GOVERNMENT OF KERALA
KERALA STATE PLANNING BOARD

FOURTEENTH FIVE-YEAR PLAN
(2022-2027)

WORKING GROUP ON

A PLAN TO IMPROVE THE EFFICIENCY OF FUNCTIONING OF KRISHI BHAVANS

REPORT

AGRICULTURE DIVISION
March 2022

FOREWORD

Kerala is the only State in India to formulate and implement Five-Year Plans. The Government of Kerala believes that the planning process is important for promoting economic growth and ensuring social justice in the State. A significant feature of the process of formulation of Plans in the State is its participatory and inclusive nature.

In September 2021, the State Planning Board initiated a programme of consultation and discussion for the formulation of the 14th Five-Year Plan. The State Planning Board constituted 44 Working Groups, with more than 1200 members in order to gain expert opinion on a range of socio-economic issues pertinent to this Plan. The members of the Working Groups represented a wide spectrum of society and include scholars, administrators, social and political activists and other experts. Members of the Working Groups contributed their specialised knowledge in diferent sectors, best practices in the field, issues of concern, and future strategies required in these sectors. The Report of each Working Group reflects the collective views of the members of the Group and the content of each Report will contribute to the formulation of the 14th Five-Year Plan. The Report has been finalised after several rounds of discussions and consultations held between September to December 2021.

This document is the Report of the Working Group on "A plan to improve the efficiency of working of Krishi Bhavans." The Co-Chairpersons of Working Group were Dr. C. Bhaskaran and Sri. T.V.Subash IAS . Dr.R.Ramakumar, Member of the State Planning Board co-ordinated the activities of the Working Group. Sri.S.S.Nagesh, Chief, Agriculture Division was the Convenor of the Working Group and Smt.G. C. Roshni, Agronomist, Agriculture Division was Co-Convenor. The terms of reference of the Working Group and its members are in Appendix 1 of the Report.

Member Secretary

PREFACE

As part of formulation of the 14th Five Year Plan, the Kerala State Planning Board had constituted working groups of experts in all the major sectors. In Agriculture and Allied Sectors, 6 working groups were constituted viz. Agriculture and Cooperation, Animal Husbandry and Dairy, Inland and Marine Fisheries, Forest and Environment, Water Resources and Regional Packages. To discuss and frame policies in each of these sectors, the working groups were further divided into 28 Expert Sub-Groups (ESG) with specific mandates.

Each Expert Subgroup held at least three meetings beside one focused group meeting before finalising the report. We, the Co-Chairs, place our deep appreciation and gratitude to all the esteemed members of the ESG for their valuable contributions in preparing the report. We are extremely grateful to Dr. V. K. Ramachandran, the Honourable Vice-Chairperson, Kerala State Planning Board, Dr. R. Ramakumar, Member, Kerala State Planning Board and Sri. S. S. Nagesh, Chief, Agriculture Division for their consistent guidance and suggestions in preparing the report. The support provided by Dr. C. Anil Kumar, Assistant Director and Smt. Shahida. M. N, Research Assistant in bringing out this report is appreciated. The drafting team put in commendable work in bringing together all the views and opinions of the members. We sincerely hope the recommendations in the report can lead to important changes in the public policy on agricultural development in the State.

Dr. C. Bhaskaran
Expert co-chairperson

Sri. T.V.Subash IAS
Official co-chairperson

CONTENTS

A PLAN TO IMPROVE THE EFFICIENCY OF FUNCTIONING OF KRISHI BHAVANS

HIGHLIGHTS

- The framework of agricultural extension has a number of weaknesses. Many developments in research remain in the "lab" and have not reached the "land."
- Organisational strengthening of Krishibhavans, forging links with LSGs, FPOs, Cooperatives, and Research Institutions, and integrating and leveraging digital technology for farmers help in setting up Smart Krishi Bhavans.
- Krishi Bhavans should focus on productivity-enhancing interventions for farmers through scientific land use and crop production strategies, timely supply of quality inputs, and interlinking output marketing to realise maximum value utilising latest technologies including Information Technology.

EXECUTIVE SUMMARY

Introduction: Agriculture occupies a central position in Kerala. Studies show that in the rain fed regions of Kerala, 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 certifed seeds, balanced fertilisation and balanced nutrient management. Higher yield gaps are broadly correlated with poor adoption of technologies. Kerala has a dense network of institutions for agricultural research under the Central and State Governments. However, the framework of extension has number of weaknesses. Many developments in research remain in the "lab" and have not reached the "land." Krishi Bhavans have been reduced to subsidy disbursing institutions, and most of the working time of agricultural officers is spent on administrative activities. Kerala should modernise its Krishi Bhavan system utilising the possibilities of e-governance, allowing officers to spend more time in the farmers' fields. The activities of Krishi Bhavans should be focussed on productivity-enhancing interventions for farmers through design of scientific land use and crop production strategies, need-based and timely supply of quality inputs, interlinking output marketing to realise maximum value utilising latest technologies including Information Technology. Smart Krishi Bhavans, which are fine-tuned with the latest trends in Global Extension Education, can guide Kerala farmers towards lasting prosperity.

Organisational strengthening of Krishi Bhavans: Structural and functional aspects of the Krishi Bhavans are inextricably interlinked with the organisational hierarchy of the Kerala State Department of Agriculture Development & Farmers' Welfare (KSDAD&FW) at the various levels of administration. If the Krishi Bhavans have to be made efficient, facilitating organisational eco-systems have to be ensured at every level of the Department. Staffing, outreach activities, technology-enabled services, adoption of new technologies, etc. must be promoted.

Linkage of Krishi Bhavans with LSG, FPO, Co-operative sector and research institutions: A symbiotic or complementary relationship is expected from Department of ADFW/Krishi Bhavans' linkage with Local Self Governments, Farmer Producer Organizations (FPO) and Co-operative sector in the benefit of the farming community. Clear guidelines are proposed for the division of authority, avenues of cooperation, meeting schedules, etc.

Integrating and leveraging digital technology solutions for smart service delivery for farmers: The Digital technology enabled service requirements are the creation of unique databases, mapping of resources and validation process, streamlining and re-engineering the administrative processes for effective service delivery, IT enabled, Intelligent driven extension services, and infrastructure and implementation requirements. Detailed guidelines and suggestions are provided in the report.

1.INTRODUCTION

Like many other states, agriculture occupies a pivotal position in Kerala with the preponderance of farming by the masses on very small farms with the average holding size being less than half an acre. But because of the presence of high-value commercial crops—rubber and spices—value of output per hectare is high. Consequently, land moves out of food grains to non-food grains, rubber and coconut being in the lead. The share of food grain production gets reduced and there is little incentive to go in for fertilizers, the per hectare use of fertilizers being one of the lowest in the country. Not surprisingly, gross value added from agriculture in the State was one of the lowest in the country and fell sharply between 2011-12 and 2015-16. Reversing this would be a major task. Similarly, learning from experience, special efforts are being made by policies of the State government and experiments by Local Self Governments and the Co-operative sector to increase the production, productivity and profit in the agricultural sector. It is encouraging to find that there has been a positive response with more than doubling of vegetable production between 2016 and 2020.

At the macro level, productivity of many crops in Kerala is declining and hence the primary task of agricultural policy 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 that in the rain fed regions of Kerala, 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 certifed seeds, balanced fertilisation and balanced nutrient management. 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. 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 unverifed sources is that zero application of fertilizers and pesticides is the singular way to attain sustainability. 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. 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 diference that one can see. The implications of this decline in fertiliser consumption in the soil for the sustenance of soil health, also has not been adequately studied. 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. There are particular instances of this new technology – nanotechnology- where introduction of nanodiagnostics, nanoagri inputs like the small tablets of fertiliser, pesticides and bio inoculants 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 exports. The more recent introduction of planning for agro-ecological zones by the Agriculture Department is a welcome step. The State's agricultural research system needs to be geared up to meet these challenges including climate resilience, heritage/ethnic agriculture, urban, rurban / peri- urban agriculture, secondary agriculture, food safety and other emergent innovations. It is hoped 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 and obviously the foci of the Navakeralam Mission namely equity, economy, employment, entrepreneurship and environment attractive to the youth, returnee migrants and others can be realised only through the application of Science, Technology and Innovation in every sphere.

The State can foster agricultural growth by enhancing productivity, profitability and sustainability. Achieving this aim requires a major reconceptualisation of agriculture in the policy sphere. This would not require much additional funding from the Government. At the same time, there is emergent need for a significant convergence of activities of the diferent players in the following fields: a) encouragement of cutting-edge research to develop high quality certifed seeds b) improvement of soil health c) integrated water resources management to expand irrigation d) efective public agricultural extension to popularise balanced fertilisation and IPM practices e) adoption of mechanisation in agricultural operations f) modernisation of supply chains and marketing systems g) large-scale investments in processing and value-addition. In our attempts to ensure convergence in these aims, Kerala should utilise two features of institutional strength in its history: decentralised governance and the co-operative movement. The role of Local Self Governments in agriculture has intensifed after Kerala initiated the People's Planning Campaign in 1996 after the passage of the 73rd and 74th amendments to the Constitution in 1994. A number of local activities and responsibilities related to agriculture have been transferred to the local bodies. The vast and vibrant co-operative movement in Kerala also shows immense potential to support the agricultural sector.

Similar is the case with agricultural extension. Kerala has a dense network of institutions for agricultural research under the Central and State Governments. However, the framework of extension has a number of weaknesses. Many developments in research remain in the "lab" and have not reached the "land." An example is the case of integrated multi-crop models of homestead cultivation. The Krishi Bhavans have been reduced to subsidy disbursing institutions, and most of the working time of Agricultural Officers is spent on administrative activities. Kerala should modernise its Krishi Bhavan system utilising the possibilities of e-governance, allowing officers to spend more time in the farmers' fields. The activities of

Krishi Bhavans should be focussed on productivity-enhancing interventions for farmers through design of scientific land use and crop production strategies, need-based and timely supply of quality inputs, interlinking output marketing to realise maximum value utilising latest technologies including Information Technology.

The Smart Krishi Bhavans, which are fine-tuned with the latest trends in Global Extension Education, alone can guide Kerala farmers towards prosperity in perpetuity. In order to make the Krishi Bhavans smarter, the status and strategy pertaining to their organisational strengthening, application of state-of-the-art technologies to ensure efficient delivery of services and convergence with Local Self Governments, Co-operatives, Farmers' Organisations and Research Institutions including the Kerala Agricultural University have to be examined and the way forward mapped. A brief attempt made in this direction by the Expert Sub-Group constituted by the Kerala State Planning Board has yielded the perspectives and prospects in this regard which are epitomised in the pages that follow.

2.ORGANISATIONAL STRENGTHENING OF KRISHI BHAVANS

Both structural and functional aspects of the Krishi Bhavans are inextricably interlinked with the organisational hierarchy of the Kerala State Department of Agriculture Development& Farmers' Welfare (KSDAD&FW) at the various levels of administration. The tacit assumption is that if the Krishi Bhavans have to be made efficient, facilitating organisational eco-systems have to be ensured at every level of the Department. It is a happy augury that the Department has decided to organise planning, implementation and monitoring of the development programmes based on agro-ecological zones. It becomes essential that the agro-ecological zones numbering 3-4 in each district will have to be headed by the Zonal Deputy Directors of Agriculture assisted by the Assistant Directors of Agriculture at the Block Panchayath level to look after the administrative issues through Real Time Governance and thus the Agricultural Officers of the Krishi Bhavans at the Grama Panchayath level can be enabled to bestow more attention to the technical problems of the farmers at the field level.

- The staff strength of Agricultural Assistants in a Krishi Bhavan may be restructured based on the nature of crops, cropped area, production potential, etc
- Staff pattern of corporations and municipalities may be restructured by deploying the Agricultural Officers from those Grama Panchayats that have been converted to corporation / municipalities
- One Assistant Director may be given charge of the Krishi Bhavan at the Corporation/ Municipality levels.
- The activities of Krishi Bhavans should be completely online and more ministerial staf from district as well as State Head Quarters may be deployed to Krishi Bhavans.
- Setting up of front office in all Krishi Bhavans.
- All agricultural related agencies and activities should be coordinated at Krishi Bhavan level.
- Crop Health Management Systems and Plant Health Clinics should be strengthened so that service of Agricultural Officers and Agricultural Assistants are made available to farmers on a full time basis.
- Initially one full-fledged Plant Health Clinic may be made available in each Block Panchayat and later it may be extended to all Grama Panchayats.
- Monthly review may be strengthened utilising online facility to update technical awareness and monitoring (KAU, KVK Training programmes).
- Ensure registration of all farmers in the AIMS portal and ensure periodical updation of data.
- Digitalisation of all records of Krishi Bhavans so that basic data of Krishi Bhavans can be updated and front office service can be made more effective.
- Integration of farmer data with land revenue data (IPMS) will help Agricultural Officers to a greater extent.
- Crop Production plan should be prepared for each Grama Panchayat, Block Panchayat

and Zone well in advance so that marketing plans can be executed effectively with the online registration details and demand supply plan.

Promotion of FPOs, farmer collectives, private marketing agencies, service delivery agencies

- FPOs should be strengthened by providing them with crop- specific projects in order to make them self-sustainable.
- Co-ordination with private / Panchayat owned markets in each Panchayat which can cater to the needs of majority of our farmers.
- Due to predominance of small and marginal farmers in the State, common incubation centres/facilitation centres should be promoted under co-operative sector as well as in coordination with State Agencies so that burden of the farmers in starting value addition/ processing units can be minimised and quality ensured.
- While implementing marketing and value addition programs, resources available with Industries Department, Co-operative Department, LSGD and other stakeholders may be considered.
- Krishi Bhavan officials should act as facilitator for Karshika Karma Sena, production of seeds and planting materials, markets, farm mechanisation etc. by using the facility of farmer interest groups/ FPOs.
- Krishi Bhavans should emerge as the convergence platforms for integrated farming systems approach involving all stakeholders including the multiple institutions and their projects.
- Krishi Bhavan officials should act as facilitator for marketing by using the facility of farmer interest groups/ FPOs/other agencies.

Technological interventions

- Appropriate technological interventions are to be incorporated into various schemes and programmes developed.
- Technologies and solutions shall cater to the needs arising from the entire supply chain in agriculture.
- Technologies should cater to preparedness and food chain crisis management and practice.
- Ensure integration of production plan and marketing plan with the help of MIS platform, linking all production centres and marketing network state-wide including private entrepreneurs and all other marketing stakeholders.
- To cater to the needs of export market, registration procedures (NPOP) may be incentivised for both farmers as well as farmer groups.
- Export oriented production plan should be formulated and executed in association with all stakeholders.
- Skilling of agri- professionals on the lines of New Extensionist Learning Kit is indispensable.
- Initiatives involving Public-Private-Panchayat-People Partnerships (5Ps) should be taken up.

- Agro-eco technology, Biotechnology, Nanotechnology, Information Technology have to be blended to tap Kerala's potential.
- Commercial Agro Service Centres integrating the Agricultural Knowledge Centres should be established on a benefit-sharing basis at the Block Panchayat level.
- Technologies shall not lead to:
  Loss of cultivated/ agricultural bio-diversity
  Afect indigenous seeds, animal breeds and species
  Destruct traditional knowledge systems and traditions
- Technologies shall be effectively used for:
  Prevention
  early- warning
  preparedness and food chain crises management and practices
  transition to 'agro ecology' for improved food security and better living conditions

need to be explored, as agro ecology offers solutions to increase agricultural yields, at the same time improving state of soils and the impact of agriculture on environment.

Projectising of schemes

- Schemes and programmes have to be location- specific and need based and should supplement to the overall development objectives of the sector.
- These are to be prepared in consultation with relevant stakeholders and incorporating relevant technology
- Each scheme/programme should have measurable deliverables (output) and shall be implemented in a project mode with the co-operation of all stakeholders with provision for pooling of resources

Urban Agriculture

- can provide a source of fresh and healthy produce for individual families, community groups and urban markets
- can play a role in improving nutrition, health and well being

Advantages

- availability of locally produced foods in cities can possibly increase or encourage the consumption of fruits and vegetables by consumers
- recycling waste and water recycling
- Contribute to urban landscape.

Challenges and Solutions of Urban Agriculture

- Lack of sufficient space: Appropriate technologies (Roof top gardening, vertical farming, indoor planting, etc)
- Ensuring quality of product: Maintaining quality standards
- Lack of access to resources and training: Combined public sector intervention, training and extension services
- Finding equipment and tools for small scale produce
- Quantification of yields from urban farms and their contribution: Digitization
- Marketing : Public /Private sector integration

Scope

- Contribute to local food security
- Contribute to overall public benefits and sustainable development of cities
- Increase ability of the cities to produce at least a portion of their own food - supply in case of emergencies

Strategies

- Subsidised land rents for urban farmers / community gardens
- Planning of cities should also include management of urban agriculture
- Multidisciplinary research and government support
- Ensure Public support
- Association with urban co-operatives
- Integrating agriculture into the agro-ecological environment can provide a wide variety of ecological provisioning and cultural services to cities

3. LINKAGE OF KRISHI BHAVANS WITH LSG, FPO, CO-OPERATIVE SECTOR AND RESEARCH INSTITUTIONS

A symbiotic or complementary relationship is expected out of Dept of ADFW/Krishi Bhavans' linkage with Local Self Governments, Farmer Producer Organizations (FPO) and Co-operative sector in the benefit of the farming community.

LINKAGE WITH LOCAL SELF GOVERNMENTS

Significant amount of assets, funds and establishment of the Agriculture department had been transferred to LSG's at the Grama Panchayath, Block Panchayath and District Panchayath levels during 1995 as part of the shift to decentralized governance. KB's are now transferred institutions at GP level and it is the duty of the concerned LSG to support the activities of KB in full spirit i.e establishment of offices and related infrastructure, earmarking plan funds for development projects, meeting maintenance and operational expenses of office etc in the best interest of the farming community.

Pertinent Issues Affecting Linkage of KB's with LSG

- The officers under each level especially KB's are under dual control i.e from Agricultural department and the corresponding LSG.
- Meetings, reporting, and even projects overlap its boundaries.
- Convergence of schemes/projects in the two streams is not practically feasible due to difference in timing of planning and implementation.
- Basic data updating is not done at KB level periodically and the data available now is obsolete. Hence the planning process is not effective as it is considered.
- Watershed master plan based on micro watersheds is not updated in each GP.
- There is no convergence at present between various departments/agencies/MGNREGS in Natural Resource Management activities undertaken in watershed development projects.
- Decentralized Planning has to begin from GP level, various GP data consolidated at BP and then various BP data at DP levels. But the participation in grama sabhas at each level, quality of deliberations, final outcome and its relation with final project proposals pose serious questions on the effectiveness of the entire process.
- Since there is no state level entity involved in implementation, decentralized planning stop at district level, leading to District plans.
- There is no mechanism to see that the consolidation of district plans would lead to fixing of priorities at State level.
- Department scheme now follows the Top-down approach which is not effective in convergence of funds and efforts.
- LSG has not played its part fully on effectively co-ordinating Agriculture, AH, Fisheries, Soil conservation , Irrigation Depatrments. Each department is now functioning on parallel lines.
- The problem with LSG scheme implementation is that the beneficiary selection

although is thought to be judicious, it does not end in finding the right beneficiaries.

- The implementing officers often neglect the 'organizing' function in the plan implementation cycle.
- Monitoring of schemes/project is rarely done now a days. In the case of LSG projects working group itself is the monitoring committee.
- Entrepreneurship development projects in agricultural sector are not often put forth by AO's / working group where as there is enough scope for it in revised project guide lines.
- Due to lack of proper awareness, scope for preparing innovative projects outside the general guidelines and codes are not effectively utilized.

Proposals for effective linkage with LSG and improving functioning of KB

- Dual control of staff should be avoided. Administration should be taken up by either of the two. Meetings should be convened based on pre-fixed schedule.
- The time of planning in department and LSG has to be synchronized to December–January, verification and approval during February - March and implementation has to start in April.
- Integrate guidelines of LSG & Department in the line of LSG "Margarekha" to create more avenues for convergence between schemes and project planning.
- In between February and March there must be a mechanism to effect any corrections from State to GP level, with regard to the mandatory allocation to any specific project at lower levels. (eg: earmarking funds locally to Flagship programs)
- The main focus of agricultural projects should be increasing productivity and farm revenue (150% of cost involved).
- Watershed master plan based on micro watersheds has to be updated in each GP, with the help of authorized agencies/Soil Conservation dept. A team comprising of multidisciplinary experts should visit each micro watershed and appraise available resources, problems and formulate solutions.
- The activities identified should be broken down into short term and long term plans and implemented through GP projects. Necessary convergence with various departments/ agencies/MGNREGS has to be ensured
- Demonstration plots have to be taken up for popularizing emerging concepts which aid in enhancing productivity & farm income.
- Soil and water conservation methods have to be adopted to enhance productivity. This can be attained utilizing the MGNREGS at GP level.
- Integration of Agriculture, Animal Husbandry, fisheries sectors is needed to reduce the risk involved in each enterprise and increase the farm revenue from unit area.
- "Jaivagriham" (RKI scheme) model is adaptable but based on the cost involved, multiple funding may be provided to farmers .
- To improve organization of plan projects, every stakeholder of the project has to be organized to work for attaining the laid out objectives (eg- Credit from Banks/Co-operatives, purchase or sourcing of other inputs from authorized agencies, Karshika Karma Sena, MGNREGS etc in adding to the labour component, Agro Service

Centers to supply essential machineries, Eco shop/VFPCK market /Cluster to ensure marketing of the produce etc)

- Local economic development has to be the primary objective in most agricultural projects. Hence transactions of input/services within the locality have to be encouraged further rather than depending on outside sources. Various forward and backward linkages need to be ensured. (Farmer groups/ FG/ CIG/ Kudumbasree for value addition ventures, Dairy farmers for supplying enriched manures to others, local eco shops for supply of inputs & procurement of farm produce, providing employment opportunities through MGNREGS/KKS etc)
- Monitoring has to be considered seriously than audit or evaluation as it can redirect the project at any stage to the end objectives.
- Entrepreneurship development projects in agriculture has to be taken up with the guidance of Kerala Agricultural University.
- Awareness about innovative projects has to be created by popularizing success stories.

LINKAGE OF KRISHI BHAVANS WITH CO-OPERATIVES

Issues involved

- There is no administrative or functional linkage at present between Agricultural department and Co-operative banks/societies in the State where as it is done by the Department of Agriculture , Co-operation and Farmers' welfare in the Centre.
- Role of Co-operative banks in agricultural sector is limited now to two things 1) issuing loans and 2) carrying out retail fertilizer/manure/PPC sale as authorized dealers, generally with few exceptions.
- Lack of initiative to link the resource crunch experienced in funding innovative agricultural projects at the GP level with the Co-operative banks is due to absence of an effective administrative mechanism from the top through specific policies or lack of co-ordination at GP level.
- Stakeholder discussion is rarely done for funding critical gaps in agricultural development projects.
- Customer base of PACS as potential consumers are often forgotten while planning marketing projects.
- Collateral security demanded by PACS often result in rejection of credit services to actual resource starved farmers without land. (lease land farmers)
- Special campaigns of Government like Special Liquidity fund (SLF) and KCC are not taken seriously by PACS in providing credit to the worthy farmer. Often, the beneficiaries of such campaigns are the same and mostly related to the power centres of these institutions.
- In reality most of the PACS have moved away from its foundation goal of serving agriculture.
- Farm plans/profitability /technical feasibility etc are not generally considered while disbursing loans to farmers by the PACS.
- Most of the farmers are of the view that since it is an agricultural loan, there is scope for loan waivers from the Government and this result in intentional defaulting of repayment.

Proposals to improve linkage of Krishi Bhavans with Co-operatives

- The role of co- ordinating the efforts to fund innovative projects in agriculture through PACS rest with the corresponding LSG.
- There should be an administrative head to link Agriculture and Co-operative departments at the State level. The Agricultural Production Commissioner may be assigned the responsibility for this.
- Co-operatives should break free from traditional notions of being a credit provider/ fertilizer/PPC dealer and transform themselves to prospective employers by implementing agricultural development projects on their own.
- Proper stakeholder discussions have to be done in case of project based funding in agricultural projects/ Entrepreneurship development projects taken up in agriculture.
- There should be some major policy initiative to link Co-operatives with agriculture in the State, co-ordination of assuring necessary funding of plan projects with credit gap rests with the Local Self Government.
- Single window system has to be provided by the PACS to cater to the increasing demands of the agricultural sector by initiating input and output marketing centres (Nurseries for supplying planting materials, Fertilizer /manure shops for distributing manures, Bio-pharmacy to supply essential bio control agents, Labour bank to supply skilled labour and machineries and finally markets/eco shops to sell farm produce.)
- Customer base of PACS have to be utilized as consumers of such inputs and outputs from these markets. A mobile app may be created to link the customers to these markets.
- PACS can initiate efforts in value addition ventures in local farm produce by procuring and adding value to produce collected through separate value addition centres. Also it can be used to provide value addition services to farmers as an incubation centre giving necessary space and machineries to the farmers to add value to their farm produce on a rent basis.
- Exemptions on Collateral security demanded by PACS may be given to lease land farmers producing certificate from Agricultural Officers that they are bonafide farmers.
- Focus of special credit campaigns (KCC/SLF) should be providing credit to the worthy farmers and this must be ensured by a panchayath level committee constituted with the directions from State Government.
- Micro level farm plans should be prepared by the Krishi Bhavan to credit worthy farmers which can be used as tools for appraising the technical feasibility/profitability of an agricultural enterprise taken up by a farmer or a collective.
- PACS can collaborate with MIDH in setting up rural pack houses, ripening chambers and other requisite infrastructure for farmers before marketing.
- PACS can work in close relation with the One District One Product (ODOP) Scheme of the Central Government through State Industries Department.
- General public perception needs change that farm loans if defaulted would not lead to serious legal consequences.

LINKAGE OF KRISHI BHAVANS WITH FPO'S

Relative low average farm size of holdings in Kerala (0.18 Ha) presents a constraint for aggregation of produce at the farm level which in turn provides scope for collectives like FPO.

- Farmer Producer Organisations (FPO) are organizational mechanisms for mobilizing farmer collectives through self - help for improving their socio- economic situation.
- FPOs in small numbers had been established in Kerala (less than 50 no.s through NABARD and 13 through SFAC).

The issues related to FPO are as follows:

- A small minority of the FPOs initiated in the State focus on tapping resources mainly assistance from Government, not able to generate sufficient resources uniformly from its members.
- Although small, some FPOs have been started or sponsored by agencies with clear cut political objectives which can derail the unity among farmer members in the long run.
- There is no effective monitoring of handholding support to member farmers by sponsoring agency at present in our State.
- For Business plan preparation of FPO's initiated by many sponsoring agencies, it is seen that there is lack of proper advice to improve forward and backward linkage of farm activities.

Proposal for improving effectiveness of Krishi Bhavans through FPO

- FPO's as windows to agricultural development, needs to be popularized among farmers through various sources but the campaign should be spearheaded by Agriculture Department. It should start from the KB level.
- Proper awareness about FPO and the procedural formalities in its formation have to be created among Agricultural Officers, training can be arranged through KAU by Agriculture Department.
- Potential small farmer collectives have to be identified by Agricultural officials from their locality.
- Policy level initiatives to integrate FPO's registered through NABARD/ Agriculture Department/ other sources should be ensured, a co-ordinating mechanism should be put in place. At present the local AO/LSG is not aware of such developments.
- Handholding support must be effectively given to strengthen organizational bond between farmers and device new avenues to increase farm income.
- Handholding agencies/ Agri Business Promoting Agencies must be selected carefully and judiciously since it is the most critical decision whereas the future of FPO is concerned. Monitoring of these agencies have to be done. At present it is not done in our state.
- Capacity building of FPO's through respective Krishi Bhavans in devising production and marketing plans.
- Intermediaries themselves becoming the sponsoring agency/promoting agency or their part should be avoided at any cost.

- AEU wise focus on crops and commodities must be ensured which should be monitored by KAU.
- Formation of FPO's and marketing through them should culminate in branding of commodities AEU wise under a single brand under the guidance of Agriculture Department but traceability should be ensured to the customers using QR code of FPO.
- Scope of export of commodities to Middle East /Europe must be one key area of marketing through FPO through which significant revenue can be gained.
- More importantly improvement of employment opportunities has to be ensured.
- FPO's must also be engaged in the Subiksha Keralam campaign to convert fallow lands to productive holdings.
- Mechanization needs of the farmer- members have also to be considered by the FPO to reduce cost of cultivation.

LINKAGE OF KRISHI BHAVANS WITH KAU AND OTHER RESEARCH INSTITUTIONS

Kerala Agricultural University is the most important stakeholder of ADFW department in connection with research and extension education. Various trials / Demonstration plots of High Yielding Varieties / Pest & Disease tolerant or resistant varieties are done in farmers' fields where the potential farmers are identified by Krishi Bhavans. Expert advice is given as part of Crop Health Management scheme with the guidance of scientist from KAU. Monthly Technical advice as part of ATMA is given by subject matter specialist scientists of KAU for the technical staff at the district level. Also Block level Agricultural Knowledge Centres have been established to improve TOT at grass root level.

Proposals to reorient extension at KB level through expert advice from KAU

- Technological innovations/advice from KAU has to be communicated to the grass root level extension functionaries through monthly workshops of Block level AKC.
- Shortage of quality planting materials has to be compensated by improving linkage with KAU farms.
- Demonstration plots have to be increased in quantity and quality with scientific advice from expert scientists.
- Block level Referral Plant Health clinics in selected KB's should have some point of contact with the available scientific experts /institutions in the district. Communication network has to be established from PHC at KB's to KAU through district level District Plant Health Manager by the Deputy Director E&T.
- Proper co-ordination to supply bio control agents produced in KAU labs to eco shops, bio- pharmacy etc at KB level have to be ensured. Right now supply is done only on payment basis. This has to change to a credit invoice based supply to KB's.
- Specific AEU based interventions to improve productivity and land utilization pattern have to be devised by the KAU and it has to be properly communicated to extension officials at KB's.
- Varietal trials of KAU/other Research institutions have to be done in potential KB's to improve confidence of farmers in accepting new varieties. This has to be co-ordinated

by the respective district level PD ATMA.

- Research- extension gap needs to be plugged effectively and timely through updating knowledge base of extension functionaries and rapid feedback to Research Institutions. Research –extension interface at three months interval in districts is proposed.
- Expert advice to improve individual farm planning of potential commercial farmers at GP level to improve farm income.
- Karshika Karma Sena and Agro Service Centre at GP and block level have to be guided/ mentored by creating effective institutional mechanisms at KAU- ARS Mannuthy, KCAET etc.

Block level project directorate of ATMA: has to be institutionalized (BL-AKC to be upgraded) with Assistant Director of Agriculture as convener and the respective scientist as joint convener. This mechanism has to co-ordinate and effectively converge the resources of Agriculture and allied departments, LSG, Irrigation, MGNREGS, KAU etc.

Virtual business project clinics: have to be started in each district by establishing network for integrated expert advice from KAU and other research institutions to cater to the requirements of new agri- startups and ventures. Concerned ADA marketing at district level should co-ordinate this activity.

4. INTEGRATING AND LEVERAGING DIGITAL TECHNOLOGY SOLUTIONS FOR SMART SERVICE DELIVERY FOR FARMERS

DIGITAL TECHNOLOGY ENABLED SERVICE REQUIREMENTS

- Creation of unique databases, mapping of resources and validation process
- Streamlining and re-engineering the administrative processes for effective service delivery
- IT enabled, Intelligent driven extension services
- Infrastructure and implementation Requirements

Database Creation, Resource Mapping, Curation, and Validation

- It is recommended to collect, curate and create the database of farmers and mapping of other resources in a time bound manner within 6 months' time using state-of-art technology tools and solutions. It may be noted that the preset AIMS software application has only 6 lakhs farmer records. The entire farmer records have to be collected and updated into the system in timely manner. The data collected as part of the farmer registration process may be cleaned and updated.
- It is necessary to create spatial data for the entire farm land and land resources and build a spatial data management platform for entire state. This spatial data set may be integrated with spatial data infrastructure of Department of IT, of Government of Kerala
- Unique Farmer ID : It is recommended to create a Block Chain enabled Unique Digital Farmer Records (DFR) with Unique Farmer ID and back end integration with AADHAAR(UID).
- A smart card for each farmer : A Smart card (NF based) may be issued to each farmer to be accessed, tracked and traced at any level. This farmer ID may have to be shared and integrated with all the Department level interactions, banks and Primary Cooperative societies for availing various services.
- Digital Farm health record - The individual farm records and farmer records have to be integrated and linked through back end system for all authentication and verification process
- Digital inventory of farm land : The GIS enabled digital inventory of farm records under each farmer/owner with proper classification and nomenclature to be developed and made available for planning and crop management in each krishibhavan
- Agricultural Input Requirement Assessment - System driven assessment of Individual Farmer demand aggregation of agricultural inputs for efective planning and resource allocation . The information from Farmer>KB>ADA>PAO>Directorate>Planning Board>Government may be established for proper requirement assessment
- Crop planning and Management System – It is proposed to develop and implement a web GIS based spatial enabled crop planning and scheduler for each KB and linked with production estimation and forecast.
- Integration of Database and farmer Records available with other departments like AH/

Diary/Fisheries/Kudumbasree/RKI/Haritha Keralam Mission etc for verification and to make a master database of farmers

Streamlining and Re-Engineering Administrative Processes for Effective Service Delivery System

- It is strongly recommended to design and develop an integrated Enterprise Resource Planning (ERP) system to support paperless file processing and document management processes at Krishibhavan level officials. This system may be designed and developed considering all the administrative functional requirements of the Officers working at various levels of the Department. This ERP has to be integrated across State to ensure the real-time information flow upto the State level. KB>ADA>PAO>Directorate>Secretariat> Minister level. The Department may choose a suitable IT solution implementation partner to design and develop this integrated system in a time bound manner.
- It is recommended to build a single window system (Online/Mobile) for farmers and officers to manage all the service delivery processes in a seamless manner.
- The Digital Farmer Records (DFR) and Farm land Records and all the available services have to be linked though this single ERP platform.
- It is recommended to use AADHAAR Vault based Farmer authentication process for all services to ensure the transparency and avoid redundancy of operations.
- Integration with other systems- It is strongly recommended to have API based back end Integration with other systems of Government like Revenue (RELIS), Registration (PEARL) and LSGI system for seamless information flow.
- The ERP solution should have the office management application as a core part of the system.
- The ERP shall provide a single sign on based master dashboard for each registered farmer with basket of services
- The ERP will also provide Master dashboards for various officers of the department like AA>AO>ADA>DD>PAO>Additional Director>Director>Secretary>Minister to access the real-time information
- The ERP will provide information on the availability of schemes/programs/components (Department scheme/LSGD schemes/Other funding agency schemes) in its master dashboard for concerned officers in each KB

Service Delivery Application Process

- An unified online application process for farmers to avail all the services/subsidies/benefts/pensions for all kind of schemes and programs. The uniform application submission has to be designed and integrated with the system. (Required re-engineering process)
- It is strongly recommended to avoid physical paper based application submission process and submission of corresponding supporting documents at Krishi Bhavans. The Government may take suitable policy level intervention to ensure this process.
- A policy level decision may be taken at the Government level specific to the digital

processing of the claim documents and related supporting documents at KB level. The physical paper based claim documents and supporting documents may be fully avoided to ensure the paperless smart office management.

- It is recommended to build tracking of the application status by farmers and necessary system triggered Push Alerts to be integrated with the system
- Beneficiary identification process- It is recommended to build Intelligent based identification of farmers/beneficiaries based on the predefined schemes eligibility parameters
- Crop Insurance Management – The Block chain enabled crop Insurance claim processing and monitoring may be adopted. Satellite data/spatial data based intelligence driven verification process for crop loss and assessment may be developed. It is suggested to use Mobile app based Field level data verification process by KB officers to endorse the claim. Dynamic Weather based crop insurance processes can be easily integrated with the system.
- Inputs suppliers- All the approved input suppliers (state Level, district level and local body level) have to be integrated with the system.
- The Government level input suppliers like Government Nurseries, Farms, seed nurseries and approved private suppliers have to be part of the system for easy logistics and supply chain processes.
- The Inputs supply system of Primary Co-operative societies and Department farms need to be integrated with the system to track and monitor the Fertilizer supply and demand.
- Planting material management – A dedicated functional module have to be developed and integrated with the proposed ERP to capture the planting material demand supply based on the crop planning. The farmer level demand can be aggregated through this system and same demand have to be passed on to the respective farms and suppliers.
- The information on availability of the planting materials have to be made online at each Krishi Bhavan level. The farmer can book their planting materials in advance through the portal.
- It is recommended to build and maintain Digital Stock registers for all inputs and implements, digital invoice, e-receipts for all input supplies and procurement.

Digital Certificate Management

- An exclusive module for digital certificates have to be included in the proposed ERP. All the certificates required by the farmers have to be made available online through the registered/authenticated farmer.
- It is recommended to have only the e- Certificates with Digital Certificates and all the issued certificates will have to have centralized archival and management.
- The predefined template driven digitally signed certificates can be issued to the farmers by the officers at any time through a single window service delivery processes.
- The major certifcates include Certificate for electricity connection, KLU certificates, bonefide farmer certificate etc.
- Various license certificates like fertilizer, pesticides, PP chemicals etc.

- Certificate on data bank, Life Mission, Kudumbasree etc have to be made online.
- All these certificates have to be integrated with Digi Locker system for easy retrieval by farmers for their future reference.

Monitoring and reporting system in Department

- It is recommended to have a dedicated Monitoring system for all the schemes, programs, and activities of the Department at various level.
- Single MIS reporting system for all official stake holders at diferent levels to bring seamless Information flow from KB>ADA>PAO-District>Directorate >State>APC>Secretary>Minister level.
- Tracking and traceability of individual farmer or beneficiary under each scheme and his farming engagement/activities
- Monitoring system for all categories schemes funded through different sources of fund like Department schemes, CSS Schemes, LSG Schemes, RKI, NABARD, Kudumbasree, District panchayath, block panchayath etc
- Output/Outcome based monitoring of schemes/programs
- SDG linked outcome monitoring and impact assessment
- More emphasis should be given to physical targets and achievements rather than financial progress
- It is recommended to use and implement the new version of PLANSPACE (PLANSPACE 2.0) implemented by Kerala State Planning Board for the effective monitoring of these schemes at the field level. Since PLANSPACE 2.0 has all the features listed above, the immediate adoption of this system will be very helpful.

Traceability

- It is recommended to develop and implement a traceability system for Farmer-Farm-Produce across the state.
- A separate traceability system for planning materials are highly essential to ensure the quality of the material
- The Block Chain based traceability system can be implemented in the marketing / supply-chain system of farm produce to get a higher visibility of the farm produce and to tap better market opportunities
- Traceability on Good Agricultural Practices of the farmers can be ensured to bring the value chain in the system.

Establishing Digital Audit Process

- A policy level decision has to be taken to establish and comply the digital audit process by various audit/inspection authorities in the Government based on the Information Technology Act and it is being practiced by AG and other audit authorities. This may be adopted at Local fund audit and Department level audit process.
- Check list of digital documents for each schemes/programs. A policy level intervention is required to define the checklist of Digital Documents and records required by farmer/beneficiary for each scheme or program. Accordingly, these requirements may be mapped into the system and audit process can be defined based on those set of

guidelines.

- E-FT Bill/Invoice process needs to be proposed for all such expenses and it has to be integrated with Treasury BIMS
- Audit trail module has to be made available in the proposed ERP system for all the relevant authorities to access and audit purpose.

IT enabled, Intelligent driven extension support services

Major areas where interventions to be required

- Revamping of Soil Testing and recommendation services – Geo spatial based (GPS) sampling process QR/barcode based unique sample numbering process, sample shipping process and tracking, sample analysis, Online results and fertilizer recommendations based on the preferred crops have to be ensured. The soil results shall be delivered to the farmers mobile or online dashboard dynamically.
- Soil condition based crop recommendations, Continuous analysis and monitoring of nutrient status through AI and machine learning techniques, nutrient status monitoring, AI based crop recommendations.
- AEU based Crop Planning – Crop suitability recommendation and crop planning support based on AEU protocols and also based on market opportunity and value addition. This process can be made totally dynamic and system driven.
- Intelligent Crop Calendar for each farmer and Integrated Calendar for each KB. The calendar can be integrated with Block, District and State level.
- Crop Life Cycle management support- Tracking and monitoring of sowing to harvest
- Plant Health Clinic – The Plant Health Clinic and dispensaries have to be established in each Krishi Bhavan and to be strengthened with IT enabled diagnostic and clinical services.
- Virtual Plant Clinic- – AI driven crop health management (Pest/disease/Nutritional deficiency symptom) based diagnosis and officer controlled recommendation process have to be implemented. The present Crop Pest Surveillance System to be modifed with smart AI driven application in this direction. The new AI based system developed by Digital University Kerala (IIITMK) for Department of Agriculture may be adopted statewide.
- Mobile App for Field level visit and field/crop/scouting service with geo tagging option for all the extension officers
- AEU based crop decision support and expert system to be developed. The decision support system developed by KAU (farm extension manger) may be adopted with revised protocols and methodologies.
- Smart communication systems like Video Conferencing solutions in each Krishi Bhavans to interact with scientists in KAU and other research stations and with farmers
- Communication management - Push messaging services/Whats App based messaging service for department/Localbody/KB level information alerts to farmer. This messaging system has to be integrated with ERP
- Innovative practices and best practices of farmers have to be captured and mapped into the system for knowledge sharing process through an IT enabled process

- Digital Media Gallery- An online digital media gallery have to be created by each KB to showcase the innovative practices and outcome of farmers and share with others
- Monthly Technology advice (MTA) may be prepared and delivered digitally to farming community.
- Facility for each KB to develop and deliver voice based communication (Out bound calls or Whats app voice messages or App based voice messages) to farmers on various aspects of crop advisory.
- Agro machinery – A major policy level intervention and change on the agro machinery management. The customized, farmer friendly agro machineries may be made available at KB level and availing services of this machineries may be handled through the online booking system.
- Field visit schedule of Agricultural Officer – The field visit schedule of the Agricultural officers can be published and made available to farmers to avail their expert services

Training and Capacity Building

- The entire KB staff have to be trained with latest agricultural technologies and systems including Hi-tech systems, practices, solutions etc.
- An integrated training calendar in each district need to be prepared and integrated with the ERP system and training institutions and partners
- The collaborative virtual training calendar in association with training partners like KAU, SAMETI, RATTC, KVK etc.

SMART Services

- Various smart services that can be easily sourced and integrated with the extension services are:
- Local specific weather information at each KB level for farmers with one week weather prediction.
- Internet of Things (IOT)based SMART devices and sensors for field and crop monitoring can be implemented on a pilot level at selected farms.
- Machine Learning and Spatial Analytics may be used extensively to assess the crop monitoring, suitability and soil fertility analysis etc. The support of Digital University Kerala may be taken to implement such innovative smart agricultural services.
- Intelligent driven mobile applications (AI supported) for field mapping and scouting have to be developed for regular field visits and crop monitoring.

Online/Virtual/e-marketing Opportunity

- The e-marketing or virtual marketing opportunities have to be explored in each Krishi Bhavans. The forward trading and marketing opportunities to be explored.
- The local level tie ups with food supply chain and logistics companies can also be linked with the platform.
- A State level e-marketing platform to be developed and aggregation from local body level for production, estimation of marketable produce in advance.
- The virtual trading or market fairs can be conducted by inviting the potential buyers into the platform.

Adoption of Green IT Processes

- The energy efficient system needs to be adopted at Krishi Bhavan level. Solar power based lighting systems, Electrical two- wheelers to AOs and other energy efficient systems in building management needs to be adopted.
- A green IT based sample demonstration units in each KB have to be developed.
- Green technology based agricultural implements, solar water pumps, irrigation systems etc have to be promoted

SMART Krishi Bhavan – Physical Infrastructure Requirements

- It is proposed to set up a Front Office at each Krishi Bhavan with computer systems/ laptops, scanners, printers with dedicated front office staff to support the farmers in online application submission process, application tracking, guidance and support. The first level interaction by the farmers may be handled at Front Office level.
- It is absolutely necessary to have aesthetically designed interiors and exteriors in each KB. The uniform color, sign boards, etc have to be designed as part of the SMART KB branding process.
- It is recommended to set up a well- equipped seminar/meeting/training Hall in each KB with modern audio/video visual equipment for handling farmer level training and interactions.
- Each Krishi Bhavan has to be equipped with modern office Furniture with modern communication tools
- A separate office may be provided for Karshika Karma Sena for managing the machinery support
- Storage facilities for critical inputs in each Krishi Bhavans have to be established
- Greenhouses / polyhouses/rain guards for the storage of planting materials are essential at each Krishi Bhavan
- It is recommended to establish Plant Health Clinic, Biopharmacy and Ecoshop in each Krishi Bhavan.

IT INFRASTRUCTURE REQUIREMENTS

- State Level : A dedicated cloud platform's high availability and scalability has to be ensured for managing the large volume of data and dynamic services.
- Fiber Optic based data connectivity at each Krishi Bhavan has to be ensured. It is also necessary to establish the secondary data connectivity at each Krishi Bhavan to maintain the redundancy. KSWAN based connectivity needs to be ensured across all the Krishi Bhavans. Permission may be given to the KB to implement any available secondary high speed fiber optic internet connection at their office.
- The State level IT cell have to be strengthened with more professionals and IT technical staff to monitor and manage all digital services. Priority may be given to the officers who have trained in PG Diploma in e-Governance and Virtual IT cadre based trainings.
- The district level IT needs to be formed at each district to support the district level digital services

- A dynamic Call Centre service have to be established at State level to support the Smart KB applications.
- A dedicated technical support team needs to be ensured at the district level to manage the hardware AMC and service support

5. CONCLUSION

The foregoing account is the outline of the proposals for strengthening the Krishi Bhavans deliberated at the Expert Sub-Group level. Each of these proposals has to be projectised with anticipated financial, phasing, output and outcome indicators. It is suggested that the 'Mission Smart Krishi Bhavan' has to be launched all over the state in 'one- go' as was the case with the 'People's Plan Campaign' which has become a world model for public policy enabled public action. Kerala, though categorised now as a non-agrarian state, has immense potential for promoting primary, secondary and urban agriculture through increasing productivity, production and profitability with the " Navakeralam' foci on equity, economy, employment, entrepreneurship and environment attractive to the farmers, youth, returnee - migrants and others in the agricultural sector.

Appendix 1

PROCEEDINGS OF THE MEMBER SECRETARY

STATE PLANNING BOARD

(Present: Sri. Teeka Ram Meena IAS)

Sub: - Formulation of Fourteenth Five Year Plan (2022-27) – Constitution of Working Group on Agriculture and Cooperation – Revised Proceedings - reg.

Read: 1. Note No. 297/2021/PCD/SPB dated: 27/08/2021
2. Guidelines on Working Groups
3. This Office order of even number dated 08.09.2021

ORDER No. SPB/342/2021-Agri(1) Dated:14.09.2021

As part of the formulation of Fourteenth Five Year Plan, it has been decided to constitute various Working Groups under the priority sectors. Accordingly, the Working Group on **Agriculture and Cooperation sector** is constituted. For the smooth functioning of the Sectoral Working Group (SWG), it is decided to split the Working Groups into Expert Sub Groups (ESG). Hence the Working Group is categorized into eleven Expert Sub Groups as indicated in the proceedings. The names of the members of the SWG are indicated under each ESG. The Working Group shall also take into consideration the guidelines read 2nd above in fulfilling the tasks outlined in the ToR for the Working Group.

1. A PLAN TO IMPROVE THE EFFICIENCY OF WORKING OF KRISHI BHAVANS

Co-chairperson

- Dr C. Bhaskaran, Professor of Agricultural Extension (Retd), Kerala Agricultural University
- Mr T. V. Subash IAS, Director, Agriculture

Members

- Dr P. Jayaraj, Programme Coordinator, KVK, Kannur
- Dr Sreevalsan J. Menon, Associate Director of Extension, Directorate of Extension, KAU
- Mr V. G. Sunil, Assistant Professor, Agricultural Extension, Communication Centre, Kerala Agricultural University
- Mr P. V. Jinraj, Assistant Director, Agmark Laboratory, Thiruvananthapuram
- Ms Asha K. Raj, Assistant Director of Agriculture, Small Farmers Agribusiness Consortium, Thiruvananthapuram
- Mr Kariyam Ravi,115 Journalist colony, NCC Nagar, Peroorkada
- Mr G. K. Manivarnan, Agricultural Officer, Pallikkal Grama Panchayath
- Mr R. Ajith Kumar, Assistant Professor, IIITM-K

- Mr Joy Sebastian, MD, VCONSOL
- Mr Sidharthan A.K, Assistant Director of Agriculture (Q C),Kozhikkodu

Terms of Reference

- To assess the present functioning of Krishi Bhavans in Kerala and suggest how to improve their effectiveness.
- To identify advanced technologies for use in Krishi Bhavans to ensure better delivery of services and their convergence with LSGIs, Cooperatives, FPOs, and KAU.

2. A PLAN TO EXPAND AND MODERNIZE SUPPLY CHAINS IN AGRICULTURE

Co-chairperson

- Dr Poornima Varma, Faculty, Centre for Management in Agriculture, IIM-Ahmedabad
- Dr A. Prema, Professor & Head, Department of Agricultural Economics, College of Horticulture, Vellanikkara, Thrissur

Members

- Ms L. R. Arathi IES, Mission Director, State Horticulture Mission, Kerala
- Dr A. Suresh, Principal Scientist, CIFT, Kochi
- Dr S. Jayasekhar, Senior Scientist, Social Science Division, CPCRI, Kasaragod
- Mr Valsan Panoli, Kerala Karshaka Sangham, Vapushas, Koothuparamba, Kannur
- Mr.V. P. Unnikrishnan, MFH Flat No.2003, Vrindavan Garden, Pattom Palace P O Thiruvananthapuram
- Ms Deepthi S. Nair, Deputy Director, Marketing, Coconut Development Board, Kochi
- Dr S. Asharaf, Professor, IIITMK
- Mr Mathew Abraham, Assistant Director, Marketing, Department of Agriculture
- Dr Sangeetha K. Prathap, Assistant Professor, School of Management Studies, Cochin University of Science and Technology, Kochi.
- Ms Chitra K. Pillai, Assistant Director of Agriculture, Agricultural Urban and Wholesale Market, Maradu
- Mr L. Subhash Babu, Deputy Director (Retd.), Department of Agriculture and Farmer's Welfare
- Mr Joy Sebastian, MD, VCONSOL
- Mr Ashar Thattarath, PGP IIM, Ahmedabad
- Mr Manu K.G, Public Relations Officer, Directorate of AD & FW

Terms of Reference

- To suggest a design of a unified supply chain for farm inputs and outputs with specific reference to aggregation/procurement, storage, and marketing.

- To suggest a framework where LSGIs, Cooperatives and FPCs can be effectively integrated into the unified supply chain.
- To suggest ways to ensure that the supply chains are integrated with the objectives of trade, value addition and processing - domestic and global – as well as agricultural finance institutions.
- To suggest ways in which the private agencies in procurement, trade and marketing are integrated with the supply chains.
- To ensure that the supply chains meet the requirements of *niche* sectors, such as organic farming, in certification and traceability.
- To suggest the major technological changes and infrastructural investments required to equip the State's supply chain systems to meet the needs of the farming community as well as domestic and international trade.

3. HOW CAN KERALA DOUBLE ITS VEGETABLE PRODUCTION IN THE NEXT FIVE YEARS?

Co-chairperson

- Ms C. A. Letha. IAS, Secretary, Agriculture, Government of Kerala
- Dr T. Pradeep Kumar, Director (Planning), Kerala Agricultural University, Thrissur

Members

- Dr P. Rajasekharan, Chairperson, State Agricultural Prices Board
- Mr V. Sivaramakrishnan, CEO, VFPCK
- Mr J Sajeev, Managing Director, Horticorp
- Ms L. R. Arathi IES, Mission Director, State Horticulture Mission
- Dr K. M. Sreekumar, Professor of Entomology, College of Agriculture, Padannakkad
- Mr Sridhar Radhakrishnan, Thirunelly Agri Producer Company (TAPCo)
- Mr Reghulal, Deputy Director of Agriculture (Rtd)
- Dr K. Mini, Deputy Manager, VFPCK, Idukki
- Mr Prakash Puthanmadathil, Assistant Director of Agriculture, Vengara
- Ms S. K. Preeja, Kerala Karshaka Sangham, Pallichal, Nemom, Trivandrum
- Mr R Balachandran, Chithiramangalam, Ulloor Medical CollegePO, Thiruvananthapuram,
- Mr Reji Jacob, Kunnamkotu House, Nediyassala PO, Thodupuzha, Idukki
- Ms Bindu.J, Assistant Engineer, Office of the Assistant Executive Engineer, Malampuzha, Palakkad

Terms of Reference

- To assess the progress achieved in increasing area, production, and productivity of vegetables in Kerala over the past five years.
- To suggest a roadmap to double vegetable production in Kerala over the next five years with special focus on increasing productivity and farmer's income.

- To examine the ways in which the institutions of LSGIs, Cooperatives and FPCs can be utilised to participate in vegetable production efforts.
- To suggest ways in which existing systems of vegetable production are modernised and integrated with the different schemes of the government as well as post-production activities.
- To review the existing procurement and distribution systems, including government initiatives, and suggest a transparent, technology-driven platform with the active support of LSGIs, Cooperatives and FPCs.
- To suggest ways to reform the existing government schemes to support vegetable production.

4. CONSTRAINTS TO TECHNOLOGY ADOPTION AND THE POTENTIAL TO RAISE PRODUCTIVITY IN KERALA AGRICULTURE

Co-chairperson

- Dr C. Chandra Babu, Vice Chancellor, Kerala Agricultural University
- Dr K. C. Bansal, Former Director, National Bureau of Plant Genetic Resources, Indian Council of Agricultural Research (ICAR), New Delhi

Members

- Dr M.N. Sheela, Director, CTCRI, Sreekaryam
- Dr C. Thampan, Principal Scientist, CPCRI, Kasargod
- Dr Madhu Subramonian, Director of Research, KAU
- Dr Jacob John, Professor & Head, Integrated Farming Systems Research Station, Karamana, KAU
- Dr P. Indira Devi, Director of Research (Retd), KAU
- Dr R. Beena, Assistant Professor, College of Agriculture, Vellayani
- Dr Archana Sathyan, Assistant Professor, Agricultural Extension, CoA, Vellayani, KAU
- Dr P. Rajeev, Principal Scientist, IISR
- Adv. Thomas V T, Varacheriyil, Pala PO, Kottayam
- Dr Nishanth K. Raman, Assistant Professor, CoA, Padannakkad, KAU
- Mr Rijish Rajan, CEO, Simplified Enterprises Management, Palakkad
- Dr Thomas Aneesh Johnson, Soil Survey Officer, Office of the Deputy Director and Soil Survey, Thrissur (North)

Terms of reference

- To assess the status of productivity of major crops of Kerala and estimate yield gaps.
- To identify linkages between the adoption and use of modern technology and the gaps in yield in major crops.

- To examine the potential for raising productivity in major crops with the existing technologies.
- To identify gap in the availability of technology and suggest measures to hasten the development of these technologies.
- To suggest measures to improve the research-extension linkages in Kerala's agriculture.
- To suggest a policy framework to transform homesteads into profit centres through the practice of technology-driven agriculture.

5. PREPARATION OF SOIL AND LAND USE PLANS IN LSGIs FOR AGRICULTURAL GROWTH

Co-chairperson

- Dr Srikumar Chattopadhyay, Faculty, GIFT
- Mr S. Subramanian IIS, Director, Soil Survey & Soil Conservation, Trivandrum

Members

- Mr T. Gangadharan, Extension Faculty, KILA, KSSP
- Mr K. S. Hiroshkumar, Scientific Officer, IFSRS, Karamana, KAU
- Mr B. P. Murali, Member, Nagaroor, Kilimanoor Block (KBPA)
- Mr R. Sukhalal, Swararagam,Cherthala South PO, Alappuzha
- Mr A. Nizamudeen, Land Use Commissioner, Kerala State Land Use Board
- Mr K.P. Abdussamad, District Soil Conservation Officer, Kannur
- Mr Anand Vishnu Prakash, Agricultural Officer, Manakkad Krishibhavan, Idukki

Terms of reference

- To critically assess the status of preparation of land use plans by LSGIs in Kerala over the past five years and identify the reasons for the poor performance of LSGIs in this regard.
- To suggest and prepare a guidance note for the effective preparation and development of land use plans, and its integration with watershed plans and agricultural production systems.
- To suggest ways to integrate and converge the objectives and activities of multiple government agencies possessing data on land ownership, land use and agriculture to facilitate regular updating of land use plans prepared by LSGIs.
- To suggest a road map for a State-level people's campaign to complete the preparation of land use plans at the LSGI-level over a period of six months.

6. WATERSHED-BASED PLANNING AND AGRICULTURE: THE POTENTIAL IN KERALA

Co-chairperson

- Dr Ishita Roy IAS, Agriculture Production Commissioner
- Mr I. B. Satheesh, MLA, Kattakada Constituency

Members

- Dr K. K. Sathiyan, Dean, KCAET, Thavanur
- Dr Celine George, Senior Principal Scientist & Head, CWRDM, Manimalakunnu
- Dr Anu Mary C. Philip, Assistant Director, Soil Conservation; IWDMK, Chadayamangalam
- Mr S. U. Sanjeev, Assistant Director of Agriculture (Rtd.)
- Mr U. Janardanan, CEO, Mayyil Rice Producer Company Ltd., Kannur
- Dr A. R. Durga, Assistant Professor, Department of Agricultural Economics, College of Agriculture, Vellayani, KAU
- Mr M. Prakasan Master, Kerala Karshaka Sangham, Pranavam, Azheekode South, Kannur
- Mr T. K. Rajan Master, Nini Nivas, Edachery PO, Kozhikode
- Mr Jo Jose, Assistant Principal Agricultural Officer, PAO Office, Kottayam
- Mr Mohanachandran, Deputy Director (Retd), Kollam

Terms of reference

- To critically assess the status of preparation of watershed plans by LSGIs in Kerala over the past five years and identify the reasons for the poor performance of LSGIs in this regard.
- To suggest and prepare a guidance note for the effective preparation and development of watershed plans, and its integration with land use plans and agricultural production systems with active support of geospatial technologies.
- To suggest ways to integrate and converge the objectives and activities of multiple government agencies possessing data on water, water use, land use and agriculture to facilitate regular updating of watershed plans prepared by LSGIs.
- To suggest a road map for a State-level people's campaign to complete the preparation of watershed plans at the LSGI-level over a specified minimum period.
- To study the different successful models of watershed plans prepared by LSGIs in the State and study the possibilities of replications, and preparation of a set of best practices.
- To provide guidance on linking the existing schemes of the government with a broader watershed-based strategy of development planning.

7. A PROGRAMME TO MODERNIZE AND UPDATE STATISTICAL DATABASES IN AGRICULTURE

Co-chairperson

- Dr Madhura Swaminathan, Professor, Indian Statistical Institute, Bengaluru
- Mr P. V. Babu, Director, Dept of Economics & Statistics

Members

- Dr U. S. Mishra, Professor, Centre for Development Studies, Trivandrum
- Ms L. R. Arathi IES, Mission Director, State Horticulture Mission
- Dr Brigit Joseph, Professor, Dept of Agricultural Statistics, CoA, Vellayani
- Dr K. P. Chandran, Senior Scientist, CPCRI, Kasargod
- Mr T. Paul Lazarus, Assistant Professor, Agricultural Economics, CoA, Vellayani
- Dr Pratheesh Gopinath, Assistant Professor, Agricultural Statistics, CoA, Vellayani
- Mr Deepak Mercy Johnson, Senior Fellow, Indian Statistical Institute, Bangalore
- Mr S. Ajayghosh, Vrindavan, Vadakkan Mainagapally PO, Kollam
- Mr Ramesh P K, TA to Director of Agriculture, Directorate of AD and FW

Terms of reference

- To critically assess the status and robustness of Kerala's statistical databases in agriculture and identify areas of concern.
- To suggest measures to improve the design, collection, analysis and dissemination of statistical data, such as area, production, yield, costs of cultivation, trade, farm harvest prices, wholesale prices, retail prices, market arrivals and so on, related to agriculture.
- To provide a framework for a better use of new technologies to improve the statistical system related to agriculture.
- To suggest ways in which Kerala's statistical system in agriculture should be geared towards meeting the challenges posed by integrated multiple-/inter-cropping based in homesteads and garden lands, apart from wetlands.
- To examine the possibilities of integrating all data on agriculture collected by different agencies in a single electronic platform.

8. A PLAN FOR VALUE ADDITION AND INDUSTRIAL INVESTMENT IN KERALA'S POST-HARVEST AGRICULTURE

Co-chairperson

- Dr K. P. Sudheer, Professor & Head, Department of Agricultural Engineering, College of Horticulture, KAU
- Mr Manu George, Strategist, Agency for the Development of Food Processing Industries in Kerala (ADFIK), KINFRA

Members

- Mr Rajeev Bhushan Prasad, Chief Coconut Development Officer, Coconut Development Board
- Dr E. Jayashree, Senior Scientist, ICAR-Indian Institute of Spices Research (IISR), Kozhikode
- Dr Lijo Thomas, Senior Scientist, ICAR-Indian Institute of Spices Research (IISR), Kozhikode
- Dr M. R. Manikantan, Principal Scientist, Harvest & Post Harvest Technology, CPCRI, Kasargod
- Mr K. K. Rajendrababu, Kunnath Veedu, Alappad PO, Thrissur
- Mr R. Manikuttan,Santhivila, Vandanmedu PO, Idukki,
- Dr V. R. Sinija, Professor & Head, Business Incubation Unit, IIFPT, Thanjavur
- Dr M. S. Sajeev, Principal Scientist & Head Crop Utilization Division, CTCRI, Sreekaryam
- Dr P. R. Geethalakshmi, Assistant Professor, Department of Post-Harvest Technology, College of Agriculture, Vellayani
- Ms K. Thulasi, Kerala Karshaka Sangham, Novelty, Matoor, Kalady, Ernakulam
- Dr P. Nisha, Principal Scientist, CSIR-National Institute for Interdisciplinary Science and Technology, Trivandrum
- Mr Abraham John Tharakan, Chairman, Amalgam Foods
- Mr Madathiveetil Ramesh, Director, Brahma Indic Nutriments Private Limited
- Mr Appu Anitha Muraleedharan, Theeram Agro World
- Ms Mini Srinivasan, Annam Flour and Batter Solutions, Coimbatore
- Mr Ajoy Sukumaran, Assistant Director of Agriculture, Directorate of AD and FW

Terms of reference

- To prepare a roadmap for the development of an entrepreneurship-driven system post-harvest value addition in agriculture while ensuring the generation of employment and skills.
- To suggest measures to effectively integrate the functioning of LSGIs, Cooperative institutions, including FPCs, and line departments towards the development of value chains in post-harvest agriculture.
- To suggest measures to ensure facilities for investment, quality control, traceability, logistics and export, including the necessary arrangements for payment systems.
- To suggest measures to augment Kerala's export of processed products, particularly in high value and *niche* segments.

9. EASE OF ENTREPRENEURSHIP IN AGRICULTURE: REFORMS IN POLICY AND ADMINISTRATION

Co-chairperson

- Mr S. Harikishore IAS, Director, Industries & Commerce Department
- Dr K. J. Joseph, Director, Gulati Institute of Finance and Taxation, Trivandrum

Members

- Dr Binoo P. Bonny, Professor & Head, Department of Agricultural Extension, CoA, Vellanikkara, KAU
- Dr K. P. Sudheer, Professor & Head, Department of Agricultural Engineering, College of Horticulture, KAU
- Mr G Prakash, Joint Director, MSME Institute, Thrissur
- Mr Roshan Kynadi, Agripreneur, Kynadi Plantations
- Mr T. Thulasidasa Menon, Krishnakripa,Thrithalangode PO, Malappuram,
- Mr M. Ramesh, Industry Expert, RABI-KAU Incubation Committee
- Mr Saji George, CEO, BIONEST
- Mr Shan Kadavil, MD, Fresh to Home Foods Private Ltd
- Mr Jamsheed, Agricultural Officer, Kannamangalam, Malappuram

Terms of reference

- To suggest a broad quantitative framework to regularly assess ease of entrepreneurship in agriculture in Kerala.
- To identify the constraints to the flow of entrepreneurial capital into the processing and value addition segments in agriculture.
- To suggest short-term, medium-term, and long-term measures to improve the ease of entrepreneurship in agriculture.
- To suggest legal and administrative measures to be initiated at different levels of governance, including LSGIs, to improve the ease of entrepreneurship in agriculture.

10. HOW CAN KERALA USE THE POWER OF COOPERATION TO RAISE AGRICULTURAL GROWTH?

Co-chairperson

- Mr P B Nooh IAS, RCS, Kerala
- Mr James Mathew, Ex- MLA, Taliparamba

Members

- Dr P. S. Geethakutty, Professor (Retd.), KAU
- Mr Salin Thapasi, Project Leader, SFAC

- Mr Paleri Ramesan, Chairman, ULCCS
- Mr James, Perambra Coconut FPC
- Fr John Choorapuzhayil, Chairman, BIOWIN, Mananthavady, Wayanad
- Dr J. Thomas, PDS Organic Spices, Kuttikanam, Idukki
- Mr G. R Rajeev, Kollam
- Mr Bimalghosh, MD, Aralam Farming Corporation
- Ms Rema K. Nair, Deputy Director of Agriculture (Retd.), Department of Agriculture
- Mr V Ravindran, Senior Manager, Kerala Bank

Terms of reference

- To critically assess the role and position of Cooperative institutions in Kerala's agricultural development pattern.
- To identify weaknesses in the cooperative institutional framework with respect to their contribution to the agricultural production processes.
- To chart out a pathway to effectively leverage Kerala's historical strengths in cooperative action – including both cooperatives and farmer producer companies (FPC) – to improve agricultural growth and farmer's income.
- To critically assess the performance of Kerala's cooperative credit system to finance agricultural activities.
- To suggest measures to modernise the functioning of Cooperatives in the State.
- To suggest measures on how cooperatives can contribute to the development of supply chains and value addition in agriculture.
- To suggest measures to improve coordination across line departments, LSGIs, Cooperatives and FPCs to contribute to agricultural growth.
- To suggest measures for transforming Kerala Bank to support the resource needs of the productive sector of the State.

11. COOPERATIVE BANKING IN KERALA: REVAMPING THE ROLE OF KERALA BANK

Chairperson

- Ms Mini Antony IAS, Secretary, Corporation

Co-Chairperson

- Dr Pallavi Chavan, Director, Reserve Bank of India, Mumbai

Members

- Mr Sasikumar M V,Director, Institute of Co-operative Management, Parasinikkadavu, Kannur
- Mr Jose T Abraham, Additional Private Secretary to the Finance Minister

- Mr K. C. Sahadevan, Chief General Manager, Kerala Bank
- Mr V. Raveendran, Senior Manager, PACS Development Department, Kerala Bank
- Mr Raja Kurup, Board Member, Kadirur PACS, Kannur
- Mr Anoop Kishore, Development Standing Committee Chairman, Wadakkanchery Municipality and District Facilitator of Decentralised plan
- Mr Romio Kattapana, President, Thankamony Service Co-operative Bank
- Mr K.C.S Nambiar, Director, Ancharakandy FSC Bank and Sahakari Coconut Processing facility
- Mr P. R. Sanjeev, Managing Director (Retd.), MILMA
- Mr R K Bhoodes Pillai, Chairman, Federation of Indian Cashew Industries, Former CEPCI
- Mr Sudheer K, Additional Director of Industries and Commerce
- Mr Damodhar, President, Kerala State Small Industries Association

Terms of reference

- To suggest broad measures to deepen and expand the participation of the cooperative sector in the process of economic growth of the State, and to involve youth in the cooperative movement in the State.
- To suggest measures to upgrade the use of technology in the functioning of primary cooperatives, such as the introduction of unified software.
- To suggest measures to improve professionalism in the functioning of cooperative societies in the State.
- To prepare a guidance note on Business Process Reengineering of the Kerala Bank to serve as a key provider of resources to the productive sectors, such as agriculture and MSMEs as well as tourism.

Convener

Sri. S S Nagesh, Chief, Agriculture Division, State Planning Board

Co- Convener

Smt. G C Roshini, Agronomist, State Planning Board

Terms of Reference (General)

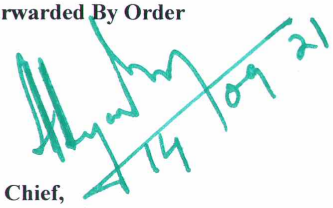
1. The non-official members (and invitees) of the Working Group will be entitled to travelling allowances as per existing government norms. The Class I Officers of GoI will be entitled to TA as per rules if reimbursement is not allowed from Departments.

2. The expenditure towards TA, DA and Honorarium will be met from the following Head of Account of the State Planning Board "3451-00-101-93"- Preparation of Plans and Conduct of Surveys and Studies.

The order read as reference 3 is modified to this extent.

(Sd/-)
Member Secretary

Forwarded By Order



Chief,
Agriculture Division

To

The Members concerned

Copy to

PS to Vice Chairperson
PA to Member Secretary
CA to Member (Dr.Ramakumar.R)
Economic Advisor to VC
Chief, PCD,SPB
Sr. A.O, SPB
The Accountant General, Kerala
Finance Officer, SPB
Publication Officer, SPB
Sub Treasury, Vellayambalam
Accounts Section
File/Stock File