' comes to a culmination today. The conference showed very interesting discussions and deliberations in certain key areas that are crucial for Kerala's economic future. I have been informed that the sessions in the conference have gone into considerable detail. There were intense discussions in nine themes running in parallel sessions. The conference has served two purposes: first, it has stimulated national and international discussions between scholars and experts in the areas that were part of the conference. We hope that this contact and discussions will continue, second many suggestions have emerged from the conference. There are issues of long-term and strategic interest to the State and also recommendations regarding policies that can be implemented in the short run. These suggestions which have come from all over the world are of particular interest to us. We will study them carefully and look at how they can be incorporated into policy. I am very glad that this conference was a great success. We got an overwhelming response from experts from different parts of the world. We thank all the distinguished scholars and experts who contributed to the success of the conference. With these words, I conclude the international conference and consultation titled 'Kerala Looks Ahead', Thank you.

ANNEXURES

KERALA LOOKS AHEAD AN INTERNATIONAL CONFERENCE AND CONSULTATION

CONCEPT NOTE

Kerala has been, and remains, the most important example in independent India of the power of public action to improve the well-being of the people and to transform social, political, and cultural conditions in a State. Kerala's achievements in human development are the basis of its national and international fame.

Kerala's present economic policy has two important aspects. First, to build on Kerala's historic achievements with respect to health, education, social welfare, social inclusion, and gender justice and secondly, to ensure economic growth through production and the application of modern science and technology, particularly in agriculture, industry, information technology, transport, other large-scale infrastructure facilities, and other productive areas.

Put another way, Kerala is committed to a path of development that will develop, enhance, and modernise the productive sectors of the economy; expand employment in various sectors with an emphasis on creating skilled jobs for educated youth; strengthen and upgrade public education and health; build upon the network of social welfare and reform measures that are part of the rich legacy of public action in the State; and ensure that the gains of development reach all sections of the people.

The Government of Kerala is organising an International Conference in order to consult frontline international experts in certain areas identified as critical to Kerala's economic future.

The themes to be covered are:

Higher education, including international academic collaboration Modern industrial possibilities Modern skill development Modernising agriculture, fisheries, and animal resources development Tourism Information technology e-governance Special Session: Local governments Special Session: Federalism and Development Financing

The Conference is scheduled to be held on February 1, 2, and 3, 2021.

The Kerala State Planning Board is the main organiser of the Conference. The Conference will be held online.

The Conference will be attended by representatives of Government and other policy makers, experts, representatives of industry, and organisations and institutions in the related field.





INTERNATIONAL CONFERENCE AND CONSULTATION KERALA STATE PLANNING BOARD

Kerala is poised for a great transformation.

Kerala has been, and remains, the most important example in independent India of the power of public action to improve the wellbeing of the people and to transform social, political, and cultural conditions in a State.

Today, it is committed to a path of development that will develop, enhance, and modernise the productive sectors of the economy; expand employment in various sectors with an emphasis on creating jobs for educated youth; strengthen and upgrade public education and health; and build upon the network of social welfare and reform measures that are part of the rich legacy of public action in the State.

Kerala Looks Ahead is an International Conference and Consultation that will serve as a platform for the Government of Kerala to learn from the experiences and best practices across the world in its efforts to modernise the economy and bring the benefits of high growth and inclusive development to all the people of Kerala.

The Conference will discuss the future prospects for Kerala in key areas, including agriculture, animal resources, fisheries, e-governance, higher education, industry, information technology, skill development, and tourism. There are two special sessions – on Local Governments and Federalism and Development Financing – that will showcase Kerala's initiatives in the respective fields. There will also be a special industry session that will discuss a roadmap for the future industrial growth in Kerala.

The Kerala State Planning Board is the main organiser of the Conference. The Conference will be held online.

Policymakers, scholars, youth, students and teachers, representatives of industry and of farmers, social workers, persons in public life, and interested persons from all walks of life, interested industry groups, associations, organisations and institutions are invited to join us at Kerala Looks Ahead and in this endeavour.

KERALA LOOKS AHEAD AN INTERNATIONAL CONFERENCE AND CONSULTATION FEBRUARY 1-3, 2021

PROGRAMME SCHEDULE

Session	
Inaugural Session	
Modernising Agriculture, Fisheries, and Animal	
Resources (Agriculture Session)	
Federalism and Development Financing	
Information Technology	
E-governance (Session I: Citizen Access to Services	
and Empowerment)	
Local Governments (Kerala Session)	
Modernising Agriculture, Fisheries, and Animal	
Resources	
(Animal Resources Session)	
Modern Skill Development	
Modern Industrial Possibilities	
Tourism	
E-governance (Session II: Decision Support Systems	
and Analytics)	
E-governance (Session III: Legal and	
Policy Dimensions: Way Forward)	
Modernising Agriculture, Fisheries, and Animal	
Resources (Fisheries Session)	
Higher Education	
Local Governments	
Special Industry Session	

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THEMATIC SESSIONS

- 1. January 24, 2021: Information Technology: Software 18.30 to 21.00 (IST)
- 2. January 27, 2021: Information Technology: Hardware 10.00 to 12.30 (IST)
- 3. January 27, 2021: Agriculture: Kerala's Agriculture: The Need to Raise Productivity 10.30 to 12.00 (IST)
- 4. January 28, 2021: Animal Resources: Productivity of Milch Cattle in Kerala 14.30 to 15.45 (IST)

KERALA LOOKS AHEAD

AN INTERNATIONAL CONFERENCE AND CONSULTATION February 1-3, 2021

INAUGURAL SESSION

February 1, 2021 (Day 1) 18.00 to 19.25 hours

	Time	Session	Speaker
1	18.00-18.05	Welcome Address	Prof V K Ramachandran Vice Chairperson Kerala State Planning Board
2	18.05-18.10	Address	Dr Vishwas Mehta IAS Chief Secretary Government of Kerala
3	18.10-18.15	Address	Mr Ramesh Chennithala Opposition Leader of Kerala
4	18.15-18.20	Address	Mr Ramachandran Kadannappally Minister for Ports, Museums, Archaeology, and Archives Government of Kerala
5	18.20-18.25	Address	Mr A K Saseendran Minister for Transport Government of Kerala
6	18.25-18.30	Address	Mr K Krishnankutty Minister for Water Resources Government of Kerala
7	18.30-18.35	Address	Mr E Chandrasekharan Minister for Revenue and Housing Government of Kerala
8	18.35-18.50	Keynote Address	Dr Soumya Swaminathan Chief Scientist World Health Organization
9	18.50-19.05	Keynote Address	Prof Joseph E Stiglitz University Professor Columbia University
10	19.05-19.20	Inaugural Address	Mr Pinarayi Vijayan Chief Minister of Kerala
11	19.20-19.25	Vote of Thanks	Dr Venu V Member Secretary Kerala State Planning Board

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TECHNICAL SESSIONS February 2, 2021 (Day 2)

THEME I: SESSION ON MODERNISING AGRICULTURE, FISHERIES, AND ANIMAL RESOURCES

	Time	Session	Speaker
	9.30-13.05	Session: Modernising Agrico Resources (Agriculture Sess	ulture, Fisheries, and Animal ion)
	9.30-10.45	Sub-session 1: Role of New Tech	nologies in Bridging Yield Gaps
1	9.30-9.35	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	9.35-9.40	Opening Remarks	Adv V S Sunil Kumar Minister for Agriculture Government of Kerala
3	9.40-9.45	Introductory Remarks by the Chair	Prof R Ramakumar Member Kerala State Planning Board
4	9.45-10.00	Nano Technology for Agriculture	Dr K S Subramanian Director of Research Tamil Nadu Agriculture University
5	10.00-10.15	Role of New Technologies in Bridging Yield Gaps with Special Reference to CRISPR Technology	Prof Kathleen L Hefferon Department of Microbiology, College of Agriculture and Life Sciences, Cornell University New York
6	10.15-10.30	Role of New Technologies in Bridging Yield Gaps with Special Reference to Biotechnology	Dr Trilochan Mohapatra Secretary, DARE and Director General Indian Council of Agricultural Research New Delhi
7	10.30-10.40	Discussion	
8	10.40-10.45	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board
	11.00-11.45	Sub-session 2: Cooperatives and Experiences	Agriculture : Learning from Global
1	11.00-11.05	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	11.05-11.15	Thailand and FPC Models	Prof Sukhpal Singh Centre for Management in Agriculture Indian Institute of Management Ahmedabad

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3	11.15-11.25	Learning from Swiss Experiences with Cooperatives in Agriculture	Dr Balz Strasser Managing Director Bio Suisse, Evilard, Berne, Switzerland
4	11.25-11.40	Discussion	
5	11.40-11.45	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division, Kerala State Planning Board
	12.00-13.05	Sub-session 3: The Promise of Ve	alue Addition
1	12.00-12.05	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	12.05-12.15	Value Addition in Coconut in Thailand	Mr Nutthanai Ninek Business Development Manager Tropicana Oil Company Limited, Thailand
3	12.15-12.25	Value Addition, Processing and Marketing of Rubber	Mr Jom Jacob Senior Economist Association of Natural Rubber Producing Countries (ANRPC), Malaysia
4	12.25-12.35	A Primer to Produce the World's Best Coffee: The Araku Story and It's Relevance for Wayanad	Mr David Hogg Chief Agriculture Advisor Naandi Foundation*
5	12.35-13.00	Discussion	
6	13.00-13.05	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division, Kerala State Planning Board

	Time	Session	Speaker
	14.00-15.55	Session: Modernising Agriculture, Fisheries, Animal Resources (Animal Resources Session)	
	14.00-15.00	Sub-session 1: Modernisation of Milk Cooperatives and Value Addition	
1	14.00-14.05	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	14.05-14.10	Opening Remarks	Adv K Raju Minister for Forests, Animal Husbandry and Zoos Government of Kerala
3	14.10-14.15	Introductory Remarks by the Chair	Dr H K Bhanwala Former Chairperson NABARD

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4	14.15-14.30	Modernisation of Milk Cooperatives and Value Addition	Dr R S Sodhi Managing Director, Gujarat Cooperative Milk Marketing Federation Limited AMUL
5	14.30-14.45	Modernisation of Milk Cooperatives and Value Addition	Mr Meenesh Shah Executive Director National Dairy Development Board, Anand Gujarat
6	14.45-14.55	Discussion	
7	14.55-15.00	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board
	15.00-15.55	Sub-session 2: Meat Sector	
1	15.00-15.05	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	15.05-15.10	Introductory Remarks by the Chair	Dr Tarun Bajaj Director, Animal Products, PFV Division, Agricultural and Processed Food Products Export Development Authority Ministry of Commerce and Industry Government of India
3	15.10-15.20	Augmenting the Possibilities in Poultry Meat Sector	Mr P Valsan Secretary All India Poultry Products Exporters Association
4	15.20-15.30	Enhancing Bovine Meat Production: Challenges and Possibilties	Mr Fauzan Alavi Vice President All India Buffalo and Sheep Meat Exporters Association
5	15.30-15.40	Exploring the Potential of Piggery Sector and Learning for further Development	Dr R Thomas Senior Scientist and i/c Food Quality Control Laboratory CAR-NRCP, Indian Council of Agricultural Research, Department of Agriculture Research and Education, Ministry of Agriculture and Farmer's Welfare, Government of India
6	15.40-15.50	Discussion	
7	15.50-15.55	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board

	Time	Session	Speaker
	16.00-18.00	Session: Modernising Agriculture, Fisheries, Animal Resources (Fisheries Session)	
	16.00-16.45	Sub-session 1: Fisheries and Develo Opportunities	oping Economies: New Challenges and
1	16.00-16.05	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	16.05-16.10	Opening Remarks	Ms J Mercikutty Amma Minister for Fisheries and Harbor Engineering Government of Kerala
3	16.10-16.25	Fisheries and Developing Economies: New Challenges and Opportunities	Dr Modadugu Vijay Gupta Former Assistant Director General, World Fish Centre
4	16.25-16.40	On the Blue Economy Possibilities	Ambassador Dr Anil Sooklal Deputy Director - General, Asia and Middle East, South Africa's BRICS Sherpa G20 Sherpa, IBSA Sherpa and the IORA
5	16.40-16.45	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board
	16.45-18.00	Sub-session 2: Kerala's Fish Resour Possibilities of Growth in Future	rces - Marine and Inland Aquaculture:
1	16.45-16.50	Welcome Address	Prof R Ramakumar Member Kerala State Planning Board
2	16.50-17.00	On Deep Sea Fishing in Kerala	Dr Leela Edwin Principal Scientist Central Institute of Fisheries Technology (CIFT)
3	17.00-17.10	Building Value Chains, Learning from Andhra Pradesh Experience	Dr Ben Belton Associate Professor, Department of Agricultural, Food, and Resource Economics Michigan State University
4	17.10-17.20	Possibilities of Inland Aquaculture: Learning From Best Experiences	Dr V V Sugunan International Expert on Reservoir Fisheries and former Director CIFRI
5	17.20-17.30	Brackish Water Aquaculture: Possibilities for Kerala	Dr P Ravi Chandran Former Head of Crustacean Division CIBA and Former Member Secretary Coastal Aquaculture Authority
6	17.30-17.55	Discussion	
7	17.55-18.00	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board

THEME II: SESSION ON FEDERALISM AND DEVELOPMENT FINANCING

February 2, 2021 (Day 2)

	Time	Session	Speaker
	10.00-12.30	Session: Federalism and Dev	velopment Financing
1	10.00-10.05	Welcome Address	Prof K J Joseph Director Gulati Institute of Finance and Taxation, Kerala
2	10.05-10.25	Opening Remarks	Dr T M Thomas Isaac Minister for Finance and Coir Government of Kerala
3	10.25-10.35	Introductory Remarks by the Chair	Prof M Govinda Rao Member, 14th Finance Commission and Honorary Professor, GIFT
4	10.35-11.50	Federalism and Development Financing	Prof C P ChandrasekharJawaharlal Nehru UniversityNew DelhiMr Rajesh Kumar Singh IASAdditional Chief Secretary, Finance DepartmentGovernment of KeralaProf D NarayanaHonorary ProfessorGulati Institute of Finance and Taxation, KeralaProf Pinaki ChakrabortyDirector, NIPFP
5	11.50-12.00	Discussant	Prof Sushil Khanna Indian Institute of Management, Calcutta
6	12.00-12.25	Open Discussion	
7	12.25-12.30	Vote of Thanks	Mr P Shaji Chief, Plan Coordination Division Kerala State Planning Board



THEME III: SESSION ON INFORMATION TECHNOLOGY

February 2, 2021 (Day 2)

	Time	Session	Speaker
	10.00-13.00	Session: Information Techno	blogy
1	10.00-10.05	Welcome Address	Prof V K Ramachandran Vice Chairperson Kerala State Planning Board
2	10.05-10.10	Vision Statement	Mr Pinarayi Vijayan Chief Minister of Kerala
3	10.10-10.15	Opening Remarks	Mr Mohammed Y Safirulla IAS Additional Secretary, Department of Electronics and Information Technology Government of Kerala
4	10.15-10.30	Presentation of the Thematic Sessions	Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology
5	10.30-10.35	Introductory Remarks by the Moderator	Mr Santhosh Kurup CEO ICT Academy Kerala
6	10.35-10.45	Major Changes in the Software Industry and How Kerala could Leverage on the Same Through Appropriate Policy Intervention	Mr S D Shibulal Co-founder Infosys
7	10.45-10.55	Emerging Trends in Digital Transformation of Various Sectors and How Kerala should Leverage on the Same Through Appropriate Policy Changes	Mr Srikanth Srinivasan Head, Membership and Outreach NASSCOM
8	10.55-11.05	Opportunities in Electronics Hardware Sector and How Kerala should Leverage on the Same Through Appropriate Policy Interventions	Ms Nivruti Rai Country Head Intel India, VP Data Center Group
9	11.05-11.15	Opportunities in Software Sector	Mr Nandakumar K Nair Founder and CEO, Suntec Business Solutions
10	11.15-11.25	Opportunities in Hardware Sector	Prof Prahlad Vadakkepat National University of Singapore
11	11.25-11.55	Moderator Led Question Answer Session	Mr Santhosh Kurup CEO ICT Academy Kerala
12	11.55-12.30	Open Discussion	
13	12.30-12.50	Response by Panellists	
14	12.50-12.55	Summing up the Session	Prof T Jayaraman Member, Kerala State Planning Board
15	12.55-13.00	Vote of Thanks	Mr Joy N R Chief, Industry and Infrastructure Division Kerala State Planning Board



THEME IV: SESSION ON E-GOVERNANCE

February 2, 2021 (Day 2)

	Time	Session	Speaker
	11.30-18.00	Session: e-Governance	
	11.30-13.15	Sub-session-1 Citizen Access to Se	rvices and Empowerment
1	11.30-11.35	Welcome Address	Mr Mohammed Y Safirulla IAS Additional Secretary, Department of Electronics and Information Technology Government of Kerala
2	11.35-11.40	Introductory Remarks by the Chair	Dr Amit Prakash Associate Professor Centre for IT and Public Policy International Institute of Information Technology Bangalore
3	11.40-11.55	Technology as an Enabler: C-DOT's R&D Initiatives for Boosting Connectivity and Digitally Empowering the Citizens Across the Nation	Dr Rajkumar Upadhyay Executive Director, Centre for Development of Telematics (C-DOT), Government of India
4	11.55-12.10	Leveraging Digital Infrastructure and ICT Against COVID 19 to Engage the Public in Korea	Dr Chang Yong Son ICT and Disaster Risk Reduction Division UN-ESCAP
5	12.10-12.25	E-Governance for Service Delivery: Focusing on Local Practice	Dr Shirin Madon Associate Professor Information System London School of Economics
6	12.25-12.40	Social Media Platforms and Threats of Misinformation	Dr Joyojeet Pal Principal Researcher Microsoft Research
7	12.40-12.55	Advancing Affordability and Meaningful Access to Connect the Last 50 per cent: Focussing on Closing the Connectivity Gaps in Asia and the Pacific	Ms Anju Mangal Asia Regional Coordinator Alliance for Affordable Internet World Wide Web Foundation
8	12.55-13.10	Open Discussion	
9	13.10-13.15	Vote of Thanks	Dr Santhosh Vidyadharan Chief, Perspective Planning Division Kerala State Planning Board



	Time	Session	Speaker
	14.00-15.45	Sub-session 2: Decision Support	Systems and Analytics
1	14.00-14.05	Welcome Address	Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology
2	14.05-14.10	Introductory Remarks by the Chair	Prof Rahul De Information Systems, Indian Institute of Management, Bangalore
3	14.10-14.25	Leveraging Open Source for Digital Transformation	Prof Rahul De Information Systems, Indian Institute of Management, Bangalore
4	14.25-14.40	COVID-19: What does It Mean for Digital Social Protection?	Dr Silvia Masiero Associate Professor University of Oslo
5	14.40-14.55	Al for Social Good	Dr Manish Gupta Director, Google Research India
6	14.55-15.10	Leveraging Digital Data for Disaster Risk Management: Supporting Cross- Sector Dialogue and Learning	Ms Gabrielle Iglesias Senior Monitoring, Evaluation and Learning Officer, SCAOHUN and Fellow for Disaster Risk Management and Climate Change Adaptation Ideacorp
7	15.10-15.25	Kerala State Digital Architecture - Interoperable Framework	Mr T Mohan Dhas Deputy Director General and State Informatics Officer (Scientist G), NIC
8	15.25-15.40	Discussion	
9	15.40-15.45	Vote of Thanks	Dr Santhosh Vidyadharan Chief, Perspective Planning Division Kerala State Planning Board
	16.00-18.00	Sub-session 3: Legal and Policy	Dimensions: Way Forward
1	16.00-16.05	Welcome Address	Mr Mohammed Y Safirulla IAS Additional Secretary, Department of Electronics and Information Technology Government of Kerala
2	16.05-16.10	Introductory Remarks by the Chair	Dr Janaki Srinivasan Assistant Professor and Convenor, Centre for IT and Public Policy (CITAPP), International Institute of Information Technology, Bangalore
3	16.10-16.25	The Constitutional Adoption of Digital Technologies in Strengthening Democratic Values	Mr Apar Gupta Executive Director, Internet Freedom Foundation

4	16.25-16.40	On Privacy Protection in Large Public Service Applications	Prof Subhashis Banerjee Computer Science Department, IIT Delhi
5	16.40-16.55	Data Security and Privacy Aspects in the Context of 5G/IOT and AI	Dr Subramanian N Senior Director, R&D, CDAC
6	16.55-17.10	On biometrics, AI and Societies - Towards a Critical Approach	Ms Vidushi Marda Senior Programme Officer, Article 19 and Nonresident Research Analyst at Carnegie India
7	17.10-17.25	The Law and Policy of Automated Decision Making in Public Administration	Mr Divij Joshi Lawyer and Independent Researcher
8	17.25-17.55	Open Discussion	
9	17.55-18.00	Vote of Thanks	Dr Santhosh Vidyadharan Chief, Perspective Planning Division Kerala State Planning Board



THEME V: SESSION ON LOCAL GOVERNMENTS February 2, 2021 (Day 2)

	Time	Session	Speaker
		Session: Local Governments	·
	10.00-13.00	Sub-session 1: Best Practices	
1	10.00-10.05	Welcome Address	Dr Joy Elamon Director, Kerala Institute of Local Administration
2	10.05-10.15	Opening Remarks	Mr A C Moideen Minister for Local Self Governments Government of Kerala
3	10.15-10.20	Introductory Remarks by the Moderator	Prof K N Harilal Member Kerala State Planning Board
4	10.20-10.35	13th Five-Year Plan of Local Governments: Some Highlights	Ms Josephine J Chief Decentralised Planning Division Kerala State Planning Board
	10.35-12.25	Best Practices by Local Governments	
	10.35-10.50	Energy Conservation: Kozhikode Municipal Corporation	Dr Beena Philip M Mayor
	10.50-11.05	Waste Management: Kunnamkulam Municipality	Smt Seetha Ravindran President
	11.05-11.20	Organic Farming: Nedumangad Block Panchayat	Smt V Ambili President
5	11.20-11.35	Child Friendly Panchayat: Peravoor Grama Panchayat	Sri P P Venugopalan President
	11.35-11.50	Elderly Friendly Panchayat: Mulamthurutthi Grama Panchayat	Smt Mariyamma Benny President
	11.50-12.05	Filament Free Panchayat: Peelikkode Grama Panchayat	Smt P P Prasannakumari President
	12.05-12.25	Panchayat Services Reaching ISO Standards	Dr P K Jayasree Director of Panchayats
6	12.25-12.55	Discussion	
7	12.55-13.00	Vote of Thanks	Ms Josephine J Chief Decentralised Planning Division Kerala State Planning Board

	Time	Session	Speaker
	18.00-20.30	Sub-session 2: Decentralisation an	d Local Governance
1	18.00-18.05	Welcome Address	Prof V K Ramachandran Vice Chairperson Kerala State Planning Board
2	18.05-18.15	Introductory Remarks by the Moderator	Ms Sarada G Muraleedharan IAS Additional Chief Secretary Local Self Government Department
3	18.15-18.25	A Theoritical view of the Role of Panchayats in the Transition to Socialism	Prof Prabhat Patnaik Professor Emeritus Jawaharlal Nehru University
	18.25-18.35	Decentralization and Urban Governance	Prof Patrick Heller Professor of Sociology International Studies and Public Affairs Watson Institute, Brown University
	18.35-18.45	Decentralisation and Local Governments	Prof Harry Blair Visiting Fellow South Asian Studies Council Yale University
	18.45-18.55	Local Governments in Disaster Management	Dr S S Meenakshisundaram IAS Visiting Professor National Institute of Advanced Studies Bangalore
	18.55-19.05	Participatory Decision Making in Local Governance	Ms Aruna Roy Founder Mazdoor Kisan Shakti Sangathan
	19.05-19.15	Local Governments and Social Justice - Way forward	Mr S M Vijayanand IAS (Rtd.) Former Chief Secretary and Chairperson 6 th State Finance Commission, Kerala
	19.15-19.25	Challenges of Natural Resource Extraction and its Impact on Local Governments in Kerala	Dr J Devika Professor Centre for Development Studies
	19.25-19.35	Decentralisation and Local Governments	Prof K N Harilal Member Kerala State Planning Board
4	19.35-20.25	Discussion	
5	20.25-20.30	Vote of Thanks	Ms Josephine J Chief, Decentralised Planning Division Kerala State Planning Board



THEME VI: SESSION ON MODERN SKILL DEVELOPMENT February 2, 2021 (Day 2)

	Time	Session	Speaker
	14.00-17.00	Session: Modern Skill Developr	nent
1	14.00-14.05	Welcome Address	Prof Mridul Eapen Member Kerala State Planning Board
2	14.05-14.10	Opening Remarks	Mr T P Ramakrishnan Minister for Labour and Excise Government of Kerala
3	14.10-14.15	Opening Remarks	Ms K K Shailaja Teacher Minister for Health, Social Justice, and Women and Child Development Government of Kerala
4	14.15-14.20	Opening Remarks	Prof V K Ramachandran Vice Chairperson Kerala State Planning Board
5	14.20-14.25	Introductory Remarks by the Chair	Prof K Ravi Raman Member Kerala State Planning Board
6	14.25-14.40	Best Practices in Korea	Prof Ju-Ho Lee KDI School Former Minister of Science Technology and Education Republic of Korea
7	14.40-14.55	Best Practices in Germany	Mr Peter Rechmann Deputy Head of GOVET and Head of Round Table Office, BIBB - Federal Institute for Vocational Education and Training Bonn, Germany
8	14.55-15.10	Global Labour Market Perspective in the Context of Covid-19	Ms Sukti Dasgupta Chief Employment and Labour Market Policies Branch Employment Policy Department International Labour Organisation
9	15.10-15.25	Best Practices in South Asia and Other Parts of Asia	Mr Gabriel H Bordado Skills and Employment Specialist, Decent Work Technical Team, South Asia International Labour Organisation

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10	15.25-15.40	Best Practices in Skill Development	Mr Atul Kumar Tiwari IAS Additional Secretary, Ministry of Skill Development and Entrepreneurship Government of India
11	15.40-15.55	International Best Practices in the Sphere of Skill Development and Employability among Young Workers	Mr Srinivas Reddy Branch Chief Skills and Employability Branch Employment Policy Department International Labour Organisation
12	15.55-16.05	Discussant	Prof Santosh Mehrotra Centre for Informal Sector and Labour Studies Jawaharlal Nehru University
13	16.05-16.15	Discussant	Prof Jeemol Unni Economics and Public Policy and Chair Master of Arts in Economics Programme Ahmedabad University
14	16.15-16.55	Discussion	
15	16.55-17.00	Vote of Thanks	Dr Bindu P Verghese Chief, Social Services Division Kerala State Planning Board



THEME VII: SESSION ON MODERN INDUSTRIAL POSSIBILITIES February 2, 2021 (Day 2)

	Time	Session	Speaker
	14.00-16.30	Session: Modern Industrial P	Possibilities
1	14.00-14.15	Welcome Address	Dr Jayan Jose Thomas Member Kerala State Planning Board
2	14.15-14.25	Opening Remarks	Mr E P Jayarajan Minister for Industries, Sports and Youth Affairs Government of Kerala
3	14.25-14.30	Introductory Remarks by the Chair	Dr K Ellangovan IAS Principal Secretary, Industries Government of Kerala
4	14.30-14.45	Latest Developments in the Areas of Logistics and Port-Based Industrial Development, Particularly on Opportunities for Kerala	Mr Rizwan Soomar MD and CEO DP World- Port and Logistics
5	14.45-15.00	Entrepreneurship Nourishment and Industry-Focused Research in Academic Institutions, Particularly the Experiences of IITs	Prof V Ramgopal Rao Director Indian Institute of Technology Delhi
6	15.00-15.15	Possibilities for Industrial and Economic Development in Rural and Semi Urban Areas on Account of Changes in Communication Technologies	Ms Daisy Chittilapilly MD, Digital Transformation CISCO
7	15.15-15.30	South Korean Experience in Promoting Industrial Development, and the Economic Growth Possibilities for Kerala in the Emerging Global Order	Prof M Jae Moon Director Institute for Future Government Studies Yonsei University
8	15.30-15.45	Building a Modern and Technologically Vibrant Industrial Sector in Kerala	Mr Tony Thomas Former CIO Nissan Motor
9	15.45-16.20	Discussion	
10	16.20-16.25	Concluding Remarks by Chairperson	
11	16.25-16.30	Vote of Thanks	Mr Joy N R Chief, Industry and Infrastructure Division Kerala State Planning Board

THEME VIII: SESSION ON TOURISM February 2, 2021 (Day 2)

	Time	Session	Speaker
	14.00-16.30	Session: Tourism	
1	14.00-14.05	Welcome and Introductory Remarks by the Chair	Dr Venu V Member Secretary Kerala State Planning Board
2	14.05-14.10	Opening Remarks	Mr Kadakampally Surendran Minister for Co-operation, Tourism and Devaswoms Government of Kerala
3	14.10-14.30	Future of Tourism in Kerala	Mr Suman Billa Director Technical Cooperation and Silk Road UNWTO, Madrid
4	14.30-14.50	Future of Active Holidays, Particularly for Destinations like Kerala	Ms Christina Beckmann Vice President, Global Strategy for Adventure Travel Trade Association & Co - Founder Tomorrow's Air
5	14.50-15.10	Tourism Marketing in a Post-Covid Scenario.	Dr Nimit Ranjan Chowdhary Professor Department of Tourism and Hospitality Management Jamia Millia Islamia
6	15.10-15.30	Responsible Tourism	Dr Harold Goodwin Founder Director, International Centre for Responsible Tourism, United Kingdom
7	15.30-15.50	Future of Tourism in Kerala	Mr Dipak Deva Managing Director Travel Corporation India Limited
8	15.50-16.25	Discussion	
9	16.25-16.30	Concluding Remarks by Chair	Dr Venu V Member Secretary Kerala State Planning Board

THEME IX: SESSION ON HIGHER EDUCATION February 2, 2021 (Day 2)

	Time	Session	Speaker
	17.00-19.30	Session: Higher Education	
1	17.00 -17.05	Welcome Address	Dr B Ekbal Member Kerala State Planning Board
2	17.05-17.10	Opening Remarks	Dr K T Jaleel Minister for Higher Education and Minority Welfare Government of Kerala
3	17.10-17.15	Introductory Remarks by the Chair	Dr Rajan Gurukkal P M Vice Chairperson Kerala State Higher Education Council
4	17.15-17.30	Curricular Innovations	Prof Gopinath Ravindran Vice Chancellor Kannur University
5	17.30-17.45	Massive Open Online Courses: Review of their Potential in Higher Education	Prof Ronald J Herring Professor Emeritus, The Department of Government Cornell University, New York
6	17.45-18.00	Institutional Innovations	Prof N V Varghese Vice Chancellor National Institute of Educational Planning and Administration
7	18.00-18.15	Institutional Innovations	Prof Shyam B Menon Central Institute of Education University of Delhi
8	18.15-18.30	Networks for Teaching, Research, and Student Exchange	Prof Daniel Little Sociology and Public Policy University of Michigan
9	18.30-18.45	Innovations in Library and Information Availability	Prof Devika P Madalli Documentation Research and Training Centre Indian Statistical Institute Bengaluru
10	18.45-19.00	Issues of Strengthening the Socially Inclusive Character of Higher Education	Prof Sukhadeo Thorat Professor Emeritus Centre for the Study of Regional Development Jawaharlal Nehru University
11	19.00-19.05	Respondent	Prof K P Sudheer Ex Officio Principal Secretary S&T Department and Executive Vice President KSCSTE
12	19.05-19.20	Discussion	
13	19.20-19.25	Concluding Remarks by Chair	Dr Rajan Gurukkal P M Vice Chairperson Kerala State Higher Education Council
14	19.25-19.30	Vote of Thanks	Dr Bindu P Verghese Chief, Social Service Division Kerala State Planning Board

SPECIAL INDUSTRY SESSION February 3, 2021 (Day 3) 10.00 to 13.00 hours

	Time	Session	Speaker
	10.00-13.00	Session: Special Industries	
1	10.00-10.10	Welcome Address	Prof V K Ramachandran Vice Chairperson Kerala State Planning Board
2	10.10-10.25	Opening Remarks	Mr E P Jayarajan Minister for Industries, Sports and Youth Affairs Government of Kerala
3	10.25-12.10	Address	Mr Ratan Tata Chairperson, Tata Trusts Mr Kumar Mangalam Birla Chairman, Aditya Birla Group Mr Azim Premji Founder Chairperson, Wipro Limited Mr Anand Mahindra Chairman, Mahindra Group Ms Kiran Mazumdar-Shaw Executive Chairperson, Biocon Limited Mr Kris Gopalakrishnan Chairman Axilor Ventures Mr M A Yusuff Ali Chairperson, LuLu Group Dr B Ravi Pillai Managing Director, RP Group Dr Azad Moopen Chairperson and Managing Director Aster DM Healthcare
4	12.10-12.35	Discussion	
5	12.35-12.55	Concluding Remarks	Mr Pinarayi Vijayan Chief Minister of Kerala
6	12.55-13.00	Vote of Thanks	Dr Jayan Jose Thomas Member Kerala State Planning Board

CONCLUDING SESSION February 3, 2021 (Day 3) 14.00 to 16.20 hours

	Time	Session	Speaker
	14.00-16.20	Concluding Session	
1	14.00-14.10	Welcome Address	Prof V K Ramachandran Vice Chairperson Kerala State Planning Board
2	14.10-14.20	Summary of Session on Modernising Agriculture, Fisheries, and Animal Resources	Prof R Ramakumar Member Kerala State Planning Board
3	14.20-14.30	Summary of Session on Modern Industrial Possibilities	Dr Jayan Jose Thomas Member Kerala State Planning Boardard
4	14.30-14.40	Summary of Session on Information Technology	Prof T Jayaraman Member Kerala State Planning Board
5	14.40-14.50	Summary of Session on E-governance	Dr Amit Prakash Associate Professor, Centre for IT and Public Policy, International Institute of Information Technology, Bangalore
6	14.50-15.00	Summary of Session on Local Governments	Ms Josephine J Chief Decentralised Planning Division Kerala State Planning Board
7	15.00-15.10	Summary of Session on Modern Skill Development	Dr K Ravi Raman Member Kerala State Planning Board
8	15.10-15.20	Summary of Session on Federalism and Development Financing	Prof K J Joseph Director Gulati Institute of Finance and Taxation
9	15.20-15.30	Summary of Session on Tourism	Er. Joy N R Chief I&I Division State Planning Board
10	15.30-15.40	Summary of Session on Higher Education	Dr B Ekbal Member Kerala State Planning Board
11	15.40-16.00	Special Address	Prof Amartya Sen University Professor Harvard University
12	16.00-16.15	Concluding remarks	Mr Pinarayi Vijayan Chief Minister of Kerala
13	16.15-16.20	Vote of Thanks	Dr Venu V Member Secretary Kerala State Planning Board

SCHEDULE THEMATIC SESSIONS

INFORMATION TECHNOLOGY

THEMATIC SESSION: SOFTWARE

Date: January 24, 2021 Time: 18:30 to 21:00 hours

Time Duration	Session	Speaker
18.30-18.35	Welcome Address	Prof T Jayaraman Member, Kerala State Planning Board
18.35-18.40	Opening Remarks	Mr Mohammed Y Safirulla IAS Additional Secretary, Department of Electronics and Information Technology
18.40-18.50	Presentation of the Thematic Concept Note	Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology
18.50-18.55	Initial Remarks by the Moderator	Mr Santhosh Kurup CEO ICT Academy Kerala
18.55-19.05		Prof T Kesavadas Director, Health Care Engineering Systems Centre University of Illinois at Urbana Champaign
19.05-19.15		Mr Sreekanth Arimanithaya Global Talent and Enablement Services Leader Global Delivery Services, Ernst &Young
19.15-19.25	Presentations Mr Nandakumar K N Founder and CEO, Sunted Mr Anoop Ambika CEO, CLAP Research Prof Rajasree M S Vice Chancellor APJ Abdul Kalam Technol	Mr Nandakumar K Nair Founder and CEO, Suntec Business Solutions
19.25-19.35		Mr Anoop Ambika CEO, CLAP Research
19.35-19.45		Prof Rajasree M S Vice Chancellor APJ Abdul Kalam Technological University
19.45-20.10	Moderator led Question Answer Session	
20.10-20.40	Open Discussion	
20.40-20.55	Final Observations by Panellists	Speakers
20.55-21.00	Vote of Thanks	Er. Joy N R Chief, I&I Division, State Planning Board

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THEMATIC SESSION: HARDWARE

Date: January 27, 2021 Time: 10:00 to 12:30 hours

Time Duration	Session	Speaker
10.00-10.05	Welcome Address	Prof T Jayaraman Member, Kerala State Planning Board
10.05-10.10	Opening Remarks	Mr Mohammed Y Safirulla IAS Additional Secretary, Department of Electronics and Information Technology Government of Kerala
10.10-10.20	Presentation of the Thematic Concept Note	Dr Saji Gopinath Vice Chancellor, Kerala University of Digital Sciences, Innovation and Technology
10.20-10.25	Initial Remarks by the Moderator	Dr Jayasankar Prasad C Managing Director Kerala Information Technology Infrastructure Ltd (KSITIL)
10.25-10.35		Prof Prahlad Vadakkepat National University of Singapore
10.35-10.45	Presentations	Mr Christo George Chairman and Managing Director Hykon India Ltd
10.45-10.55		Mr Althaf Jehangir CEO and Executive Director, NeST SFO Technologies
10.55-11.05		Mr Gautam Shankar VP-Operations, India and Japan Kimball Electronics
11.05-11.35	Moderator led Question answer Session.	
11.35-12.05	Open Discussion	
12.05-12.25	Final Observations by Panellists	
12.25-12.30	Vote of Thanks	Er. Joy N R Chief, I&I Division, State Planning Board

MODERNISING AGRICULTURE, FISHERIES, AND ANIMAL RESOURCES

THEMATIC SESSION: KERALA'S AGRICULTURE: THE NEED TO RAISE PRODUCTIVITY Date: January 27, 2021 Time: 10.30 to 12.00 hours

Time Duration	Session	Speaker
10.30-10.35	Introductory Remarks	Prof R Ramakumar Member, State Planning Board
10.35-10.45	Opening Remarks by the Chair	Dr R Chandra Babu Vice Chancellor Kerala Agricultural University
10.45-11.00	Data based Presentation on Yield Gaps and Major Challenges	Dr Jacob John Professor and Head Integrated Farming Systems Research Station, Thiruvananthapuram
11.00-11.15	Research Advances to Bridge Yield Gaps	Dr Madhu Subramanian Director of Research Kerala Agricultural University
11.15-11.30	Agriculture Extension and Productivity in Kerala	Dr Jiju P Alex Director of Extension Kerala Agricultural University
11.30-11.55	Discussion	
11.55-12.00	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board



THEMATIC SESSION: PRODUCTIVITY OF MILCH CATTLE IN KERALA Date: January 28, 2021 Time: 14.30 to 15.45 hours

Time Duration	Session	Speaker
14.30-14.35	Introductory Remarks	Prof R Ramakumar Member, State Planning Board
14.35-14.45	Opening Remarks by the Chair	Dr M R Saseendranath Vice Chancellor Kerala Veterinary and Animal Sciences University
14.45-15.00	Milk Productivity Trends of Bovines in Kerala	Dr Jose James Managing Director Kerala Livestock Development Board
15.00-15.15	Strategies for Attaining Sufficiency in Milk Production	Dr Sudheer Babu Professor and Head College of Dairy Sciences and Technology Kerala Veterinary and Animal Sciences University
15.15-15.40	Discussion	
15.40-15.45	Vote of Thanks	Mr S S Nagesh Chief, Agriculture Division Kerala State Planning Board

*To be confirmed

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REGISTRATION NOT REQUIRED



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OUR PARTNERS





Kerala State Planning Board Pattom, Thiruvananthapuram Kerala 695 004

PROCEEDINGS OF THE MEMBER SECRETARY STATE PLANNING BOARD, THIRUVANANTHAPURAM (Present: Dr. Venu .V. IAS)

- Sub: International Conference Kerala Looks Ahead General Organising Committee and Session-level Committees constituted – Orders issued
- Ref: 1. Note No. SPB/37/2020 –VC dated: 06.03.2020 of the Hon'ble Vice Chairperson, State Planning Board
 - 2. Minutes of the meeting held on 05.10.2020

ORDER No. SPB/320/2020/EVND Dated: 08/10/2020

Government of Kerala is organising an International Conference titled "Kerala Looks Ahead" scheduled to be held on 28th, 29th and 30th of January 2021 on virtual mode vide reference 1st cited. The Conference will cover Kerala's achievements and a vision for social and economic development for the next 25 years. State Planning Board will be the lead organiser of the event.

The Conference will include sessions on the following (i) Higher education, including international academic collaboration (ii) Modern industrial possibilities (iii) Medical educational and research institutions (iv) Building a modern agriculture and diversifying exports (v) Fisheries (vi) Tourism (vii) Information technology (viii) Skilling and employment and (ix) e-governance (x) issues of finance and federal polity in India and (xi) achievements in the sphere of local government.

In this context, a general Organising Committee and Session-level Committees for each session has been constituted for the smooth conduct of the Conference vide 2nd cited.

Name of the Committee

Members

- 1. Organising Committee Chair Convenor Co-Convenor
- 2. Session Level Committee Co-Chair Co-Chair

Convenor Members

Committee Members

Vice Chairperson, SPB Member Secretary, SPB Chief (i/c), Evaluation 1. EA to VC, SPB 2. Division Chiefs 3. PS to VC 4. Sr. Administrative Officer 5. Publication Officer

Vice Chairperson, SPB Member Concerned Division Chiefs concerned 1. EA to VC, SPB

- 2. PS to VC
- 3. Two Technical Officers from each division nominated by Chiefs
The responsibility of each session is assigned as follows.

Session	Member Concerned	Division Responsible
Higher Education (including International Academic Collaboration)	Dr B Ekbal	Social Service Division
Modern Industrial Possibilities	Dr Jayan Jose Thomas	Industry and Infrastructure Division
Medical Education and Research Institutions	Dr B Ekbal	Social Service Division
Modern Skill Development	Dr K Ravi Raman and Dr Mridul Eapen	Social Service Division
Building a Modern Agriculture and Diversifying Exports	Dr R Ramakumar	Agriculture Division
Fisheries	Dr R Ramakumar	Agriculture Division
Tourism	Dr Venu V (Member Secretary)	Industry and Infrastructure Division
Information Technology	Dr T Jayaraman	Industry and Infrastructure Division
e-Governance	Dr Venu V (Member Secretary)	Perspective Planning Division
Local Governments	Dr K N Harilal	Decentralised Planning Division
Fiscal Devolution	Office of the Finance Minister to coordinate with SPB	

Sd/-Member Secretary

То

- 1. All Members
- 2. EA to VC
- 3. All Chiefs
- 4. Senior Administrative Officer
- 5. PS to VC

6. Publication Officer

Copy to:-

- 1. PA to the Vice Chairperson
- 2. CA to Member Secretary
- 3. CA to Members
- 4. Finance Officer
- 5. Stock file

Approved for issue

Kuch

Chief (i/c) Evaluation Division

PROCEEDINGS OF THE MEMBER SECRETARY STATE PLANNING BOARD, THIRUVANANTHAPURAM (Present: Dr. Venu .V. IAS)

Sub: - International Conference - Kerala Looks Ahead - Organising Teams constituted - Orders issued

Ref: -

- 1. Note No. SPB/37/2020 –VC dated: 06.03.2020 of the Hon'ble Vice Chairperson, State Planning Board
- 2. Minutes of the meeting held on 05.10.2020

ORDER No. SPB/320/2020/EVND Dated: 13/01/2021

Government of Kerala is organising an International Conference titled "Kerala Looks Ahead" on virtual mode vide reference 1st cited. The Conference was scheduled to be held on 28th, 29th and 30th of January 2021. As the dates of the Conference coincide with the Budget Session of Kerala Assembly, it is rescheduled to February 1-3, 2021. The Conference will cover Kerala's achievements and a vision for social and economic development for the next 25 years. State Planning Board will be the lead organiser of the event.

The Conference will include sessions on the following (i) Higher education, including international academic collaboration (ii) Modern industrial possibilities (iii) Medical educational and research institutions (iv) Building a modern agriculture and diversifying exports (v) Fisheries (vi) Tourism (vii) Information technology (viii) Skilling and employment and (ix) e-governance (x) issues of finance and federal polity in India and (xi) achievements in the sphere of local government.

In this context, six organising teams have been constituted for the smooth conduct of the Conference and a leader is selected from each team. The duties and responsibilities of the State Planning Board officials in six teams are given in **Annexure**.

The team members are entrusted to ensure that, the work allocated to them is carried out smoothly and efficiently for the successful conduct of the International Conference.

> Sd/-Member Secretary

Approved for issue

Ruel

Chief, Evaluation Division

То

The Persons concerned

Copy to

- 1. PS to VC
- 2. CA to Member Secretary

3. CA to Members

4. EA to VC

5. All Chiefs

6. Senior Administrative Officer

- 7. Publication Officer
- 8. Stock file

ANNEXURE

KERALA LOOKS AHEAD

AN INTERNATIONAL CONFERENCE AND CONSULTATION

February 1-3, 2021

Duties and Responsibilities of the State Planning Board Officials in Six Teams

SI. No.	Team	Person	Duties and Responsibilities
1	Website	 Gauthaman M (Research Assistant, PCD) (Team Leader) Ibrahim Siddique (Technical Consultant) Akhil Bharathan (PA to VC) Riya(TA to VC) 	 Ensuring that material for website is collected and provided to developers Proof Reading of Content in website (Design aspects also) Timely editing/updation of contents on website Collecting the photos and Profile of speakers and updating them Ensure that session details are provided Live streaming of sessions
2	Invitations	 Praveen P (Asst. Director, PPD) (Team Leader) Sreedevi. S.S (Research) 	I. There will be 2 types of participants, namely, Speakers, Invitees (Zoom room), Attendees (social media platform)
8 		Officer, PCD) 3. Salini.S (Research Officer, I&I)	and Attendee List separately in their respective sessions (Session- wise)
	· · · · · · · · · · ·	4. Roopa R.V (Research Officer, DPD)	III. Master Google spreadsheet to be shared with the Invitation team.The Invitation team to ensure:
i -		 Shibin.P.B (Research Officer, PPD) Ramsiya K (Research Assistant I&I) 	 i) Invitees received invitations ii) Track confirmation iii) Address (Postal Address, email address, Mobile No. (Whatsapp No.) iv) Send reminder mails regarding
		7. Aparna T.S (Research Assistant, Agriculture) 8. Sujith S (Research	participation v) Put up details regarding cancellations (to be communicated to VC Office)
		Assistant, SS) 9. Vijayasuryan. C.K (TA to VC) 10. Susmitha Vinodh (TA to VC)	

3	Speakers	1.	Dhanya S. Nair	1) Ensur	e that invitations are received
	1		(Asst. Director,	by the	Speakers
			Agriculture)	2) Ensu	re that the confirmation is
			(Team Leader)	receiv	ed from the Speaker
		2	Roshni	3) Comt	municate to VC Office in case
		2.	Padmanabhan	of de	line or last minute
			Research	chang	es/cancellations if any
			Officer	(1) Colle	et and update in the Cooole
			A animaltana)	4) Cone	about the
		2	Agriculture) $D_{i=1}^{i}(TA + VC)$	spread	Makila NJa (Whataataa
	- 11 L. K.). 1	Kiya(1A to VC)	(1)	Mobile No. (Whatsapp
		4.	Vijayasuryan.		No.)
			C.K (IA to VC)	(11	e-mail Address
				(11	1) Mailing or Postal
-					Address
1	1				
		1.1.1.1		5) Photo	os and Profile of Speakers to
	e fet to the			be co	llected (Coordinate with
				Webs	ite Team) and update the
				same	in Google spreadsheet
	Market Contractor			6) All Po	ower Point Presentations to
				be	collected 2 days prior to
				the C	onference (to be compiled by
				Vijavs	survan) (to coordinate with
	2.1.2			Docu	mentation Team)
4	Publicity	1.	Arun Syamnath	1) CM's	write up to be published
	1	ia	(Asst. Director,	throu	gh PRD in newspapers
	hard to be to		I&I) (Team	regard	ling the Conference (the
			Leader)	previe	ous day itself)
		2	Muhammed Iias	2) Febru	ary 2. 3-Promotion to be
			Palanadan	done	
-	1 A 1 A 1 A 1 A		(Research	3) Provi	de Invitations Brochures to
			Assistant DPD)	media	
		3	Bipin Chandran	4) Logo	and Website Launch by CM
		5.	(TA to VC)	5) Dress	release everyday
		1	Rechungthan M	5) 11055	to PRD
		т.	(APS to VC)	a. h	to Media List (prepare
1		5	Akhil Bharathan	D.	Media list - Drint Andia
		5.	(DA to VC)		Vieual)
				6) Sum 1	visual)
				7) LL	ince (if papagam)
				() $()$ $()$ $()$ $()$ $()$ $()$ $()$	Wideo (if accessary)
				δ) Them	lie video (if necessary)
				9) Co-01	cunate with event manager
	T	-	C	tor se	naing flyers
5	Logistics	1.	Saji.V (Asst.	1) Backg	ground for Speakers from
		ж. Т	Director, SS)	State	Planning board (flex of the
			(Team Leader)	Confe	erence if necessary)
		2.	Arun Syamnath	2) Ensu	re the working and availability
			(Asst. Director,	of Int	ernet, Printers, Papers
			I&I)	3) Ensu	re Computers, Internet, Web
		3.	Sudesh T.P(Asst.	Platfo	orms of MS, VC, and

		 Director, I&I) 4. Gauthaman M (Research Assistant, PCD) 5. Ibrahim Siddique (Technical Consultant) 6. Divya S Nair (e- office Technical Consultant) 7. Akhil Bharathan (PA to VC) 	 Members, are functioning properly 4) Sammridhi hall to be set up as Control room 5) Arrangement for Event Managers and Support Team 6) Ensure Speakers, Projectors, Microphones are functioning properly
		 Vinod S (Clerk, SPB) Dhanesh M S (Office Attendant, SPB) 	
6	Documentation	Concerned Officers in the Division (List to be	 Minutes of each session preparation Collect Power Point Presentations of
		provided by the Division Chief)	Speakers from the Speaker Team 3) Assist Member to prepare the summary to be presented at Concluding session
		Ideally, 2 Technical Officers from each Division handling the	4) Put up draft report of Conference Proceedings session-wise
		Sector concerned to be provided. This will be decided by the Chief	5) Draft Report to be submitted to Government
	, , , ,	with the Member concerned.	Documentation charge will remain with Member concerned and Division Chief
-		 Vincent Sebastian (Asst. Director, PCD) (Team Leader) Saneesh Kumar K. K (Research) 	
		Officer, Evaluation Division) 3. Soumya S. N (Research Assistant, PCD)	

Sd/-Member Secretary

GOVERNMENT CENTRAL PRESS, THIRUVANANTHAPURAM