TWELFTH FIVE YEAR PLAN
[2012-2017]

WORKING GROUP
ON
FOOD SECURITY

REPORT

STATE PLANNING BOARD
GOVERNMENT OF KERALA

FEBRUARY 2012

PREFACE

The Working Group on Food Security for the Twelfth Five Year Plan was constituted by the State Planning Board of Government of Kerala as one among the forty eight working groups. The working group held five sessions, the outcome of which is submitted herewith as a Report of Recommendations. I thank Shri. K.M. Chandrasekhar IAS, Vice-Chairman, Kerala State Planning Board and Shri. Subrata Biswas IAS, Member Secretary, Kerala State Planning Board for entrusting this task to our team under my Chairmanship. I am very much thankful for the team effort and co-operation extended by all the members of this group during the deliberations and preparation of the Report.

Sd/-
Dr. B.A.Prakash

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Working Group – Its Constitution and Terms of References

1. The State Planning Board of Government of Kerala has constituted forty eight Working Groups as part of exercise of Twelfth Five Year Plan of the State for giving recommendations to the Board.

2. The Working Group on Food Security is one among them constituted vide Order No. 5563/2011/EV/WG/FS/SPB dated 18.08.2011 and revised on 12.9.2011.

3. The Working Group consist of seven members

Dr.B.A.Prakash, Alwin Villa BNRA-164 A,Bhagavati Nagar, Kowdiar P.O. TVPM 695 003	Chairman
Dr .L.Vijayalakshmi, Prof. & Head, Dept. of Applied Nutrition, Medical College, TVPM	Member
Dr.K.R.Radhakrishnapillai, Retd.Professor, Aranya, Sooradanadu South Patharam P.O. Kollam	Member
Dr.B. Nedumpana Anilkumar, Assistant Professor Department of Economics M.G. College, Trivandrum	Member
Prof. S. Rajeev, Director Asian School of Business, Techno City, Pallippuram Tvpm.695316	Member
Smt.M.S.Jaya IAS, Director, Commissionerate of Civil Supplies & Chairman and Managing Director, Kerala State Civil Supplies Corporation Public Office Building, Museum P.O Trivandrum.	Member

Shri. Siraj Hussain — Member
Chairman and Managing Director,
Food Corporation of India,
Headquarters,
Khadya Sadan,16-20 Dara
Khamba Lane,New Delhi 110001

Dr. V.Vijayakumar, — Convener
Chief, Evaluation Division
State Planning Board
Pattom, Trivandrum- 4

J. Venugopalan Pillai — Joint Convener
Joint Director, Evaluation Division
State Planning Board
Pattom, Trivandrum- 4

4. Terms of Reference of the Working Group are:

- To examine the efficacy of various projects launched in the state with the aim of ensuring food security during the 11th Five Year Plan.
- To examine the role of Public Distribution System and other market intervention measures and food distribution schemes for poor.
- To suggest measures to address hunger, poverty, and malnutrition and food insecurity in a socially inclusive manner.
- To analyze the problems associated with the variation of the prices of food crops.
- To examine the problems associated with the procurement of food crops and suggest remedial measures.

5. The working group convened six meetings on 6th& 23rd September, 3rd, 21st & 31st October and 14th November, 2011. During the six meetings, detailed discussions were held on food security as part of formulation of Twelfth Five Year Plan and suggested recommendations.

Chapter 1

Food Security and Poverty

1.1 Introduction

Kerala is a state facing acute food deficit. Of the total requirements of food grains only 15 per cent is produced in the state. More than 90 per cent of the pulses, beans, sugar are being imported from other states of the country or from abroad. Except a small share, almost all items of fruits are brought from other parts of India. In the case of vegetables the state heavily relies on imports from the neighbouring states. More than 57.6 per cent of all vegetable items are brought from other states. Major share of other food items like eggs, meat, fish are also imported from other states. This chronic food deficit creates frequent shortages in the supply of the food items, hoarding of food items, increase in the prices due to the supply shortages, wide fluctuation in prices and creates acute problems in food security of Kerala. In this context, public distribution and other market intervention measures possess a crucial role in ensuring food security and stabilizing the prices of food items.

Another dimension of food security is the high incidence of Below Poverty Line (BPL) households in Kerala. According to the BPL estimate, Kerala has 32.29 lakh BPL households constituting 42 per cent of the total households. Ensuring food security to the poorer sections is a tremendous task. In this context, the 12^{th} Five Year Plan of Kerala has to give top priority for ensuring food security of the state. In this chapter we have a discussion on the concept of food security and the estimates on poverty in Kerala.

1.2 Concept of Food Security

1.2.1 Definitions on Food Security

The definition of food security originated in the year 1970 and by now, there are scores of definitions. In 1974, at the World Food Summit, the definition of food security was "availability at all times of adequate world food supplies of basic food stuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices". In the year 1983, food security was redefined by Food and Agriculture Organization (FAO) by including the issue of accessibility of food for vulnerable people and trying to give a balanced equation of food security problem. The definition was "ensuring that all people at all times have both physical and economic access to the basic food that they need". In 1986, the food insecurity problem was divided into two dimensions according to the "Poverty and Hunger" report of the World Bank. The first is chronic food insecurity, which is associated with the problem of chronic poverty or low level of income or accessibility, and the other is transitory food insecurity which is normally consequence of natural catastrophies like storm, typhoon, Tsunami etc. and harsh transitory economic situations. The elaborated definition of food security thus became access of all people at all times to enough food for an active, healthy life.

In the 1990s, the definition of food security was further widened. The components of food safety and nutritional balance were included. In 1994, according to the UNDP Human Development Report, food security is one of the components of human security. In 1996, World Food Summit generated a redefinition of food security; "Food security, at the individual, household, national, regional and global levels (is achieved) when all people, at all times have physical and economic access to sufficient, safe and nutrition food to meet their dietary needs and food preferences for an active and healthy life".

Till the 1970s, food security was mainly seen as a national supply problem. Today, the food security concept has shifted from a supply and production problem to poverty and market problem in which purchasing power and access to food entitlements play an important role. Therefore, food security can be seen not only as a problem of production, but also as an allocation problem.

In recent years, most of the research initiatives for food security have focused on four key components of the FAO's definition.

1. **Availability** – Providing a sufficient supply of food for all people at all times has historically been a major challenge. Although technical and scientific innovations have made important contributions focused on quantity and economies of scale, little attention has been paid to the sustainability of such practices.
2. **Accessibility** – The equality of access to good is a dimension of food security. Within and between societies, equities have resulted in serious entitlement problems, reflecting class, gender, ethnic, racial and age differentials, as well as national and regional gaps in development. Most measures to provide emergency food aid have attempted to help the disadvantaged but have had limited success in overcoming the structural conditions that perpetuate such inequities.
3. **Acceptability** – This dimension of food security is important in determining whether information and food system innovations will be accepted in a country, given the social and ecological concerns of its citizens.
4. **Adequacy** – Food security also requires that adequate measures are in place at all levels of the food system to guarantee the sustainability of production, distribution, consumption and waste management. A sustainable food system should help to satisfy basic human needs,

without compromising the ability of future generations to meet their needs. It must therefore maintain ecological integrity and integrate conservation and development.

From the above definitions, the following points emerged.

1. Food security involves adequate physical availability of food to the entire population in a country.
2. People have enough purchasing power so that they can acquire the food they need.
3. For healthy life, the food available should be adequate in quality as well as quantity to meet nutritional requirements.
4. A nation has to ensure the growth rate in food supply so that it takes care of the increase in population as also the increase in demand resulting from increase in income of the people.
5. In the final stage of food security, People should have cereals, pulses, milk and milk products, vegetables and fruits, fish, eggs and meat.

1.3 Definitions on Dietary Energy, Malnutrition etc.

1. Dietary energy intake: the energy content of food consumed.
2. Dietary energy requirement: the amount of dietary energy required by an individual to maintain body functions, health and normal activity.
3. Depth of under-nourishment: magnitude of the dietary energy deficit of the undernourished population.
4. Malnutrition: an abnormal physiological condition caused by deficiencies, or imbalances in energy, protein and/or other nutrients.
5. Undernourishment: food intake that is insufficient to meet dietary energy requirements continuously.

6. Under nutrition: the result of undernourishment, poor absorption and/or poor biological use of nutrients consumed.

1.4 Major Challenges Faced by Food Security in the 21st Century

1. Growth in rural income: The hunger and under nutrition can be reduced through economic growth. In most developing countries, the poorest people still live in the rural countryside. Therefore, there is an urgency to focus on rural income growth (improving the productivity and profitability of millions of small – scale farmers and the people engaged in non-farm rural sector).
2. Enhance and expand Safety Net Programme: Even with economic growth, the rural and urban poor will need safety net programmes that include nutrition and health services.
3. New problems on Food Security
    a. Increasing population leads to increased demand for food and reduced per capita availability of arable land and irrigation water.
    b. Improved purchasing power and increased urbanization lead to higher per capita food grains requirements.
    c. Marine fish production is tending to become stagnant and coastal aquaculture is facing environmental problems.
    d. There is increasing damage to the ecological foundations of agriculture such as land, water, forest, biodiversity and the atmosphere and there are distinct possibilities for adverse changes in climate and sea level.
    e. While dramatic new technological developments are taking place, particularly in the field of biotechnology, their environmental health and social implications are yet to be fully understood.

f. Since land and water are shrinking resources for agriculture, the need for more food has to be met through higher yields per units of land, water, energy and time.

1.5 Policy Framework for Promotion of Food Security

1. Neglect of agriculture and importance given to urbanization has intensified the problem of rural poverty and led to decreasing returns from agriculture. So promote agriculture with emphasis on small and marginal farmers.
2. Discourage the conversion of paddy land for cultivation of non food crops or for non agricultural purposes.
3. Good governance is an essential element of food security today. Governments must ensure that food security is part of the mainstream of national, sub-regional and local policy design and implementation.
4. Policies should create appropriate incentives for investment in public goods such as infrastructure and research. Poverty education, increasing levels of equality, institutional reform and strengthening security and safety nets become important for reducing food insecurity.
5. Decentralization is critical to the success of community based approaches to reduce food insecurity and malnutrition.
6. PDS is one of the main instruments for ensuring food security. PDS includes sub systems for the procurement, storage and distribution of food grains. The PDS contain rises in food prices, ensuring availability of food to all, ensures food to poor at reasonable prices. The failure of PDS to reach the needy, its patently urban bias and poor quality and unreliable supply in the ration shops affects food security.

7. Poverty alleviation should be given priority through the activities such as food for work, self-employment and employment generating schemes.
8. Priorities should be given to increase the production and productivity in agriculture. Livestock sector's output has to be increased through the provision of better livestock policy.
9. Health, education and rural credit are very important ingredients needed in achieving food security. Governments and NGOS should work in an integrated manner in providing the facilities.

1.6 Estimates on Poverty in Kerala

In this section we present the concept of poverty line, the official poverty line of Planning Commission, the revised poverty estimate based on Planning Commission Expert Group 2009 (Tendulkar Committee) and the BPL estimates of Kerala.

1.7 The Concept of Poverty

Poverty is the denial of opportunity to lead a long, healthy, creative life and enjoy a decent standard of living, freedom, dignity and self-respect and the respect for others.

Box 1
Reasons Cited for Poverty in Asia and Sub-Saharan Africa

- Being disabled (for example, blind, crippled, mentally impaired and chronically sick).
- Lacking land, livestock, farm equipments, and a grinding mill.
- Being unable to decently bury their dead.
- Being unable to send their children to school.
- Having more mouths to feed, fewer hands to help.
- Lacking able-bodied family members who can feed their families in a crisis.
- Having bad housing.
- Suffering the effects of destructive behaviours (for example, alcoholism).
- Having to put children in employment.
- Being single parents.
- Having to accept demeaning or low status work.
- Having food security for only a few months in each year.
- Being dependent on common property resources

Source: Human Development Report 1997

1.8 Official Poverty Line in India (Based on Planning Commission's Expert Group 1993)

- **Poverty Line:** Poverty line serves as a cut-off line for separating the poor from the non-poor, given the size distribution of population by per capita consumer expenditure classes.
- Population with per capita consumer expenditure levels below the level defined by the poverty line is counted as poor.
- The data on the size distribution of population by expenditure classes is obtained from the household consumption survey conducted under various National Sample Surveys (NSS) rounds.
- The official estimates are based on a calorie norm of 2400 calories per capita per day for rural areas and 2100 calories per capita per day for urban areas.
- **Poverty line in 2004-05:** The poverty line in 2004-05 at all India level is fixed at monthly per capita total consumer expenditure of ` 356.30 for rural areas and ` 538.60 for urban areas. At the consumer expenditure the above calorie norm will be met.

1.9 Population Below Poverty Line in India

The official poverty line of the central government is based upon Planning Commission's definition of poverty. Table 1.1 gives the definition of official poverty line for India as well as Kerala state for the years 1987-88 to 2004-05. Accordingly, a monthly per capita total consumer expenditure of ` 356.30 for rural areas and ` 538.60 for urban areas is the poverty line fixed for all India for 2004-05. According to the official poverty line, there has been a reduction in the population below the poverty line between 1987-88 and 2004-05 (Table 1.2). And it is estimated that 27.5 per cent of the population in India is poor or below poverty line in 2004-05. Table 1.3 gives the total population below the poverty line between 1987-88 and 2004-05.

Table 1.1
Definition of Official Poverty Line
(Monthly Per Capita Total Consumer Expenditure) *(In Rupees)*

Year	Kerala		India	
	Rural	Urban	Rural	Urban
1987-88	130.61	175.11	115.43	165.58
1993-94	243.84	280.54	205.84	281.35
1999-2000	-	-	327.56	454.11
2004-05	430.12	559.39	356.30	538.60

Source:
i) Planning Commission, 1993, Report of the Expert Group on Estimation of Proportion and Number of Poor.
ii) Ministry of Agriculture, Agricultural Statistics at a glance 2004 & 2008.

Table 1.2
Population Below Poverty Line in India (per cent)

Year	Rural	Urban	Total
1987-88	39.06	40.12	39.34
1993-94	37.27	32.36	35.97
1999-2000	27.09	23.62	26.10
2004-05	28.30	25.70	27.50

Source:
1) Planning Commission, 1993, Report of the Expert Group on Estimation of Proportion and Number of Poor.
2) Planning Commission, 2008, Eleventh Five Year Plan 2007-12, Vol.3.

Table 1.3
Total Population Below Poverty Line in India *(In lakh)*

Year	Rural	Urban	Total
1987-88	2293.96	833.52	3127.48
1993-94	2440.31	763.37	3203.68
1999-2000	1932.43	670.07	2602.50
2004-05	2209.24	807.96	3017.20

Source:
1) Planning Commission, 1993, Report of the Expert Group on Estimation of Proportion and Number of Poor.
2) Planning Commission, 2008, Eleventh Five Year Plan 2007-12, Vol.3.

1.10 Population Below Poverty Line in Kerala

We may also examine the population below poverty line based on Planning Commission's estimate for Kerala. A monthly per capita total consumer expenditure of ` 430.12 for rural areas and ` 559.39 for urban areas is the poverty line fixed by the Planning Commission for Kerala in 2004-05 (Table 1.1) According to this poverty line, the population below poverty line in Kerala declined from 32.08 per cent in 1987-88 to 15.00 per cent in 2004-05 (Table 1.4). It is estimated that 49.60 lakh population are below poverty line in 2004-05 (Table 1.5). Political parties in Kerala raised strong objections to the estimate. They point out that this is an under estimate and does not reflect the real magnitude of poverty.

Table 1.4
Population Below Poverty Line in Kerala (per cent)

Year	Rural	Urban	Total
1987-88	29.10	43.36	32.08
1993-94	25.76	24.55	25.43
1999-2000	9.38	20.27	12.72
2004-05	13.20	20.20	15.00

Source:

1) Planning Commission, 1993, Report of the Expert Group on Estimation of Proportion and Number of Poor.
2) Planning Commission, 2008, Eleventh Five Year Plan 2007-12, Vol.3.

Table 1.5
Population below Poverty Line in Kerala *(In Lakh)*

Year	Rural	Urban	Total
1987-88	66.20	26.02	92.22
1993-94	55.95	20.46	76.41
1999-2000	20.97	20.07	41.04
2004-05	32.43	17.17	49.60

Source:

1) Planning Commission, 1993, Report of the Expert Group on Estimation of Proportion and Number of Poor.
2) Planning Commission, 2008, Eleventh Five Year Plan 2007-12, Vol.3.

1.11 Poverty in India 2004-05 (Based on the Revised Poverty Line of PC Expert Group 2009)

Planning Commission's Expert Group 2009 has revised the definition of poverty line. The revised definition of poverty line is given in Table 1.6. According to the revised poverty line, the total population below poverty line in India is 37.2 per cent (Table 1.7). According to this estimate, 41.8 per cent of the rural population and 25.7 per cent of the urban population are below poverty line in India in 2004-05. The expert group 2009 has enhanced the percentage of population below poverty line in India from 27.5 per cent to 37.2 per cent for the year 2004-05.

Table 1.6
Revised Definition of Poverty Line in 2004-05 (Planning Commission Expert Group, 2009)
(Monthly per capita total consumer expenditure) *(In Rupees)*

	Rural	Urban
India	446.68	578.80
Kerala	537.31	584.70

Source: Planning Commission, 2009, Report of the Expert Group to Review the Methodology for Estimation of Poverty.

Table 1.7
Population Below Poverty Line in 2004-05 (Based on Revised Definition) (per cent)
(Monthly per capita total consumer expenditure) *(In Rupees)*

	Rural	Urban	Total
India	41.8	25.7	37.2
Kerala	20.2	18.4	19.7

Source: Planning Commission, 2009, Report of the Expert Group to Review the Methodology for Estimation of Poverty.

The Expert Group also revised the definition of poverty line and population below poverty line for Kerala. The revised definition of poverty line is given in Table 1.6. According to the revised definition, the total population below poverty line in Kerala is 19.7 per cent for 2004-05. It is estimated that 20.2 per cent of the rural population and 18.4 per cent of the urban population are below poverty line in Kerala in 2004-05. Based on the revised poverty line, the poverty ratio in Kerala is the lowest compared to other southern states like Andhra Pradesh, Karnataka and Tamil Nadu (Table 1.8). In rural and urban areas in Kerala, the percentage of people below poverty line is lower in Kerala compared to the southern states.

Table 1.8
Poverty Lines and Poverty Ratio for 2004-05 (Expert Group, 2009)

States/ UTs	Poverty Line (`)		Poverty Headcount Ratio (%)		
	Rural	Urban	Rural	Urban	Total
Andhra Pradesh	433.43	563.16	32.3	23.4	29.9
Karnataka	417.84	588.06	37.5	25.9	33.4
Kerala	537.31	584.70	20.2	18.4	19.7
Tamil Nadu	441.69	559.77	37.5	19.7	28.9
All India	**446.68**	**578.80**	**41.8**	**25.7**	**37.2**

Source: Same as Table 1.6

1.12 Below Poverty Line (BPL) Households in Kerala

The government of Kerala has classified the households or families into two categories viz., BPL and Above the Poverty Line (APL). The state government has issued 20.82 lakh BPL ration cards to households in January 2008. According to this estimate, 29.66 per cent of the households are BPL households (Table 1.9). The percentage of BPL households varied between 20.54 to 34.5 per cent among the districts in Kerala. These BPL households are given subsidized rice and other items through public distribution system.

The state government has also conducted another survey of BPL households in 2011. According to this survey, 32.29 lakh households were enumerated as BPL households in 2011. And the BPL household constitute 42.64 per cent household in the state (Table 1.10). It is estimated that in some districts more than half of the households were BPL households.

In Wayanad district 57.46 per cent and in Idukki 55.38 per cent of the households are BPL. The economists have raised objections about the estimate. They argue that this is an over estimate which accommodate a large number of non eligible households.

Table 1.9
Number of BPL Households in Kerala, January 2008

District	APL Card	BPL Card*	Total Ration Card	BPL Card (per cent)
Thiruvananthapuram	576109	232518	808627	28.75
Kollam	409035	211451	620486	34.07
Pathanamthitta	214181	86935	301116	28.87
Alappuzha	331214	179779	510993	35.18
Kottayam	306852	136463	443315	30.78
Idukki	177722	92932	270654	34.33
Ernakulam	558438	144373	702811	20.54
Thrissur	476451	220836	697287	31.67
Palakkad	412047	145460	557507	26.09
Malappuram	445880	199802	645682	30.94
Kozhikode	419423	171702	591125	29.04
Wayanad	114101	60142	174243	34.51
Kannur	344243	129079	473322	27.27
Kasaragod	152232	71202	223434	31.86
Total	**4937928**	**2082674**	**7020602**	**29.66**

**Andyodaya Annayojana in included in BPL Card*
Source: Department of Economics and Statistics, 2009, Statistics for Planning 2009

Table 10
Number of BPL Households in Kerala, January 2011

Districts	BPL Households (in Lakh) (January 2011)	Percentage of BPL Households to Total Households (per cent)
Thiruvananthapuran	3.99	47.30
Kollam	3.10	46.08
Pathanamthitta	1.14	36.50
Alappuzha	2.56	48.57
Kottayam	1.93	41.43
Idukki	1.53	55.38
Ernakulam	2.62	34.23
Thrissur	2.94	39.93
Palakkad	3.02	48.77
Malappuram	2.92	38.65
Kozhikode	2.55	38.73
Wayanad	1.07	57.46
Kannur	1.82	34.09
Kasaragod	1.11	42.64
BPL Households	32.29	42.41
APL Households	43.83	57.58
Total Households	76.12	100.00

Source: Mathrubhumi Daily, January 29, 2011

Thus, we have two estimates on the poverty in Kerala by Planning Commission and state government. The planning commission's estimate says that the percentage of BPL population in Kerala for 2004-05 is 19.7 per cent. On the other hand, the state government's BPL survey in 2011 says that 42.41 per cent of the households in Kerala are poor. Thus, we can notice wide variations in the two estimates and the actual percentage of poor may be in between the two estimates.

Chapter II

Review of Food Situation

Food availability is an important element of food security. Agricultural production plays a significant direct role in tackling the problem of food insecurity by increasing the food availability in a region and raising the income of the people. In other words, the internal production of food grains influences both the availability and the ability of households to obtain food. Declining internal production of rice along with tapioca (the most prominent cereal substitute) clearly raises the potential problem of food availability in the state.

Kerala does not produce even one fourth of the total requirement of our staple food grain. We need 42.65 lakh tonnes of rice per year, while the quantity of production is only 5.98 lakh tonnes. In other words, 86 % of the food grain required comes from other states, namely Andhra Pradesh and Tamil Nadu. The gap between production and requirement is widening every year. More and more farmers are retreating from farming. The unseasoned rainfall, rising temperature and the depletion of groundwater are some crucial factors that worsen the situation.

The monthly entitlement of food grain per adult was 13.8 kg in Kerala (or 460 grams per day), satisfying the minimum requirement of 370 grams of cereals per person per day recommended by the Indian Council of Medical Research. The quantity of food grain purchased from the PDS has been higher than in most other states, making a significant contribution to household nutrition. In 1991, the annual off take of food grain from the PDS averaged 69.9 kg per person in Kerala. The annual purchase of grain from the PDS provided about one half of the cereal requirements per person. Given the scale and effectiveness of the PDS, it has been noted that the system has contributed to an improvement in consumption and nutrition in Kerala.

District wise production of some major food items like rice, tapioca, milk, egg, meat and fish in Kerala is presented below:

2.1 Paddy

Rice is considered as a major food crop of the people in the state and its consumption is increasing day by day. But its production has been declining continuously for the last two decades. Table below shows the district wise production of rice from 2003-04 to 2008-09.

Table 2.1
Production of Rice - District wise

(In Tonnes)

Sl. No.	District	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
1	Thiruvananthapuram	11278	12356	11034	10077	7182	7274
2	Kollam	22419	20646	16063	12580	7988	8292
3	Pathanamthitta	12641	10784	7518	7101	4631	7399
4	Alappuzha	63008	78491	71748	90160	62270	104250
5	Kottayam	26195	32789	31261	35550	28428	32154
6	Idukki	7526	7782	7500	7507	5959	5494
7	Ernakulam	54044	54501	48033	44007	24407	25907
8	Thrissur	79842	87463	72951	65036	59381	71909
9	Palakkad	189443	260118	266634	270103	244244	240143
10	Malappuram	36744	36539	31377	33123	21748	23265
11	Kozhikode	7579	6727	6314	6092	5097	5613
12	Wayanad	28421	29206	28385	30722	32079	33861
13	Kannur	16518	17098	17383	17375	14111	13637
14	Kasaragod	14387	12605	13786	12142	10963	11043
	State	**570045**	**667105**	**629987**	**641575**	**528488**	**590241**

Source: Directorate of Economics and Statistics

2.1.1 Area under Cultivation: Paddy

The area under paddy cultivation in Kerala had continuously decreased over the past twenty years and this amply shows a clear decreasing trend. In 1990-91, 559500 ha area was brought under the cultivation of paddy, which alarmingly came down to 234013 ha in 2009-10 so that the percentage decrease was 58.17. That is, around fifty eight per cent of the area which was once brought under the cultivation for paddy production now being used for some other purposes viz for the production of commercial crops, for housing the net addition of population, building infrastructure for industrial or service sector etc.

Table 2.2
Area under Cultivation: Paddy (1990-91 to 2009-10)

(In Hectare)

Year (X)	Area (Y)	Trend Equation, $Y = 604770\ e^{-0.05x}$		Elimination of Trend
		Value of X	Trend Values	
(1)	*(2)*	*(3)*	*(4)*	*(5=2-4)*
1990-91	559500	1	575275.02	-15775.02
1991-92	541300	2	547218.53	-5918.53
1992-93	537600	3	520530.36	17069.64
1993-94	507800	4	495143.80	12656.20
1994-95	503300	5	470995.35	32304.65
1995-96	471100	6	448024.64	23075.36
1996-97	424800	7	426174.22	-1374.22
1997-98	387100	8	405389.45	-18289.45
1998-99	352600	9	385618.38	-33018.38
1999-00	349774	10	366811.55	-17037.55
2000-01	347455	11	348921.94	-1466.94
2001-02	322368	12	331904.81	-9536.81
2002-03	310521	13	315717.62	-5196.62
2003-04	287340	14	300319.89	-12979.89
2004-05	289974	15	285673.12	4300.88
2005-06	275742	16	271740.68	4001.32
2006-07	263529	17	258487.73	5041.27
2007-08	228938	18	245881.13	-16943.13
2008-09	234265	19	233889.37	375.63
2009-10*	234013	20	222482.45	11530.55

Source: 1.Directorate of Economics and Statistics, Thiruvananthapuram 2. Output of MS EXCEL
** Provisional Figure*

An exponential trend equation, $Y = 604770\ e^{-0.05x}$, is fitted for the data on area under cultivation of paddy. This line of best fit indicates a coefficient of determination of 0.981 so that

the line fitted is 98.10 per cent best fit to the data also. In the equation, 604770 is the intercept and -0.05 is the slope or the regression coefficient of the equation. These values show the decreasing trend in the area for the cultivation of paddy. Details along with the elimination of trend by additive model (actual values – trend values) are given in Table 2.2. The major reasons for declining area under paddy cultivation are conversion of paddy fields into horticultural crops and non-agricultural purposes, mainly for housing. The other reasons are urbanisation, migration of labour from other states, lack of modern technical know-how and increasing cost of labour for cultivation.

Figure 2.1
Area under Cultivation: Paddy (1990-91 to 2009-10)

(In Hectare)

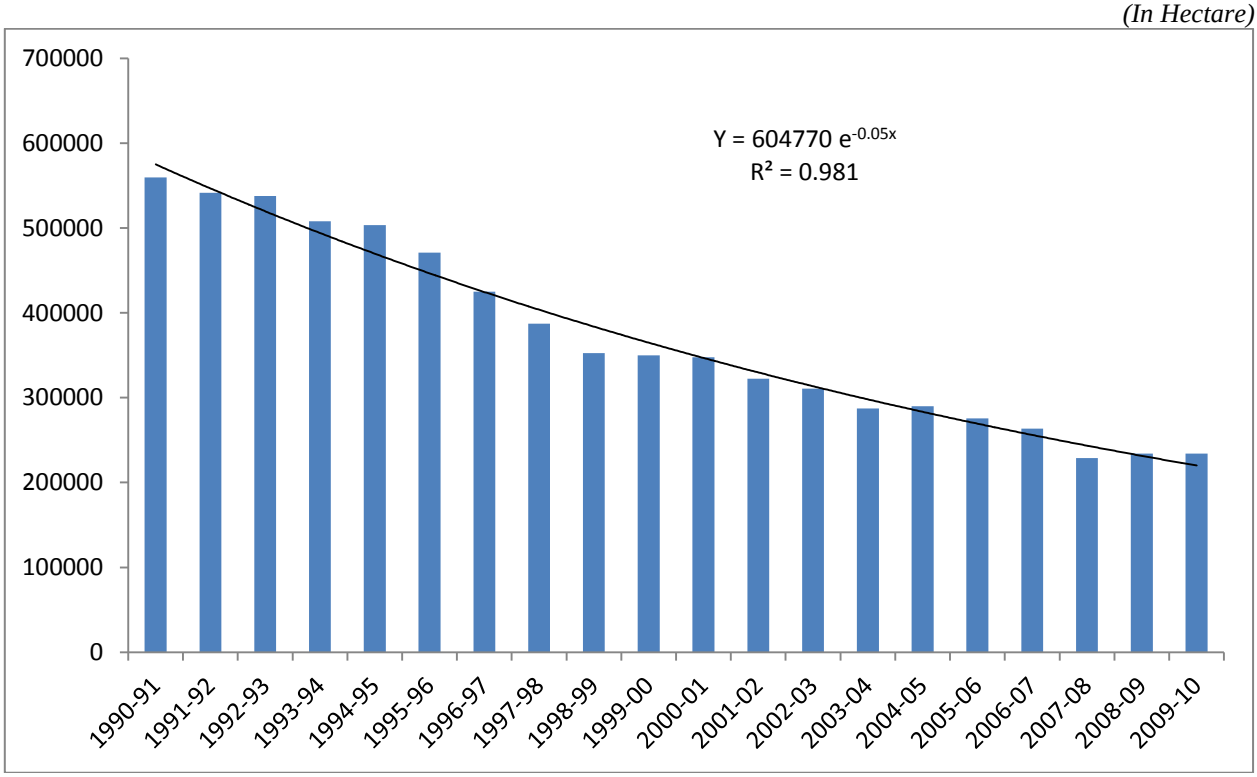


Table 2.3 gives projections. The expected area for cultivation of paddy during 2011-12 is 201311 ha, in 2015-16, it is 164819 ha and in 2019-20 it is estimated to be 134942 ha only. Hence time bound policy measures such as special rice package in selected districts and farm & crop insurance should be made compulsory. More importance is given to extend irrigation

facilities in various parts of the state and also should introduce new improved rice cropping pattern.

Table 2.3
Projected Area for Cultivation: Paddy (2011-12 to 2019-20)

(In Hectare)

Year (X)	**Trend Equation, $Y = 604770\ e^{-0.05x}$**	
	Value of X	***Projected Value of Y (Area for Cultivation)***
2011-12	22	201310.45
2012-13	23	191492.42
2013-14	24	182153.22
2014-15	25	173269.51
2015-16	26	164819.05
2016-17	27	156780.73
2017-18	28	149134.45
2018-19	29	141861.07
2019-20	30	134942.43

Source: Output of MS EXCEL

2.1.2 Production: Paddy

Production of paddy indicates increasing trend with up and down. Production was 1086578 tonnes in 1990-91, which came down to 598339 tonnes in 2009-10. In other words, the percentage decrease over this period was accounted for 44.93. That is, a 58.17 per cent decrease in the area for paddy production caused only a 44.93 per cent decrease in production during the last twenty years. This difference was due to the art of improved agriculture activities, which resulted in substantial improvement in the productivity of paddy. A polynomial trend equation of the form $Y = 1.3221\ X^2 - 57.082\ X + 1191$ is estimated with the data for the production of paddy and this equation is 94.82 per cent best fit to the observed data also. The trend values along with elimination of trend are given in Table 2.4.

Table 2.4
Production: Paddy (1990-91 to 2009-10)

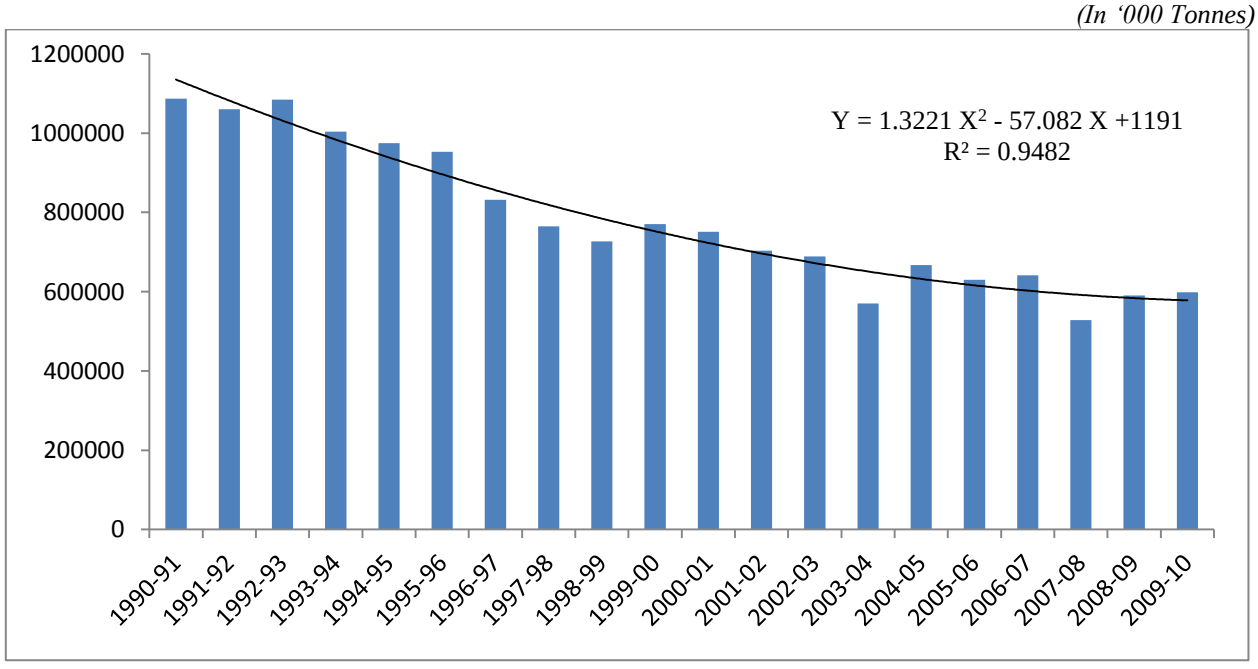
(In '000 Tonnes)

Year (X)	Production (Y)	Trend Equation, $Y = 1.3221 X^2 - 57.082 X + 1191$		Elimination of Trend
		Value of X	Trend Values	
(1)	*(2)*	*(3)*	*(4)*	*(5=2-4)*
1990-91	1086.578	1	1135.24	-48.66
1991-92	1060.35	2	1082.12	-21.77
1992-93	1084.878	3	1031.65	53.23
1993-94	1003.938	4	983.83	20.11
1994-95	975.065	5	938.64	36.42
1995-96	953.026	6	896.10	56.92
1996-97	831.600	7	856.21	-24.61
1997-98	764.610	8	818.96	-54.35
1998-99	726.743	9	784.35	-57.61
1999-00	770.686	10	752.39	18.30
2000-01	751.328	11	723.07	28.26
2001-02	703.504	12	696.40	7.11
2002-03	688.859	13	672.37	16.49
2003-04	570.045	14	650.98	-80.94
2004-05	667.105	15	632.24	34.86
2005-06	629.987	16	616.15	13.84
2006-07	641.575	17	602.69	38.88
2007-08	528.488	18	591.88	-63.40
2008-09	590.241	19	583.72	6.52
2009-10*	598.339	20	578.20	20.14

Source: 1.Directorate of Economics and Statistics 2. Output of MS EXCEL
** Provisional Figure*

Figure 2.2
Production: Paddy (1990-91 to 2009-10)

(In '000 Tonnes)



Projections are worked out in Table 2.5. In 2011-12, the expected production of paddy is 575090 tonnes, in 2015-16 it is estimated to be 600610 tonnes and in 2019-20, it is worked out to be 668430 tonnes.

Table 2.5
Projected Production: Paddy (2011-12 to 2019-20)

(In '000 Tonnes)

Year (X)	**Trend Equation, $Y = 1.3221 X^2 - 57.082 X + 1191$**	
	Value of X	**Projected Value of Y (Production)**
2011-12	22	575.09
2012-13	23	577.50
2013-14	24	582.56
2014-15	25	590.26
2015-16	26	600.61
2016-17	27	613.60
2017-18	28	629.23
2018-19	29	647.51
2019-20	30	668.43

Source: Output of MS EXCEL

2.1.3 Productivity: Paddy

Productivity is defined as total output in kg/ha. It is obtained by dividing total output in kg by land area cultivated in ha. Productivity data of paddy in Kerala shows a marginal increase over the past ten years so that it had indicated an increasing trend. The main reasons for this are the impact of technological change on rice yield due to the effective implementation of schemes like National Agricultural Development Programme and National Food Security Mission and also due to supply of good quality seeds to farmers. In 1990-91, the productivity of paddy was 1942 kg/ha, which rose to 2557 kg/ha in 2009-10, so that the percentage increase was 31.67 per cent. This increase in productivity was attributed to improvement in the art of agriculture such as the use of better fertilisers and manure, better seeds, improved irrigation facilities etc. The polynomial trend equation fitted of the form $Y = 1.702 X^2 – 5.9872 X + 1968.9$ gives a coefficient of determination of 0.8529 (See: Table 2.6 and Fig 2.3).

Table 2.6
Productivity: Paddy (1990-91 to 2009-10)

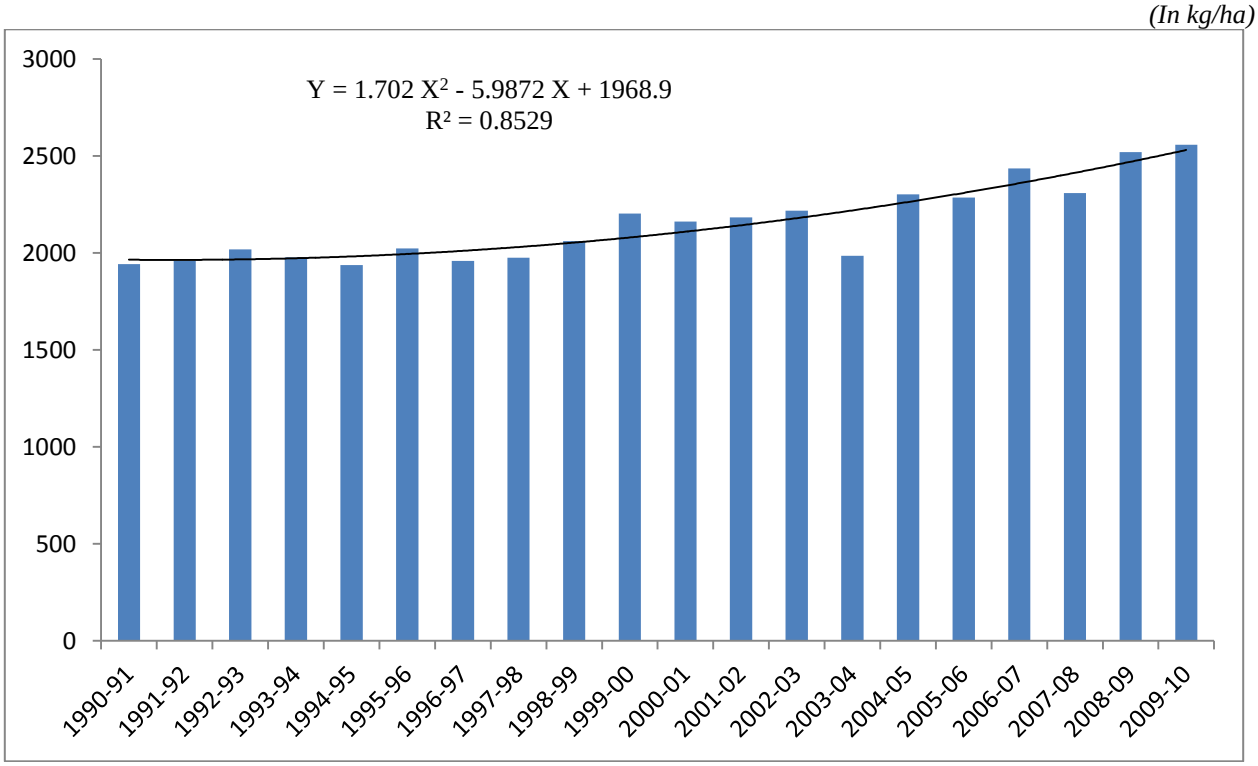
(In kg/ha)

Year (X)	Productivity (Y)	Trend Equation, $Y = 1.702 X^2 - 5.9872 X + 1968.9$		Elimination of Trend
		Value of X	Trend Values	
(1)	*(2)*	*(3)*	*(4)*	*(5=2-4)*
1990-91	1942	1	1964.61	-22.61
1991-92	1959	2	1963.73	-4.73
1992-93	2018	3	1966.26	51.74
1993-94	1977	4	1972.18	4.82
1994-95	1937	5	1981.51	-44.51
1995-96	2023	6	1994.25	28.75
1996-97	1958	7	2010.39	-52.39
1997-98	1975	8	2029.93	-54.93
1998-99	2061	9	2052.88	8.12
1999-00	2203	10	2079.23	123.77
2000-01	2162	11	2108.98	53.02
2001-02	2182	12	2142.14	39.86
2002-03	2218	13	2178.70	39.30
2003-04	1984	14	2218.67	-234.67
2004-05	2301	15	2262.04	38.96
2005-06	2285	16	2308.82	-23.82
2006-07	2435	17	2359.00	76.00
2007-08	2308	18	2412.58	-104.58
2008-09	2520	19	2469.57	50.43
2009-10*	2557	20	2529.96	27.04

Source: 1.Directorate of Economics and Statistics 2. Output of MS EXCEL
** Provisional Figure*

Figure 2.3
Productivity: Paddy (1990-91 to 2009-10)

(In kg/ha)



The 85.29 per cent best fitted function is used for projecting the productivity of paddy for the coming years. The expected productivity of paddy is 2661 kg/ha in 2011-16, 2964 kg/ha in 2015-16 and it is 3321 kg/ha in 2019-20. Details of projections are given in Table 2.7

Table 2.7
Projected Productivity: Paddy (2011-12 to 2019-20)

(In kg/ha)

Year (X)	**Trend Equation, $Y = 1.702 X^2 - 5.9872 X + 1968.9$**	
	Value of X	***Projected Value of Y (Productivity)***
2011-12	22	2660.95
2012-13	23	2731.55
2013-14	24	2805.56
2014-15	25	2882.97
2015-16	26	2963.78
2016-17	27	3048.00
2017-18	28	3135.63
2018-19	29	3226.65
2019-20	30	3321.08

Source: Output of MS EXCEL

2.2 Tapioca

Tapioca is also considered as one of the major food security crop demanded by people in the state. The district wise production of tapioca is given below:

Table 2.8
Production of Tapioca - District wise

(In Tonnes)

Sl.No	District	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
1	Thiruvananthapuram	422572	467006	463702	418332	413181	525897
2	Kollam	581214	577573	694984	596629	650489	546135
3	Pathanamthittah	184733	226993	255006	246963	253419	235436
4	Alappuzha	85333	82144	62286	66790	70918	95578
5	Kottyam	209915	162744	182262	192110	170248	221996
6	Idukki	274386	203171	205293	230842	211702	255284
7	Ernakulam	163782	130038	182605	223441	178642	209906
8	Thrissur	23744	46527	28254	43096	41049	35426
9	Palakkad	92021	101867	105321	97180	72523	75446
10	Malappuram	208078	155833	164029	191559	287438	292908
11	Kozhikode	97710	68573	61311	45263	49119	48589
12	Wayanad	102609	91915	85599	94326	95540	94828
13	Kannur	76064	66969	63880	60190	52367	69013
14	Kasaragod	18629	18690	13752	12278	9815	5672
State		**2540790**	**2400043**	**2568284**	**2518999**	**2556455**	**2712114**

Source: Directorate of Economics and Statistics

2.2.1 Area under Cultivation: Tapioca

The area under tapioca cultivation in Kerala shows a continuously downward trend over the past twenty years. Major reasons for the declining trend in area under tapioca cultivation are increased urbanisation, increased cost of labour, uncertainty regarding product pricing, weak marketing strategies and poor policies and programmes extended so far for tapioca cultivation. Sub division & fragmentation of land holdings further aggravated the problem. Availability of credit to small scale farmers is also inadequate.

Table 2.9
Area under Cultivation: Tapioca (1990-91 to 2009-10)

(In Hectare)

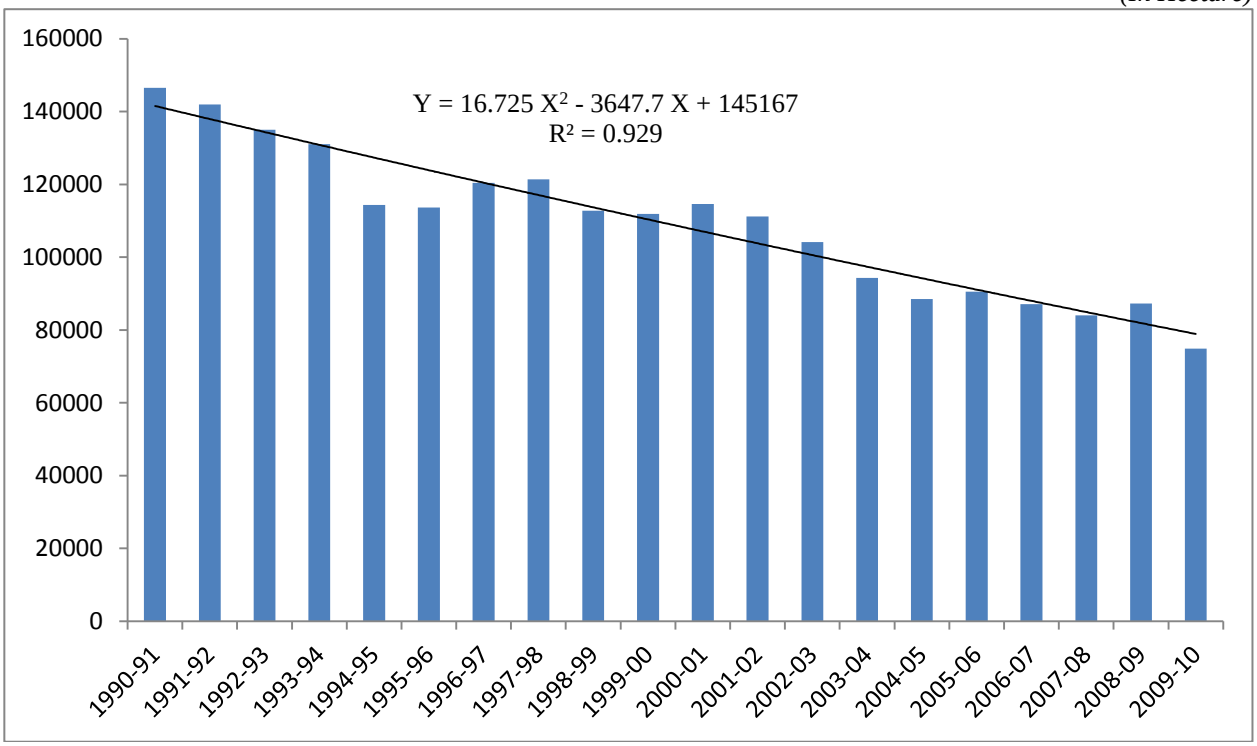
Year (X)	Area (Y)	Trend Equation, $Y = 16.725 X^2 - 3647.7 X + 145167$		Elimination of Trend
		Value of X	Trend Values	
(1)	*(2)*	*(3)*	*(4)*	*(5=2-4)*
1990-91	146500	1	141536.03	4963.98
1991-92	141900	2	137938.50	3961.50
1992-93	135000	3	134374.43	625.58
1993-94	131000	4	130843.80	156.20
1994-95	114300	5	127346.63	-13046.63
1995-96	113600	6	123882.90	-10282.90
1996-97	120400	7	120452.63	-52.63
1997-98	121400	8	117055.80	4344.20
1998-99	112800	9	113692.43	-892.43
1999-00	111922	10	110362.50	1559.50
2000-01	114609	11	107066.03	7542.98
2001-02	111189	12	103803.00	7386.00
2002-03	104179	13	100573.43	3605.58
2003-04	94297	14	97377.30	-3080.30
2004-05	88486	15	94214.63	-5728.63
2005-06	90539	16	91085.40	-546.40
2006-07	87128	17	87989.63	-861.63
2007-08	83990	18	84927.30	-937.30
2008-09	87241	19	81898.43	5342.58
2009-10*	74856	20	78903.00	-4047.00

Source: 1.Directorate of Economics and Statistics 2. Output of MS EXCEL
** Provisional Figure*

In 1990-91, the area under tapioca production was 146500 ha, which around by halves in 2009-10. A polynomial function is best suited to this data and the function is fitted of the form $Y = 16.725 X^2 – 3647.7 X + 145167$ with a coefficient of determination of 0.929. The trend values and the elimination of short term fluctuation are given in Table 2.9

Figure 2.4
Area under Cultivation: Tapioca (1990-91 to 2009-10)

(In Hectare)



Projections are given in Table 2.10. Projected area to be brought for the cultivation of tapioca is 73013 ha in 2011-12, 61633 ha in 2015-16 and it is estimated to be 50789 ha in 2019-20. For fetching more land area for tapioca cultivation, the management conditions of the cultivable lands should be standardised and promote regulated markets to ensure better price.

Table 2.10
Projected Area for Cultivation: Tapioca (2011-12 to 2019-20)

(In Hectare)

Year (X)	**Trend Equation, Y = 16.725 X^2 - 3647.7 X + 145167**	
	Value of X	***Projected Value of Y (Area for Cultivation)***
2011-12	22	73012.50
2012-13	23	70117.43
2013-14	24	67255.80
2014-15	25	64427.63
2015-16	26	61632.90
2016-17	27	58871.63
2017-18	28	56143.80
2018-19	29	53449.43
2019-20	30	50788.50

Source: Output of MS EXCEL

2.2.2 Production: Tapioca

The production status of tapioca in Kerala shows wider fluctuations. These fluctuations were not the result of trend, cyclical or seasonal variations, but due to irregular variations. Tapioca production was 2803001 tonnes in 1990-91 and fell down to 2525380 tonnes in 2009-10, so that it had been experienced a 9.90 per cent fall in production. The best selection of trend line is polynomial, but the fitted line explains only 22.25 per cent variation of observed data of production (See: Table 2.11 and Figure 2.5) and hence further application is not worked out for projecting the values of production.

Table 2.11
Production: Tapioca (1990-91 to 2009-10)

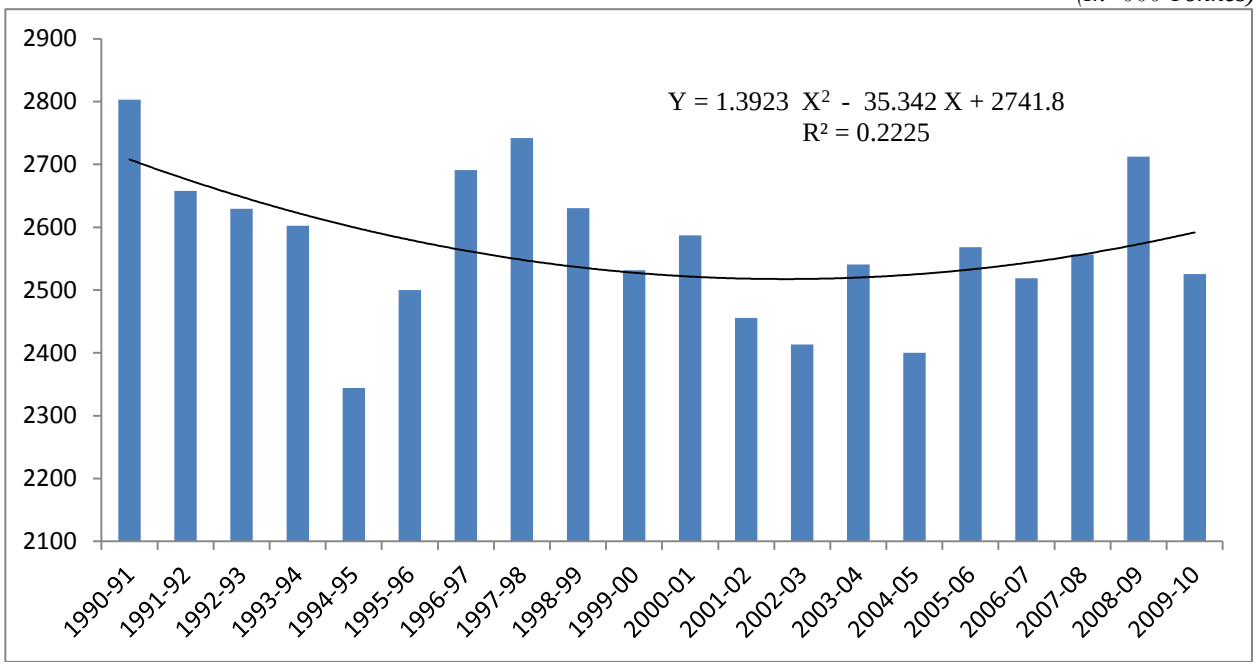
(In'000 Tonnes)

Year (X)	Production (Y)	Trend Equation, $Y = 1.3923 X^2 - 35.342 X + 2741.8$		Elimination of Trend
		Value of X	Trend Values	
(1)	*(2)*	*(3)*	*(4)*	*(5=2-4)*
1990-91	2803.00	1	2707.85	95.15
1991-92	2657.87	2	2676.69	-18.83
1992-93	2629.13	3	2648.30	-19.17
1993-94	2602.21	4	2622.71	-20.5
1994-95	2344.24	5	2599.90	-255.66
1995-96	2500.11	6	2579.87	-79.76
1996-97	2691.12	7	2562.63	128.49
1997-98	2741.70	8	2548.17	193.53
1998-99	2630.16	9	2536.5	93.66
1999-00	2531.75	10	2527.61	4.14
2000-01	2586.90	11	2521.51	65.39
2001-02	2455.88	12	2518.19	-62.31
2002-03	2413.22	13	2517.65	-104.43
2003-04	2540.79	14	2519.90	20.89
2004-05	2400.04	15	2524.94	-124.9
2005-06	2568.28	16	2532.76	35.52
2006-07	2519.00	17	2543.36	-24.36
2007-08	2556.46	18	2556.75	-0.30
2008-09	2712.43	19	2572.92	139.51
2009-10*	2525.38	20	2591.88	-66.50

Source: 1.Directorate of Economics and Statistics 2. Output of MS EXCEL
** Provisional Figure*

Figure 2.5
Production: Tapioca (1990-91 to 2009-10)

(In '000 Tonnes)



2.2.3 Productivity: Tapioca

Productivity of tapioca in Kerala shows an increasing trend over the past twenty years. Reasons for increasing trend in productivity of tapioca in the state are better climatic conditions, availability of good quality fertilisers and good crop management. The productivity was 19133 kg/ha in 1990-91, which increased to 33737 kg/ha in 2009-10. That is, a 76.33 per cent increase in productivity. By selection, a best fitted line of the form $Y = 33.549\ X^2 - 2.6958\ X + 19466$ is estimated with a coefficient of determination of 0.9501 (See: Table 2.12 and Figure 2.6).

Table 2.12
Productivity: Tapioca (1990-91 to 2009-10)

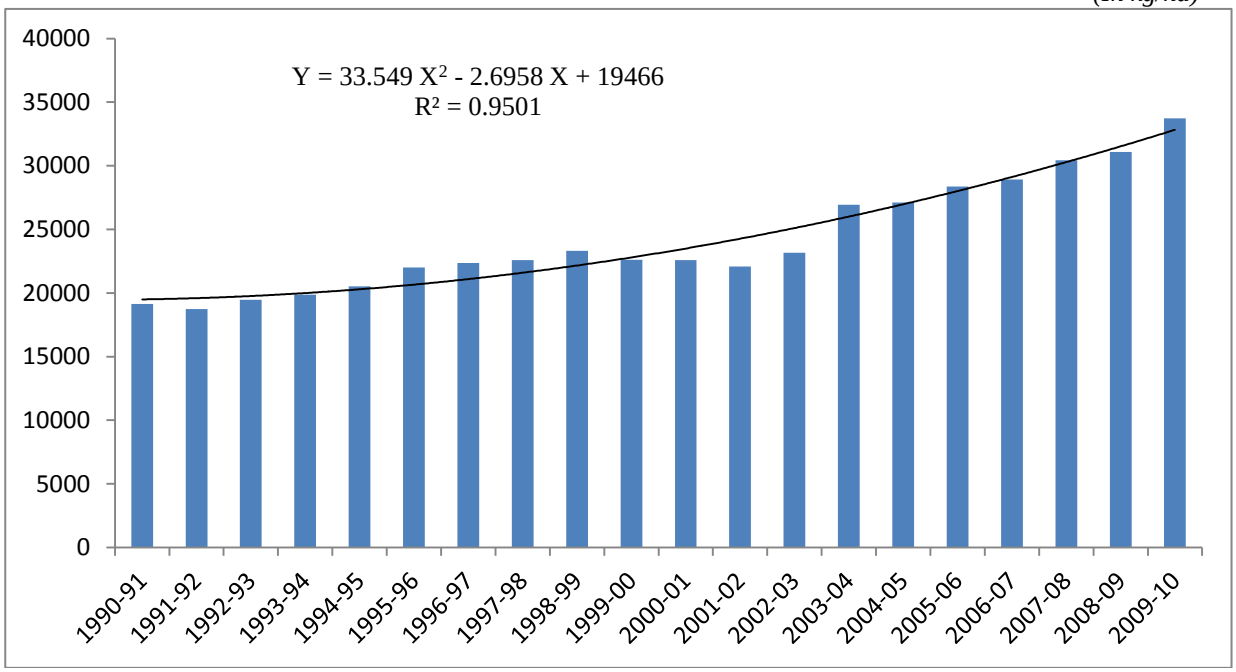
(In kg/ha)

Year (X)	Productivity (Y)	Trend Equation, Y = 33.549 X^2 - 2.6958 X + 19466		Elimination of Trend
		Value of X	Trend Values	
(1)	*(2)*	*(3)*	*(4)*	*(5=2-4)*
1990-91	19133	1	19496.85	-363.85
1991-92	18731	2	19594.80	-863.80
1992-93	19475	3	19759.85	-284.85
1993-94	19864	4	19992.00	-128.00
1994-95	20510	5	20291.25	218.75
1995-96	22008	6	20657.59	1350.41
1996-97	22351	7	21091.03	1259.97
1997-98	22584	8	21591.57	992.43
1998-99	23317	9	22159.21	1157.79
1999-00	22621	10	22793.94	-172.94
2000-01	22572	11	23495.78	-923.78
2001-02	22087	12	24264.71	-2177.71
2002-03	23164	13	25100.74	-1936.74
2003-04	26945	14	26003.86	941.14
2004-05	27123	15	26974.09	148.91
2005-06	28367	16	28011.41	355.59
2006-07	28911	17	29115.83	-204.83
2007-08	30438	18	30287.35	150.65
2008-09	31091	19	31525.97	-434.97
2009-10*	33737	20	32831.68	905.32

Source: 1.Directorate of Economics and Statistics 2. Output of MS EXCEL
** Provisional Figure*

Figure 2.6
Productivity: Tapioca (1990-91 to 2009-10)

(In kg/ha)



Projections are given in Table 2.13. Expected productivity of tapioca is 35644 kg/ha in 2011-12 and 49579 in 2019-20.

Table 2.13
Projected Productivity: Tapioca (2011-12 to 2019-20)

(In kg/ha)

Year (X)	**Trend Equation, $Y = 33.549 X^2 - 2.6958 X + 19466$**	
	Value of X	***Projected Value of Y (Productivity)***
2011-12	22	35644.41
2012-13	23	37151.42
2013-14	24	38725.52
2014-15	25	40366.73
2015-16	26	42075.03
2016-17	27	43850.43
2017-18	28	45692.93
2018-19	29	47602.53
2019-20	30	49579.23

Source: Output of MS EXCEL

2.3 Milk

Milk, meat and egg are the major contributors from livestock sector in the state economy. The milk production of the state for 2010-11 is estimated at 74 lakh litres per day. However, demand for milk per day is 86.25 lakh litres. Thus there is a gap of nearly 12 lakh litres per day. The gap is filled by importing milk from neighbouring states. District wise production of milk from 2006-07 to 2009-10 in Kerala shows slight increasing trend.

Milk production during 2006-07 was 21.19 lakh tonnes and it increased to 22.48 lakh tonnes in 2007-08. It further increased to 24.51 lakh tonnes in 2008-09 and to 25.37 lakh tonnes in 2009-10. The increase in percentage over the period was 19.37.

Table 2.14
District wise Milk Production in Kerala

(In '000 Tonnes)

Sl.No	District	2006-07	2007-08	2008-09	2009-10
1	Thiruvanathapuram	223.263	263.772	157.491	159.488
2	Kollam	199.940	201.857	336.251	289.680
3	Pathanamthitta	136.785	149.956	169.868	219.733
4	Alappuzha	125.909	149.227	204.156	233.721
5	Kottayam	196.307	227.278	266.873	273.512
6	Idukki	140.731	157.829	178.642	238.898
7	Ernakulam	197.529	207.091	186.718	209.437
8	Trissur	150.956	154.966	169.553	163.663
9	Palakkad	212.799	217.707	223.151	213.080
10	Malappuram	117.989	104.482	130.530	125.338
11	Kozhikkode	123.597	99.510	107.595	94.742
12	Wayanad	101.333	102.302	104.317	93.636
13	Kannur	122.991	143.597	125.100	129.222
14	Kasaragod	68.745	68.060	90.283	92.958
	Total	**2118.874**	**2247.634**	**2450.528**	**2537.108**

Source: Directorate of Animal Husbandry

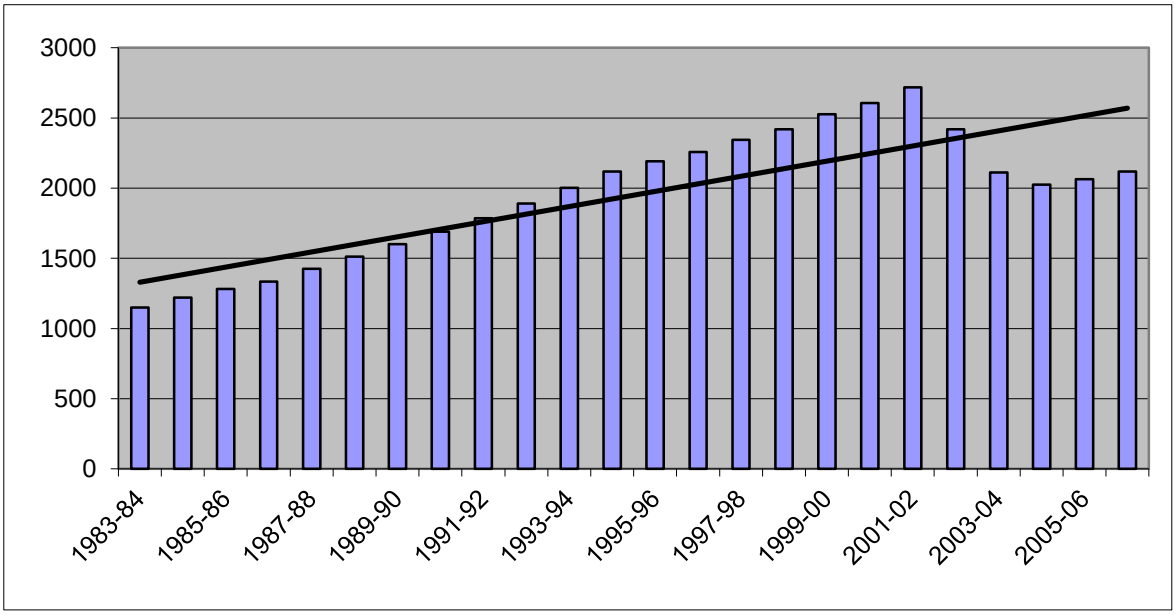
Table 2.15
Trend in Milk Production: Kerala
(1983-84—2006-07)

(In '000 Tonnes)

Year (X)	*Production (Y)*	*Trend Equation Y = 53.012X +1276.4*		*Elimination of Trend*
		Value of X	*Trend Values*	
(1)	*(2)*	*(3)*	*(4)*	*(5 = 2-4)*
1983-84	1150.40	1	1329.41	-179.01
1984-85	1220.50	2	1382.42	-161.92
1985-86	1282.94	3	1435.44	-152.50
1986-87	1333.63	4	1488.45	-154.82
1987-88	1425.71	5	1541.46	-115.75
1988-89	1511.83	6	1594.47	-82.64
1989-90	1600.32	7	1647.48	-47.16
1990-91	1689.58	8	1700.50	-10.92
1991-92	1784.53	9	1753.51	31.024
1992-93	1889.42	10	1806.52	82.903
1993-94	2001.33	11	1859.53	141.80
1994-95	2118.25	12	1912.54	205.71
1995-96	2192.22	13	1965.56	226.66
1996-97	2258.09	14	2018.57	239.52
1997-98	2342.92	15	2071.58	271.34
1998-99	2420.04	16	2124.59	295.45
1999-00	2525.27	17	2177.60	347.67
2000-01	2605.46	18	2230.62	374.84
2001-02	2717.89	19	2283.63	434.26
2002-03	2418.98	20	2336.64	82.34
2003-04	2110.55	21	2389.65	-279.10
2004-05	2025.21	22	2442.66	-417.45
2005-06	2063.20	23	2495.68	-432.48
2006-07	2118.88	24	2548.69	-429.81

Source: 1.Directorate of Animal Husbandry 2. Output of MS EXCEL

Figure 2.7
Trend in Milk Production: Kerala
(1983-84—2006-07)



The trend equation fitted by the method of Least Squares is: Y = 53.012 X + 1276.4 with R^2 = 0.68. This means that the curve fitted was 68 per cent best fit to the actual observed values of milk production. That is, the unexplained variation out of total variation was 32 per cent only. In the trend equation, 1276.4 is the intercept term and 53.012 is the slope.

The projected values of total milk production in Kerala are given in Table 2.16. It shows that the expected value of milk production in Kerala is 2760.74 thousand tonnes in 2010-11, 3025.80 in 2015-16 and 3237.84 thousand tonnes in 2019-20. That is, a steady increase in milk production is expected in future.

In conclusion, a cyclical pattern in milk production was observed with an increasing trend in milk production. In Kerala farmers have adjusted to the situation by restricting the number of cattle and that too through selection of high yielding crossbreeds. This is evident from the steep increase in the proportion of crossbred cows, which Kerala could achieve during the last three decades.

Table 2.16
Projected Milk Production: Kerala
(2010-11—2019-20)

(In '000 Tonnes)

Year (X)	***Trend Equation Y = 53.012 X +1276.4***	
	Value of X	**Projected Value of Y (Milk Production)**
2010-11	28	2760.74
2011-12	29	2813.75
2012-13	30	2866.76
2013-14	31	2919.77
2014-15	32	2972.78
2015-16	33	3025.80
2016-17	34	3078.81
2017-18	35	3131.82
2018-19	36	3184.83
2019-20	37	3237.84

Source: Output of MS EXCEL

2.4 Egg

Poultry production in Kerala remained largely as a backyard venture. Egg production statistics in the state from 2006-07 to 2009-10 shows an increasing trend. The percentage of increase from 2006-07 to 2009-10 was 35.45.

Table 2.17
District wise Egg Production in Kerala

(In Lakh Numbers)

Sl.No	District	2006-07	2007-08	2008-09	2009-10
1	Thiruvanathapuram	1065.494	1196.815	1447.492	1536.157
2	Kollam	956.241	1108.168	1306.139	1280.351
3	Pathanamthitta	758.719	949.491	1198.575	2017.610
4	Alappuzha	1134.431	1090.168	1010.736	1303.675
5	Kottayam	1046.899	1224.919	1142.149	1177.117
6	Idukki	452.190	500.750	626.622	726.809
7	Ernakulam	1013.137	1176.190	1451.814	1585.015
8	Trissur	1224.312	1751.330	2200.187	2161.704
9	Palakkad	884.298	845.317	1065.915	945.815
10	Malappuram	1446.726	1625.247	1288.250	1354.162
11	Kozhikkode	807.847	793.688	709.076	835.087
12	Wayanad	279.241	300.178	305.974	250.046
13	Kannur	652.757	862.730	783.470	579.714
14	Kasaragod	334.264	366.917	529.222	577.150
	Total	**12056.556**	**13791.908**	**15065.621**	**16330.412**

Source: Directorate of Fisheries

2.5 Meat

According to Animal Husbandry Department, Kerala is the highest consumer of meat with a daily requirement of over 5000 tonnes. District wise meat production in the organised sector is given below:

Table 2.18
District Wise Meat Production in Kerala

(In MT)

Sl.No	District	2006-07	2007-08	2008-09	2009-10
1	Thiruvanathapuram	2328	1589	2669	2423
2	Kollam	8810	8792	18732	25210
3	Pathanamthitta	1390	1333	2882	3108
4	Alappuzha	5091	4967	8807	9492
5	Kottayam	3330	2943	4847	4520
6	Idukki	4959	4768	8372	8088
7	Ernakulam	9986	11344	21505	20829
8	Trissur	2975	2301	5044	4992
9	Palakkad	572	315	1496	4395
10	Malappuram	7810	9558	17204	14013
11	Kozhikkode	4433	4061	8150	6470
12	Wayanad	1807	1569	2383	2256
13	Kannur	4547	4398	6030	4640
14	Kasaragod	2075	2255	2226	1591
	Total	**60113**	**60193**	**110347**	**112027**

Source: Directorate of Animal Husbandry

2.6 Fish

Fish production in the state had shown a sluggish performance from 2006-07 to 2008-09. The overall production figures had shown a marginal decrease over the years from 2006-07 to 2008-09. The percentage of decline is 2.5.

Table 2.19
District Wise Fish Production in Kerala

(In MT)

Sl. No	District	2006-07	2007-08	2008-09
1	Thiruvanathapuram	48289	47299	47055
2	Kollam	121922	119516	118859
3	Pathanamthitta	0	0	0
4	Alappuzha	137971	134905	134313
5	Kottayam	0	0	0
6	Idukki	0	0	0
7	Ernakulam	58407	57333	57000
8	Trissur	69484	68283	67887
9	Palakkad	0	0	0
10	Malappuram	29200	28679	28530
11	Kozhikkode	89743	87952	87440
12	Wayanad	0	0	0
13	Kannur	24958	24546	24389
14	Kasaragod	18082	17773	17677
	Total	**598056**	**586286**	**583150**

Source: Directorate of Fisheries

2.7 Fisheries Department

Food security schemes in the fisheries sector in the 11th Plan period were 1) Deep sea fishing, 2) Matsya Keralam 3) Integrated prawn/fish culture in Kuttand and Integrated prawn/fish culture in kole lands.

A drastic change was seen in the inland fish production of the State through the implementation of Matsya Keralam project. Through the implementation of the project and its wide acceptance by Local bodies and farmers, the inland fish production is 150000 tonnes.

2.8 ICDS

I.C.D.S. is an integrated approach for the development of women and children from disadvantaged sections across the life cycle. ICDS Programme was conceived in Kerala since 1975 with an integrated delivery package of early child hood services so that their synergistic effect can be taken full advantage of the schemes. The Scheme targets the most vulnerable groups of population including children up to 6 years of age, pregnant women and nursing mothers belonging to poorest of the poor families and living in disadvantaged areas including backward rural areas, tribal areas and urban slums. The identification of beneficiaries is done through surveying the community and identifying the families living BPL.

2.9 Supplementary Nutrition Programme (SNP)

On October 2nd 1975, when Integrated Child Development Services Scheme was introduced in the State, the policy of the state was to conduct SNP with locally available food materials. However, in course of time, the State utilized the services of CARE and World Food Programme (WFP) until 1986.

In the 9th Plan when the People's Plan was introduced in the State, as part of the Panchayath Raj System, all the feeding programmes in ICDS have been transferred to Local Self Governments w.e.f. 01-04-98. The LSG are providing noon-meal with rice and green gram to Pre-School children. On the other hand the LSG are empowered to plan and implement their own food items for SNP based on local needs without affecting the nutritive value. The funds for SNP were included in the Service Sector under Plan Scheme of LSG.

2.10 Directorate of Dairy Development

The Dairy Development Department is undertaking programmes aimed at increasing milk production and consumption. The thrust areas of functioning of this department are Fodder Development, Dairy Extension and promotion of rural milk marketing.

2.11 Milma

Three Regional Milk Unions are implementing various schemes. Details of the activities carried out by each Regional Union are given below:

2.11.1 Thiruvanathapuram Regional Co-operative Milk Producers' Union Ltd. (TRCMPU)

To improve milk production and reduce deficit of milk, following schemes are suggested during 12th Five Year Plan.

Sl No	Scheme	Nos.	Estimated Cost (Rupees..in Lakh)			Beneficiary Contribution
1	Supply of milking machine	200/yr	91	91	91	50%
2	Supply of mineral mixture of milch animals	20000/yr	40	40	40	50%
3	Free cattle feed to mini dairy units	4000/yr	122.4	122.4	122.4	nil
4	Heifer Nursery	1000/yr	209.4	209.4	209.4	50%
5	Calf adoption scheme	5000/yr	169.05	169.05	169.05	Nil
6	Heifer adoption scheme	4000/yr	354.68	354.68	354.68	50%
Total			**986.37**	**986.37**	**986.37**	
Government share			**638.61**	**638.61**	**638.61**	

2.11.2 Ernakulum Regional Co-operative Milk Producer's Union Ltd (ERCMPU)

Schemes to be proposed for the 12th Five Year Plan are given below:

1. Completion of ongoing schemes

2. Second phase of strengthening infrastructure for quality & clean milk production (SIQ&CMP)
3. Project for dairy development in Idukki under Idukki package
4. Project for capacity expansion of Ernakulam Dairy under RKVY

Supply-Demand Gap in ERCMPU

Year	Local Procurement (LPD)	Sales(LPD)
2007-08	191254	246379
2008-09	171143	257052
2009-10	169864	273920
2010-11	156309	272647

The gap between local procurement and sales was met by purchasing milk from outside state and reconstitution of milk powder.

2.11.3 Malabar Regional Co-operative Milk Producers' Union Ltd. (MRCMPU)

Schemes proposed for the 12th Five Year Plan are

Schemes	Estimated Cost(In Lakh)
Establishment of cattle feed milling unit at Wayanad	124
Establishment of cattle feed milling unit at Kasaragod	210

2.12 Supply - Demand Gap

2.12.1 Rice

Following the implementation of land reforms, the agricultural sector in Kerala has undergone wide-ranging changes in terms of farm size, cropping pattern, cultivation practices and productivity. 96 per cent farmers are marginal farmers holding less than one acre of land. The chances of them to sustain farming are bleak. The redistribution of agricultural holdings and

the socio-economic changes during the past four decades is important factors contributing to the changes in the agriculture sector of the State. Of this, the changing structure of agriculture holdings is a major factor affecting land use, cropping pattern, productivity, and farm employment. The principal cause of food insecurity is poverty, there are also many other contributing factors, linked to the balance of supply and demand.

The demand for food was not just because rising populations resulted in more mouths to feed, but also because higher incomes enabled consumers to buy more and better food. The poorest people typically have to buy the cheapest available carbohydrates. But, with more money, they can buy more fruits and vegetables, along with meat, dairy goods, and eggs. As a result, food habit has been changing from a traditional diet based on carbohydrates and vegetables to one richer in fat and protein. Food production in Kerala has never been sufficient to meet the requirements of its ever-growing population.

Rapid population growth is major reason for hunger. Population growth in already densely populated area reduces the land available for each family, inevitably contributing to poverty and rural malnutrition. Ending malnutrition will require reducing the cost of food for households and increasing their incomes. With rapid population growth, per capita agricultural productivity increased much more slowly than production. In Kerala, food production has been decreased day by day due to shortage of cultivable land area, absence of labours and several other factors, furthermore the rapid growth of population lead to widen the food gap and bring about a serious concern over our food security in future.

Table 2.20
Requirement and Availability of Rice

(In Lakh Tonnes)

Year	Population (Lakh)	Requirement	Own Production		External Supply		Deficit %
			Total	Available	PDS	Private	
1	2	3	4	5	6	7	8
1951	135.49	14.22	7.12	6.41	--	7.81	55
1961	169.04	19.77	10.68	9.61	--	10.16	51
1971	213.47	24.96	120.98	11.68	7.37	5.91	53
1981	254.54	29.77	12.72	11.45	10.63	7.69	61
1991	290.99	34.03	10.87	9.78	17.50	6.75	71
1996	311.01	36.37	9.53	8.58	13.50	14.29	76
2001	318.41	37.98	7.51	6.76	9.07	22.15	82
2009	338.87	42.65	5.98	5.38	10.14	24.62	86

Note: Ten percent of the production of rice is treated as seed requirement to arrive at availability.
Source: NSS Consumer Expenditure Reports

The extent of the food grain deficit in Kerala as indicated in Table 2.20 had shown that Kerala's deficit in rice was 50 to 55 per cent from the early fifties to the mid-seventies. Since then the deficit had increased steadily and now stands at more than 85 per cent of its requirement. From the national view, Kerala accounted only 1.3 per cent of the production in India till the mid-seventies; this has now come down to 0.5 per cent. Till the mid seventies Kerala accounted for only 4 percent of India's population which has declined to 3.3 per cent by the end of the century. Given the continuing trend in the decline of the area under rice, and the continuing increase in the requirement as a result of population increase, although at a slower rate, the deficit is likely to go up to above 90 per cent of the requirement within the next few years. Latest figures (for 2009-10) show that the rice production in the state has declined to 5.98 lakh tonnes. i.e. only around 13.40 per cent of the requirement.

There has been an unprecedented hike in the price of rice over years. In 2000, the price of rice in the open market was ` 7 per kg. In 2010 it was ` 27.15 for one kg of rice. The Food and Agriculture Organization (FAO) foresee 70 per cent hike in the price of rice every year. If the

price continues to shoot up in this fashion, we will have to pay ` 150 to buy one kg of rice by 2020. The average Retail Prices of Rice in Kerala 2006-2010 is given below;

Table 2.21
Average Retail Prices of Rice in Kerala 2006-2010

Sl. No	Commodities	Unit	Prices During December (In Rupees)					% Variation over Previous Years			
			2006	2007	2008	2009	2010	2007	2008	2009	2010
1	Rice (Red) OM Matta	Kg	14.03	17.67	19.76	22.89	27.15	25.90	11.80	15.8	31.5

Source: Directorate of Economics & Statistics.

2.12.2 Vegetables, Fruits and Tubers

Kerala is highly deficient in its requirement of vegetables. Out of the total availability of vegetables of 8.18 lakh tones, it hardly produces 3.47 lakh tones or 42 per cent only. 58 per cent of the total availability is accounted for by the neighboring states. If the requirement is worked based on ICMR norms, the state requires as much as 24.11 lakh tones. In that case, its production is hardly 14 per cent of the total requirement, excluding imports from neighboring states and exports to Gulf. In the case of fruits, the state produces 69.22 per cent of total availability with 30.78 per cent flowing from neighboring states. As per ICMR norms, the total requirement of the state works out to 13 lakh tons while the state produces hardly around 6.07 lakh tones or 46.69 per cent. Though, Kerala is highly deficient in its requirements of vegetables and fruits, it is almost self sufficient in tuber crops like tapioca in total availability and off – take. These are detailed below:

Table 2.22
Availability, Production and Requirement of Vegetables, Fruits and Tubers

Item	Availability and Local Production					Total Requirement as per ICMR Norms	
	Total Availability (MT)	Local Production (MT)	% of Production to Total Availability	Supplies from Outsides/ States	Food Gap (In %)	Total Requirement (MT)	% of Local Prodn.
Vegetables	818400	347000	42.40	471400	57.60	2411044	14.39
Fruits	877674	607494	69.22	270180	30.78	1300625	46.7
Tubers	463015	443775	95.84	19240	4.16	1049619	42.28

Source: Horticulture Mission, Govt. of Kerala

Chapter III

Public Distribution System

3.1 Policy Interventions

Policy interventions can be divided into three broad classes: (i) interventions to ensure household food security by strengthening targeted safety nets; (ii) interventions to lower domestic food prices through short-run trade policy measures or administrative action, and (iii) interventions to enhance longer-term food supply. Within all three categories of policies there are 'first best' or preferred options that are more effective and equitable, and introduce fewer distortions.

3.2 Ensuring Household Food Security via Targeted Safety Nets

First best options to address food insecurity include targeted cash transfers to vulnerable groups**.** These support the purchasing power of the poor without distorting domestic incentives to produce more food, and without reducing the incomes of poor food sellers. Examples include cash or near-cash transfers that are conditional upon meeting a requirement (such as low income, location or occupation) or engaging in a mandated behaviour (such as sending children to school). The scale, targeting efficiency and value of such transfer programs tend to be directly related to overall levels of development, given the administrative complexities and fiscal costs entailed.

Agriculture including crops, livestock and aquaculture is a powerful poverty reduction tool. According to the World Bank, for every one per cent growth in agriculture, poverty declines by as much as two per cent. And because the majority of those who are hungry, live in rural areas and depend on agriculture and natural resources for their livelihoods, investing in agriculture is the most efficient way to target those in need. Investments in the agricultural sector

also contribute to overall economic growth by increasing efficiency in the marketing chain, reducing the share of poor people's income spent on food, and enabling them to purchase other goods and services, like education, health care, and housing. Unleashing the potential of small-scale farmers and agribusinesses to produce and sell food will substantially reduce hunger and create a more flexible food supply for everyone.

Adopt a comprehensive approach to food security that focuses on advancing agriculture-led growth, reducing under-nutrition, and increasing the impact of humanitarian food assistance. Reducing hunger and ensuring food security is being developed through a consultative process within the government and with the academic community and other stakeholders, including non-governmental organizations, and the private sector. In the past, food production efforts have been undermined by a lack of coordination, limited transparency, uneven monitoring and evaluation. Going forward, we will emphasize consultation and careful analysis of impact and make corrections as we go. While we will increase our own efforts, success will ultimately rest on the shoulders of the farmers and entrepreneurs who wake up each day committed to grow their future. It also will rest on the national and local leaders in their localities who must foster environments where investments in agricultural development can thrive, with zero tolerance for the petty corruption and polices that restrict agriculture-led growth.

3.3 Efficiency of Major Agriculture Projects Launched in XI Plan

Kerala's position with regard to the availability of food is below the national average leading to the characterization of the state as a "food deficit "one. The extent of this deficit has increased over time in Kerala increasing its vulnerability to any short- term or long term food grain deficit at the national level. This is borne out by the experience of Kerala since its formation in 1956 to the mid-seventies when the country experienced shortfalls in food grain

production and consequent introduction of restrictions on the movement of food grains. The 'food problem' then assumed a critical place in the politics of the state as well as its relations with the central government. Even if we consider only rice Kerala is not self sufficient in the recent path. There are various projects launched in the state with the aim of ensuring food security during the XIth Five Year Plan period (2007-12). Here we examine the physical targets of major crops and its achievement upto 2009-10.

Table 3.1
Physical Target and Actual Growth up to 2009-10

(In Lakh Tonnes)

Sl No	Item	Base Level	XI Plan Target	Actual Growth upto 2009-2010
1	Rice	6.30	9.45	5.9
2	Coconut (Million Nuts)	6020	8000	5667
3	Pulses	0.08	0.16	0.03
4	Tapioca	27.14	28.50	25.23
5	Banana & Other Plantai	9.55	15.00	4.08
6	Mango	5.60	9.06	NA
7	Pineapple	1.13	1.50	NA
8	Cashew	0.58	0.80	0.36
9	Pepper	0.76	1.04	0.37

Source: Kerala State Planning Board

In the above table, we can see that the actual growth (after the completion of 3 years of XI Plan) of major agricultural products is less than the base level growth. From this trend we can predict that the plan target will not only be achieved and it will become less than the base level growth. This will again widen the food gap between supply and demand and it worsen our food security some more.

3.4 Public Distribution System

PDS is primarily a social welfare and antipoverty Programme of the Government of India. Essential commodities like rice, wheat, sugar, kerosene and the like are supplied to the people under the PDS at subsidized prices. It has been one of the most important elements in

India's safety net system for almost 60-years and also the most far reaching in terms of coverage as well as public expenditure on subsidies. PDS provides rationed amounts of basic food items (rice, wheat, sugar, edible oils) and other non-food products (kerosene, coal, standard cloth) at below market prices to consumers through a network of fair price shops disseminated over the country. The scale of the programme is evident from the fact that it handles 15 per cent of the total availability of rice and wheat. With a network of more than 400,000 Fair Price Shops (FPS) in India is perhaps the largest distribution machinery of its type in the world. The PDS is said to distribute commodities worth more than ` 15,000 crore to about 16 crore families each year. The success of this huge network is dependent on its ability to translate a macro level self-sufficiency to a micro level, by ensuring availability of food grains for poor households. The PDS is considered as the principal instrument in the hands of government for providing a safety net to the poor and the downtrodden.

The system serves triple objectives namely protecting the poor, enhancing the nutritional status and generating a moderate influence on market prices. Thus, the main objectives of the PDS can be summarized as follows:

- Maintaining price stability
- Raising the welfare of the poor (by providing access to basic foods at reasonable prices to the vulnerable population)
- Rationing during situations of scarcity
- Keeping a check on private trade.
- Growth with stability, and
- Social justice.

3.4.1 Different Phases of PDS

The focus and exposure of PDS has been changed far and wide over the years. Initially during the World War civilian consumption was restricted so as to divert food items to meet the food requirement of defence forces. Subsequently, frequent occurrence of drought throughout the country made the planners think about food shortages. In order to overcome these shortages, the ration system came in to existence. Fair Price Shops were opened to distribute the items of mass consumption in urban areas. Thereafter, it was extended to rural areas. From the year 1992, the Revamped PDS was introduced in those areas where Drought Prone Area Programme and Dessert Development Programme were in operation. Under this system people were allowed to purchase essential items from the FPS at relatively lower subsidized rates. After, the Chief Ministers' Conference held in July 1996, a revised scheme known as the Targeted PDS was introduced countrywide with a network of 4.74 lakh FPS. Under the TPDS a two-tier subsidized pricing system is followed. Card holders are classified as APL) and BPL. The BPL families are entitled to receive the essential commodities at a price, which is very close to the economic cost. The TPDS was further extended in December 2000 to include the Antyodaya Anna Scheme. It consists of the identification of 10 million of the poorest families out of the total BPL population of 65.2 million-'the Poorest of the Poor', and provides them with 25 kg of food grains per family per month at the price of ` 2 per kg of wheat and ` 3 per kg of rice.

3.5 Food Subsidy

Food subsidy, given by the centre to procurement agencies like the Food Corporation of India, is to cover the difference between buying and selling prices. To ensure that farmers get a good price the minimum support price for their crop and at the same time food is available to the poor at below market rates, the government procurement agencies buy costly and sell cheap,

with the difference being made good by the Centre. The food subsidy consists of two components. The first component is the distribution subsidy that comes about from the fact that the difference between the issue price (at which the government sells) and the procurement price is not enough to cover the costs of distribution. The second component is the cost of carrying buffer stocks. Between 1971-72 and 2001-02, the food subsidy has averaged a little less than 0.5 per cent of GDP. Broken up by decade, the food subsidy has increased over this period and is nearly 0.6 per cent of GDP in the decade leading up to 2001-02. A strong food security system requires financial backing and adequate allocations. At present the food subsidy budgeted for 2009-10 of the Government is 46,906.68 crore rupees, which is about 1.18 per cent of GDP.

3.6 PDS in Kerala

The salient features of the Kerala's Public Distribution system were its universal coverage, high levels of utilization, physical access made possible through a vast network of retail outlets, rural bias and progressive utilization of the system. The origin of public distribution of food grains in Kerala can be traced back to Second World War. In order to make good the deficiency and to safeguard the interests of the common man against exploitation by the private traders, a system of PDS has been in practice in the state even from the pre-independent days, which was discontinued for a short spell from 1954 to 1956. The state government introduced an informal system of distribution of rice at subsidized rates to lower income group in 1957 and the system continued till October 1964. The state experienced acute shortage in the availability of rice during the year 1964 consequent on the restriction imposed in the movement of rice by the southern states of India. The formal rationing was introduced throughout the state with effect from 1st November 1964.

All households in Kerala possess ration cards with which they can purchase rice, wheat, sugar, kerosene, etc. in a specific quantity per week or month at subsidized rates. The result is that retail price of essential commodities cannot rise steeply when compared to other states in India, even though Kerala is a consumer state. We can see that 99 per cent of Kerala villages are served by a Fair Price Shop within two kilometres as compared to only 35 per cent of India's villages generally. The profile of PDS in Kerala during 1990 – 2010 is given in Table 3.2.

Table 3.2
Profile of PDS in Kerala (1990-2010)

*Y*ear	Ration Cards (In lakh)	Ration Permits to Institution (In Numbers)	No. of Retail Shops (In Numbers)	Whole Sale Shops (In Numbers)	FCI Depots (In Numbers)
1990	50.52	9016	13007	296	39
1995	56.5	13173	14179	353	39
2000	62.6	17528	14226	345	23
2005	67.8	14187	14195	333	21
2010	68.4	14101	14239	335	22

Source: Departmentt. of Civil Supplies. Government. of Kerala, 2010.

In 1990, there exist 50.52 lakhs ration cards in Kerala and ration articles are issued through 296 wholesale ration depots scattered all over Kerala. During 2010, there are 14239 ration retail shops in Kerala as against 13007 shops in 1990. Out of these 14239 retail shops, 12428 shops are in rural areas and 1811 are in urban areas. The benefits of the system were equitably spread across income groups in both rural and urban areas. Each retail outlet served about 400 households and, according to the state government, no individual needed to walk more than 2 km to fetch his ration. The system required a certain minimum off take in all these shops if they are to be viable.

3.7 Targeted Public Distribution System (TPDS)

Well targeted and properly functioning PDS is an important constituent of the strategy for poverty alleviation. In order to make PDS more responsive to the need of the poor, Targeted Public Distribution System was introduced in June 1997. In the TPDS, subsidies are restricted BPL households. A profound consequence of TPDS is that it ties the central government subsidy to the BPL population within a state.

The TPDS has affected Kerala's PDS in several ways. First, as 25 per cent of Kerala's population have been termed BPL by the Planning Commission, the guaranteed and subsidized allocation of grain for BPL households under the TPDS accounts for only 10 per cent of the previous PDS supply. Given that Kerala is a food deficit state, in the pre-TPDS period, the state's own production accounted for 20 per cent of grain requirements, the PDS accounted for 32 per cent and the rest came from private trade.

Secondly, the main flaw is that in the approved list of BPL families (targeted beneficiaries) certain non eligible have found place whereas the 'real' eligible have been left out. It has been found that the criteria for inclusion in BPL list are solely economical which is often understated. There are complaints that persons having political patronage have found a place in BPL list. A large number of the very poor are in the APL category and are thus denied 'physical access' and their right for subsidized food grains from PDS. The list, which was prepared in 1997, is not periodically revised and updated so as to weed out those who have come up above the poverty line in due course. The Kerala government has identified 42 per cent of households as BPL households and is providing the BPL subsidy to these households from the state budget. The Kerala government has continued to provide additional grain to BPL households as well as

maintained its entitlements for APL households. There is a state subsidy on sales to APL households.

Thirdly, off take from the PDS has declined. As compared to an annual off take of rice and wheat of around 2 million tonnes in 1991 and 1992, the off take in 1999 was 1.6 million tonnes and in 2000 it fell further to 0.71 million tonnes.

Fourthly, there is evidence that ration shops are becoming unviable and closing down. With the higher APL prices, ration shops have lost their advantage in relation to private stores for the majority of the population and it is reported that people have begun to shift to private traders. As compared to a monthly sale of 7500 kg of rice and 2000 kg of wheat in early 2000, fair price shops are now selling 1400 kg of rice and 200 kg of wheat a month. Since sales from fair price shops have declined, many are estimated to be making losses.

Finally, the distinguishing feature of TPDS is now has a dual central issue price: prices for BPL consumers and prices for APL consumers. A third price introduced in 2001, is for beneficiaries of the Antyodaya Scheme.

The central government dubiously restricted 11 lakh of families under the BPL list. At the same time, the state government expanded it as 25 lakh of families and distributed rice through ration shops for 2 rupees per kg. Government intervention through numerous stores of the Civil Supplies Corporation and Consumer Fed, Maveli hotels and Co-operative stores, in fact facilitated to curb the rate of price rise. And hence price for numerous food grains, vegetables etc. has become lesser than the producing states. For this, the state government spent 400 crores through the PDS, which is the ever highest amount in this regard.

3.8 Monthly Requirements

Monthly requirement of rice under PDS as per 100 per cent entitlement and other welfare schemes including AAY is about 3.92 lakh tonnes per month. Government of Kerala is fully utilizing allotments made by the Government of India under APL BPL and AAY quota. Present monthly sales of rice under public distribution system, including AAY, is about 3.17 lakh tonnes. Due to the increase in the open market price of rice, off take of rice under PDS is also on the increase. A quantum of 49.39 lakh tonnes of rice and 8.36 lakh tonnes of wheat has been distributed through PDS on Kerala (Source: Economic Review, Planning Board, 2010). Details are given in Table-4.7 and 4.8

Table 3.3
Distribution of Rice, Wheat, Sugar & Kerosene through the PDS (2007-08 to 2009-10)

Year	Rice (In Metric Tonnes)	Wheat (In Metric Tonnes)	Sugar (In Metric Tonnes)	Kerosene (in KL)
2007-08	854105	258932	37023	245448
2008-09	859091	202607	53787	243961
2009-10	1013931	202607	68147	244873

Source: Economic Review,2010

Table 3.4

PDS Food Grain Distribution for Different Schemes

(In MT)

Scheme	Allotment	Lifting	% of off take Against Allotment	Off take
APL	447672	442190	99	442599
BPL	318792	319172	100	317841
AAY	250260	249872	99.76	249649
ANP	5400	5400	71.17	3841

Source: Economic Revie ,2010

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3.9 Per Capita PDS Purchase

The trend of per capita PDS purchase emerging from Kerala requires further comment. Average purchase of rice crashed from 4.1 kg/capita in 1999-2000 (the highest across states in that year) to 1.71 kg/capita in 2004-05, and then recovered partially in subsequent years to 2.24 kg/capita at the end of the reference period. The initial decline in per capita purchase in Kerala is partly because PDS coverage in Kerala suffered with the introduction of the TPDS. In the pre-1997 period, Kerala was the only state in which access to the PDS was close to universal in principle and in operational terms.

3.10 Issues in Intervention

In principle, food market interventions are supposed to enhance the efficiency of food markets as well as improve the equity of food market outcomes. The efficiency effect arises from price stabilization. As private storage of food grains is typically unprofitable across years, markets do not supply price stabilization even though it is socially desirable, as poor risk-averse food consumers cannot obtain credit or insurance against crop failures. The reduction in risk is beneficial to producers as well. Even with stabilization, the market outcome involves unacceptably low food consumption for the poor. The equity objective of food market intervention is to augment the food consumption of such target groups by offering subsidies. Both these goals could be achieved by procurement, storage and distribution. To meet the equity goal, the government offers limited quantities of food to poor consumers at subsidized prices.

Targeting schemes usually involve a trade-off between errors of exclusion and inclusion. Subsidies with universal access minimize exclusion errors but maximize inclusion errors.

3.11 State Government's Initiation on Food Security

Rice is the staple food of Kerala. While availability for a large portion of consumption needs of an average family has been taken care of under PDS, affordability of essential commodities to the poorest is another major issue. Food grains at the rate of ` 2 is being distributed to BPL/AAY sections of card holders, as well as families of SC/ST, Fishermen, and Asraya in the state in Thiruvananthapuram district from 22.5.2009 and in other districts from 23.5.2009 onwards. The amount spent for the implementation of this scheme during the financial year 2009-10 is ` 195.95 crores (Source: Directorate of Civil Supplies, 2010). This is achieved by reducing the issue price of rice from ` 2 per kg to Rupee 1 per kg from 1.9.2011. This is an appreciable initiation by the state government to provide reliable food security. Kerala is the second state in the country to supply 1 kg of rice at ` 1/- after Tamil Nadu. The Table 3.5 shows PDS issue prices for various commodities distributed through fair price shops in Kerala during 2011.

Table 3.5
PDS Issue Prices in Kerala

(`/ kg)

Items	BPL Households	APL Households
Rice	1	6.90
Wheat	2	6.90
Kerosene	9.90 per litre	-

Issue price of essential commodities under public distribution system is significantly lower than those fixed by Government of India. As a result, state government has been incurring substantial subsidy expenditure which is released to Kerala Civil Supplies Corporation. During 2009-2010, the state had to enhance the food subsidy to ` 195.95 crore due to the purchase of additional quantum of rice needed to cover the excess offtake over and above central pool allocation.

The case for the urgent need for strengthening the institution of PDS in Kerala is on several grounds. The need to complement food availability in the state given the state's acute and growing food deficit status, the need to stabilize the open market food grain prices and ensure physical and economic accessibility of food grains to the economically vulnerable households, to improve the extremely low existing level of cereal and calorie consumption of the poor households and to sustain the health achievements of the state.

PDS had long been considered as an important institutional intervention for maintaining food security in such a chronically food deficit state of Kerala. Public Distribution System (PDS) is said to have existed from the time before independence in India, and was initially intended to protect consumers from food shortages and producers from price fluctuations (Tarozzi 2002).
At present the Government of India has, in addition to the TPDS, two other programmes called the Antyodaya Anna Yojana (AAY) and the Annapurna scheme, which are discussed below:

3.12 The Beneficiaries of AAY Scheme

The poorest of the poor families from amongst the BPL families covered under TPDS like landless agriculture labourers, marginal farmers, rural artisans/craftsmen such as potters, tanners, weavers, blacksmiths, carpenters, slum dwellers, and persons earning their livelihood on daily basis in the informal sector like porters, coolies, rickshaw pullers, hand cart pullers, fruit and flower sellers, rag pickers, cobblers, destitute and other similar categories in both rural and urban areas.

Households headed by widows or terminally ill persons/disabled persons/persons aged 60 years or more with no assured means of subsistence or societal support.

All primitive tribal households: The scale of food grains under the AAY scheme is 35 kg per household, priced at ` 3 per kg of rice.

3.13 The Beneficiaries of Annapoorna Scheme

Indigent senior citizens or those 65 years of age or above, who though eligible for old age pension under the National Old Age Pension Scheme (NOAPS) are not getting the pension, ten kg of food grains per person per month is supplied free of cost under the Annapurna scheme.

These two programmes show a wrong coupling of categories of the very poor. This is what happens when food-related programmes are conceived in an ad-hoc fashion to meet a particular situation like liquidation of stocks accumulated in excess of the buffer needs because of food stocks procured at high minimum support prices but offered at unaffordable prices to the poor in the TPDS.

The sustainability of PDS is now a matter of concern. To quote the High Level Committee Report 'the introduction of targeting has not reduced the expenditure on the food subsidy while it has at the same time weakened the overall system'. A switchover to the universal system would at least ensure access to PDS to all the genuinely poor households in Kerala. However, the consideration of subsidy burden may go against such a policy change. A feasible alternative would be to bring down the targeting errors, particularly the exclusion errors to a negligible level. However, adherence to the strict income criterion, ie, having the income below a certain level for being eligible to be categorized under the BPL category, is not likely to serve the purpose. This would result in bringing back the forced market dependents back to the ration category, thereby helping improve their consumption level. Only adequate public intervention through a well functioning PDS can ensure economic access to food and nutrition by the poor and help sustain the high social achievements of the state. A significant policy decision to restore the system to its past glory is the immediate need of the hour.

3.14 Civil Supplies Department

The prime objective of the Civil Supplies department is to run the PDS in an effective manner and ensure that rationed articles are made available to consumers at subsidised price fixed by the government. The PDS in the state, came into existence from 01-06-1966 with the implementation of Kerala Rationing order 1966.The coverage of ration population is nearly hundred per cent. The department is also responsible for ensuring availability of essential commodities in the open market at reasonable price as well as to prevent unfair trade practices like hoarding undue profiteering and black- marketing. Today the Civil Supplies Department has to administer a PDS that caters to the needs of 76 lakh rationed cardholders by making available rationed articles at subsidised price through a network of 335 Authorised Wholesale Dealers, 295 Kerosene Wholesale Dealers and 14250 Authorised Retail dealers.

3.14.1 Schemes/Projects Implemented during 11th Five Year Plan

Table 3.6
Schemes/ Projects Implemented during 11th Five Year Plan

(In Lakh)

Sl. No.	Schemes	Eleventh Five Year Plan Outlay	Annual Plan 2007-08		Annual Plan 2008-09		Annual plan 2009-10		Annual Plan 2010-11		Annual Plan 2011-12
			Out lay	Expenditure	Outlay	Expenditure	Out lay	Expenditure	Outlay	Expenditure	Out lay
1	Strengthening and Modernisation of PDS/Computerisation Programme	25	3	1.48	10	9.99	10	10	115	114.83	20
2	Annapurna	1670	334	292.06	334	332.63	334	306.28	334	334	334
3	Training Programme	25	3	2.44	5	5	5	4.85	5	5	5
4	Consumer welfare fund (50% CSS)	40	10	0	15	15	15	15	15	9.11	15
6	Supply- Co - Council for food research and development	740	45	45	52	52	58	58	60	58.00	110
7	Modernization of authorized Ration depots				15	15	15	16.70	15	14.85	15
	Shifted/Deleted scheme			239.28							
8	One time plan assistance for inflation control measures (New Scheme)										8025
	Total	**2500**	**395**	**580.26**	**431**	**429.62**	**437**	**420.83**	**544**	**535.79**	**8524**

Source:Kerala State Planning Board

3.14.2 Schemes/ Projects Proposed during 12th Five Year Plan

Table 3.7
Schemes/Projects Proposed during 12th Five Year Plan

(In Lakh)

Sl No	*Schemes/Project*	*Outlay*
1	Computerization	25400
2	Training Programmes	50
3	Consumer Welfare Fund	100
4	CFRD	7200
5	Annapoorna	1670
6	Modernization of ARDs	1004
7	Integrated Project on Consumer Protection for Strengthening the Infrastructure of Consumer Courts	500
8	One Time Plan Support Fund for Inflation Control Measures	35400
Total		

Source: Civil Supplies Department

Chapter IV

Measures to Address Malnutrition in a Socially Inclusive Manner

The concept of food security has undergone considerable changes in recent years. Food availability and stability were considered good measures of food security till the seventies and the achievement of self-sufficiency was accorded high priority in the food policies of developing countries. Though India was successful in achieving self-sufficiency by increasing its food production and also improved its capacity to cope with year-to-year fluctuations in food production, it could not solve the problem of chronic household food insecurity. This necessitated a change in approach and as a result, food energy intake at household level is now given prominence in assessing food security.

While India achieved success in combating transient food insecurity caused by droughts or floods, it miserably failed to make much dent in chronic food insecurity as reflected in the low energy intake and high incidences of malnutrition. The overall improvement in nutritional status has also been very slow. There is chronic under-nourishment in about half of the population, particularly among the vulnerable groups of children, women and elderly from the lower half of the expenditure class. Curiously, the proportion of consumption expenditure spent on food is slowly going down even in the households with chronic under-nourishment. Under nourishment in the bottom 30% of the expenditure class is alarming. And even the middle 40% is not free from it. The mounting food stocks miserably failed to banish mass under-nourishment. Chronic food insecurity is likely to persist longer. Moreover, with the recent shift to a more market-oriented and outward-looking macro-policies, the poor are likely to be exposed to the resultant risk of market uncertainties. As a result several types of programmes need to be targeted exclusively at the poor aimed to

(i) eliminating transient food insecurity on account of inadequate access to food in periods of crises

(ii) reducing chronic food insecurity by enhancing their capabilities to participate in the growth process

(iii) reducing malnutrition among pre-school children and women and

(iv) improving basic services (safe drinking water, health care etc.) to the poor. The portfolio of poverty alleviation programmes (PAP) should be contextual and suit the specific needs of the poor communities. Socially excluded groups are highly heterogeneous and, therefore, poverty reducing effects of any intervention based on a uniform package of programmes will not be fruitful.

4.1 Goal of Current Food Security Planning

Increase the healthy population of Kerala through behavioural change communication by enhancing intake of desirable food and ensuring household food security.

4.2 Need to Address Food Security

Problem of malnutrition does exist in Kerala in spite of high literacy rate. Nutrition status of Kerala as seen by NFHS studies show that percentage of children under 3 years of age, who are stunted still remains as 21.1 and wasted as 16.1 and this is a matter of concern. Children who are underweight remain at 28.8 per cent. Women with BMI below normal remains as 12.5 per cent while men are 11.9 per cent. On the other sides of the spectrum women who are overweight is seen to be 34% and men as 24.3%. Anaemia is an existing problem cutting across all age groups.

4.3 Planning Nutrition Interventions

The energy intake is a poor measure of nutritional status, which depends not only on the nutrient intake but also on non-nutrient food attributes. The non-food factors which influence biological absorption are also considered as important for food security as food factors. It is suggested that the assessment of malnutrition should be based on outcome measures rather than input measures. The suggested outcome measures include anthropometric measures, clinical signs of malnutrition, biochemical indicators and physical activity. Outcome indicators are more closely related to health and functional capacity. Among the outcome measures, anthropometric measures are considered to have an advantage over other indicators because it is non-invasive and easy to collect data.

Nutrition intervention activities for the population of Kerala should take into consideration the above existing facts of both under nutrition and over nutrition in all ages. The intervention planning activity should be of lifecycle approach beginning from the complementary feeding age ie. 4 - 6 months of the infants till old age.

4.4 Methodology

To attain **'Healthy Long Life for all'** the nutrition intervention activities should start as early as possible. The demand from the community for nutritious diet should be generated. Imparting knowledge on the need for proper diet by the community is the first step for creating demand generation. This nutrition education programme should be conducted in a phased manner so as to first generate a group of competent trainers who will further educate the community.

For training the trainers in the field of food security the inputs from the following personals can be used:

- Bureaucrats and policy makers(esp. food policy makers)
- Agricultural experts
- Civil supplies personals
- Nutritional experts
- Health experts
- Experts in law
- Human right activists
- Social service experts
- Management experts
- Statistical experts
- Proven philanthropists
- Individuals with positive results in this field

4.4.1 Training of Trainers

* Who will train?

Medical professionals, Nutritionists, Dieticians, volunteers with adequate scientific knowledge and ability to convey message.

* Who will be trained?

Already existing training individuals like Anganwadi teachers, School teachers and community nutrition leaders willing to impart training to the public.

The trainers have to be equipped with the nutrition information for different sect of population - village, urban, semi-urban, migrant, special group concerned with physical/mental disabilities, tribes, destitute and vulnerable population.

The existing nutrition problem in Kerala both under nutrition on one side and over nutrition due to imbalance in nutrient intake have to be explained. The need for a change in the current food intake pattern of consuming excessive carbohydrates and fats and low intake of vegetables and fruits should be made known. To maintain a healthy long life, undesirable food intake containing trans fats, high salt, highly processed food, saturated fats and refined sugar should be avoided or minimised.

Modules need to be prepared for the training of trainers focusing the above nutrition information. These modules should be very short and simple with picture demonstration to convey the essential message.

The content of the module should include the following information:

- **Breast feeding-** Right infant feeding practices – Initiation of breast feeding within one hour of birth, exclusive breast feeding for first six months of life, supporting and encouraging the mother for breast feeding, frequency of feeding and need for medical consultation when problems in feeding arise.
- **Complementary feeding-** Introduction of age appropriate complementary food, adequate in quality and quantity, time of introducing the complementary food, preparing the food at home using locally available food items, methods of introducing newer food items and hygienic practice to be followed during preparation and feeding. Support systems to facilitate infant feeding.
- **Feeding pre-school and school children-** Healthy way of feeding by right choice of nutritious food, making eating an enjoyable experience by different means like telling stories, giving attractive bowl/plate etc. Feeding during illness.

- **Full immunization** - Administrative efficiency. MOH.
  Greater efficiency and better strategies in ICDS to reach out to young infants.
  Greater emphasis on mothers' education. - MWCD.

  Women's education, awareness and empowerment- decision making. Social

  Engineering, through multi-media. - MWCD, HRD, I&B.

  Nutrition education in school (teachers, students, cooks, mothers) to stress the nutritional importance of supplementary feeding. - HRD.

  Nutrition should be an important input and outcome indicator in NRHM.
- **Food choice of adolescents**- Starting from the break-fast choosing tasty foods prepared at home need to be encouraged. Special nutrient needs in this age group like calcium, iron, proteins should be stressed. Necessity for negating drinking, smoking, experimenting with drugs, influence of mass media on undesirable food intake.
- **Adult eating behaviours** - Need for taking balanced nutritious diet with adequate vegetables, fruits and greens for maintaining long term good health. Stress release mechanisms, avoiding high fat, trans-fat, high salt, high sugar edibles. Need to perform some physical activity daily for a minimum period every day.
- **Care of the elderly** - Age specific food containing plenty of fibre, plenty of water.
- **Common factors for all age groups** - Availability of safe drinking water for all during all seasons, personal hygiene, environmental sanitation, adequate sleep, adequate recreation, medical health care facility.
- **Exhibition**- Exhibition should be conducted to make aware that nutritional diseases and poor nutrition status of the people come from four factors: (1) dietary deficiency (2) ignorance (3) eating habits and (4) standard of living. The principal object of nutrition education is to ensure that each individual eats suitable food to safeguard the health of the individuals.

Cooking of tasty nutritious food using locally available food materials should be demonstrated. Tapping uncommon food materials readily available in the locality should be done to reap better health. The food must be hygienically prepared and meet the quality making it safe for consumption.

The disorders that are likely to occur due to imbalance in nutrient intake should be made very clear. Intake of high carbohydrate diet with very little pulses and vegetable/fruits can lead to the life-style diseases like Diabetes Mellitus, Hypertension, Overweight/Obesity and cardiovascular disorder should be taught. The problem will be compounded by physical inactivity.

4.4.1.1 Training the Community

The trainers well equipped with the theoretical and practical knowledge on the right use of food materials can train the community at various levels. The community participation in attaining Healthy Long Life should be reiterated. Local Self Help Group formation should be encouraged. The long term vision of maintaining healthy life is possible only by the committed effort by the community. The community should get themselves involved in production of food items as far as possible, taking delivery of available food grains and making scientific storage facilities for surplus food items.

Knowledge of food labelling should be imparted to the community to enable them purchase food items of right choice.

House hold food security must be made possible. Encouraging kitchen garden/terrace garden will ensure availability of pesticide free food items as well as improving physical activities. In the schools also vegetables/fruits garden scan be advocated. Drinking water should be made safe.

4.4.1.2 Monitoring

Periodic effective monitoring has to be carried out to assess the results of the implementation of the training programme. If the expected results are not obtained, mid-term course correction has to be done.

4.5 Policy Decisions

Nutrition Security Mission should be moved from back burner to front burner. Nutrition should be clearly stated as an important input and output parameter for judging development and should not be treated as trickle down beneficiary of economic and technological development. It should not get subsumed under curative or preventive health care in general, where emphasis tends to be on chronic diseases and immunization–important as they are. Without Nutrition, neither communicable nor non-communicable diseases can be prevented and hence it should have an important status as an independent entity. Malnutrition is the worst form of non-communicable disease. **Nutrition should become a priority issue at national and sub-national levels.** Leadership and efficient governance is required at all levels to ensure synergy through convergence between Programmes/Missions/Acts which impact nutrition directly or indirectly (income, sanitation, drinking water, feeding programmes etc.) run by different departments/ ministries like health, women and child development, agriculture, civil supplies, education etc.

All planning and execution should be done with community participation and involvement of trained nutrition leaders from the community. There should be more scientific dialogue and interaction between nutrition scientists and scientists belonging to agriculture, medicine, public health, basic sciences and social scientists.

Chapter 5

Strategy of Food Security in the 12th Five Year Plan

Kerala is facing acute food deficit and more than 85 per cent of the food grains required for consumption in the state are being imported from other states. Except a small share, almost all the items of pulses, beans, sugar, vegetable, fruits etc are imported from other states. In the case of other items of food like egg and meat, major share is imported from other states. In agriculture the continuous shift in cropping pattern from food to non food crops has resulted in the decline of production of food crops. There has been a decline in the production of livestock and fish. The acute shortage of food items has created serious problems in the economic and social front. The problem of food deficit is managed through import of food item from other states, the public distribution of food items and other market intervention measures. Another dimension of food security is the high incidence of poor households in Kerala. Nearly 42 per cent of the households are estimated as BPL households in the state. The high incidence of consumption of alcohol and other hot drinks and the consequent spending of the major share of income also affected the food security of poor households. In this context, the strategy of food security should be formulated taking into consideration the chronic food deficit, decline in the production of food items, the working of public distribution system, other market interventions, import of food items from other states, high incidence of poor households and consumption of alcoholic products.

5.1 Strategy of Food Security

The strategy of food security should give emphasis on increase in production of food items within the state, strengthening the Public Distribution System, subsidized distribution of food grains to the poor, effective market intervention measures, removing the restrictions in the free flow of food items to the state, promotion of the nutritional schemes, expanding the poverty

alleviation schemes meant for generation of income and employment and reduction in the consumption of alcoholic products.

5.1.1 Achieve Increase in Production of Food Items

- Policies and plan schemes should aim at increasing production of crops such as paddy, pulses, beans, fruits (Mango, Papaya, Pineapple, Banana etc.) , vegetable (Beet, Brinjal, Cabbage, Carrot, Cauliflower, Cucumber, Beans, Lady's finger, Onion, Potato, Tomato, Water melon etc.) within the state.
- Increase the production of non-vegetarian food items like milk, meat, eggs, chicken, fish etc. within the state.
- Schemes should be formulated to reverse the process in the shift of cropping pattern from food crops to cash crops.
- Schemes should be formulated to provide irrigation and other input support as well as strengthening the paddy procurement system to increase the number of paddy crops cultivated per year.
- The decentralization in the procurement and distribution of food grains with community involvement may be given emphasis.
- Local production-local marketing mechanisms, fare price festivals, etc may be promoted.
- In order to promote the cultivable of fallow and uncultivated land, land laws relating to ownership, lease etc. should be modified. Persons interested to cultivate land may be allowed to take land on lease.
- Promote more value-added agriculture production.
- More agro-based industries should be started.

5.1.2 Strengthening Public Distribution System

In the context of chronic food deficit and wide fluctuations in the prices of food grains, there is a need to strengthen the existing public distribution system for distributing food grains and other food items.

- Measures may be taken to increase the efficiency in the distribution of food grains at subsidized prices to BPL households through PDS (Scheme of rice at ` 1 per kg and other schemes).
- Criteria for selecting beneficiaries under Annapoorna scheme should be modified.
- Expand the other market intervention measures to make available food items in the market through Supply Co and other Government as well as Co-operative agencies.
- Measures should be taken to identify the BPL households on the basis of strict norms.
- The programmes/schemes relating to food security may be interlinked with other existing schemes of different sectors viz. Health, Social welfare etc.
- For transparency and avoiding corruption, the details on the quantity of food grains and other articles supplied to households through ration shops may be given in Website.
- More funds may be provided for executing the scheme of issuing biometric card.
- Monitoring software package may be introduced for strengthening Civil Supplies department.
- Supply of essential commodities should be ensured in Civil Supplies dept. with only normal profit.
- There are some novel schemes in Jharkhand for ensuing better PDS. So the higher level officers in Civil Supplies Department may be sent to Jharkhand for training, workshop and to study the prevailing PDS.
- Food quality Monitoring Lab (FQML), Food Processing Training Centre (FPTC) and College of Indigenous Food Technology (CFT) may be established in all districts.

- ❖ All ARDs should be modernised in a phased manner.
- ❖ As per Essential Commodities Act, ration cards should be verified once in every year by LSGIs.
- ❖ Integrating community involvement and decentralized procurement have also been suggested for reducing corruption. Scaling up involvement of multiple stakeholders including teachers, parents, civil societies, private organisations and religious communities would enhance accountability and performance of PDS.
- ❖ The introduction of technology such as digital cameras to monitor fair price shops and storage facilities; development of an effective redressel mechanism by the provision of a toll free number in order to register complaints; and the use of banking and information technology into PDS operations to ensure transparency.
- ❖ The existing Noon Meal Scheme needs to be re-crafted as a Comprehensive Mid-Day Meal Programme (CMMP) to meet the complete health and growth requirements of students up to class tenth.
- ❖ Amalgamate all food and nutrition schemes of the Central Government such as the mid-day meal scheme and ICDS nutrition programme in the proposed legislation.
- ❖ Find out the bogus cards and eliminate it at the earliest.

5.1.3 Remove Restrictions and Allow Free Trade

- ❖ Remove restrictions in the free flow of food items from other states to Kerala through road, rail, water and other modes of transport. Exemptions in the sales Tax/VAT and check up in check post may be given for food grains and other food items; brought to the state.

- ❖ In the case of eggs, chicken, meat and milk brought from other states, Tax/VAT exemptions may be given.
- ❖ Interstate trade restrictions relating to food items may be removed or liberalized to the maximum extent possible.

5.1.4 Promote Nutritional Programmes

In the context of high incidence of BPL households, there is a need to promote nutritional programmes meant for poor and weaker sections.

- ➢ Expand the schemes meant for providing nutrition to poor women, tribal people, school children and other poorer sections of people.
- ➢ Measures may be taken to improve the nutritional schemes, noon-meals programme for school children, Anganwadi scheme for women and children and other programmes.
- ➢ Environmentally sustainable, nutrition oriented cropping pattern, using a blend of time-tested conventional and new technologies with appropriate safety checks. – Awareness and education of agriculture professionals at all levels and community–Ministry of agriculture (MOA), ICAR, State agriculture universities, MI&B.
- ➢ House-hold food and nutrition security through decentralised, nutritionally oriented cropping pattern, homestead production of nutrient-dense vegetables, fruits, and animal products–poultry, dairy, fishery. Home grown food can ensure livelihood security, reliable and affordable food security and reduce rural urban and gender divide. - Awareness and education of agriculture professionals at all levels–MOA, ICAR, State agriculture universities, I&B.
- ➢ Nutrition dimension should be main-streamed into national missions like Horticulture, Food security, NREGA and Rural Health Mission, with defined input and output

parameters for monitoring. NREG scheme should be well structured to create assets that would help ecology and nutrition and develop skills. S&T institutions should be involved in its execution. - MOA, Ministry of rural development (MRD), MOH.

- Community gene, seed, grain and water banks, and crop livestock integrated farming will enhance nutrition security in **dry land areas** - Agriculture extension, MOA, ICAR, State agriculture universities.
- Mechanisms for **Nutrition monitoring and surveillance** have to be set up. Currently the NNMB functions in project mode in only 9 states. It should become a permanent institution under the ICMR, cover the entire country and include Nutrition Surveillance as an additional dimension.
- Nutritious awareness programme should be strengthened through Education and Social Welfare Departments.
- State level Food and Nutrition Board should be established.
- Special nutrition programme for pregnant women should be initiated.
- Strengthening the supplementary nutrition programmes for small children, adolescents, pregnant women, etc through Anganwadies.
- Existing special nutrition programmes should be strengthened in Social Welfare department and Tribal Welfare department.
- Feasibility for **linking production and supply** of cooked food items in extremes of ages should be explored. The possibility of central/common kitchen for the preparation of complementary foods for preschool children, mid-day meals for school children and specially prepared food for old age people and supply to the beneficiary can be worked out.
- Mass media – television, radio and press must be appropriately utilised to disseminate the food security measures adopted by the Government.

- Policy decision to keep at bay the intake of fast foods, soft drinks and bakery items by school children by **banning** such **food outlets** inside the school campus and at least 100 meters periphery from the schools. Fruits and vegetable shops near the schools may be recommended.
- The fried food items are the only snacks available in most of the offices. Food security ensures that healthy snacks like simple fruits, poha or traditional preparations without oil are made available to prevent onset of lifestyle disorders.

5.1.5 Expand Poverty Alleviation Schemes

- Priority should be given for the poverty alleviation schemes of centre and state which aim to generate employment and income to poor households.
- Measures may be taken to improve the performance of the Mahatma Gandhi National Rural Employment Guarantee Scheme which gets 90 per cent of expenditure as grant from the central government.
- Due to the lack of land, the poor households cannot engage in income generating activities in agriculture, horticulture, livestock rearing etc. Schemes may be formulated to distributed land to the rural poor (distribution of government land, forest land, surplus land etc.).
- A scheme may be formulated to purchase land by using plan funds for the distribution of rural poor.

5.1.6 Correction of Drinking Habit

- De addiction centres for drunkards and drug addicts must be started in Taluk and District hospitals.

- Government should provide grants in aid and other assistance to social organisations to run de addiction centres.
- Schools should start campaigning programme for school children to create awareness of the bad effects of alcoholism.
- Nutritious drinks, ayurveda products and non-alcoholic drinks may be made available in the market to prevent the use of liquor.
- Educational campaign should start in schools against the bad effect of alcohol consumption, drugs like panparag etc.

5.2 Suggestions for Improving Agricultural Production

- Policy allowing leasing of lands for cultivation will be adopted. Legal protection will be provided to the right of possession of those land owners who lease out land for agricultural purposes.
- Investment in research and development services - agricultural health, land titling and registration, information, institutional strengthening.
- Adopt co-operative farming through employment guarantee programme on uncultivated and under cultivated land.
- Attract corporate investors in land for producing more food grains. The government and private land have to hand over to investors on lease for a limited period and this will lead to modernization of agriculture and creation of surplus.
- The Local Self government should be given the right to identify and cultivate the uncultivated and under cultivated area of land under their jurisdiction to ensure food security.
- Training for production of export quality products by Agricultural Departments in selected areas including remote villages and not just at the head offices at the district levels.
- Facilitate trade expansion by helping to reduce tariffs and other formal restrictions, and improve banking laws that hinder cross-border capital flows.

- Improve agricultural productivity to increase yields, reduce post-harvest losses, adopt better technologies and production practices, and improve links to markets.
- Promotion of homestead cultivation through Publicity in visual and print media, awareness programmes and direct approach methods in tie with voluntary organizations, Kudumbashree Projects, etc. will pave the way for;
    - Promotion of vegetable and fruits cultivation.
    - Organic farming.
    - Small plot paddy cultivation.
    - Cattle rearing for self consumption and the family.
    - Terrace cultivation.
- Financial assistance will be provided to those industrial units engaged in agricultural processing. Setting up of industrial parks for food processing will be encouraged.
- To ensure better utilization of land**,** the total land area should be categorized into different groups according to its fertility, climatic situation, topography, geography, etc. Formulate, enact and implement laws for assigning entire land area to appropriate uses like Agricultural – Food & Cash Crops, Industrial, Housing, Worship places, Play grounds, Social Infrastructure , Market, ponds & streams, Forest, etc. To ensure the assigned use of land, the LSG should frequently monitor the entire land area under their jurisdiction.

5.3 Suggestions for Improving Paddy Production

Promotion of Irrigation

- Complete the execution of all ongoing major and minor irrigation projects without delay.
- Construct new check dams, minor irrigation projects and other irrigation projects by giving subsidies and other assistance.

- Renovate all existing ponds, water sources, canals and streams, which provide water for irrigation.
- Provide financial support and loans to farmers to construct micro irrigation projects, community irrigation projects, developing new water sources, constructing irrigational infrastructure, installation of pump sets etc.

Crop Diseases

- Strengthen the agricultural research and development activities of the Kerala Agricultural University and other agencies to find out solutions to contain the diseases of paddy.
- Efforts are required to develop new high yielding seed varieties of paddy suited to the agroclimatic conditions of the State.
- Expand the measures of the Department of Agriculture and other agencies to help the farmers through pest control measures, distribution of medicines etc.

Price Stabilisation Measures

- The state government should continue to procure paddy to stabilise prices.
- The paddy procurement machinery and payment system should be made more efficient.
- The procurement agency should bear the transportation cost of paddy procured from farmers.
- The government should make an arrangement with the Rice mills to purchase paddy and incentives in the form of subsidies or tax concessions should also be given to the Rice Mills.

Relief to Distressed Farmers

- Relief to the farmers are to be given only in situation where there is crop damage due to natural calamities like flood, drought and spread of diseases etc. resulting in loss in production.
- Relief to the distressed farmers are to be distributed based on criteria such as size of agricultural holding, levels of dependency of agricultural income, the crops cultivated and the magnitude of the damage of crops.
- While formulating norms for relief high priority has to be given to sub-marginal farmers (having holdings upto 0.5 hectare) and other marginal farmers (0.5 to 1 hectare) who solely dependent on agricultural income (all workers of the households are getting income or wage from agriculture and allied activities).

Credit Support to Farmers

- Long term loans at low rate of interest should be given to farmers for development of infrastructure, purchase of agricultural machinery and irrigation purposes by commercial banks, co-operative banks and other financial institutions.
- Short term loans at low rate of interest may be given to farmers for meeting the working expenses of cultivation and purchasing livestock.

Restructure the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

- Instead of exclusively executing local public works, the workers may also be allotted to the marginal and small farmers for cultivation development of agriculture infrastructure, irrigational development etc.

- To prevent the shortage of agricultural workers in agricultural seasons, the MGNREGS may be suspended during the peak agricultural season in those districts / taluks cultivating paddy crop as the principal crop.

Promotion of Mechanisation of Paddy Cultivation

- Follow a strategy to promote mechanisation of all activities of paddy farming.
- Development of appropriate and financially viable agricultural machinery.
- Provision of long term loans to farmers, farmer-co-operatives, and others to purchase agricultural machinery like tractors, trillers, harvesting and thresher machine etc.
- Provision of subsidies to purchase agricultural machinery.
- Training programmes to youth for operating repairing and servicing the agricultural machinery.
- Development of infrastuctural parks providing facilites for servicing and repairing all kinds of agricultural machinery.
- Provision of credit and other support for rapid mechanisation by banks and other agricultural credit and promotional agencies.

Distribution of Subsidised Fertilisers

- Many farmers are not utilising the subsidised fertilisers distributed through 'Padasekhara Samithi' due to lack of timely distribution or non availability of the required item of fertilisers.
- It is reported that some of the 'Padasekhara Samithis' are selling the unutilised fertilisers in the black market.
- Steps may be taken to distribute subsidised fertilisers to the farmers directly by the Krishi Bhavans.

Organic Manure

- There has been a steep fall in the production and use of organic fertilisers like ash, cowdung, composite manure etc. adversely affecting the fertility of soil.
- Promotional measures may be taken to promote the production of organic manure.
- Liberal credit and other support should be given to promote livestock development.

5.4 Suggestions for Improving Tapioca Production

- Promotion of new high yielding varieties of plants.
- More importance should be given to proper manuring.
- Impart training on scientific management for tapioca cultivation.
- Pest and disease resistant variety of tapioca should be promoted for small scale and large scale cultivation.
- Eliminate market uncertainty and find new foreign markets.
- More concentration should be given to value added products.

5.5 Suggestions for Improving Milk Production

- All ongoing schemes for improving milk production should be continued
- Assistance for fodder cultivation should be continued and enhanced
- To improve procurement of milk by Dairy co-operatives, production incentives should be given to farmers based on the quantity of milk poured in the Dairy cooperatives
- Rural Dairy Extension activities should be strengthening for improving all management practices

5.6 Major Thrust Areas for Future Aquaculture Development

- Organizing awareness campaigns through meetings/seminars/workshops at all levels to spread the benefits of aquaculture and utilization of open water bodies and awareness of

the role of eco-friendly aquaculture in providing food and nutritional security as well as new livelihoods/employment

- Increasing aquaculture production and socio-economic benefits by expansion of cultivation of high valued species such as freshwater prawn, pearl spot, shrimp, crab, and mussel in addition to catla, rohu and mrigal.
- Expansion and intensification of integrated fish farming and increasing production and recycling wastes for cleaner environment through promotion of integrated plant/animal/bird/fish/prawn farming
- Establishment of a fish health management system for the State
- Establishment breeding and seed production of all major aquaculture species centres - quality seed production of major aqua-farmed species, including pathogen-free seed.
- Conservation of aquatic biodiversity and its sustainable utilization

5.7 Integrated Agricultural Production and Distribution System (IAPDS)

IAPDS may be defined as "the integration of production and distribution of food grains development for filling the gap between the cut-pieces of rural components in the domestic production and their requirements through the direct participation as MREGS volunteers (agricultural labourers) and Authorised Retail Dealers (ARDs) of PDS"

5.7.1 Method of Organisation

For the effective performance of this system, there should be a co-ordination of different departments;

a. Civil Supplies Department.
b. Rural Development Department.
c. Agricultural Department, and
d. Local self-Government.

For the implementation of the system, there is a need of Rural Agricultural Production and Distribution Board (RAPDB).

At least one member must be among rural BPL households with a minimum quorum of 10 member is selected as the president of the Board. The ARD owner will be the Secretary of RAPDB. Local Panchayat member is the Advisor of the Board. The working of the Board will be under the Co-operative Act of the state.

- The Board must identify the unutilized or under-utilised land area with the jurisdiction of the local ARD. This information must be reported to the local panchayat, who must acquire it on a tenant basis from the land owners.
- For cultivation purpose of this land, the government must provide interest-less refundable loan on a long tenure through local panchayat.
- These unemployed labourers must involve in cultivation of such acquired land at their own free time.
- The necessary agricultural inputs like fertilizers and pesticides must be provided through 'krishibhavan' at subsidized rate.
- Such agricultural products must be procured by the local ARDs and must be distributed among rural households at differential prices of 10 per cent less for BPL families and 5 per cent for APL families from the market price.
- The surplus items that are not distributed through ARDs in respective areas must be procured through a procurement cell of the local panchayat and it must be distributed among the viable markets where there is potential demand for it. This will lead to greater socio-economic equality.
- Of the total profit, 10 per cent as the crops development fund of the RAPDB and the remaining 90 per cent is to be distributed among the labourers participating in the system as wages.

Government must co-ordinate the interconnected departments like Civil Supplies, Rural Development, Agriculture and Local Governments for implementing the aforesaid systems.

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