1. INTRODUCTION

1.1 Agriculture and allied sectors are the most crucial sectors of the Kerala economy as they provide livelihood to approximately two-third of the population and contribute a fourth of the SDP. Agriculture in Kerala has passed through many changing phases. The major change started from the later part of 1970s, when decline in rice production in Kerala happened owing to the increased availability of rice grains at a comparatively cheaper price Consequently, investment in rice production decreased and a major portion of the land was shifted for the cultivation of perennial tree crops and seasonal crops. Profitability of crops is reducing due to the high wages for farm labourers, the high price of land and the uneconomic size of operational holding areas.

1.2 The population pressure on land is very high in Kerala and the land has become shifted from the position of a resource for production to the level of an asset. This made the situations more complex and the farmers are started shifting from cultivation and the practice of putting the most valuable land to other purposes than farming began. Many farmers were forced to stop agriculture due to these reasons and farming became a non-lucrative vocation.

1.3 Kerala is known as a consumer state. This dependence is creating very serious problems as the neighbouring states are restricting the free flow of food materials outside. The state is primarily depending on the states like Tamil Nadu, Karnataka, Andhra Pradesh etc., for the staple food, rice. But the fact is that these states are announcing 'rice holidays' for their farmers and the land is kept fallow. For the unavoidable other food materials like egg, milk and meat, the dependency on other states is at its maximum. If the present trend is allowed to continue, the state of Kerala would become the most food insecure part in the country.

1.4 This poses serious threat for not only in the food security of the State, but also in the environmental aspects which is the basis for sustenance of life. Under these circumstances, the Government of Kerala, headed by the Hon'ble Chief Minister, Sri. Oommen Chandy and Hon'ble Minister for Agriculture, Animal Husbnadry, Printing and Stationary Sri. K.P. Mohanan decided to formulate an Agriculture Development Policy with a view to bring safety and status to the cultivators and assuring income from farming.

1.5 In May, 2012 The Government of Kerala constituted an advisory committee under the chairmanship of Hon'ble Minister for Agriculture, Sri. K.P. Mohanan. The advisory committee entrusted the task of preparation of a draft policy document to a Sub-Committee chaired by a renowned farmer Sri. K. Krishnankutty. The other members are Sri. M.S. Joseph, Retd. Agricultural Production Commissioner, Sri. R. Hali, Retd. Director of Agriculture, Dr. Vadivelu, former Director of Extension, Tamil Nadu Agricultural University, Dr. P. Rajasekharan, Chief (Agri.), State Planning Board, Dr.P.V. Balachandran, Director of Extension, Kerala Agricultural University, Dr. K.G. Suma, Director, Animal Husbandry Department, Sri. R. Ajithkumar, Director of

Agriculture as Convener and Sri. A.K. Madhavachandran, Deputy Director of Agriculture as Joint Convener. The Hon'ble Chief Minister was kind enough to attend the first meeting of the Sub-Committee along with the District Panchayat Presidents and Political Farmer Organisations (PFOs). He suggested that considering the very important role, the Sub-committee had to visit and gather in formations from the farmers of the 14 districts and all the stake holders while formulating the Policy. As per his suggestion the Sub-Committee conducted a series of sittings with a participatory approach with all the stakeholders of agriculture throughout the state. It took a mission mode approach for the generation of draft policy document.

1.6 Formulation of the draft policy

1.6.1 A series of consultation meetings were conducted to understand the needs of different sections of the society as well as the design and content. Meetings with farmers, farm labourers, Local Self Governments, various stake holders in the sector such as farmer organisations, agricultural labour organisations, Organisations of professionals and extension workers engaged in the sector, Non Governmental Organisations (NGOs), representatives from public sector enterprises, representatives from commodity boards and national research institutions, meetings with Managing Directors and Chairmen of Public Sector Undertakings (PSUs) and state level bodies which are promoting agriculture and allied activities, the farm journalists, etc., were conducted across the state. All the decisions in the meetings, suggestions and opinions of the participants were considered for the policy document preparation.

1.6.2 In order to elicit responses from different sections such as the important peoples' representatives like MLAs, progressive farmers, eminent personalities in the field of agriculture, the Chairman wrote detailed letters to them and their suggestions were sought. For the participation of the public wide publicity for the committee along with the contact numbers and e-mail address were given in the leading news papers of Kerala. As expected, it got a very good quantum of responses.

1.6.3 A total of 48 sittings, 384 hours long discussions and 128 days long document writing were conducted for the policy document generation. A total of 96 number of organisations and 2650 number of people attended for the policy document generation.

1.6.4. The Government of Kerala (GOK) headed by Sri. K.Karunakaran as Chief Minister and Sri.P.P.George as Minister for Agriculture, announced the first Agricultural Policy for the state During March, 1992, and as more than two decades passed by; there needs a thorough reorientation of the policy on the light of the present agricultural scenario of the state. Further, the Government of India approved a 'National Policy for Farmers' submitted by the National Commission on Farmers (NCF) under the chairmanship of Prof. M.S. Swaminathan during September, 2007. The primary focus of this policy was on the 'farmer' defined holistically and not merely on agriculture. In that sense the policy was regarded as more comprehensive than merely an agricultural policy. The guidelines of this policy are also taken for the manuscript preparation of the State Agricultural Policy by incorporating the primary production sectors

such as Animal Husbandry, Dairy and Fisheries. Lately, during 2010, the GOK also formulated a thorough strategy for the adoption of organic farming by amending the then exisitng organic farming policy of the state. Since an organic farming farming poicy has already been framed, this document does not cover any policy related to organic farming. However, the background activities needed for setting up of organic farms throughout the state is dealt in detail in the respective heads.

1.6.5 With this background works, the policy is designed with the primary view of ensuring a respectable living to farmers and those who are associated with farming of Kerala by improving the net income earned by them by the judicious utilization of available resources of land, water, rural manpower and technology with focus on increasing the productivity and profit in a planned manner.

1.7. Vision of the Policy document

1.7.1 The policy document encompasses a vision of "**ensuring a sizable income from farming along with food, water, livelihood security and modern living amenities to every citizen of the State by maintaining sustainability of the agriculture production system and develop agriculture as a worthwhile occupation capable of assuring a modern living with dignity and social status to farmers so that the future generation is attracted towards farming which must be a charming and challenging enterprise to them through the primary sectors like Animal Husbandry, Dairy, Inland Fisheries along with Crop Husbandry including harvesting and handling**".

1.7.2 As mentioned earlier the document covers the primary production sectors such as Crop Husbandry, Animal Husbandry, Plantation sector, Dairy and environment.

2. GENERAL BACKGROUND OF THE STATE

2.1 Kerala is characterised by the resource richness such as rainfall, fertile soil, good sunshine and humidity. It also possesses different climatic conditions like tropic, sub tropic and semi-temperate. The state is already divided in to 26 different agro ecological zones. It is well known for the plant and animal diversity of the Western Ghats, which is heard as a 'Biodiversity Paradise'.

2.2 Currently, agriculture in Kerala suffers from characteristics such as declining cultivable area, low productivity per unit of labour, predominance of tiny and fragmented holdings, aversion of agriculture sector by young generation of farmers and agricultural labourers due to the insecurity in income and uncertainty in the agriculture production and poor marketing channels. Emergence of export-oriented cash crops over food crops has resulted in the decline of food crop to non-food crop area ratio from 64:36 (1960-61) to 16:67 (2009-10). The fact remains that 80% of the agricultural products like rubber, tea, coffee, spices etc., produced from Kerala are still marketed outside the state. The impact of climatic variations started affecting agricultural production to a greater extent. The drought situations of 2003 and 2013 are very good examples for it.

2.3 Out of the total geographical area of 38.86 lakh hectares, net area sown is 20.71 lakh hectares which comprises of 53.3% of the total area. The net area has decreased by 0.35% when compared with the 2009-10 statistics. Out of the gross cropped area of 26.47 lakh hectares; food crops, comprising rice, pulses minor millets and tapioca occupy only 12.05 % (Agricultural Statistics 2010-11). Kerala is facing serious challenges in retaining even this meagre area. Even though Kerala has the least waste land available when compared to the rest of India, (2.01 lakh hectares) area, which can be put in agricultural purposes is still to be exploited.

2.4 The general appearance of the green lush of the state signifies the feed availability for the livestock and thus it forms an integral part of the production system.

2.5 The integrated farming combining live stock, backyard poultry and inland fishery is known as the 'homestead farming' which is unique to Kerala.

2.6 The share of Agriculture in State Domestic Product (SDP) during 1970-1971 was 49.44% which declined to 14% in 2009-10 like in India. However, the share of service sector during the same period showed an increase to 61.3% from 34.23%.

2.7 Kerala was the pioneering state in India in implementing the land reforms. But at the present condition, those who own the land leave it fallow because of many reasons such as non availability and high cost of labour, inputs, high production cost, very poor profit margin and several other critical constraints. Thus the situation is such that cultivable fallow is available, but resources required for cultivation is costly or not available to the needy. Land owners also fear that their land will be lost if given for others on rent for a longer time.

2.8 According to Government figures, Kerala's total food grain requirement in 1997 was 48 lakh tonnes a year and internal production accounted for only 10 lakh tonnes. Twenty four lakh tonnes used to be provided under the PDS, the rest of the requirement being met from the open market. The present crop situation of the state is as follows. The total area under paddy is 2.13 lakh hectares, vegetables 0.42 lakh hectares, fresh fruit plants 2.83 lakh hectares, tapioca and other tubers 0.93 lakh hectares, pulses 0.004 lakh hectares, coconut is 7.7 lakh hectares, sugarcane 0.0064 lakh hectares, spices & condiments 3.54 lakh hectares, and plantation crops 6.7 lakh hectares according to 2010-11 statistics.

2.9 Kerala agriculture is mainly dominated by small, marginal and homestead farmers. The average land holding size is smallest in Kerala. Marginal farmers with an area less than one hectare and dominated by home stead farming of 10-20 cents is a special characteristics of Kerala. The above category constitutes 90.4% of the total small farmers with 1-2 ha (4.3%) semi medium farmers with 2-4 ha (1.3%) large farmers with 4-10 ha (0.3%) (Economics and Statistics, 2009).

2.10 Majority of livestock population in the state is concentrated in villages. The biggest contribution of livestock sector is the provision of quality food materials like milk, egg and meat. Mostly casual and agricultural labourers are engaged in cattle rearing and allied activities and hence any development in the animal husbandry sector strengthens rural livelihoods. Livestock sector in the state is a major contributor to Gross State Domestic Product (GSDP); it could be as high as 40 percent of the agricultural GSDP in Kerala. Out of the total live stock keepers in Kerala, about 14 % keep bovine, 23 % keep poultry and 10% keep goats. According to the livestock census data 2007, of animal husbandry dept., cattle population in Kerala is 17.31 lakhs, buffalo population is 58145, goat population is 17.29 lakhs, pig population is 59017 and poultry population is 118.2 lakhs. Average milk yield of crossbred cows in Kerala is 9.02 litres, buffalo is 6.5 litres and egg per layer per year is 221. The total cross bred population of cattle is 93% with exotic blood limited to 50%.

2.11 The potential of inland water resources for fish production have not been utilized optimally till date because Kerala is still depending on the marine fish. But the marine fish population is also depleting at a faster rate and there lies the possibility of utilising the inland water resources for fish production. The inland water bodies, including 44 rivers (85000 ha.), 53 reservoirs (44289 ha.), 53 back waters and brackish water bodies (65213 ha.), the polders of Kuttanad having a water spread area of 35000 ha., 17,000 ha. of Kole lands of Thrissur and Malappuram, 12,000 ha. of Pokkali lands in Ernakulam and Thrissur, 2500 ha. of Kaipad lands in Kannur can be suitably utilized for production of fresh water fish. Alarmingly, due to fast urbanisation; invasion to these places are taking place at a very faster rate and the area has diminished to the extent that the Pokkali lands decreased to 3000-3500 ha.

3. A NEW WAVE POLICY FOR AGRICULTURE

3.1 The world is after food grains. The traditional granaries of India are being depleted at a faster rate. Many of the traditional rice growing states have already announced 'Rice Holidays'. Kerala is known as a food hungry state. When the cereals are not available or costly, people are depending on the other unavoidable foods like pulses, meat, egg and milk. Food has become costlier in Kerala over the past few years. This is actually inflicting in the wound. Price escalation with non availability of food is a serious concern of the state as this may lead to the control of 'free flow of food grains'. This gives ample scope for agricultural production within the state, but the farmers are still withdrawing from cultivation and the pressure on land is very high in the state. The cultivated area is shrinking day by day. Less profit out turn of field crops compared to industrial crops and labour availability are the main issues faced by the agricultural producers.

3.2 FAO admits that 1.02 billion people are under nourished worldwide in 2009 which represents more hungry people and worsening of unsatisfactory trends. The increase in food insecurity is not a result of poor harvest but high domestic food prices, increasing unemployment and lower incomes which reduced the food for the poor. Financial crisis of 2009 deepened the food insecurity. With the shortfall in production, prices shot up. It is worrisome that Kerala has the highest deficit in food production (one per cent of total area, but three percent of total population) and also least waste land available.

3.3 The decline in agricultural growth coupled with declining profitability in the agriculture sector, in the face of rapid growth of non-farm sector, is one of the major concerns. The declining profitability is partially due to fluctuating world prices of agricultural commodities and the efforts to keep the domestic prices low to protect consumers' interest, which resulted in decline in the terms of trade for the farm sector. This, coupled with the stagnating and declining yield levels, resulted in low income to the farmers. In the present condition many are withdrawing from cultivation and the land is put in to other non-agricultural practices.

3.4 These situations and complexities are to be addressed carefully so that a viable and sustainable agricultural production system would prevail and that require careful planning and a new policy initiation from the part of the Government. The research and extension system of the state would be equipped on these lines and definite bench marks are laid down in the policy document.

3.5 This definitive approach needs thorough understanding of the terms frequently used to describe the content. They are defined and attached with the policy document for further clarifications and strategy / project / scheme formulations and implementations.

4. DEFINITIONS

4.1 Definition of Farmer: It is suggested that the definition given by the National Commission for Farmers (NCF) may be adopted for the state policy as the definition is inclusive of all practitioners of farming. For the purpose of this Policy, the term "FARMER" will refer to a person actively engaged in the economic and/or livelihood activity of growing crops and producing other primary agricultural commodities and will include all agricultural operational holders, cultivators, agricultural labourers, sharecroppers, tenants, poultry and livestock rearers, milkers, fishers, beekeepers, gardeners, pastoralists, non-corporate planters and planting labourers, as well as persons engaged in various farming related occupations such as sericulture, vermiculture, and agro-forestry. The term will also include tribal families / persons engaged in shifting cultivation and in the collection, use and sale of minor and non-timber forest produce. (National Policy for Farmers 2007)

4.2 Kerala State Agriculture debt Relief act 2006 defined Farmer as a person who holds whether as owner, licensee or mortgagee in possession oral lease, Government land lease "Kuthakapattam" or partly in one capacity and partly in another with possession of an extent of land not exceeding four hectares and whose principal means of livelihood is agriculture and whose annual income does not exceed rupees two lakhs and includes an agricultural labourer, Kudumbasree and self help group units doing cultivation by taking over agricultural land on lease agreement condition. For satisfying the objective of certain aspects related to credit and other issues this definition holds good. The Self Help Groups (SHGs), Joint Liability Groups (JLGs) and the like groups who are involved in agriculture are also categorised under 'farmers'. The definition of farmer as described under 4.1 and 4.2 is adopted for the implementation of the Agricultural Development Policy.

4.3 Agriculture: is the cultivation of plants, animals, fungi, and other life forms for food, fibre, bio-fuel and other products used to sustain human life.

4.4 It can also be defined that agriculture is the science, art, or practice of cultivating the soil, producing crops, and raising livestock and poultry and in varying degrees the preparation and marketing of the resulting products.

4.5 Farming is an activity of primary production and processing type where by the farmer derives income, mental satisfaction and / or environmental protection initiatives like soil and water conservation measures in single or in combination.

4.6 The term 'farm land' refers to the land or space where cultivation of crops is being done or capable of cultivation by any crop, livestock maintenance and intentional aquaculture is being practised and could be made possible.

5. INTRODUCTION TO POLICY REFORMS

5.1 The proposed agricultural growth and prosperity could be made in to reality by improving the livelihood capital and means of production.

5.2 Accordingly, the livelihood capital outlay is classified as natural capital, physical capital, financial capital, human capital and social capital. The concept here is to formulate an agricultural policy that would assure the fundamental requirements such as food, water, livelihood, and minimum amenities of life to all the citizens of the state.

5.3 In developing countries, where a majority of families derive their livelihoods from agriculture, sustainable agriculture cannot be discussed in isolation of sustainable rural livelihoods. Sustainable rural livelihood is a multifaceted concept and refers to maintenance or enhancement of access of rural families to food and income-generating activities on a long-term basis. It encompasses secured ownership of, or access to, resources, assets and income-earning activities to offset risks, ease shocks and meet contingencies. In the Kerala context, where average farm-size is very small, and poverty and food-security continue to be preponderant among small landholders, the notion of sustainable agriculture ought to be viewed in the context of need for enhancement of productivity, production and profitability of agriculture and above all, for improvement in the economic conditions of farmers. All these need a careful and intentional policy interventions by the Government.

5.4 Necessary legal provisions would be created for the implementation of the Agricultural Development Policy wherever the situation demands creation, ammendment and / or additions.

6. POLICIES RELATED TO LAND

6.1 The best and most versatile farming land is a valuable resource that should, in general, be protected from irreversible development. As described earlier, the pressure on land in Kerala is very high. There is a growing tendency that the land is being put for purposes other than agriculture since the status of the land has changed from the concept as an input to an asset. Thus the value of the land is on the rising and people expect an out turn from that investment to more profit like real estate. This made a steady decline in our most blessed natural resource namely land. Unless land is utilized for cultivation, it becomes a commodity in the hands of land traders, a situation already critical in Kerala. This is also important in the context of climate change and the price rise, globally and locally. Reducing the 'food miles' is gaining popularity even in the developed world and Kerala can show a model in this regard.

6.2 Policy 1: The farm lands are to be protected and should not be put for any other use than farming activities.

6.2.1 The primary requisite for agricultural production is the farmland (as per section 4.6 of the policy document). For assuring the production, the availability of the farm land is to be assured first. The following policies would help in the preservation of ideal farmland.

6.2.2 The states like Punjab, Haryana, UP etc., where agriculture occupies a prime position with respect to the state's income are now facing serious threats due to the declining ground water table and land conversions. Many of the Indian states like ours are depending on these states for the food.

6.2.3 The farm land as per the definition under as per section 4.6 of the policy document must be conserved for agricultural purposes alone. A farmer can develop his own residence and care must be taken to see that a residential colony should not be grown up under any circumstances utilising this provision. Farm lands at any cost should not be converted other than for Government purpose at unavoidable circumstances. When farm lands are needed by the Government for non agricultural purposes under these very unavoidable circumstances, the agencies which are receiving the land must develop equivalent degraded / wastelands elsewhere and make it potent for a profitable farming. An act in this line is a must.

6.3 Policy 2: The agriculturally potential land is to be identified and demarcated with the help of modern technologies such as remote sensing, satellite imagery, etc., and a database is to be made.

6.3.1 Assistance of National Remote sensing agency will be taken in this regard and this area is to be notified as 'agriculturally important'. The maintenance of this database is the joint responsibility of Agriculture Department and Revenue Department and legal provisions for not putting the land for other purposes are also to be made.

6.3.2 The land records needs to be made perfect, digitalised and made it available for

open references and official law enforcement. The ownership of the land should be made traceable with the help of the database made. The Revenue Department and Agriculture Department should see that the database is updated correctly.

6.3.3 The existing system of land classification by the revenue officials is only wet land and garden land. This does not calls for a detailed classification. The land is to be classified in to different zones namely, 'Green Zone, Pink Zone and Brown Zone' depending upon the uses for which it has to be put. The Green Zone will be marked exclusively for agricultural purpose, the Pink Zone for residential purpose and Brown Zone for industrial purpose.Under no circumstances, Green Zone would be converted for any other purposes. Necessary legal provisions for this has to be made by the Government urgently to protect the farm land. An individual approach should be mandatory and at no circumstances, the least land owners be affected in constructing house for his own family requirement.

6.4 Policy 3: The transactions on farmlands are to be made more transparent for protecting the ineterests of farmers

6.4.1 In order to protect the farmlands, Karnataka Government has suitably amended the THE KARNATAKA LAND REVENUE ACT, 1964 in 1995 enabling only the farmers for purchase of notified farm land. But in the Kerala condition it would be impracticable if the transactions are restricted. In this context, it would be desirable if a law could be made for the farm land transactions making it more transparent.

6.4.2 Since it was observed that huge amount of farm lands were being purchased by different Trusts and Organisations and there must be a ceiling for all these type of activities. Necessary legal provisions are also to be incorporated so that the excess land taken by them can be realised by the Government and put for farming activities. In this context, developing the satellite cities utilising the most valuable farm land would prove to be suicidal and that should be discouraged with the enactment of a law.

6.5 Policy 4: Cultivable wastes should be brought under plough with immediate effect for augmenting the food production.

6.5.1 Less intensive crops like tubers, pulses and coarse millet are to be grown in these potential areas of food production. Schemes for this type of interventions should be formulated so that every possible extent of arable land is put under crops.

6.6 Policy 5: Land owned by Kerala Agricultural University, Department of Agriculture, Department of Animal Husbandry, Department of Dairy, Veterinary University etc., should not be put for any other use than the purposes for which it was intended for.

6.6.1 'Keep off' from the land owned by Universities and Departments as it would cause serious problems with regard to the training and testing of different technologies developed for the farmers. Considering the food security point of view, the coming era would of the type on intensive training and testing of the technologies. In the research and development front also there would be a

boom and many developed nations are investing on the lands of Africa based on this prediction. So, the land owned by Universities and Departments in connection with agriculture should be protected.

6.6.2 The land owned by Universities and Departments are being put for non agricultural purposes. As per the quick estimate made, it was revealed that 22 ha of land was lost by the KAU, 62 ha by the Department of Agriculture and 31 ha by the Animal Husbandry Department from the original possession. This practice will be discouraged.

6.7 Policy 6: Appropriate legislative mechanism may be evolved for the promotion of 'Rent a Land for Farming' programmes.

6.7.1 Keeping the land fallow is a bad trend observed in Kerala by the Sub-Committee. This might be due to the fear of possession by the people who take land for rent for doing cultivation. This should be addressed with immediate effect protecting the ownership of the land and programmes for renting the land for farming is to be launched by the Government.

6.7.2 The fallow lands should be made available to the SHG and JLG groups like 'Kudumba Sree' for increasing the production as well as improving the livelihood support. The rent on these lands should be regulated so that the owner and tenant will be getting remunerative out put.

6.7.3 The operationalisation of these programmes should be in line with the Farmer Producer Organisations as described under the Chapter 18.

6.8 Policy 7: Necessary administrative mechanism may be evolved for bringing the different agencies connected with land related activities under one co-ordination agency.

6.8.1 Land Development should be recognised as the most important measure for the effective up-gradation of production possibilities of natural resource base. Within the natural unit of a watershed, soil and water conservation, agriculture development and allied activities like animal husbandry, pisciculture, etc, will be carried out in an integrated manner with a full involvement and participation of the farmers. The watershed based activities will be brought under single umbrella under the control of single co-ordination agency and implemented with the support of various stake holders.

6.9 Policy 8: The Government should have the aim of employing InformationTechnology to transform the existing system of land records maintenance and thereby ensuring efficient, accurate and transparent delivery mechanism and conflict resolution in ownership of land.

6.9.1 The land records digitisation is a much needed step in streamlining the entire system pertaining to land transactions in the state. The absence of an updated database is the major reason behind land disputes. A central database having a comprehensive link to all land-related organisations under a single network is needed for monitoring the land related transactions, better service delivery etc. With such a set-up the government officials sitting at their offices can see any transformation of land or change of ownership.

7. WATER RELATED POLICIES

7.1 Water has become one of the most abused resources in Kerala. The State is blessed with 3000 mm of annual precipitation, 41 rivers running across the full breadth, 3 rivers in partial coverage and numerous wetlands. But if the rivers are put together, they may not carry water as Krishna River carry.

7.2 As per the classical classification land is the primary requisite for production and when agriculture is concerned water also forms an important component. All households require water for consumption. Farming households also require water for producing crops and raising livestock.

7.3 The ground reason for the non-availability of water during the critical stages of requirement as a part of its sustainable use should be looked in to. The probable reasons could be the increasing level of contamination, the destruction of wetland ecosystems, and over-exploitation of the remaining water for domestic and industrial uses.

7.4 During March 1992, a state water policy was announced by the then Hon'ble Minister for Irrigation and Cultural Affairs Sri. T.M. Jacob. The cropping pattern, land use, hydrological status and environmental need of the Kerala State are distinctly different from those of the other states. That was the background for formulating a state water policy.

7.5 Substantial increase in area under crops grown more than once in Punjab had been primarily due to the availability of assured ground water for irrigation. Therefore, assuring ground water for all crop production programmes is the need of the hour. Therefore, the policies related to water considering agriculture should have the following dimensions. Apart from the policy initiatives started as per the State Water Policy ,1992 these would also be in vogue.

7.6 Policy 9: Preservation and sustainable use of water should be the motto of all crop production programmes of the state.

7.6.1 Majority of farmers in the state depend on groundwater for irrigation. This resource, in which farmers may have invested their hard-earned savings, is being depleted and the water table is receding fast. Therefore, rainwater harvesting and aquifer recharge would be accorded priority for ensuring the stability and sustainability of water.

7.6.2 When the crop production schemes of the Departments are formulated, it should contain the different aspects of sustainable use of water. Water-use efficiency can be enhanced by generating synergy with seed varieties, nutrients (macro and micro) and farm implements. So a crop production scheme is to be formulated with all these aspects in mind and there should be a sustainable water use component in every such programmes.

7.7 Policy 10: Water budgeting should be adopted in a watershed basis.

7.7.1 Water budgeting could be defined as 'an estimate of harvest of water resources and its utilization for a set period of time'. The requirement of water in a watershed is assessed scientifically and a plan is to be made. The water available from rains, irrigation requirement, water holding capacity of the soil, irrigation frequency, method of irrigation, crop duration etc., should be taken in to account and a water budget is to be formulated with the help of irrigation engineers, NGOs, farmers and Agricultural Officers. This would not only help to regulate the water use but also in improving the per unit productivity of the available water. The water use can effectively be extended to other areas which would therefore be helpful in assuring the crops. This should be given priority in water scarce areas of the state.

7.8 Policy 11: Rain water harvesting and aquifer recharge would be given priority for ensuring the stability and supply of water.

7.8.1 Rain water harvesting is essential because the surface water is inadequate to meet the demand and the state have to depend on ground water and due to rapid urbanization, infiltration of rain water into the sub-soil has decreased drastically and recharging of ground water has diminished.

7.8.2 Artificial recharge to ground water is a process by which the ground water reservoir is augmented at a rate exceeding that obtaining under natural conditions or replenishment. Any man-made scheme or facility that adds water to an aquifer may be considered to be an artificial recharge system.

7.8.3 Kerala has over 6.60 million wells according to a study conducted as early as 2007. This makes it the highest density of wells in the world. With a simple method of rooftop rainwater harvesting, keeping the roof clean, providing a simple filter and leading the rainwater into the dug-wells water security can be ensured for the whole year. Fluoride toxicity seen in parts of the State can also be address by this.

7.9 Policy 12: The micro-irrigation technology is to be popularised in the state with adequate share of state budget.

7.9.1 The largest share of energy is utilized for pumping of irrigation water. Various research studies have shown that water saving, electricity saving, irrigation efficiencies and yield of crops using drip irrigation are substantially higher than crops irrigated by the conventional flood irrigation method.

7.9.2 The modern irrigation systems, drip and sprinkler can act as a mitigation measure. Eventually with little water available, crop can survive and can virtually come out the over dependency on monsoon. Because, whatever rain is available in arid regions can be will be stored and water applied to root zone with drip, will bring this region out 'rain feed' clutches with increased productivity. Apart from that the costly inputs such as chemical fertilisers can be significantly reduced which will in turn reduce the cost of production and environmental damages

7.9.3 Micro Irrigation has following advantages- 1. In this type of irrigation system water is saved through different ways such as - by reducing loss of water in conveyance - by reducing loss of water through evaporation, run

off, and by deep percolation. - A water supply source with limited flow rates such as small water wells or city/rural water can be used in this type of irrigation system. 2. Energy savings up to 30-40%– This type of irrigation system requires a smaller power unit and consumes less energy. 3. This type of irrigation system is helpful in inhibiting growth of weeds as it keeps limited wet areas. Under this condition the incidence of disease is also reduced up to major extent. 4. Fertilizers and chemicals can be applied with water through micro irrigation system. This systems can be automated which reduces labor requirements. 5. Improved production on marginal land.

7.10 Policy 13: Farm ponds and Thalakkualams needs to be promoted and protected.

7.10.1 It is estimated by CWRDM that about 910 farm ponds are there in the State with 0.5 ha area. About 50% of these need rejuvenation. There are more than 20 artificial reservoirs and 2-3 large fresh water lakes in the state having good quality water. There are numerous perennial springs throughout the state with ample amount of water which could be utilised for drinking and irrigation.

7.10.2 The 'Thalakkulams' form the apex irrigation source in a Padasekharam or a cultivation area. They were usually fed from the natural springs and the excess water would be drained out through an out going channel. These systems should be restored with Government and people participation and that can reduce the drought problem by 30%. The existing programme of 'Sahasra Sarovar' should be intensified. The LSGs should take a lead role in this regard.

7.11 Policy 14: Sub surface dykes are to be constructed at possible places for the ground water recharge

7.11.1 Subsurface dike is a structure that is built in an aquifer with the intention of obstructing the natural flow of ground water, thereby raising the ground water level and increasing the amount of water stored in the aquifer. The ideal location for the dike is a well defined, wide, greatly sloping valley with a narrow outlet having limited thickness of loose soil or porous rock on the top with massive or impervious rock below.

7.11.2 Subsurface dike has many advantages. It does not require additional surface reservoir. There is no loss of agricultural land. There is minimum evaporation loss since the storage is subsurface. There is no siltation and loss of reservoir capacity. The cost of construction is low and maintenance is negligible. It is environment-friendly and it can be implemented with locally available materials.

7.11.3 In areas of a well defined watershed with a narrow outlet and undulating topography, which is typical of Kerala, subsurface dike is an efficient system to conserve and utilise the rainfall that is received in a watershed. The water conserved in the dike can be utilised for irrigation and other purposes. It also allows for recycling of irrigation water and nutrients in the catchment area.

7.12 Policy 15: The irrigation canals of Kerala are to be structurally reset for the prevention of seepage loss of water.

7.12.1 Huge water loss is happening through the old earthen irrigation canals throughout the state. The technology suggested for improving the irrigation efficiency by IDRB is the spot delivery of irrigation water to the fields through a covered water way mechanism. This should be adopted in areas where the tail-end plots does not receive irrigation water at all.

7.12.2 The main irrigation canal where the covered system of water delivery is not possible, the top portion of it should be covered with solar electric panels, so that evaporation loss is minimised and at the same time power is also generated. The power thus generated could be very well used for agricultural purposes and thus the dependency on costly electric power could be minimised.

7.13 Policy 16: The activities of the Committee on the release of irrigation water should be in deeds than in words.

7.13.1 The district level committee on the release of irrigation water is to be recasted at Panchayt level including the Agricultural Officer of the area. Periodic meetings should be made mandatory and only according the recommendation by this committee the regulation of irrigation water should be done. At present, there are instances where the water was released during the harvesting season and no water was available during the critical phases of crop growth.

7.14 Policy 17: Pumping subsidy provided to the Kuttanad and Kole land farmers are to be routed through the Department of Agriculture.

7.14.1 Kuttanad and Kole areas are part of the 'Ramzar' sites and globally protected areas of agricultural heritage. The outlook on the importance of these sites made the Government to take the tax payers' money and utilise it for the sustenance of this Global Agricultural Heritage. As a part of it for conserving the rice cultivation followed here a huge amount of money is being spent. Considering the need for a single united agency to look after the cultivation aspects which is liable for invasion by pests and diseases and to protect the global heritage, all the interventions are to be routed through a single agency. Agriculture Department may be made the sole responsible agency for these type of activities as per the mandate.

7.14.2 During the sittings at Alleppey and Thrissur, the farmers vehemently made a plea before the sub-committee that the pumping subsidy should be routed through the Department of Agriculture, so that, they can approach only one agency for all the cultivation aspects.

7.15 Policy 18: All interstate water sharing g agreements have to be timely reviewed to promote thrust areas of irrigation development.

7.15.1 Joint Water Regulation Boards of interstate river water agreements must have agriculture experts also while negotiating the sharing pattern for a particular season.

7.16 Policy 19: Irrigated agriculture being the largest water demanding sector, special attention has to be given for creating and sustaining irrigation infrastructure.

7.16.1 The possibility of increasing the storage capacity of major and minor irrigation schemes shall be explored and de-silting of dams and canals has to be taken up as a priority area to improve the water availability for crops in the ayacut area.

7.16.2 Irrigation scheduling of all major and minor irrigation projects shall be formally completed and published before the commencement of each irrigation season. Agriculture Department and Water Resources Department shall jointly coordinate the cropping pattern after assessing the water availability in a scientific manner.

8. SOIL RELATED POLICIES

8.1 The soil is home to a large proportion of the world's biodiversity. In a balanced soil, plants grow in an active and steady environment. The mineral content of the soil and its heartiful structure are important for their well-being, but it is the life in the earth that powers its cycles and provides its fertility. Without the activities of soil organisms, organic materials would accumulate and litter the soil surface, and there would be no food for plants. Natural Soil is often referred to as living because it contains billions of organisms that plants need for their health and longevity.

8.2 In general, the soils of Kerala are acidic, kaolintic and gravelly with low CEC(Cation Exchange Capacity), low water holding capacity and high phosphate fixing ability. Policy initiatives are meant for improving the soil quality aspects.

8.3 Policy 20: Bio-Manure and Bio Fertiliser production is to be enhanced for reviving the soil health and should be one of the primary activities of the Department of Agriculture.

8.3.1 Use of organic manure in the soil would be the effective step in maintaining the health of the soil. Composting, vermicomposting, use of Farm Yard Manure, use of green manure crops, green leaf manuring etc., would be promoted as part of it. The availability of these types of natural organic manures is to be assured by employing effective mechanisms and logistic networks so that the organic content of the soil is increased to the level ideal for shifting towards 'Organic Farming' without affecting the returns.

8.3.2 There will be initial decrease in the production where 'Organic Conversion' is being parctised. Appropriate financial support programmes are to be launched by the Government to bridge the loss sustained due to the shift in to organic parctices.

8.3.3 The Bio Fertiliser production programmes are to be taken up by the PSUs, following model as that of FACT, done during the 1960s and 70s in input production.

8.4 Policy 21: The production potential of the soil is to be improved.

8.4.1 pH regulation in the problem soils would be an effective step in increasing the production potential. Most of our paddy fields are in the acidic range and it needs regular supply and application of soil ameliorants like lime and gypsum. Acidity regulation involves a community based approach where the farmers and LSGs can play their roles effectively. As the availability of lime and gypsum are limited now a day, the application of environmentally safe industrial wastes such as basic slag would be promoted.

8.5 Policy 22: The first week of June of every year shall be observed as 'Green Manure Week' by the State Government for the promotion of green manuring methods and green manure crops.

8.5.1 June is the starting month with respect to agriculture in Kerala. This strategically important period is to be treated as Green Manure Week for the promotion of different green manure crops of Kerala. Different

planting materials such as Daincha seeds, glyricidia branches are to be distributed to farmers in a campaign mode. Different types of composts are to be popularised and different methods are to be employed in farmers fields. However, a massive public participation programme is a must in the case of promotion of organic manure production. The aim of the State is to produce the required quantity of organic manure within the farm it self.

8.6 Policy 23: A cadastral Level soil information system is to be launched

8.6.1 A database of the soils of Kerala State is to be made indicating the different characteristics of the soils and the crops suited for them with the corrective measures needed for introducing alternate crops. Farmers should get these details at their fingertip through the web and facilitated by Agricultural officer who is the grass root functionary of the system. The database on soils should be at Panchayath level base and treated as baseline for any development programmes.

8.7 Policy 24: Make every effort to reduce soil erosion on a watershed basis.

8.7.1 Soil conservation is an effort made by man to prevent soil erosion in order to retain the fertility of soil.

8.7.2 Any erosion such as gullies already formed should be tackled by construction of dams or obstructions. Ploughing and tilling of land should be done along contour levels so that the furrows run across the slope of land. Bunds should be constructed according to contours. Trees reduce the force of straight winds and obstruct blowing away of dust particles. Plants, grass and shrubs reduce the speed of flowing water. Therefore, such vegetable cover should not be removed indiscriminately, where it dose not exist, steps should be taken to plant it.

8.7.3 Measures suggested for soil conservation for the prevention of soil erosion are

(i) Planting cover crops such as grasses, on uncultivated land.
Trees should be planted along hill slopes.

(ii) Adoption of correct farming techniques such as contour ploughing and strip cropping.

(iii) Terracing, the practice of cutting steps in hillside, to create level land for cultivation.

(iv) Construction of check dams on steep slopes which prevent gully erosion and spreading of gullies.

(v) Creation of wind breaks by planting lines of trees, hedges or fences which obstruct the path of wind thereby reducing its speed and hence reducing soil erosion.

8.8 Policy 25: Steps should be take to develop regional nutrient plans on a watershed basis preferably.

8.8.1 Even though different soils have some properties that cannot be changed, such as texture, soil quality can be improved by implementing good management strategies. A good management strategy includes the use of nutrient plans by which nutrients to the soil at the required level can be very effectively be added.

9. CLIMATE & ENVIRONMENT RELATED POLICIES

9.1 According to Indian Journal of Geo-Marine Sciences "Climate Change is the greatest ecological, economic and social challenge of our time". Therefore, it is high time to have climate change adaptation strategies to mitigate ill effects of weather aberrations and sustain crop production under projected climate change scenario because, Kerala is the most vulnerable place as far as the climate change is concerned.

9.2 Special attention is to be given in this direction to the thermo-sensitive crops like black pepper, nutmeg, cardamom, tea, coffee and cocoa as temperature range is likely to increase and rainfall is likely to decline along with deforestation as these crops grow under the influence of typical forest-agroecosystems.

9.3 The potential impacts of global climate change in coastal Kerala are salinity intrusion into aquifers and rise in salinity of wetlands. It has also been observed that over exploitation of ground water in certain stretches of Kerala coast has contributed to the entry of salinity into the coastal aquifers from the sea. Reports say that if the ground water table goes beyond 600 ft., there would be increase in the concentration of Na+ salts. With these backgrounds Government should consider the following policies.

9.4 Policy 26: Research & Development initiatives are to be strengthened in climate change adaptation for sustenance of agricultural production in the State of Kerala.

9.4.1 As crops are more vulnerable to short terms variabilities rather than long term climate changes, the impact of climate variability on crops has to be documented. Detailed investigations are the need of the hour to understand the short and long term effects of climate change in the case of plantation crops through crop-simulation models. To understand the impact of climate change on crops, simulation models need to be developed and revalidated.

9.4.2 Crop species- specific and location-specific crop weather relationships are to be worked out based on long period experimental data.

9.5 Policy 27:Network of meteorological observatories should be increased.

9.5.1 Presently, the network of temperature stations under IMD across the State is scarce, though it has a good number of rain gauge stations. Hence, there is urgent need to record surface air temperature across the State. This will provide a better picture of temperature variability over the State under the projected climate change scenario. This still holds good across the high-ranges. A series of micro-weather stations at all the Departmental farms are also to be established in collaboration with competent agencies like ISRO.

9.6 Policy 28: There is a need to train skilled personnel in the field of climate change adaptation and mitigation.

9.6.1 The changes in rainfall and thermal regimes may result to shifting of climate from wetter to drier zones within the humid type of climate. Therefore, there is a need to study in detail on rainfall and temperature trends across the State on zone-wise. The climate shifts over Kerala, if any, and occurrence of droughts and floods in the State have to be brought out in projected climate change scenario. The impact of climate change/variability on crops grown in the State, including food security of the State has not been attempted under the projected climate change scenario. Trained personnel in this regard should be made available for mitigating the climate change effect on crops and environment.

9.7 Policy 29: Optimize the ecological load on the natural systems as well as building up the State's economy while minimizing environmental degradation.

9.7.1 The Policy on Environment 2009 has been designed to suit the specific local conditions of the State of Kerala and to help re-orient its development in conformity with environmental perspectives so as to make the development sustainable. The policy accepted in the same document is also accepted here.

9.8 Policy 30: The Government should make a focussed approach to facilitate the possibility of strategic planning for systematic Disaster Management, as well as for contingency planning at District, Block and Grama Panchayat levels against all emergencies, pro-actively (for preparedness, prevention and mitigation) and responsively (for response, relief, repatriation, rehabilitation, reconstruction, the whole way to recovery in the full Disaster Cycle).

9.8.1 Disaster Risk Management encompasses a full continuum from preparedness, relief and rehabilitation, mitigation and prevention. The Policy aims to increase and sustain resilience of vulnerable communities (especially farmers) to hazards through diversification of their livelihoods and coping mechanisms. This entails a shift from the short term relief responses to development. The mechanisms in preserving livelihoods and minimising suffering by providing sufficient and timely early warning information on potential hazards that may result to disasters, are to be done in a co-ordinated manner. It is also aimed at alleviating suffering by providing timely and appropriate response mechanisms for disaster victims.

9.8.2 If needed, enactment of an enabling comprehensive legislative framework which lays down the legal foundation for collaborative partnership in institutional (different Departments of the Government) participatory management of disasters, including mobilisation of the essential wide range of resources (financial, material, technological, professional and technical, human and infrastructural) necessary for management of all disasters should be done.

9.8.3 There is a need to bridge the current gap between science, policy and practice. For example, there has been a disconnect between research and end users. Relevant climate information is often inaccessible or not usable or understandable by end users and decision-makers. International organizations and responsible national line departments should be encouraged to be proactive in facilitating collaboration among environment research institutes working on climate change, service providers such as extension services and meteorological services, line departments and humanitarian actors.

10. POLICIES RELATED TO WATERSHED DEVELOPMENT APPROACH

10.1 Effective use of land and water is fundamental to growth and sustainable development. The concept of watershed management has evolved to ensure effective use of both natural and social capitals. Thus, the watershed development programmes include land, water and human resources as essential components.

10.2 Policy 31: Agriculture planning and development programmes of the state shall be based on watershed.

10.2.1 Local self-government level decentralized water management plans to be developed for long periods. Water resources management plans with suitable watershed measures, afforestation, eco – restoration of catchments, rainwater recharging and harvesting, storm water drainage, water auditing, recycling and reuse etc. should be built into it. These water management plans should integrate into basin level management plans.

10.2.2 Within the natural unit of a watershed, soil and water conservation, agriculture development and allied activities like animal husbandry, pisciculture, etc, will be carried out in an integrated manner with a full involvement and participation of the farmers.

10.2.3 While formulating the projects, the pooling of available funds should be made and the officials responsible for the implementation of the different components should sit together under a single co-ordination agency such as the Grama Panchayats guided by the Block level ATMA.

10.3 Policy 32: It is the responsibility of the state for water management / water poverty.

10.3.1 While the world's growing demand for water is a serious problem, the story is more complicated than just too many people putting their straws in the glass. The growing conflicts over water use are about the broader questions about ownership of common resources, and equity of access to those resources.

10.3.2 Human race has taken water for granted and massively misjudged the capacity of the earth's water systems to sustain the demands made upon it. The supply of available fresh water is finite and represents less than half of one percent of the world's total water stock. Thirty-one countries are facing water stress and scarcity and over a billion people lack adequate access to clean drinking water. It is anticipated that by the year 2025, as much as two-thirds of the world's population will be living with water shortages or absolute water scarcity.

10.4 Policy 33: The watershed development plans are made to improve rural livelihoods and reduce poverty by developing and strengthening community based approaches.

10.4.1 The programmes should aim at improving water, soil, biomass and other natural resources which would help the rural livelihoods and institutionalizing and scaling up participatory approaches and processes in natural resource management with a focus on livelihoods.

10.4.2 They also should facilitate diversification, decentralization and devolution of decision making powers in the management of natural resources. One of the important objectives is to focus on the future mode of optimum and sustainable use of natural resources for livelihoods.

10.4.3 The theme of any watershed development should be the improvement of agricultural and livestock production and the well-being of local inhabitants without degrading the fragile environment.

11. POLICIES TO ADDRESS FARMERS IN DISTRESS

11.1 In a period nearing twenty years, the farmer suicides crossed a quarter million mark in India. During this period, Kerala has also witnessed a tragic scenario of many farmers. This fact is alarming since the total number of farmers is declining significantly. In other words, farm suicides are rising through the period of India's agrarian crisis, even as the number of farmers is shrinking.

11.2 Crisis is now manifested in different ways: non-remunerative prices, volatile economy, absence of a protective market etc. Even agrarian crisis also manifested in the form of burning their farm fields, throwing the agricultural produce on the roads etc. It is true that forms of suicide is slowly changing: earlier the suicide was confined to swallowing pesticide/hanging or even jumping into the well however now the shift has taken place wherein farmers' are now committing suicide by jumping into the burning field.

11.3 The suicides appear concentrated in regions of high commercialisation of agriculture and very high peasant debt. Cash crop farmers seemed far more vulnerable to suicide than those growing food crops. Yet the basic underlying causes of the crisis remained untouched. The predatory commercialisation of the countryside; a massive decline in investment in agriculture; the withdrawal of bank credit at a time of soaring input prices; the crash in farm incomes combined with an explosion of living and cultivation costs; the shifting of millions from food crop to cash crop cultivation with all its risks; the corporate hijack of every major sector of agriculture including, and especially, seed; growing water stress and moves towards privatisation of that resource.

11.4 Kerala's agriculture is hugely cash crop-based and fragile at the best of times. Cash crop prices are highly volatile, and often rigged by powerful corporations at the global level. This makes Kerala more vulnerable to price shocks than any other State in India. In the early years of the last decade, for instance, vanilla fetched Kerala farmers prices of up to Rs. 4,000 a kilogram. It then crashed to under Rs. 80 a kg or less , wrecking farmers who had invested huge amounts of mostly the borrowed, money in its cultivation. Most plunged into debt, several committed suicide in despair.

11.5 Kerala set up a debt relief tribunal in 2005, raised support to the farm sector and took other steps to mitigate distress. Even its troubled food crop sector received a boost. Between 2005 and 2013, Kerala doubled the support price for paddy from Rs. 700 to Rs.1,700. Yet, it seems that the State will take a worse hit than any other due to the multiple free trade agreements the Union government has signed or will enter. And reports of rising farm suicides again in the cash-crop citadel of Wayanad signal which way Kerala is now headed.

11.6 Policy 34: The Government should take earnest steps to instill confidence in the debt-ridden farmers for the prevention of farmer suicides for ever by the introduction of 'relief funds' or 'relief loans' so that the immediate financial requirement can be met by them.

11.6.1 It was observed in the farm families in Waynad district which were crushed by the suicides of the farmers who were the only support to them, observed that financial institutions, including cooperative banks and scheduled commercial banks, are unsympathetic to the needs of farmers and were very much reluctant in providing crop loans to them. As a result, farmers were forced to take loans from private financial institutions at a higher rate of interest. In these types of cases Government intervention is necessary to assure the farmers credit at the time of emergency. The Governmental mechanisms should act concurrently to build confidence among the farmers that the situation could be managed easily by them with the help of the most powerful agency, the Government.

11.6.2 The landless farmers usually takes land on lease to grow crops like ginger and plantain. They borrows from banks, cooperatives and money lenders for their farming operations. But the price crash and crop failure would shatter their dreams and they will be forced to close the chapters of their lives. The price is to be assured for the produce and thereby building the confidence has to be taken up by the Government by employing multi disciplinary approach and income from farming is to be assured. The details of the same are presented in the Sections 20.5 and 20.10

11.6.3 To boost up the level of confidence among the farmers especially the debt ridden ones who are at the edge of suicide the primary financial requirement of them should be met by the Government to save their and their families' lives. The immediate strategy of the Government is to address this issue by providing them 'relief funds' or 'relief loans' so that the immediate requirement of money can be met and the confidence level of the farmer can be raised avoiding the suicidal attempts.

11.7 Policy 35: The approach of the financial institutions needs to be changed while attempting for recovery from the debt ridden farmers and an integrated resource base analysis and separate fringe credit support for them should be extended so that they would be brought above the repayment threshold level.

11.7.1 There were few attempts made in this regard in various parts of the State. The cases of debt ridden farmers are to be taken and addressed individually. The causes of indebtedness is to be assessed as a farm family basis. The farmers will possess different income earning avenues in their family level itself. Those have to be assessed before attempting for the recovery of money. Many farm families have opportunities for developing themselves from the resources they have; like adoption of improved methodology in farming to get more income, family members can go for additional employment like providing tuition if they are educationally qualified, can be engaged in animal husbandry, dairying, poultry, inland fisheries, food processing, marketing, part time avocations like bee keeping, ornamental aquaculture, pet animal rearing etc. These possibilities are to be assessed and a 'livelihood plan' should be worked out for those who are indebted.

11.7.2 The livelihood plan is inclusive of the crop plan and has to be worked out by a body consisting of Local Body Head, Agricultural Officer, Veterinarian, Dairy Development Officer, Village Extension Officer and Bank Official. The 'fringe financial assistance' required for this livelihood plan is to be arrived by the joint meeting of the proposed body. This type of intervention was adopted in the Perumatti Service Co-operative Bank during 2004-05 in the case of indebted farmers and succeeded in implementing it. The plan should be covering the aspects like production plan and repayment plan. The primary objective of giving a 'fringe finance' is to make them capable of repaying the loan by assuring livelihood support and income generation from the unidentified resources a farmer has.

11.7.3 Thus a detailed resource analysis has to be carried out for making a livelihood support plan for bringing the farmers above the repayment threshold level.

11.7.4 In order to track the proper utilisation of credit and to monitor the credit availed farmers, the financial institutions should communicate the month wise report on them to the proposed body under Section 11.7.3. The convenor of the proposed body should be the Village Extension Officer. A proper advice can be given to the farmers and an effective monitoring mechanism can be evolved for the credit mobility and requirement. A statutory authority may be given for this body for reporting the matter to the District Collector at times of intervention such as crop loss, natural calamity, price fall etc.

11.7.5 Hence, a comprehensive intervention to ensure self-reliance and capacity building of farmers in modern farming techniques, a monitoring and support system for vulnerable farmers and a transparent, village-level system for making a livelihood plan to derive income from alternate sources along with farming is required to prevent farmers' suicides in the near future.

11.8 Policy 36: The loans taken by the real and full time farmers for their needs like housing, medical treatments, marriages, children's education and other unavoidable consumption needs are also to be treated as agricultural loans as the repayment is to be made from farming.

11.8.1 Like the other individual in the society farmer is to be treated as a professional who is deriving income from the 'universal profession' of farming in the case of the credit requirements of consumption such as housing, marriages of his children, educational requirements, medical treatments etc. He is the ultimate producer and the Committee is of the opinion that the requirements of the producer is to be treated as the requirement of production. If he avails the loans for the purposes other than farming, the repayment of the same has to occur from the farming. Considering his unique involvement in the production process and the role of supporting his own family, the credit availed for immediate purposes other than farming is to be treated as agricultural credit. All the benefits and formalities for availing credit for

agricultural purposes are to be applied here also. The Government should see that only full time small and marginal farmers whose primary income is from agriculture and allied activities shall be entitled for this.

11.9 Policy 37: There is a need to strengthen the Mental Health Programmes at primary health care level, involvement of extension officials and institutions so as to offer support and counselling to vulnerable farmers.

11.9.1 Many researchers found out that there exists a strong correlation between the incidence of natural calamities and price fall of the produce with rate of farmer suicides. The need for stress relief camps and counselling services for farmers was expressed in many sittings. Many psychologists believe that even in the absence of psychiatric morbidity, farmers are more likely to report that life is not worth living compared with the general population.

11.9.2 Hence, if a natural calamity is predicted, there is the need for rapid mobilization of extension workers, psychologists and psychiatrists to the calamity hit region along with other supportive measures. The Government action most often is predominantly limited to political announcement of exgratia benefits and not towards prevention strategies.

12. FARMER & FARM LABOURER WELFARE RELATED POLICIES

12.1 In the past, advisory services was being focused in the first place for optimizing production and profitability while improving the ecological and social status of the farms received much less attention. New societal demands now urge the Government to focus on the welfare of farmers and farm labourers so that the status of them in the society is improved and the new generation is attracted towards farming.

12.2 The only state in India where a pension scheme for farmers is being operated is Kerala. Apart from the monthly pension, other welfare measures such as farmer insurance is also being done. The following policy measures are suggested for imparting a 'human face' to the agricultural development initiatives of the Government.

12.3 Policy 38: The Pension Scheme for farmers will continue

12.3.1 It was a great thing from the part of the Government during 2009 to include farming community viz.,the paddy farmers under pension scheme of the government. The introduction of a State wide farmers pension scheme in 2012 was also a landmark move. It also acted as a recognition for the real farmers of the State. The government should act to restore young farmers' confidence in the farmers pension scheme also by periodically and sustainably improving the monetary benefit.

12.3.2 The government should not be reluctant to change the basic design to meet the rapidly changing realities. The biggest realities today are the ever-growing rural-urban gap - which has to be narrowed - and recognizing that most of the farmers today will not be farmers after two decades. Improving the scheme will undoubtedly cost more money now, but it will lay the foundation of a more genuine self-sufficient pension scheme for the future.

12.4 Policy 39: As agricultural development and farmer welfare are inseparably linked, a farmer welfare fund board is to be established.

12.4.1 As the population engaged in farming is getting reduced day by day due to various reasons, it is very essential to attract and retain more and more people in the sector, especially younger generation. As per the National Commission on Farmers, a farmer welfare board is suggested as part of this initiative. The benefits shall be restricted to farmers those who derive income primarily from agriculture. The small and marginal farmers should be given preference for all the welfare measures initiated.

12.4.2 A fixed contribution, which is on a half yearly or yearly basis from the farmers, cess from spices/coconut and other trades, contribution from the State and Central Governments, contributions from Nationalised and Cooperative banks, contributions from trade houses and export houses in agribusiness in the form of cess will form the operational capital of the Board.

12.5 Policy 40: There is a need to promote comprehensive health insurance schemes for all the farmers of the state.

12.5.1 Due to climatic changes and changes in the environment, excessive per capita expenditure on health rose to Rs. 92/- as per the NSSO results. Health and life insurance coverage up to 10 lakh, reasonable pension amount, loan facilities for education of children and marriages of children etc., should be the prime focus of the welfare board. On the job accidents, should also be made eligible for pension. Family pension also should be a major component.

12.5.2 Full time farmer with land area up to 2 ha and primary vocation is agriculture and the only source of income will be brought under this programme.

12.6 Policy 41: Agriculture labour banks will be started at Panchayat level to address the issue of shortage of agricultural labourers.

12.6.1 A labour bank at Panchayat level may be formed with co-ordination at the Block level and allocation of MGNREGS workers for agricultural and related works is an important aspect to address the shortage of workers for agricultural activities.

12.6.2 This labour bank should act as a source of all kinds of logistic support for agricultural labourers and should provide all facilities include ESI and Pension based on quantum of work done by the labourer. A minimum of 100 days per year should be worked by them in the agricultural sector for this scheme. This association of labourers shall be for the unskilled persons only.

12.7 Policy 42: A production incentive will be awarded to the farm laboures who works in the agriculture sector for not below than 100 days.

12.7.1 As the farm labourers who work in the agricultural production front contributes directly to the farm production they should be paid a production incentive. The eligibility criteria should be such that they should work in the farms at least 100 days per year.

12.7.2 If the work is done by any labourer from outside the state, the benefit shall be passed on to them also for assuring the availability of labour throughout the year.

12.7.3 The details regarding fund generation is detailed in the Section 20.5 of the Agricultural Development Policy.

12.8 Policy 43: Sufficient number of seats in professional courses should be reserved for the children of farmers so as to improve their social status.

12.8.1 By reserving sufficient seats in professional educational courses for their children, the society would feel that the profession of farmers is an attracting one. This would help in retaining the farmers in farming and attracting others towards farming as this profession is assuring a social security.

13. POLICIES RELATED TO HUMAN RESOURCE DEVELOPMENT IN FARM SECTOR

13.1 Human resources constitute the most critical inputs relying on the use of science and technology for development. It involves a planned approach to learning aimed at changes in knowledge, skills, understandings, attitudes and values, and in the behaviour of a learner or group of learners.

13.2 The size of the human resources of the Department of Agriculture, Animal Husbandry and Dairy put together, it will give an mazing figure like 6117 number of field assistants, 2481 field officers, 520 middle level officers, 237 senior officers and 21 state level officers. This huge resource has to be genuinely designed to produce the output for achieving the ever dreamt agricultural and sustainable prosperity.

13.3 Human resource capacity building encompasses aspects of awareness-raising, education and training, attitude change, confidence building, participation in decision-making and action. A critical goal of HRD is that of maximizing people's potential to contribute to development by participating fully in all its activities. Through capacity building, individuals and groups are empowered to expand their abilities to more fully participate in the development process. As people increasingly direct and control the process of change that they themselves are bringing about, then the knowledge, skills, attitudes and behaviors they require also change. Based on these facts, the following policies may be included.

13.4 Policy 44: Improved agricultural productivity depends on agricultural education and competency-based trainings and are essential for building the human resource capacity.

13.4.1 This is required to improve agricultural productivity and to manage natural resources for sustainable development. An urgent need is to improve the quality and content of the agricultural education provided to students. It was observed by the sub-committee that often the subject matter is minimally relevant to the agro-ecological conditions, technological levels and socio-economic circumstances of local farm populations.

13.4.2 In order to attract the young generation the curriculam is to be added with agricultural subjects from the school level. The curriculum should provide a critical analysis of agricultural and food systems and helps students understand new concepts through hands-on examples.

13.5 Policy 45: Develop the extension personnel of the state to meet the knowledge & skill requirements of farmers as self-reliant agri-prenures.

13.5.1 To develop specially the small and marginal farmers as agri-prenures and making farming a profitable enterprise, the state sponsored extension machinery will have to take lead with completely changed focus and attitude towards their roles and responsibilities. A new agenda of Human Resource Development for

agricultural extension personnel in terms of required competencies in technical, organisational, managerial, communication and business skills will be required to meet these new challenges. The Human Resource Development will not be confined to competency building but providing congenial working environment to extension functionaries.

13.5.2 The extension personnel at all levels will have to change their attitude and role from manager of "files and subsidies" to manager of "information generation and dissemination" for different segments related with agricultural extension.

13.6 Policy 46: Empowering the small farmers in order to have say in policy matters of government in agriculture sector would pave a way for better development.

13.6.1 Farmers are to be empowered in the following areas so that they may become a part of the decision making process of the Government which would ultimately reflect in the production and productivity.

1. Technological skills related to production
2. Technological skills related to soil & water management
3. Organisational and management skills in working together as Farmer producer Organisations (FPOs).
4. Business skills in analysis of cost and benefit
5. Marketing skills
6. Skill for value addition to agriculture produce
7. Handling of Information Technology tools.
8. Credit management expertise.

13.7 Policy 47: It will be required to make necessary changes in the systems to provide scientific and technical knowledge and skills in agricultural operations to the input dealers, so that they may advise farmers in right direction & provide valuable extension services to farmers specially to small & marginal farmers.

13.7.1 Besides public sector extension functionaries, there are a large number Non government organizations, para extension workers, traders and retailers of seed, fertilizer and pesticide, providing technical advise to their client farmers about the products as well as its use.

13.7.2 The other players are Indian & multinational companies in agri-business , which provide extension services to farmers having business dealings like Buy-back arrangement for farm produce. The agri-business companies in organised sector take care of Human Resource Development of their extension personnel well. It will require to make necessary changes in policy and systems to provide scientific and technical knowledge and skills in agricultural operations to the input dealers, so that they may advise farmers in right direction & provide valuable extension services to farmers specially to small & marginal farmers. They should act according to the Government guidelines and close supervision by the Department of Agriculture.

13.7.3 All these initiatives are to be closely monitored by the concerned departments to assure 100% protection of the farmers' interests and at any cost, the misuse of this provision shall be allowed.

13.8 Policy 48: Extension personnel of the state will have to acquire latest knowledge as well skills in use of various electronic devices such as computers, multimedia, internet etc.

13.8.1 In the era of information technology, where information play a vital and decisive role in taking strategic decision, extension personnel will have to acquire latest knowledge as well skills in use of various electronic devices such as computers, multimedia, internet etc. The day is not far when tele/video conferencing will be common means to interact with larger number of farmers to extend extension messages or sharing market information by extension personnel. In coming years, the area of Information Technology for developing communication skills will be the largest segment for competency building among agricultural extension personnel for supporting farming community.

13.9 Policy 49: The Human Resource Development of the extension functionaries is to be done scientifically and time bound.

13.9.1 Current recruitment process in the department is immediate posting to a location after issuing the appointment order both for all officers and assistants in the respective department. A class room training module should be created both sets of professional staff and mentoring system under senior officer for a period of one month. Mandatory location specific on the job modules also should be created as part of technology up gradation of the staff.

13.9.2 The Agricultural Officers are those who have secured a good position in the various competitive examinations and the potential of them should be tapped fully providing adequate in-service provisions for acquiring higher qualifications such as MSc and PhD in agricultural sciences so that a task force could be formed with technologically sound persons for improving agricultural productivity and to manage natural resources for sustainable development. An urgent need is there to improve the quality and content of the agricultural education provided to students. Sometimes the subject matter is minimally relevant to the agro-ecological conditions, technological levels and socio-economic circumstances of local farm populations.

13.9.3 This facility shall be extended to all technical officers of the Department for sharpening their expertise. At least 20 persons per year have to go for higher studies in the institutions inside Kerala, India and even out side the country for assuring a technologically sound manpower in the Government set up. The vision behind this programme must be to upgrade all the potential of the manpower of the state to the fullest extent possible.

14. POLICIES RELATED TO ICT APPLICATION

14.1 According to International Food Policy Research Institute (IFPRI), the generation and application of agricultural knowledge is increasingly important, especially for small and marginal farmers, who need relevant information in order to improve, sustain, and diversify their farm enterprises. ICTs can directly support farmers' access to timely and relevant information, as well as empower the creation and sharing of knowledge of the farming community itself. The public, private, and non-governmental organization (NGO) extension services will be able to increase their effectiveness by using these ICT tools.

14.2 The National Commission on Farmers has noted that knowledge deficits constrain agricultural productivity in India. It added that the use of Information and Communication Technologies (ICTs) for agricultural extension is one way of addressing the information needs of farmers.

14.3 As government is thinking and formulating the policy for the betterment of the agricultural community with special focus on marginal and small farmers, ICT has to be the key for that. It should be embedded in the agricultural activities. With the advent of new technologies, agricultural output has increased, but it is not enough. Through ICT, modernisation of the agricultura sector of Kerala is the need of the hour.

14.4 The concept of ICT is still in nascent stage, though Kerala has attempted some pioneering models like, KISSANKERALA.NET. More over, the state has not tried different automation methods for agricultural extension management. The policies regarding ICTs are framed with these backgrounds.

14.5 Policy 50: Immediate steps are to be taken to materialise the concept of 'Paperless Offices' with the help of ICT in the case of Krishi Bhavans to assure services with 100% fastness and accuracy.

14.5.1 The Krishi Bhavans of Kerala were originated with the model concept of 'Paperless Offices'. But now the situation is such that the system is tied with numerous file works rather than the field works. If any farmer wants an advice from the extension officials, they have to come to the office and discuss with them. The present approach is to have an e- automated office, so that every activity of the Krishi Bhavan is made online.

14.5.2 This will have advantages like cost effectiveness, time saving, unified format for the implementation of programmes throughout the state, timely delivery of services and above all the extension works of the Department can be monitored very efficiently from the top. The statistical data can also be generated in a realtime basis.

14.5.3 An online software for the technology management is to be developed without any delay. Since, the current policy of the State and Central Governments regarding subsidy distribution is e-payments and the state had already taken a lead role in this regard, an online software with proper authentication protocols at different levels are to be

developed for saving the valuable time of the extension officials and they can concentrate on filed works effectively. A situation would arise where the officials go to field instead of farmer visiting the office for various assistance and technology.

14.5.4 Hand held electronic gadgets such as Tab Computers with connectivity are to be provided to the Krishibhavans for updating the data regarding the farmers and their crops while visiting the field. A farmer can upload the applications for various assistance online with his unique registered identification number and the extension officials with the help of the Tab Computers the data regarding the crop and farmers can be uploaded when they visit the field. With the help of the GPS locator, it is possible to identify the exact location, while uploading the data and thus accuracy of the system is assured. Moreover, the authorities can have a state wide picture of agriculture situation with the help of a mouse-click.

14.5.5 The controlling officers can generate the financial claims with the help of a mouse click and that can be presented in the treasury and money can be disbursed without any delay by e-payment. The system gets transparent, becomes smooth, efficient and time saving. Automatically, with the help of electronic administration, it would become field oriented and unnecessary time delay in implementation of different schemes of the Department can be avoided.

14.6 Policy 51: The planning process should be based on the real-time data generated with the help of modern ICT tools and State Agricultural Plan is to be developed every year .

14.6.1 The modern technologies such as cloud computing, GPS, android based applications, mobile based technologies etc., assure accurate information over a short period of time. As described in the Section 14 an online software for electronic administration is mandatory. This can also help in the data generation such as the following.

i. The current area under different crops in the state.

ii. The present crop condition and situation.

iii. The exact requirement of the State with respect to produces.

iv. The accurate point at which the Government is to intervene.

v. Requirement of financial resources

vi. Perfect market intelligence - What to grow, Where to grow, How to grow, When to grow, Where to sell, At what price to sell etc.

14.6.2 The same online software developed for electronic administration can also be used for generation of State Agricultural Plan. The data will be updated every time when the field functionaries are in the field. Thus accurate, real time and authentic data will be got for the planning purpose and this will drive away the un wanted pushing of programmes in the non needy tracts and not getting the programmes in the needy tracts of the state.

14.7 Policy 52: When ICT enabled technologies are made popular, Concentrate on the demand, not on the technology.

14.7.1 It is seen that a lot of touch screen information KIOSKs are kept idle throughout the state. Besides that a number of online programmes are available in the internet where

no farmers are seen directly operating it, though it is claimed to have developed for the direct use of even the illiterate farmers of the state. A number of interactive CDs and programmes were made utilising the taxpayers' money but no one is found to be used by the common man. So any developed technology should be based on the demand for the technology and not on the merit of the information technology at all.

14.7.2 The ICT enabled technology should be such that it should empower the extension official in bringing the targeted technology to the targeted population rather than addressing the targeted population directly.

14.8 Policy 53: The Call Centers are to be made efficient.

14.8.1 Many a time it was observed that the Call centres are failing in providing the right information. The Call Centre are to be strengthened and reorganised with the help of technical staff so that the queries can be answered in the specific moment and with accuracy.

14.8.2 Local people and their information needs should be the driving force behind ICT initiatives and not the technology. Engage local people in the validation of the various communication tools and let them identify the most useful medium to meet their needs.

14.9 Policy 54: Farmer databases are to be made perfect.

14.9.1 A novel approach initiated from the part of the Government is the registration of farmers for the building up of a database. But due to many reasons the same could not be materialised. In this context it is recommended that an online registration which provides a unique identity number for the registered farmers and coupling with a permanent identity proof so that a smart-card can be issued to them in the due course. This database must of the one used in many governmental organisations like IRCTC, where frequent updating and verification is possible and very accurate database is got.

14.9.2 The database thus formed become the part of the planning process, whereby the first hand information on all aspects like the crop profile, land use capability, extent of land that can be put for additional production etc., can be got.

14.9.3 Only the registered and validated farmers will have eligibility for assistance under different schemes of state, representing them in different committees for development and for voting for the selection of their representatives. This will check the unwanted entry of individuals in to the places reserved only for real farmers.

14.10 Policy 55: Provide need-based ICT training at all levels, but especially to youth, women and marginal farmer groups.

14.10.1 Farmer ICT basic training, site specific Crop Management systems , GIS, GPS, e-Marketing, crop models, ICT managed irrigation and fertigation systems, greenhouse management systems, process control pilots, distance learning, etc are to be imparted to the client groups on a need based format.

14.11 Policy 56: Necessary mechanism should be evolved for providing the market information to the farmers on a realtime basis with the help of ICTs

14.11.1 Marketing forms a key issue in any agrarian development. So with the help of the modern ICT tools the farmers are to be provided with the latest market updated for their products.

14.12 Policy 57: The modern ICT tools are to be modelled in such a way that it should provide information about rural development programmes and subsidies to farmers.

14.12.1 Many at times the farmers become unaware of the developmental programmes of the Government. In this context the reliable tool can be the SMS services regarding the launching of new programmes by the department. The registered farmers would get SMS relating to the programmes and they can apply online as suggested in the Section 13.5.3.

14.13 Policy 58: ICT enabled weather forecasting services, input prices and availability, early warning of diseases and pests and soil testing & soil sampling information are to be provided by SMS services.

14.13.1 When the databases of the farmers are made perfect, it is possible to get a target population capable or needed for receiving these type of informations by Short Message Services (SMS).

14.13.2 Farmers considers market information, facilitation of access to land records, a question-and-answer service and detailed information on the Government's agricultural development programmes most appropriate to their needs. Information on the best packages of practices, post-harvest technology, general agricultural news and information on crop insurance schemes were suggested by most of them as needy ones.

14.14 Policy 59: There should be initiatives for the application of technologies such as 'Tele Presence' and 'Google Glass' for the conferences , technology refinement and transfer.

14.14.1 Telepresence refers to a set of technologies which allow a person to feel as if they were present, to give the appearance of being present, or to have an effect, via telerobotics, at a place other than their true location. Telepresence requires that the users' senses be provided with such stimuli as to give the feeling of being in that other location. Additionally, users may be given the ability to affect the remote location. In this case, the user's position, movements, actions, voice, etc. may be sensed, transmitted and duplicated in the remote location to bring about this effect. Therefore information may be travelling in both directions between the user and the remote location. It would be useful in the conferences and technology transfer. It is expected to reduce the cost and time involved for the travelling of officers to attend the meeting.

14.14.2 Google Glass is a wearable computer with a head-mounted display (HMD) that is being developed by Google in the Project Glass research and development project with the mission of producing a mass-market ubiquitous computer. Google Glass displays information in a smartphone-like hands-free format, that can interact with the Internet via natural language voice commands.

14.14.3 These ICT tools are of recent origin and underway in the develeopment. But the Government policy is to tap its potential as and when it is come in to reality, without making the situations compell to adopt them.

15. POLICIES RELATED TO TECHNOLOGY DISSEMINATION AND MANAGEMENT

15.1 Agricultural extension is a key component of the strategies and objectives of the Government's agricultural policy. As part of the Governmentís responsibility for the establishment of policies,regulations and projects that will ensure sustained agricultural production, the need for developing a New Agricultural Extension Policy was felt.

15.2 Policy 60: Extension Services are to be made more efficient

15.2.1 The efficiency of agricultural extension services will be improved through training, skill development, institutional strengthening and logistical support. Trained extension agents will be provided to work effectively with all categories of farmers, and with all members of households, and to solve basic production, management and marketing problems in a wide range of crop, fishery, livestock and household enterprises. The focus of outreach activities is to provide the most cost-effective services to farmers.

15.2.2 The extension agencies in the three sectors (government, non-government organisation and private) will continue to work within their own organisational structures and procedures, but the policy seeks to ensure that effective co-ordination is established to increase the efficiency of agricultural extension. The new extension reform in the country namely, ATMA can play a vital role in this regard.

15.3 Policy 61: Demand led extension is the need of the hour.

15.3.1 Extension programmes concentrate on meeting the information needs of farm households, in particular helping them solve the key problems they face in their farming activities. All extension activities and research priorities are to be based on the needs, problems and potential identified at farm level. This may lead to the involvement of extension agencies in local on-farm participatory research in order to identify appropriate solutions to farmers' problems. Extension staff will work closely with farmers to identify agricultural problems, using participatory methods and techniques such as Rapid Rural Appraisal, Participatory Rural Appraisal and Problem Censuses. Farmers' problems will set the extension agenda, and in this way, extension services will be demand led, and based on local situations and resources.

15.4 Policy 62: Group approach should be the motto in all the extension activities of the state.

15.4.1 For the extension services to provide individual attention to the more than 7 million farm families is beyond the resources available in Kerala State. A group approach to extension offers the opportunity for more effective use of limited extension resources for problem identification and solution, sharing of information and cost-effective choice of extension methodology.

15.4.2 A group approach to extension also has the advantage of providing a forum for participation, an area in which many non-government organisations have considerable expertise.

15.4.3 The New Agricultural Extension Policy endorses the principle that extension staff should work with groups of all kinds, in order to bring maximum benefit to farmers. It recognises that a very wide range of mutual interest groups already exists in the field. These groups range from extremely temporary, such as a seasonal Kerasree group/ Cluster, to virtually permanent, such as the Padasekhara Samithies, and may be affiliated to a wide variety of agencies, including those responsible for input supply, credit extension and marketing. These existing groups would be the focus of extension activity. New groups will be encourage where there are none at present or where key target farmer categories are not included in the membership of existing groups. Extension staff from different agencies will work with groups to:

- bring extension staff into contact with more farmers;
- help all categories of farmers (men, women, large, small and marginal) to benefit from extension;
- improve the learning and spread of knowledge among the farming population;
- enable farmers to fully participate in the planning of extension programmes;
- provide a forum where decisions can be taken for farmers to take co-ordinated action leading to self-reliance (for example, on pest management, forest management, livestock grazing and soil conservation);
- promote a closer, participatory working relationship between staff and farmers.

15.5 Policy 63: The development of close co-operation between extension agencies and formal research institutes is essential if farmers are to be provided with the services they require.

15.5.1 Research institutes require information from extension about the problems farmers are facing, for which there are no available solutions, in order to conduct research programmes both on research stations and on-farm with farmers. Extension requires the findings from research programmes, in order to provide farmers with the most appropriate advice. Effective mechanisms to ensure that there is a free flow of information between extension and research will be institutionalised.

15.5.2 The New Agricultural Extension Policy also recognises that farmers themselves are actively engaged in their own experimentation, as part of their daily agricultural lives. Efforts to learn from and strengthen such informal research will be made.

15.6 Policy 64: The existing system of extension activities are to be put under one single body so that the services to farmers can be done efficiently.

15.6.1 To enhance the human capital, Panchayath level extension strategy need to be designed and devised. Under the chairman ship of the Gramapanchayath President, a Panchayath extension body should be functional in Panchayath level in tune with the ATMA Model. This should be under the

leadership of agricultural officer and the officers who support allied activities such as veterinary, animal husbandry, fisheries, sericulture and watershed management should align their activities and extension strategies in that model. This body should be structured in such a way that any knowledge pertaining to any field of agriculture can be transferred to farmer. Formation of farmer clusters, management of different commodity clusters, training programmes, workshops, leadership development of farmers to take up agricultural related activities, etc should be the role of these panchayath level bodies. The enhanced role of Plan Coordinator of the Panchayath and Convenor of the Panchayath level watershed committee should enable the Agricultural Officer to coordinate the activities of the commodity groups formed under ATMA Programme.

15.6.2 Current ATMA system of approach can be more functional with extension focus. The commodity based clusters can be federated at block level and form producer companies or cooperatives based on nature of the commodities.

15.6.3 ATMA should act as the nodal extension body which can play a greater role in coordination of the activities of multi disciplinary departments such as Agriculture, Animal Husbandry, Diary, Fisheries, Soil Conservation and Soil survey etc. The senior most officers in the Department of Agriculture Should head the ATMA project the entire extension strategy should be implemented through this body as envisaged in the national level.

15.6.4 The current administrative set up of ATMA will be made more functional for state level coordination of integrated extension approach.

15.7 Policy 65 : The new face extension should provide integrated environmental support.

15.7.1 The lives of more than 70 percent of the population are almost totally dependent upon the natural resource base which supports agricultural production. However, it is recognised that this critical resource base is under threat. Among the concerns are deforestation, water scarcity caused by overabstraction, and an increased incidence of pest damage due to introduction of monoculture and inappropriate use of pesticides. To maintain the ecological balance in the natural environment, the Government's environmental objectives are to:

- control and prevent pollution and degradation related to soil, water, and air;
- promote environment-friendly activities;
- strengthen the capabilities of public and private sectors to manage environmental concerns

as a basic requisite for sustainable development;

- create opportunities for people's participation in environmental management activities.

15.7.2 The New Agricultural Extension Policy therefore should support extension programmes which seek to support and encourage farmers and farmers groups to apply sustainable agricultural practices. Through the sharing of

information among all the agencies in the agricultural extension system, it is expected that the capacity of agencies to promote sustainable agricultural development will be enhanced. It is recognised that farmers own Indigenous Technical Knowledge is often environmentally sustainable, and efforts should be made to support and learn from farmers, as well as the formal research system. The policy recognises that, inevitably, with increasing demand for higher agricultural output due to a rapidly increasing population, there may be a negative effect upon the natural environment. However, the policy will support extension efforts aimed at balancing the demands for increasing production and environmental preservation. This effort will be integrated extension support for the whole farming system.

15.8 Policy 66: Improved productivity of livestock and improved quality of the livestock keepers are possible only if policies focus directly on people and policy instruments are directed towards building their capacities for vibrant, competitive, informed and responsible participation in very aspect of the livestock sector.

15.8.1 Animal husbandry-extension is very poor in the State and, if at all, is limited to giving advice to farmers in a fashion not conducive for secular livestock growth. The approach towards livestock development will have to change from delivery of pre- packaged services to participatory process of planning, implementation and monitoring of development, based on people's knowledge, access and control over resources, their development aspirations and their perceptions regarding what risks they are willing and able to take as livestock entrepreneurs.

15.8.2 There are five training centers under the Department of Animal Husbandry by which the routine mandate of trainings are undertaken. But for a professional approach in participatory process of planning, implementation and monitoring of development, based on people's knowledge, access and control over resources etc., an apex Institute which would be a centre of excellence is a must. Hence the Government should take immediate steps to materialise a centre of excellence in veterinary trainings and the present training institutes/ centres are to be developed as its satellite units.

16. POLICIES RELATED TO MARKETS & MARKETING

16.1 Reforms in agricultural marketing policies are intended to improve the efficiency and effectiveness of the marketing system in the state so that the benefits such as increase in farmers' net income, assuring remunerative and profitable price to farmers and affordable supplies of food stuff is realized.

16.2 According to FAO, Agricultural marketing includes: (a) the performance of physical and institutional infrastructure to transfer farm products from the farmers to consumers; (b) the discovery of prices at different stages of marketing; and (c) the transmission of price signals in the marketing chain specifically from consumers to farmers. Agricultural marketing adds value in terms of time, place, form and possession of utilities to the agricultural products originating at the farm level. Physical infrastructure for agricultural marketing, inter alia, consists of storage structures, roads and transportation facilities, marketing yards, grading equipment, packaging facilities, processing plants, and retail outlets. The institutional infrastructure includes organizations (public, private or cooperatives) and rules of the game, prescribed by either government or market functionaries - individuals or their groups - for performing various marketing functions.

16.3 Therefore, the policies are aimed at improving market infrastructure and assuring better marketing channels with an intelligence system in the state.

16.4 Policy 67: Efficient marketing infrastructure such as wholesale, retail and assembly markets and storage facilities is essential for cost-effective marketing, to minimise post-harvest losses and to reduce health risks.

16.4.1 National Institute of Agricultural Marketing (NIAM) conducted a detailed study regarding the agricultural markets in Kerala and come out with some recommendations. Since they are in an integrated manner, all are adopted for the policy initiatives in infrastructure development of agricultural markets.

16.4.2 Kerala state lacks well developed agricultural markets and market related infrastructure and also having poor market information and market intelligence system. The state also lack well developed agricultural market infrastructure on post harvest handling, assembling, sorting, grading, processing, packing, transportation, quality certification, palletization, labelling, pre-cooling, cold-store, ripening chambers and exports. In addition to that scenario of overcrowding, chaos and insanitary condition is apparently visible in the markets.

16.4.3 The following points may be taken in to consideration for the development of the market infrastructures.

16.4.4 Major renovation of existing infrastructure like buildings and market roads should be carried out for six whole sale agricultural markets. The interventions to be considered are:

- Cool rooms /controlled atmospheric storage with supporting reefer trucks should be set up.

- Integrated pack houses and ripening chambers should be set up.
- Retail markets should be set up to promote direct marketing
- E- auction facility should be created in urban markets.
- Shops-Mall concept may be established in three urban markets considering the proximity to Metros .
- Construction of training hall and staying facilities including dormitories should be given importance.
- Theme park with food courts should be established.
- Scientific waste management facility should be created.- (Biogas, vermicomposting etc.)
- Auction platforms should be constructed.
- Processing unit should be set up.
- Farmers / traders rest house facility should be created.
- Electronic Weigh Bridge should be set up.
- Canteen should be made functional.
- Food safety and hygienic practices should be followed in the market.

16.5 Policy 68: Reforms needs to be made in such a way that common marketing infrastructure is created in all major production centres under the direct control of producer organisations

16.5.1 Village market infrastructure is now under the control of Grama Panchayaths. Renovation and modernization of all these markets is essential.

16.5.2 Infrastructure like cold storage, cool chamber and concrete floors for fruits and vegetables handling facility should be created in Vegetable & Fruit Promotion Council Keralam (VFPCK) markets.

16.5.3 Commodity Specific infrastructure like Pine apple processing plant, mango processing plant may be modernized, coconut Chips making unit at small scale level, Banana ripening chamber and Tapioca starch making unit facilities should be created. In addition to that Commodity specific market yards should be created.

16.5.4 Government should facilitate block level or taluk level marketing centres and retail controlled by producer organisations and farmers. The Commodity futures needs to be carefully controlled to avoid speculations and government regulated futures needs to be established for spices and condiments. All government procurements such as procurement of SUPPLYCO, CONSUMERED, HORTICORP should be made only from farmer producer organisations and outside procurement should only be made unless and until there is no produce in the producer organisations.

16.6 Policy 69: The twin goals of ensuring justice to farmers in terms of a remunerative price for their produce and to consumers in terms of a fair and affordable price for food would be achieved through the establishment of 'AMUL' model outlets for the procurement and distribution of agricultural produces.

16.6.1 In the recent past, there was a condition in the state when vegetable growers faced a crash down in prices for their produces, the HORTICORP, a prime organisation designed for the procurement of vegetables from farmers was distributing vegetables to the consumers at 30% less cost than prevailing in the open market. This condition is to be stopped immediately as the organisations like VFPCK and HORTICORP are designed for assuring a decent prices for the farmers. They should concentrate mainly on the procurement of farmers' produce rather than at distribution. The distribution mechanism is controlled by the Department of Civil Supplies and they can intervene at times of provision of good food to the people at affordable prices.

16.6.2 At this backdrop, the Government has to think of establishing AMUL model outlets throughout the state under Farmer Producer Organisations for the collection and distribution of farm produces.

16.6.3 Farmer Retails Outlets (FROs) are another important tool for marketing. They can run retail markets in the cities and the produces can be brought there as per the demand and price of the produce is assured there.

16.7 Policy 70:Aseparate Agricultural Marketing wing may be set up under the Department of Agriculture for the better infrastructural developments.

16.7.1 More number of markets is being controlled by Local self-government. Poor management and less market development activities are being done by them. So, Kerala government may bring all these Local self of Government markets under the control of Department of Agriculture, Government of Kerala and also may set up separate agricultural marketing wing under Department of Agriculture.

16.8 Policy 71: A perfect market intelligence system should be developed with the help of modern ICT tools and techniques.

16.8.1 Market information is of vital importance to all in the marketing system whether farmers, traders, processors or consumers who require market information for different purposes. For provision of information of prices of agricultural commodities prevailing in the State, outside the state and abroad an ICT-based Marketing Research and Information Network is necessary in the State. This can provide electronic connectivity to important markets in the State for collection and dissemination of price and market-related information.

16.8.2 In addition to price, diverse other market-related information is also to be provided on the portal, for example, the accepted standards of grade labeling; sanitary and phyto-sanitary requirement; physical infrastructure of storage and warehousing; marketing yards; fees payable; etc. A regional atlas of agricultural markets in the state on a GIS Platform that would indicate the availability of the entire marketing services in the State including storage, cold storages, markets and related infrastructure is a must. Similarly, commodity profiles indicating the post-harvest requirements of important commodities are also must be uploaded on to the portal.

16.8.3 The State Agricultural Plan as described in the Section 14.6 would be inter alia connected with the Market intelligence system so that, the farmers can be advised about what to grow, when to grow, where to grow, how to grow, at what extent, where to sell and at what price.

16.8.4 Globalization of agriculture has also opened up opportunities for export of agricultural commodities for which demand by importing countries and their quality specification and standards should be made available to domestic exporters to pave for export led growth. The farmers should also be made aware of the consequences of imports on domestic prices. These emphasizes the need for establishing a State Domestic and Export Market Intelligence Cell (SDEMIC) as in the case of the State of Tamil Nadu.

16.8.5 The main objective of SDEMIC would be to disseminate timely, comprehensive, current and future price intelligence on agricultural commodities for better scientific decision-making by farming community, traders, firms and researchers. More specifically,

- to forecast the supply and demand of important agricultural commodities
- to forecast future prices of major agricultural commodities;
- to study the State and National market situation related to important commodities;
- to disseminate the market and price information to the farmers for planning, production and holding stocks; and
- to suggest policy measures to the Government.

17. POLICIES ON INTERNATIONAL TRADE RELATED ISSUES

17.1 As a necessary element to human survival, food is a human right. Small, local family farms are the bedrock of traditional rural communities and global food security- the ability of countries to produce the food they need to survive. Yet the global food supply is increasingly falling under the control of giant multinational corporations. Large agribusinesses have rewritten the rules of the global agricultural economy, using "free trade" agreements to turn food into a commodity for profit rather than a human right. The global corporatization of agriculture has had disastrous effects on farmers, food security, and the environment.

17.2 The adverse impacts free trade in agriculture have already adversely impacted farmers in the State. The cost of inputs has risen while the international price depression of agriculture products has reduced the incomes of farmers. South India has been particularly badly affected by cheap international imports. Palm oil from Malaysia and Indonesia have depressed the price of coconut among other crops like pepper and tea in Kerala. Fisherfolk and dairy cooperatives are also facing threats of loss of livelihoods.

17.3 Some of the key issues identified by the farmers during the sittings of the Committee were the lack of awareness not only at the leadership level but especially at the grassroots of the numerous FTAs and WTO processes. The secrecy of the GOIs negotiations and need to stay updated on the recent developments to the policy makers of the State. At this back drop, following policy measures are suggested for assuring a sizeable income to the farmers of the state.

17.4 Policy 72: The WTO cell of the Department of Agriculture needs a reorganisation and made funcionally and professionally independent.

17.4.1 The WTO cell of the Department of Agriculture was formed primarily to advice the State Government on policy matters related to trade in agriculture in the context of India being a signatory to the WTO and Kerala's agriculture being predominantly trade oriented. It holds the other functions like, advising the State Government on issues related to Foreign Trade Policy of Government of India with specific reference to the State's agriculture sector, periodically appraising the State Government on the Agricultural situation based on regular monitoring of the performance of the crops, suggesting inclusion of schemes and programmes in the Annual/Five Year Plans with a view to enhance the competitiveness of agricultural commodities in the liberalized trade regime, examining the various WTO Agreements, International Treaties and national legislation which have a bearing on State legislation on agriculture and advice the State on its implication, mode of implementation, modification /amendments, if any, to be made, advising the State on policy directions based on studies initiated by the Cell, etc.

17.4.2 The present organisational setup and powers are not supportive for the effective performance of the above functions. A structural reorganisation is needed in the light of the new FTAs and FDIs in agriculture.

17.4.3 A very senior administrative service officer of the cadre Additional Chief Secretary should head the Cell. The other statutory members in the Board must be an economist with proven track record in the international trade scenario and livelihood management, a legal expert having sufficient experience in the international trade related laws, an agricultural production expert having sufficient experiences in agricultural marketing, value addition and product diversification. A well organised office setup with efficient officers from the field must be absorbed for the functioning.

17.4.4 The WTO cell should be given with the powers of sending advices and reports regarding the impact of different trade agreements which are happening in and around the world to the Government directly and before the Legislative Assembly for the timely intervention of the Government in protecting its most valuable farming community.

17.4.5 The WTO cell should make a Vigilance Wing for keeping their eye open on all the trade related issues and making detailed and timely studies regarding the impact of FTAs and other treaties and agreements between the world nations.

17.4.6 An immediate step in this matter is necessary because, the spice sector, milk and milk products, etc., are known to be affected by some of the FTAs.

17.5 Policy 73: Equipping the farmers to produce the products with international standards and value added products to get an uniformity in production will sort out problems faced by farmers FTAs to a greater extent.

17.5.1 In many developed countries, their products come in to the international markets in the most processed and branded form with assured quality. The examples of milk, fruit products, food additives etc are examples. The farmers of the state by creating the FPOs would become in a position to generate products with world class standards if proper technology for producing the same is advocated to them. A hand holding support on assessing the market demand and quality assurance is necessary. This must be given by the WTO cell after assessing the world requirement of agro-processed - value added and branded products.

17.5.2 Spices are good examples of this type of product diversification based on the international requirements and standards. They can be converted to oils, oleoresins, semi processed products etc,. when a market glut is noticed because of the international causes, the WTO cell advice the system about this possiblities and the standards of production.

17.6 Policy 74: Terminal markets are to be watched carefully for the entry of restricted agro-produces in the disguised forms and strict ban on such items should be executed to protect the interests of the farmers.

17.6.1 Many at times the farmers of Kerala experience a steep fall in price of the commodities due to the entry of cheap under quality agro-produces. For example, the price fall in pepper is attributed to the entry of low quality Vietnam pepper which is routed through the Colombo port and finally to India and mixed with the pepper of Kerala and being sold in the international market as Kerala pepper which is known for its good quality. This type of mechanism which maintains its secrecy can only be caught if we keep a vigil at the terminal markets. The WTO cell should make necessary mechanism to check this type of un healthy practices.

17.7 Policy 75: Create Programmes supportive of small farmers and sustainable agriculture to save the livelihood of farmers.

17.7.1 Government will finance sustainable agricultural practices and the improvement of agricultural infrastructures. It should acknowledge that small farmers and cooperatives need policies that protect land ownership, provide access to credit, offer technical assistance, provide appropriate technology transfers, and guarantee pricing mechanisms that reflect the true costs of production. Investments in agriculture should promote local knowledge systems with improvements in technologies.

18. POLICIES RELATED TO FARMER PRODUCER ORGANISATIONS

18.1 Collectivization of producers, especially small and marginal farmers, into producer organisations has emerged as one of the most effective pathways to address the many challenges of agriculture but most importantly, improved access to investments, technology and inputs and markets (National policy for the promotion of farmer producer organisations(FPOs), 2013)

18.2 The vision envisaged is to build a prosperous and sustainable agriculture sector by promoting and supporting member-owned producer Organisations, that enable farmers to enhance productivity through efficient, cost-effective and sustainable resource use and realize higher returns for their produce, through collective action supported by the government, and fruitful collaboration with academia, research agencies, civil society and the private sector.

18.3 Policy 76: FPO must be a body registered and administered by farmers and the organisation must be focused on activities in the agriculture and allied sectors.

18.3.1 The membership to FPOs shall be limited to farmers as per Section 4 of the 'Agricultural development Policy' only. Necessary legal provisions may be made so as restrict the entry only the real farmers. The prime need for the promotion of FPOs is to increase the net income of the farmers. So the formation of FPOs must be based on the actual requirement by the farmers of the particular locality and the profit share of the same would be divided among the members only.

18.3.2 The formation and development of FPOs will be actively encouraged and supported by the Central and State Governments and their agencies, using financial resources from various Centrally-sponsored and State-funded schemes in the agriculture sector agencies. This goal will be achieved by creating a coalition of partners by the concerned promoter body, involving civil society institutions, research organisations, consultants, private sector players and any other entity which can contribute to the development of strong and viable producer owned FPOs.

18.4 Policy 77: State Government should take up formation of FPOs on a large scale through Centrally-sponsored and State-financed programmes and schemes.

18.4.1 The primary objective of mobilising farmers into member-owned producer organisations, or FPOs, is to enhance production, productivity and profitability of agriculturists, especially small farmers in the state. The participant farmers will be given the necessary support to identify appropriate crops relevant to their context, provided access to modern technology through community-based processes including Farmer Field Schools; their capacities will be strengthened and they will be facilitated to access forward linkages with regard to technology for enhanced productivity, value addition of feasible products and market tie-ups. Farmers will be organised into small neighbourhood informal groups which would be supported under the programme to form

associations/organisations relevant to their context including confederating them into FPOs for improved input and output market access as well as negotiating power.

18.4.2 Mobilising farmers into groups of between 15-20 members at the village level (called Farmer Interest Groups or FIGs) and building up their associations to an appropriate federating point i.e. Farmer Producer Organisations (FPOs) so as to plan and implement product-specific cluster/ commercial crop cycles.

18.4.2.1 Strengthening farmer capacity through agricultural best practices for enhanced productivity.

18.4.2.2 Ensuring access to and usage of quality inputs and services for intensive agriculture production and enhancing cluster competitiveness.

18.4.2.3 Facilitating access to fair and remunerative markets including linking of producer groups to marketing opportunities through market aggregators.

18.5 Policy 78: FPOs must be based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity.

18.5.1 FPO members must believe in the ethical values of honesty, openness, social responsibility and caring for others.

18.5.2 FPOs are voluntary organisations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.

18.5.3 FPOs are democratic organisations controlled by their farmer-members who actively participate in setting their policies and making decisions. Men and women serving as elected representatives are accountable to the collective body of members. In primary FPOs farmer-members have equal voting rights (one member, one vote) and FPOs at other levels are also organised in a democratic manner.

18.5.4 Farmer-members contribute equitably to, and democratically control, the capital of their FPO. At least part of that capital is usually the common property of the FPO. Farmer-members usually receive limited compensation, if any, on capital subscribed as a condition of membership. Farmer-members allocate surpluses for any or all of the purposes like developing their FPO, possibly by setting up reserves, part of which at least would be indivisible; benefiting members in proportion to their transactions with the FPO; and supporting other activities approved by the members.

18.5.5 FPOs are autonomous, self-help organisations controlled by their farmer-members. If they enter into agreements with other organisations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their farmer- members and maintain their FPO's autonomy.

18.5.6 FPOs operatives provide education and training for their farmer-members, elected representatives, managers, and employees so that they can contribute effectively to the development of their FPOs. They inform the general public – particularly young people and

opinion leaders – about the nature and benefits of FPOs.

18.5.7 FPOs serve their members most effectively and strengthen the FPO movement by working together through local, national, regional and international structures.

18.5.8 FPOs work for the sustainable development of their communities through policies approved by their members.

18.6 Policy 79: The Government should make 'Hand Holding Support' to FPOs by taking policy decisions and providing expert management man power.

18.6.1 The Government may appoint an expert in the FPOs for their professional management. The person engaged for this purpose will not have any voting power in the FPO. He will be a paid officer with high professional standards. he should have the capacity of organisational management, financial management, group mobilisation, marketing management etc. In the due course, the FPOs can make their own arrangement for appointing suitable experts.

18.6.2 By declaring FPOs at par with cooperatives registered under the relevant State legislation and self-help groups/ federations for all benefits and facilities that are extended to member-owned institutions from time to time.

18.6.3 The State Government may support FPOs by making provisions for easy issue of licenses to FPOs to trade in inputs (seed, fertilizer, farm machinery, pesticides etc.) for use of their members as well as routing the supply of agricultural inputs through FPOs at par with cooperatives.

18.6.4 The FPOs may be supported by using them as producers of certified seed, saplings and other planting material and extending production and marketing subsidies on par with cooperatives.

18.6.5 The activity of FPOs may be strengthened By appointing them as procurement agents for MSP operations for various crops.

18.6.6 The FPOs may be developed as a development tool by using them as implementing agencies for various agricultural development programmes, especially RKVY, NFSM, ATMA etc. and extending the benefits of Central and State funded programmes in agriculture to members of FPOs on a preferential basis.

18.6.7 The financial nearness to farmers may be assured by linking FPOs to financial institutions like cooperative banks, State Financial Corporations etc. for working capital, storage and processing infrastructure and other investments.

18.6.8 The entry of industries in to the proposed 'Rice and coconut bioparks should be restricted to FPOs only for preventing the exploitation of farmers by the so called 'big shot' companies.

18.7 Policy 80: The FPOs are to be designed in such a way as to provide 'end to end' services to its members.

18.7.1 FPOs are to provide almost end-to-end services to its members, covering almost all aspects of cultivation (from inputs, technical services to processing and marketing). The FPO will facilitate linkages between farmers, processors, traders, and retailers to coordinate supply and demand and to access key business development services such as market information, input supplies, and transport services. Based on the emerging needs, the FPO will keep on adding new services from time to time.

18.7.2 The set of services include Financial, Business and Welfare services.

18.7.3 Financial Services: The FPO will provide loans for crops, purchase of tractors, pump sets, construction of wells, laying of pipelines.

18.7.4 Input Supply Services: The FPO will provide low cost and quality inputs to member farmers. It will supply fertilizers, pesticides, seeds, sprayers, pumpsets, accessories, pipelines.

18.7.5 Procurement and Packaging Services: The FPO will procure agriculture produce from its member farmers; will do the storage, value addition and packaging.

18.7.6 Marketing Services: The FPO will do the direct marketing after procurement of agricultural produce. This will enable members to save in terms of time, transaction costs, weighment losses, distress sales, price fluctuations, transportation, quality maintenance etc.

18.7.7 Insurance Services: The FPO will provide various insurance like Crop Insurance, Electric Motors Insurance and Life Insurance.

18.7.8 Technical Services: FPO will promote best practices of farming, maintain marketing information system, diversifying and raising levels of knowledge and skills in agricultural production and post-harvest processing that adds value to products.

18.7.9 Networking Services: Making channels of information (e.g. about product specifications, market prices) and other business services accessible to rural producers; facilitating linkages with financial institutions, building linkages of producers, processors, traders and consumers, facilitating linkages with government programmes.

18.8 Policy 81: The State Government may appoint SFAC as the Resource Institution (RI) for the promotion of FPOs.

18.8.1 The National Policy on FPOs also suggests that the Government can appoint SFAC as the RI for the promotion of FPOs. This provision may be utilised. However, necessary staff support to SFAC may me provided as the activity has to be taken up in a war footing.

18.8.2 Cluster areas are to be selected by the RI in consultation with the respective State Government departments.

18.8.3 A Diagnostic Study is to be conducted by the RI in the selected cluster area. The Diagnostic Study is conducted to assess the preliminary situation of the farmers and level of agriculture in the area. The study will also

help in identifying the potential interventions required and understand the specific project implementation context.

18.8.4 Feasibility Analysis for the formation of FPCs should be carried out by SFAC and then appraised by hired external experts in various technical areas. A normal feasibility study should cover aspects such as financial, technical, legal, political, socio-cultural, environmental, economic and resource feasibility. The Feasibility Analysis will establish a case for promotion of FPCs in the prevailing specific regional environmental context of the FPOs.

18.8.5 Baseline Assessment, to be carried out by RI, will help in generating data related to the current prevailing situation of farming and small, marginal and tenant farmers. Baseline assessment will cover a variety of factors to identify the potential interventions, to plan development and business plans and to establish the base figures based on future outcome indicators that can be measured to understand the change contribution. The assessment shall be conducted using stratified random sampling through structured household-level interviews and open-ended focus group discussions with a variety of stakeholders.

18.8.6 Business Planning will be carried out by SFAC with the help of selected farmers' representatives. Business planning is a process through which the strategic and operational orientation of an emerging FPO is shaped. While baseline assessment figures will be important inputs to understand the level from which products and services for farmers' members should be developed, more important will be the collective visualisation of the future of the FPO. Using a variety of tools and systematic collective reflections, a business plan with proper projections on various aspects needs to be developed. The key is to develop business plans in detail with at least 10% of FPO farmer members to provide clear vision.

18.9 Policy 82: The formation of FPOs are to be done in a scientifically organised basis so that sustainability of the same should be ensured.

18.9.1 Once a strong case has been established by Spear Head Team (SHT) with the help of a select group of farmers through the business planning process, it is time to mobilise farmers into FIGs and eventually as farmer-members of FPOs. Mobilisation of farmers should be done with a variety of communication aids like – pamphlets, documentary movies, posters, regular village-level meetings, proper vision development of promoter farmer-members. Promoter farmer-members are those who are eager to form a FPO on voluntary basis, having understood the importance and potential benefits of forming FPOs, obtained through training programmes and exposure provided by SHT of RI.

18.9.2 FIGs in an aggregated cluster together form FPOs. Typically, around 50-70 FIGs can come together to form a FPO. FPOs can be registered under the Producer Company provision under the Companies Act. A separate manual on registration of FPOs is depicted in the National Policy on FPOs. However, it must be clarified that the purpose of mobilising farmers is not merely to achieve the target of registering a formal entity.

18.9.3 The final form which the FPO assumes (i.e. cooperative, producer company, multi-state cooperative etc.) must be a decision taken by FIG members at an appropriate time. It is important to stress that the process must not be hurried in any manner and there is no "right time" by which the FPO must be registered. Any period between 18 months to 24 months may be necessary for the FIGs to settle down and understand the implications of aggregation. Only then should the FPO registration be attempted.

18.9.4 Before initiating the operations of a FPO all required resources should be mobilised by the RI with the help of FPO representatives and board of directors. Financial, human (staff), technical and physical resources should be developed during this particular step. Based on the business plan the RI should liaise with various financing agencies and mobilise resources for hiring/ purchasing and developing various resources.

18.9.5 RI should facilitate the development of management systems in the FPO. Guidelines for management systems should be able to address all requirements related to financial services, input and output management services. Systems related to management of finance, human resources, stock and inventory, procurement and quality management, marketing, internal audit, internal conflict resolution and other important functional areas should be developed. Standard operating procedures for the same should be established.

18.9.6 RI should carefully train both the governing and operational structures of the FPO in order to ensure smooth functioning of business operations. Business operations is the commencement of procurement, production, processing, marketing and financial service activities of a FPO. The entire value-chain related to various agriculture and allied products and commodities needs to be managed.

18.9.7 RI should facilitate constant assessment of performance of various stakeholders like farmer members, governing board of directors and service providers. They should also help FPOs to reflect using Institutional Maturity Index to understand areas of improvement. Internal process and accounting audits will help maintain both transparency and accountability.

19. POLICIES RELATED TO FARM MECHANISATION

19.1 Farm mechanization is regarded as sine-qua-non to reduce the human drudgery and enhance the agricultural productivity. During the post-green revolution period, the impact of farm mechanization on agricultural production and productivity has been well recognised in India. Depending upon the use of other inputs such as irrigation, high yielding seed varieties, chemical fertilizers, herbicides and pesticides, different States in India have attained different levels of mechanization. Consequently the agricultural production & productivity has witnessed three to four fold increase.

19.2 According to FAO, The term "farm mechanization" is used to describe tools, implements and machinery applied to improving the productivity of farm labour and of land; it may use either human, animal or motorized power, or a combination of these. In practice, therefore, it involves the provision and use of all forms of power sources and mechanical assistance to agriculture, from simple hand tools, to draught animal power and to mechanical power technologies.

19.3 For Kerala to make a positive impart in agriculture, infusion of modern technology and methodology is a must. Farm mechanization has been helpful to bring about a significant improvement in agricultural productivity. Using mechanical equipment which has higher output capacity cuts down the number of operations to be performed has helped in increasing area under cultivation and its productivity. Mechanization reduces the cost of production and saves labour. Further, large scale production reduces the unit cost on the farms and also reduces the weather risk and risk of non-availability of labour. Timely marketing is also made possible by quick harvesting, cleaning and handling. Mechanization also helps to reduce the harvesting losses considerably.

19.4 Policy 83: Encourage custom hiring operation of tractors, power tillers and farm machinery through training, financial incentives, subsidized loans and adequate financing to allow procurement of high capacity equipment by the custom operator to ensure sufficient turn over and income.

19.4.1 Due to continuing fragmentation, the average size of operational holdings is shrinking in the State and the percentage of marginal, small and semi-medium operational holdings is increasing. This is making individual ownership of agricultural machinery progressively more difficult.

19.4.2 The Agro-Service Centres established in selected Blocks of the state are with this objective proves to be the best alternative, but the service delivery may be concentrated at the Panchayat level. For this purpose, the Agro-Service centres may be established at the Panchayat level and the FPOs as per Section ... of the Policy can be made the agency for running the same.

19.5 Policy 84: Financial incentive should be provided for replacement of inefficient equipments by improved tools and implements.

19.5.1 The small and marginal farmers of the State are now not in a position to improve their farm machinery to the most modern equipments, because of the shortage in their capital investments. Owing to this fact, the State Government may chalk out programmes for the replacement of less efficient machinery with that of the improved ones. Financial incentive programmes would be launched to support this venture.

19.5.2 Till now the State assisted in the supply of machineries to the farmers of Kerala and becoming the priority area. The technology has changed a lot during this period and the machineries need to be replaced with the modern ones.

19.6 Policy 85: The State should develop strategies and approaches for optimum involvement of extensionists, researchers, development agents, and the eventual users of the technology as a unified body for the fast and effective farm mechanisation.

19.6.1 Modern agriculture requires an innovative capacity which goes far beyond the individual farmer, researcher, industrialist, and even beyond the abilities of any one of their organizations or institutions. Considering the fact that "ineffective linkage of research and the agriculture industry", and "lack of a State strategy for agricultural mechanization (Agricultural Mechanisation Strategy - AMS)" are the other main factors found in the sittings of this Committee, the challenge is therefore to develop strategies and approaches for optimum involvement of extensionists, researchers, development agents, and the eventual users of the technology as a unified body in order to be effective. Since all mechanization inputs have to be paid by the farmers, they must be the main focus of all activities.

19.7 Policy 86: Developing human resources and generation of self-employment by way of providing skill-oriented training in the farm mechanisation sector is important.

19.7.1 Different types of training programmes in the selection, operation, repair/maintenance and management of farm machinery for the benefit of technicians, rural youth, farmers and engineering graduates are to be launched by the Government so that the technology become a user friendly one and capable of finding self employment for the qualified personnel. This would aid in the improvement in the quality of services and elimination of unemployment.

19.7.2 The Regional Testing and Training Centres of the State would be developed as 'Centre of Excellence' and time bound and need based trainings are to be imparted by them.

19.8 Policy 87: Agricultural mechanization strategy ought to clearly define the roles of the private sector and that of the state.

19.8.1 The private sector should have the role of providing the technology, services and spare parts to the farmers. Mean while, the state should be a facilitator through the creation of the enabling environment. Farmers will only mechanize if this will result in increased or maintained incomes. This is the driving force for the adoption of mechanization technologies. It is the farmer

who will decide what technology to use, from whom and how to use it. Hence farmers are the most important stakeholders because they are the primary drivers of the mechanization process.

19.8.2 Government needs to re-double efforts to create enabling environments for private sector initiatives. The components of such enabling environments include: appropriate macro-economic policies, legal and regulatory frameworks, efficient and effective judicial support, land ownership and tenure policies.

19.9 Policy 88: Availability of machinery, equipment, spare parts and other supplies is essential for successful and sustainable mechanization.

19.9.1 This means that agricultural mechanization also involves the development of local industries for the production of machinery and implements, and where production is not feasible, the establishment and development of local franchise holders to import them. In this case, establishing the effective and efficient distributional channels for equipment, spare parts, repair services and energy (oil and fuel) is critical for success. When mechanization process involves development of supply chains and services farmers have a better choice of equipment. Having spare parts and supply chains is simply not enough, it is vital that these chains are reliable and offer low-cost supplies of equipment.

19.10 Policy 89: To reduce drudgery and improve human labour productivity, there is a need to improve the design of existing tools and machineries.

19.10.1 Ergonomic tools and women-friendly tools in farming operations that could significantly enhance human labour productivity in different terrains should be introduced through programs and projects. Ergonomically designed harnesses, yokes and improved implements such as seed cum fertilizer drills, planters and multi row inter culture implements are also required depending upon the demand and region. Emphasis may be given for introducing multi crop equipment such as medium range multi-crop axial flow threshers, multi-crop reapers and roto-tillers suitable by bringing about design improvement to suit the crops, gender and the terrain.

19.11 Policy 90: Pollution free mechanization practices that conserve natural resources such as land, water and soil nutrients need to be promoted.

19.11.1 Mechanization options that allow direct sowing, minimum/reduced tillage, land levelling, retention of crop residues will result in sustainable economic growth. The outstanding success of no-till and conservation agriculture practices in Brazil is a good example of the approach to be taken.

19.12 Policy 91: Farm mechanisation is a part of agricultural extension.

19.12.1 The extension programs on mechanization should include front line demonstration, agricultural machinery shows, media, publications and face-to-face contacts with farmers and co-operatives. The government can absorb and place the new flow of diploma graduates specialized in agricultural mechanization produced as extension agents across the State. The extension services should place more emphasis

on the development of small-scale farmers in:

-The use of appropriate and affordable mechanization options

-Credit acquisition

-Effective supply of agricultural inputs (including spares)

-Encouraging farmers' co-operatives to participate in availing and providing services of agricultural machineries.

19.12.2 Local manufacture of agricultural machineries and implements can be promoted through trainings on village-level craftsmanship, manufacturing technology, operation, repair and maintenance. The government should also provide in-service training for existing staff, technicians and artisans to improve their understanding of the different power and mechanization options available to farmers and to expose them to new technologies and opportunities.

19.13 Policy 92: The agricultural machineries and implements shall be exempted from import duty and value added tax (VAT) in order to reduce the cost.

19.13.1 Subsidization of machineries / implements for small- and medium holder farmers in the short-term shall also be envisioned where the costs of machineries can be subsidized during the initial period (2 to 3 years) after introduction and thereafter withdrawn gradually to zero subsidies on investments.

19.14 Policy 93: The installation of solar, wind and hybrid technology based high volume output pumps along the bunds of these Padasekaharams so that the power consumption and cost of cultivation could be minimised.

19.14.1 The most used machinery in the rice production sector in Kerala is the indigenous 'Petty and Para'which is prevalent in the Kuttanad and Kole regions. The main problem associated with this device is the low efficiency when the power factor is concerned. As an alternative means, energy efficient dewatering devices are to be developed indigenously in collaboration with the private manufacturers and Kerala Agricultural University. The technology or devices thus developed has to be handed over to the public limited undertakings based on the memorandum of understanding set forth during the phases of development.

19.14.2 Another important area of consideration is the installation of solar based high volume output pumps along the bunds of these Padasekaharams so that the power consumption and cost of cultivation could be minimised. The technology and equipments are available in the market but the limiting factor for adoption is the cost involved. The Government can intervene at this point and the installations are to be made by the Government itself or subsidising the installations when done by the Padasekharams.

20. POLICIES RELATED TO INCOME ASSURANCE & CROP INSURANCE

20.1 Assuring the price of the produce and insuring the crop against loss are the prime requisites for the sustainability in agriculture.

20.2 The price fixation is undertaken by the government such that the productive resources are channeled into production of required food commodities and also generates enough income to farmers for decent living and provide for capital formation in agriculture for future production.

20.3 Price stabilization is one of the most important objectives of agricultural policy. Different methods of price stabilization (buffer stocks, floor-ceiling prices, buffer funds, export / import taxes and subsidies) can be observed in their purest form in India.

20.4 The policy considers assuring income from farming and ensuring it by the proper insurance schemes of the Government in a Public Private Partnership (PPP) mode wherever applicable.

20.5 Policy 94: An Actio Apportum* concept is to be introduced for the first time for assuring the farmers a legal demand of right for sharing revenue or profit generated out of the farm produce when it is traded.

20.5.1 Farmers are important in society because they feed the masses. They produce food that is consumed to keep both human beings and animals alive and healthy. If there were no farmers, there would be no people or animals.

20.5.2 Farmers are the primary producers in the society and the consumers get their produces from the traders and not from the producers directly. There exists a wide gap between the price at which a producer sells his commodity and the price at which the consumers receive the same - the difference between the producer and the consumer price- is referred as marketing margin of the produce.

20.5.3 It was estimated that when palakkad matta is sold in the upcountry metro markets for Rs. 65/- to Rs. 70/- per kg the producer in Kerala is selling it at Rs. 22.60/-. The difference goes as profit to one or two middle level trade agencies. When milk and milk products are concerned, there exists a marketing margin ranging from 25 - 82 percentage for the liquid milk and processed products respectively. In the case of fruits and vegetables, the marketing margin varies from 14-82 percentage.

20.5.4 If the producer farmer was doing the marketing and trading, the entire marketing margin would have gone to him alone. But due to the resource poverty and lack of time other than production he is not in a position to do the same. He is actively engaged in the food production process for the society. Actually, the middle level agencies and traders are utilising this weakness of the farmer and they are generating huge profits out of the farmers' hard earned crop. So there is a legal right for the producer farmer to have a share from the marketing margin.

20.5.5 It is estimated that over 40 lakh tonnes of rice is being sold in Kerala. If State could

*Derived from Latin, *Actio* = a legal demand of right, *Apportum* = profit or revenue

could take away mere one rupee per kg of rice sold in the terminal market can generate an amount of Rs.350 to Rs.400 crores every year. This could be used as *Actio Apportum* (Avakasa Labham) a legal right for sharing the profit generated out of the farm produce when it is traded at the terminal market. Every farmer who has given their produce to the state will be eligible to have Rs.5 per kg of paddy as Avakasa Labham. This may facilitate a farmer giving 3 tonnes of rice to earn a cheque for Rs 15,000 rupees as Avakasa Labham from the Department of Agriculture for every crop season. Similar exercises could be worked out for rubber, milk and other crops after detailed study. This will facilitate the farmer to invest more money to produce more paddy so that it offers a decent return as a right with out fail. The unspent amount will remain as a 'nidhi' for future utilization..

20.5.6 A similar situation can be simulated in the case of milk also. If an amount of Rs. 0.5/- per litre of milk consumed is taken up from the ultimate profit, the small farmers who are the back bone dairy and animal husbandry sector will enjoy the *Actio Apportum* concept.

20.5.7 The *Actio Apportum* should be made admissible only to those small and marginal farmers who are depending only on agriculture for their livelihood.

20.6 Policy 95: A price fixation authority should be formed for fixing the price of the agricultural commodity in the state, so that protection from price falling would be enabled.

20.6.1 As per the suggestion of the Swaminathan Commission, the total revenue that has to be earned by a farmer for his decent living is the sum of cost of cultivation and just half the amount as profit. In order to estimate the cost of cultivation, an authority with autonomous nature should be formed at the state with the Agricultural Production Commissioner as its Chairman. The authority should be purely a technical one with persons having sufficient experience in the field of estimation and scientific assessment. Under no circumstances, persons with low profile or without technical background is allowed in the authority. The authority has to depend upon the 'State Agricultural Plan' as envisaged in the section 13.6.2 for arriving at the realistic price of the produce.

20.6.2 When price of the commodity in the open market falls below the price fixed by the Authority, the Government has to take immediate steps for procuring the item through the 'Amul' model outlets, HORTICORP or Civil Supplies as the case may be.

20.7 Policy 96: Minimum Support Price (MSP) for paddy, vegetables, banana and spices may be announced during the commencement of the season by the state Government with the help of the Price Fixation Authority.

20.7.1 At present there is no mechanism for announcing MSP for crops grown in the state. With the help of the Price Fixation Authority, it is possible to announce the prices of the important crops such as paddy, coconut, cucurbitaceous, solanaceous, leguminous and leafy vegetables, fruits like banana, pine apple and mango, etc well in advance during the beginning of the season.

20.8 Policy 97: An Agricultural Risk Fund may be formed with the objective of providing immediate assistance to farmers at the time of emergency.

20.8.1 Mechanisms for risk mitigation are poor or absent in the state. A proper risk management fund is to be provided at the department level for minimising the administrative delay in disbursing the assistances needed for addressing the emergency situations. There were instances of breaching the bunds during the peak cropping seasons in Kuttanad, Kole and Palakkad regions as presented before the Committee while its sittings in that districts where a huge loss on crops occurred. These types of emergency situations could be very well managed if the financial assistances are provided in time.

20.8.2 The initial corpus fund for the same could be met from the budgetary provisions of the State and for the coming periods, remains of the *Actio Apportum* Fund can be taken.

20.9 Policy 98: The Agricultural Prices Board will be strengthened with broader guidelines.

20.9.1 The Agricultural Prices Board was setup in the State with the objective of collecting, analysing and advising the farmers about the price situations of current and future. But with the introduction of the Price Fixation Authority as per Section 20.6, the activities of the board are to be widened regarding the market intervention policies of the Government. The Prices Board would tell the Government about the suitable market regulation and intervention programmes apart from the present duties. The international as well as national market price situations are to be analysed employing suitable modern tools by the Prices Board and the matter would be brought to the attention of the Government by an intelligence mechanism. The data collected may not be made available to the public as it is regarded as a strategic one. If the situation of the State is known to others, they can dump the produce in the state leading to 'price crash' of the indigenously produced goods.

20.10 Policy 99: Government should adopt 'Income Guarantee' programmes for the farmers as the main agricultural support instrument and an Act in this line should be passed.

20.10.1 If the vision envisaged in the policy document is to be accomplished, the farmers should be assured of an income to the tune of that received by a Class Four Employee in the State service.

20.10.2 The National Farmers' Commission stated, "Progress in agriculture should be measured by the growth rate in the net income of farm families..... moving away from an attitude which measures progress only in millions of tonnes of food-grains and other farm commodities."

20.10.3 The government will be directly accountable for improving the net incomes of farming households. So there is a necessity that formulation and enactment of Farmers' Income Guarantee Act which assures all farming households a dignified living income to meet the basic living expenses.

20.11. Policy 100: The views of the farmers should also be taken in to account while the regulations on the management of trespassing animals in the farm lands causing crop loss.

20.11.1 Crop damage by wild animals is a severe problem in some parts of Kerala. Field surveys showed that on an average 20% of the crop was damaged by wild animals in Kerala. Fortyseven species of crops were vulnerable to animal damage. Highly nutritious crops like paddy, plantains and coconut were more vulnerable.

20.11.2 Only 8.2% of the amount claimed by the farmers were seen sanctioned by the Forest Department. and in most of the instances. payment was delayed. Cropping pattern and location of the agriculture fields have great influence on crop damage incidence. Crops like betel leaf, cashew, clove, cotton, curry leaf and turmeric were not prone to damage. Damage of mulberry (up to 56%) recorded at Palanad by gaur is unique in Kerala. Gaur is known to damage crop only at Marayur in Kerala. If suitable remedial measures are not taken, the farmers may become hostile and serious damage to wild life and livelihood of the farmers would be resulted.

20.11.3 In Kerala. both traditional and modern methods are employed as the control measures against the crop raiding animals. Most of the traditional methods are effective for short periods. Electric fencing using energisers, is an effective method for preventing herbivores like elephant, gaur and deer. Wild boar can be prevented by erecting good fences or stone walls. In this study it was found that bar soap was useful in controlling browsing of sambar for short periods. The method can be employed in critical periods and is economical also. Census of wild boar should be initiated before initiating any reduction in their numbers.

20.11.4 Educating the settlers about the behaviour of wild animals and resettling the enclosures to the outside areas will mitigate the problem of crop raiding to a certain extent.

20.11.5 All preventive methods discussed so far can be considered as only short term, which may provide immediate relief. As a long term measure, intensive management of wild life population will be needed. Accurate assessment of the population of wild animals like elephants, wild boar, Indian porcupine, sambar, spotted deer and gaur is a must to evolve management options. After estimating the optimum population level, the excess individuals may be removed, either by culling or by translocation. The views of the farmers in this regard should find a due place in the regulations evolved.

21. AGRICULTURAL CREDIT POLICIES

21.1 Access to affordable and timely credit is crucial. Credit should be provided by formal sources which should pay special attention to productivity raising investments. Credit at the right time and in adequate amount is a basic requirement of small farm families.

21.2 The debt deaths underline the need for urgent reform of farm credit. Many foreign countries give loans to farmers at zero percent interest. Obviously, the Government and not the Banks meet the transaction cost.

21.3 Researchers revealed that reduction in cooperative banks' credit and slow growth in commercial banks' credit to agriculture in the post-reforms period have led the re-emergence of money lenders in rural agriculture credit marketing system in recent years. This has increased the debt problem among marginal farmers and has led to increasing farmers' suicides in the country. Therefore, a policy initiative is needed to strengthen the cooperative credit system along with reduction in disparities of commercial banks in agricultural credit allocation across the states.

21.4 Policy 101: Increase flow of credit to farmers including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

21.4.1 The credit providing institutions will be advised to increase the flow of credit to the small and marginal farmers of the state. In spite of government pronouncements, credit is becoming increasingly difficult to access. It is obvious that dire financial straits are driving hapless farmers to take to extreme steps including suicides.

21.5 Policy 102: The SHG Bank Linkage programme is the most appropriate financial mechanism to extend credit to marginal farmers.

21.5.1 An economically poor individual gains strength as part of a group. Besides, financing through SHGs reduces transaction costs for both lenders and borrowers. While lenders have to handle only a single SHG account instead of a large number of small-sized individual accounts, borrowers as part of an SHG cut down expenses on travel (to & from the branch and other places) for completing paper work and on the loss of workdays in canvassing for loans.

21.6 Policy 103: All the District co-operative banks functioning in the state should apportion a sizeable portion for agricultural loans.

21.6.1 Co-operative sector plays an important role in the provision of farm credit. Usually the farm credit portion of the District co-operative banks are at low and has to be increased

21.7 Policy 104: Interest free loans will continue.

21.7.1 The State Government had taken a pioneering step in this regard and implemented

the same for paddy cultivation. The interest portion would be paid to the Co-Operative banks by the State Government. The Committee was very well convinced the utility of the same by the farmers of the state in its various sittings. The programme would be continued for the coming years also. Also, interest should be waived on loans in areas hit by drought and floods and for crops under heavy pest infestation. Compounding of interest on arrears should be applied only in the case of recalcitrant borrowers who do not pay their dues in spite of having adequate repaying capacity.

21.8 Policy 105: Livelihood finance, which is a comprehensive approach to promoting sustainable livelihoods for the poor, is the need of the hour.

21.8.1 The National Commission for Farmers emphasisized the need of livelihood finance. It comprises of:

(i) Financial services (insurance for life, health, crops and livestock

(ii) Infrastructure (finance for roads, power, market and telecommunications

(iii) Investments in human development, agriculture and business development services (including productivity enhancement, local value addition, and alternate market linkages

(iv) Institutional development services (forming and strengthening various producers' organisations such as self-help groups, water user associations, forest protection committees, credit and commodity cooperatives, empowering panchayats through capacity building and knowledge centres)

21.9 Policy 106: The loans taken for poultry, dairying and animal husbandry are also to be treated as agricultural loans.

21.9.1 At present, these types of loans are not categorised under the agricultural loans and are treated only as 'Medium term Loans' which are charged at a higher interest rate. Appropriate mechanism from the part of the State Government is to be taken to put pressure on the Central Government to consider these types of loans also at par with crop loans as these activities are of the primary production type and inseparable from agriculture.

21.9.2 Since the repayment of all loans taken by the farmers are from farming only, they are to be treated as 'Agricultural Loans' regarding the interest component.

21.9.3 These provisions are to be made admissible only to those farmers who are registered with the Government by the 'Farmer Registration' programme.The amount eligible would be according to the details validated against the possession of land either owned, leased and / or both.

21.10 Policy 107: An 'Agricultural Credit Relief Fund' is to be formed for addressing the waiver of loans in the event of natural calamities.

21.10.1 Natural calamities like drought, flood which are frequent and recurrent occurrences and pest infestation are serious and crippling risks. Rescheduling and restructuring of their loans are not enough. Waiver of loans is also needed. An Agriculture Credit Relief Fund, set up with contributions from the Central and

State governments and banks in a predetermined fashion, as suggested in the Report of NCF as Risk Fund, could provide relief to farmers in the form of waivers in full/ part of loans and interest.

21.11 Policy 108: Take an integrated credit requirement approach combining farm and consumption needs and has to be adopted by the financial institutions.

21.11.1 The credit is involved at all the levels that is from production, processing, storage, marketing, trading, but institution or non institutional credit is available or confined to farmers at Production and consumption requirements only. At this back drop the Government should address the integrated credit requirement approach.

21.12 Policy 109: Necessary mechanism should be evolved from the part of the state Government in the light of restrictions imposed on Primary Agricultural Co-operatives (PACs) in dealing with agricultural credit very recently by the Reserve Bank of India (RBI).

21.12.1 During the recent past the RBI has introduced many regulations for the provision of agricultural loans by the PACs. The actual situation regarding the agricultural credit is that the PACs provided credit to the farmers in a very appreciable way. More over, the first institution where the farmers of the rural area approach for credit is the PACs. In this context appropriate mechanism should be evolved from the part of the Government in keeping the PACs in providing valuable credit facilities to farmers.

21.13 Policy 110: The agricultural credit must be monitored from the time of disbursal to the repayment.

21.13.1 It is seen from the statistics that, huge amount of money has been advanced as crop loans in the entire state. But it is paradoxical to see that, that much agricultural production has happened. Hence there is some problem associated with it. So the credit advanced must be monitored to see that the same has been used for agricultural production purpose alone.

21.13.2 The financial institutions at the time of dispersal of loans must inform the respective development officer for giving the farmers good guidance regarding the adoption of modern technologies, so that he can repay the amount in time. The credit has to be monitored from the time of advancement and not at the time when it becomes defaulted. The credit advancement must be given according to the Section 21.9.3 only. Good credit related policies would help the farmers.

22. POLICIES FOR CROP HUSBANDRY

22.1 The main crops grown in the state are paddy, coconut, pepper, cashew, cassava, other tubers, banana, fruits and plantation crops like rubber. Cash crops, like coconuts, rubber, tea and coffee, pepper and cardamom, cashew, areca nut, nutmeg, ginger, cinnamon, cloves and the like, give the agriculture of Kerala a distinct flavour.

22.2 The main crop is coconut which bring the people their principal source of earning in agriculture. Nearly 70% of Indian output of coconuts is provided by the State. Cashew is an important cash crop. The state has facilities for converting raw cashew into the dried fruit, salted or plain. Cardamom is another cash crop which gives Kerala a distinctive place in Indian export. Alappuzha, one the district of Kerala known as the 'rice bowl of the state', has a predominant position in the production of rice. Paddy cultivation in the state is facing numerous issues and the area is dwindling very fast. The lush greenery of Kerala state is the outcome of the environmental impact of the paddy crop.

22.3 Policy initiatives needed for the crop profile of the state is listed below.

22.4 Paddy crop related policies

22.5 Paddy occupies the largest area among annual crops. The first crop of paddy is mostly a wetland crop and it covers twice the area under the second crop and the four times the area under the summer crop. Under high yielding variety programme, substantial increase in paddy production has been achieved, even though the percentage of area sown under paddy is decreasing year after year, due to conversion of paddy fields to other purposes.

22.6 Indiscriminate reclamation of paddy fields, allegedly under the disguise of developmental activities, appears to have led to a sharp fall in area under the crop, and a consequent substantial drop in rice production. The maximum area under rice was in 1974-75 at 8.81 lakh ha, with production at 13.34 lakh tonnes. But as per the current data, the area have decreased to 2.13 lakh ha. and production 5.2 lakh tonnes.

22.7 Two main reasons have been attributed to the continuous fall in its production are "indiscriminate reclamation of paddy fields in the name of developmental activities and shifting to other lucrative crops without making concerted efforts to increase productivity, making paddy cultivation profitable giving it the due importance and priority over others. With these backgrounds the policy initiatives are listed.

22.8 Policy 111: Kerala cannot afford any more conversion of paddy lands, ecologically or economically.

22.8.1 The challenge facing our Government for the next few years will be to feed the escalating population, keeping prices low to benefit poor consumers and reducing production costs to benefit poor growers. To feed a population of 3.3 crore, Kerala has to produce approximately 40 lakh tonnes of food grains every year at the minimum per capita food availability of 320 g.

22.8.2 The Kerala Conservation Of Paddy Land And Wetland Act, 2008, has to be implemented in its true sense to arrest conversion and to protect existing paddy lands. The ecosystem services provided by the rice crops need be recognised and intensive efforts have to be taken to bring back fallow land under cultivation by providing institutional support for developing the required infrastructural facilities and by promoting lease land cultivation wherever owners of paddy lands are unable to continue rice farming.

22.9 Policy 112: Among the strategies for increasing rice production in the State, area expansion needs immediate attention.

22.9.1 Intensive efforts will be taken to retain the existing paddy area and at the same time, bring more fallow land under cultivation, promote lease land cultivation and also convert sizable area from single crop to double crop and double to triple crop.

22.9.2 The programme envisages enhancing the existing area of 2.13 lakh ha to 3.0 lakh ha in a phased manner within a period of five years . The following programmes may be given priority.

22.9.2.1. Bringing additional area under paddy by cultivating paddy in cultivable fallow lands.

22.9.2.2. Increasing upland rice cultivation.

22.10 Policy 113: The current productivity of 2.30 t / ha of rice has to be increased to 4.0 t / ha so as to achieve the production target of 12.0 lakh tonnes of rice from 3.0 lakh ha. within a span of five years.

22.10.1This increased productivity could be achieved through popularization of high yielding rice varieties and rice hybrids in larger areas and promotion of scientific rice farming through group approach in a participatory mode. The programmes suggested for increasing productivity of rice in Kerala include the following

1.Revitalizing Group farming Programme
2. Constitution of farm advisory service for each district.
3. Popularization of High Yielding Varieties of rice.
4. Integrated nutrient management based on soil test data.
5. Organizing frontline demonstrations for
maximizing profitability of rice.
6.Production, multiplication and distribution of
quality seed to ensure supply of right seeds in the right quantity at the right time.
7. Integrated Pest Management
8. Encouraging farm mechanization
9. Minimising Post harvest loss
10. Strengthening the Kerala State Seed Development Authority
11. Strengthening of Paddy Development Agencies and other agencies involved in Rice cultivation in
Kerala
12. Providing interest free loan to rice farmers at the start of the season
13. Insurance to paddy crop against natural calamities

22.10.2 These programmes may be formulated with the help of State Agricultural Plan as envisaged in the Section 14.6 for achieving the results very fast.

22.11 Policy 114: Rice farming has to be made more remunerative to attract more farmers for which measures to augment income from rice based farming has to be formulated.

22.11.1 The income from farming should be a lucrative one to sustain the farmers in that vocation. The policy of the Government should be such that income is assured to paddy farmers in an year round basis. The following steps will have to be taken to assure subsidiary income to paddy farmers of the state.

1. Providing supplementary income to rice farmers.
2. Popularization of Organic rice and ethnic special rice varieties
3. Integrated rice-fish culture.

22.12 Policy 115: Considering the food security point of view and the environmental benefits of paddy cultivation, the land area ceiling of 2 ha. has to be raised to 5 ha. for availing the input and financial assistance of the Government Schemes.

22.12.1 Food grain production is becoming a matter of concern for India as a whole and Kerala in particular. Rice is the staple food of Malayalees and as Kerala's population continues to grow steadily, demand for rice is also growing. It is only past history that the former princely State of Travancore, a constituent of the present Kerala, had made great progress in providing food security for its people and was also exporting rice till the middle of the last century. The food scene in Kerala is turning grim as factors ranging from global to local accelerate the scarcity and price hike of food grains. Our land and water resources are declining and we have been experiencing shortage of our main food grain-rice- even for own consumption at least from the beginning of the present century.

22.12.2 Considering these factors it is necessary that rice crop is to be promoted in a war footing. So the subsidy norms has to be changed accordingly so that, this less remunerative crop as per farmers' perception has to be supported covering more rice farmers as beneficiaries.

22.13 Policy 116: Paddy farmers are to be provided with incentives comparable to that of fruit plants and industrial crops.

22.13.1 Currently the farmer invests 90% of the total cost of paddy farming to sustain the food security and ecological restoration of the wet land (The cost invested in an approximate area of 2 lakh Ha is Rs 8000 crores and Government investment is approximately 1000 crores!). The wet land farmers invest more to protect the wet land and water conservation for 3 crores population in the state.

22.13.2 All subsidies to be converged and subsidy norms may be revised taking into account the regional specialities (The total subsidy for paddy cultivation should be a minimum of 50 % of cost of cultivation).

22.14 Policies related to coconut

22.14.1 Next to paddy, coconut is the most important crop in Kerala. The crop is grown over all the state. Most of the Kerala houses also have Coconut palm grown for immediate household needs. The growing of coconuts is by tradition part of the local rural economy rather than a major element of national agriculture.

22.14.2 The State's coconut farmers are facing a severe crash in prices, with prices of all other edible oils rising, but coconut oil prices falling.

22.14.3 According to the Coconut Development Board, in order to save the coconut sector, projects to improve production and productivity will have to be initiated on an urgent basis. Otherwise, families of coconut growers, numbering around 35 lakh, would be put to severe hardship. Clearly, it's time that the 'Land of Coconuts' began sprucing up its backyard. Still, coconut remains an important crop for Kerala. Covering 9 lakh hectares, coconut accounts for 42 per cent of the net cropped area, and provides livelihoods to over 3.5 million families in the State.

22.15 Policy 117: Since the import of edible oils affects the price of the coconut adversely, the State Government has to pressurize the Central Government for setting up a frame work, so that the farmers would get remunerative price for coconut oil, even if the import of edible oil is happening.

22.15.1 Imported edible oils enjoy tariff concession as well as subsidy and this brings down their market price at retail level. During the November 2011 -May 2012 period, import of refined oil (RBD Palmolein) increased 97%. A total of 1 million tonnes of oil was imported during the period, compared to 5.5 lakh tonnes in the corresponding period last year.

22.15.2 The excessive import of edible oils, especially the palm oil, during the peak coconut production season would definitely trigger price crash of coconut oil. The price movement of coconut oil reveals that import of large quantities of palm oil would result in crash of coconut oil price.

22.16 Policy 118: Introducing dwarf varieties in at least 25% of the new trees or through under-planting in the existing coconut gardens for meeting the ever growing requirement of the State's Official Drink - the tender coconut water.

22.16.1 The coconut development board (CDB) estimated that the share of dwarf trees in Kerala is 1% as against a national share of 3.4%. A study conducted in 2010-'11 had found a 30% growth in the local tender coconut water market, which is also mainly serviced by imports from neighbouring states.

22.16.2 Varieties like Chowgat green/ orange dwarf, Malayan green/orange dwarf and Gangabondam green dwarf attain just 20-30 ft height and facilitate easy harvest. Nuts from these varieties have almost double the water content at 600 ml/nut than the tall varieties besides bearing fruits from as early as three years.

22.16.3 The farmers should ideally aim at introducing dwarf varieties in at least 25% of the new trees or through under-planting in the existing coconut gardens. The Government in collaboration with CDB should plan to popularize cultivation of dwarf and hybrid varieties through the coconut producers' societies besides launching special schemes to promote these varieties. The seed nuts may be made available from the master farmers as well as from the Departmental farms.

22.17 Policy 119: The long cherished dream of producing 'Neera' by the coconut farmers of the State is to be materialised for improving their income.

22.17.1 Talking of diversification, the most important value added product from coconut that has sought the attention of all the stakeholders in coconut is Neera. The nutritious non alcoholic drink, Neera has enormous market potential. The various value added products from Neera like palm syrup, jaggery and sugar have prospects in both domestic and export market. Neera production is permitted in Maharashtra and parts of Karnataka. Neera is sold in Maharashtra as a health drink. The Karnataka Department of Horticulture has introduced in the market, packed Neera in pouches.

22.17.2 The current contribution of coconut to the SDP is more than Rs. 8000 crores and Rs. 2000 crores in the foreign exchange. If the value from Neera is taken in to consideration, the share of SDP at the current prices would go up to a woofing of Rs. 25000 crores.

22.17.3 Globally the development of each drop is not separated from the production and marketing of its value added produce which will give maximum profit to the producer. Viewed from this angle, the coconut floral sap and its value added materials are of immense importance with respect its medicinal and health value. All coconut growing countries since the formation of the WTO has made tremendous progress in this line.

22.17.4 Indonesia, Philippines, Malaysia and Sri Lanka has gone far ahead in these ventures. Indonesia alone produces 10 lakh tonnes of coconut sugar annually out of the coconut floral sap. In fact, India though started some works, is pathetically slow and passive in the development pathway. Even though KAU developed a technology for keeping the sweet toddy unfermented some six years back, the programme seen stagnated.

22.17.5 Neera can provide Rs. 1500/- per month from one plant to a farmer based on the estimation by Kerala Agricultural University. Under such conditions the economic returns of the farmers will be improved a lot producing revolutionary changes in the product development in coconut.

22.17.6 Neera production is to be undertaken in a well disciplined manner. The whole production process demands transparency, efficiency and accuracy. Entrusting well functioning CPS/ Federations/FPOs with production of Neera will enable production in an efficient manner. Also, Neera production can be done under the auspices of CPS and processing into various value added products can be undertaken by the FPOs.

22.17.7 At present there are two technologies for the production of Neera. They have to be evaluated. They are developed by KAU and DFRL. The DFRL technology is used by the CDB and Karnataka Government. So two projects for the same should be given shape for evaluation. The projects are to be undertaken in areas such as Palakkad and Alappuzha where the potential exists. A Special Officer for this task is to be appointed by the Government.

22.17.8 The Neera production should accord high priority in the Government policies.

22.18 Policy 120: A new platform that would bring farmers, processors and retailers together have to be launched to link agricultural production to the market, to maximise value addition, minimise wastage and boost farmers' income.

22.18.1 A new platform will be developed under the farmers participation model. This would provide for the infrastructure requirements for farm-level procurement in identified clusters. It will also help in the processing of products,. Centralised infrastructure to take care of processing activities requiring cutting edge technologies will have to be established.

22.18.2 This proposed platform should ensure value addition and effective marketing. The main aim is to create world-class infrastructure facility, offering quality service to coconut products' manufacturing industry. It will also bring in more investment in the sector. Exports will also grow due to the value addition and opening up of new markets.

22.18.3 The proposed 'Coconut Bio Park' is of this type, but the investment on these parks should be limited to FPOs based on coconut only for sharing the profit to the farmers only.

22.19 Policies related to vegetable cultivation

22.19.1 Vegetables and fruits are vital components of our daily food. Mainly 12 major varieties of vegetables are cultivated in Kerala.

22.19.2 According to Department of Economics and Statistics, 7,20,671 Quintals of different kinds of vegetables were produced in the state in an year. According to the survey, major vegetable producing district is Malappuram. The major crops in the district are Bitter gourd, Cucumber, Ash gourd, Ladies finger and other vegetables. Kottayam district is the second largest producer of vegetables. The least vegetable-producing district is Alappuzha.

22.19.3The major vegetable crops in the state are Ash gourd, ginger, bitter gourd and snake gourd. Brinjal, coccinia, ladies finger, amaranthus etc are also cultivating at a good extent.

22.19.4 The percentage loss of fruits and vegetables due to poor infrastructure and post harvest handling is very high. Lack of suitable storage system, immediate processing facilities and uncertainty in prices etc discourage farmers from undertaking large scale cultivation of vegetables and fruits.

22.20 Policy 121: 'Safe to eat' branding programme for vegetables is to be introduced for assisting the domestic production and attracting more consumers so that the farmers get more demand for their produce.

22.20.1 Vegetables are one of the most important food items in people's daily diet, because people obtain essential nutrients from vegetables, which they cannot get from other food. Therefore, eating vegetables is a part of people's daily life, which may be why people pay so much attention to the quality of the vegetables they buy. Vegetable quality has to do with the freshness of the product, the diversity of varieties, hygiene standards, the level of chemical residues, etc. In the past, most consumers were concerned only about the freshness and diversity of vegetable varieties. Until a few years ago, they did not realize that hygiene and agrochemical residues pose a problem. In fact, food safety is a new concept to most consumers. Nowadays, consumers - and especially urban consumers - are very cautious about the safety of the vegetables they eat. They attach importance not only to freshness and the diversity of varieties, but also to sanitary aspects and chemical residues. They complain about the poor quality of the vegetables they buy and, consequently, vegetable safety has become a socio-economic and even a political issue today.

22.20.2 There is a large potential for the production of 'Safe to Eat' vegetables in Kerala due to the favourable agro climatic conditions. Many vegetables are grown in our state without the application of chemical fertilizers or pesticides. Sate's demand for chemical free food is increasing day by day. The farmers of the state are found using comparatively less fertilizers and vegetables grown out of agrochemicals have great advantage in the market. There is immense scope for promoting 'Safe to Eat' branded vegetables. Agencies like SHM, HORTICORP, Vegetable and Fruits Promotion Council, Kerala can help much in promoting safe to eat food production in the state as vegetables and fruits produced out of free of chemicals are in high demand inside and outside the state/country.

22.21 Policy 122: Homestead farming of vegetables and popularisation of vegetable gardens in schools proved the impact on the increased vegetable production in the state and the programmes should continue.

22.21.1 Homestead farming is the traditional farming system in Kerala where every part of the homestead is used for the agricultural production. Vegetables form an important component in this system. Significant results were observed during the year 2012-13 by the intensive vegetable production programmes of the state. Homestead farms contribute remarkably to food security and farm income in terms of output and provision of variety of plants compared to distant farms. Thus for assuring the nutritional security, homestead vegetable production is to be promoted.

22.21.2 Vegetable gardens at schools were being promoted very recently by the state with the prime objective of transferring the rich culture of 'farming' to the younger generations. The programme was welcomed

by one and all and very good response was received from the schools. Considering this gesture of acceptance, newer programmes in these lines are to be continued.

22.22 Policies related to banana crop

22.22.1Small and marginal farmers are adopting banana cultivation faster than ever before due to increased demand and soaring prices for locally-grown banana varieties such as Nendran and Red banana. According to statistics from the Kerala Horticulture Mission, Kerala saw a steady but gradual resurgence in banana cultivation. Acreage under the crop has moved up in the past one decade, even as the area under cultivation of crops such as coconut and paddy fell considerably.

22.22.2 The steady demand for banana due to its varied uses and wide adaptability to different farming situations makes it the small farmer's favourite crop. The dwindling farm holdings also make this a practical alternative to other crops.

22.22.3 It is the red banana which is proving more profitable to the farmers. This is mainly because it has earned the label of an export item in addition to its strong domestic market. Thiruvananthapuram is the biggest export market for red bananas and exports are mainly to the Gulf countries.

22.23 Policy 123: Since more than 70 per cent of banana cultivation is done on leased lands by resource-poor farmers, obtaining maximum income from a unit area under cultivation assumes utmost importance.

22.23.1 Several research institutes developed different technologies for pushing up productivity. High density planting developed by Kerala Agricultural University helps the farmer to earn better. Uniformly growing tissue cultured Nendran plants are the best planting material for doing high-density banana cultivation.

22.23.2 However, sucker plantations can also be raised successfully if due care is given to planting equal weighing suckers in the same pits.

22.23.3 Another technology of double planting helps the plants to utilize water and fertilizer more efficiently through increased root density. It also helps the plants resist winds more effectively and cost for staking was considerably reduced.

22.23.4 Modern technologies of this type has to be promoted by the Government through research trials, demonstrations, seminars, training, and field visits in the subsequent years and the potential of 27 t / ha. yield should be attained in the place of 8-7 t/ha. in conventional methods. This will surely add additional income to the resource poor farmers of the state.

22.24 Policy 124: By-product utilisation and product development should be given preference for assuring steady income from banana cultivation.

22.24.1 Enormous by-products of banana are an excellent source of highly valuable raw materials for other industries by recycling agricultural waste. This possibility prevents an ultimate loss of huge amount of untapped biomass and environmental issues.

22.24.2 The utilization policy of banana by-products such as peels, leaves, pseudostem, stalk and inflorescence in various food and non-food applications serving as thickening agent, coloring and flavor, alternative source for macro and micronutrients, nutraceuticals, livestock feed, natural fibers, and sources of natural bioactive compounds and bio-fertilizers are to be worked out for which sound technologies are now available. Future prospects and challenges are the important key factors to be discussed in association to the sustainability and feasibility of utilizing these by-products. It is important that all available by-products be turned into highly commercial outputs in order to sustain this renewable resource and provide additional income to small scale farm families of the state without compromising its quality and safety in competing with other commercial products.

22.25 Policies related to mango production in Kerala

22.25.1 Mango is not considered as a commercial crop of Kerala, but mango trees are inevitable components of homesteads of the state. The total estimated area under mango cultivation is 75,911 hectares with an annual production of 323,517 tonnes. Commercial orchards of mango are being established in the Palakkad district, where the climatic conditions are more suitable for mango trees.

22.25.2 The mango population consists of both seedling and grafted trees but the commercial orchards are of grafted trees only. The cultivated varieties include Alphonso, Sindhoor, Bangalora, Banganapally, Neelum, Kalapady, Guddadat, Priur, Kalappady, Olur etc.

22.25.3 The main feature of Kerala's mango production is the earliness. The first mango fruits of the season come to the Indian markets from Kerala. The flowering commences by November-December and the harvesting starts by March-April, which helps to fetch the maximum price for the fruits to the growers due to the high demand for the fruits in the main markets in the other parts of the country.

22.26 Policy 125: The government should develop a 'Mango Export Zone' in Muthalamad due to the early bearing nature, it could be exported at high prices.

22.26.1 According farmers of Muthalamada about 15,000 hectares of land can be brought under mango cultivation in Chittur taluk alone on a commercial basis. The cultivation can be taken up in all 10 panchayats of the taluk, making it one of the largest exporters of mango. For this, government help is required. The farmers can earn good profit and foreign exchange for the country. Now annually, mango worth more than Rs.300 crore is exported from Muthalamada alone. It can be increased to Rs.500 crore if more areas come under cultivation in Chittur taluk.

22.26.2 Support from the Government is required in meeting the phytosanitory standards at international level. The farmers are to be equipped with the infrastructure and technology.

22.27 Policy 126: Kerala is well known for some traditional mango varieties and the germplasm of them are to be protected and a research station under KAU should be set up for mango at Muthalamada.

22.27.1 Kerala has the indigenous mango varieties such as Kottukonam, Preeyoor, Thenmaanga, Chandrakaran, Thathammachundan, Mayilpeeliyan, Nambiar Maanga, Nedumangadan. There are well known oversized mango varieties such as the Aanathalayan, Muthalamookkan and Kossery weighing up to two kg. These varieties are in danger and has to be protected. Germplasm collections of the same are to be done in Departmental farms at the earliest to protect these varieties.

22.27.2 Muthalamada is known as the 'Mango City of Kerala' which is famous for the fabulous varieties. The research on mango in Kerala is in a very crude stage and has to be promoted at the earliest as mango has been predicted by the international agencies as the 'crop of the years to come'. A research station under KAU should be started at Muthalamada.

22.28 Policy 127: Since climate plays an important role in the production of quality mangoes, an advisory system should be developed to protect the quality and production.

22.28.1 Muthalamada farmers get a good price for their mangoes because these reach the market early. The harvest starts early in January every year. There are only two other places in the world where mangoes ripen as early as in January — Peru and Bolivia. So, Muthalamada mangoes get good export orders and high price from different parts of the world because they are the first to hit the international market.

22.28.2 Mango trees need rain in the months of December and January for good productivity and for getting good quality fruits. The annual yield at Muthalamada, is estimated to be over 45,000 tonnes of premium varieties such as Alphonso, Banganapilly, Malgova, Kalapadi, Suvarnarekha, Sindhooram and so on. If no rain is received during the above two months, yield will come down to half. The quality too will not be up to the mark.

22.28.3 Besides the loss of internal and external markets, the farmers may have to loose the price advantage too. In this context an advisory mechanism should be set up at district level and should be monitored at Directorate level.

22.29 Policy 128: A separate insurance and supporting scheme for mango in the event of crop loss has to be built up.

22.29.1 Mango farmers said that they did not get any compensation for crop loss from the government as in the case of other crops during the sitting of the Committee at Palakkad. There is also no crop insurance scheme for mango though it is cultivated on a commercial scale in large parts of the district.

20.30 Policies related to roots and tubers

22.30.1 According to FAO roots and tubers provide a substantial part of the world's food supply and are also an important source of animal feed. On a global basis, approximately 55 percent of roots and tuber production is consumed as food; the remainder is used as planting material, as animal feed or in the production of starch, distilled spirits, alcohol and a range of other minor products.

22.30.2 More than simply food crops for the rural poor, roots and tubers can also serve as sources of cash income for low-income farm households and raw material for processed products for both rural and urban consumption.

20.30.3 Lifestyle changes, historical and cultural factors, and evolution in tastes also influence root and tuber consumption trends. The rapid increase in urbanization in our state over the last three decades, the greater participation of women in the labour force (especially in the MGNREGS), and the pervasive exposure to advertisement of food commodities and to the eating habits of NRKs have increased the proportion of purchased foods in total food intake. These changes in consumption patterns have affected the demand for roots and tubers in various ways.

22.30.4 In controlled conditions, tubers such as cassava, yams, and aroids have been found to withstand extreme drought. This attribute will help policy planners promote tuber as a substitute crop to meet exigencies.

22.31 Policy 129: Promoting tubers as an alternative to cereals will augment food security.

22.31.1 Tubers are to be farmed as an alternative to cereals and pulses during drought conditions. Promotion programmes of the same has to be taken up.

22.31.2 Tubers generally shed leaves during drought, leaving just a few to sustain the life of the plant with minimum photosynthesis. The plants sprout fresh leaves with rain. In greenhouse experiments, 7 to 8 degrees above the ambient temperature, tapioca performed reasonably well while the performance of elephant foot yam was comparable to that in the best conditions. When rain-dependent kharif crops fail in the absence of monsoon, tuber crops will survive with just life-saving irrigation during the planting season.

22.32 Policy 130: Tuber 'minikit' programmes are to be introduced for promotion of roots and tubers in the homesteads.

22.32.1 Planting material availability is to be assured at the door steps so that the households are fully utilised the potential of tuber crops. Though rice was the staple food in Kerala, tubers, especially tapioca, were the survival food.

22.33 Policy 131: Tubers could be used to produce quality cattle-feed, thus bringing more profit to the farmers.

22.33.1 Many developing countries are under increasing pressure to make more effective use of available resources in the agricultural sector both to satisfy the growing demand for livestock products and to raise rural incomes by generating additional value added through processing. The cost of balancing domestic demand for livestock products with feed or livestock imports has become prohibitively expensive. The prospects for increases in the output of cereals of the magnitude required to meet livestock and human requirements remain problematic. Consequently, alternative sources of livestock feed both to spur domestic livestock production and to free cereal supplies for human consumption are receiving closer attention. Interest in the potential for a

expanded use of tuber and tuber by products as animal feed in the current scenario has arisen in this context.

22.33.2 For eg., after harvest, large quantities of the biomass such as cassava leaf (5-7t -ha) and tuber rinds (15-23 per cent of the tuber) are generally thrown as waste. Leaf of cassava is a rich source of protein and other nutrients, nevertheless, the toxic principles in it is a constraint to commercially exploit this as a cattle feed or allied purposes. But technologies are available for processing the same.

22.34 Policy 132: Exploit the new technologies, new variety of crops and bio-pesticides developed by institutions such as the CTCRI based on tuber crops so that the State can be self-sufficient in food and can reduce its dependence on other States

22.34.1 The bio-pesticides from cassava could be used for management of borer pests like pseudostem weevil (Odoiporus longicollis) in banana, red palm weevil (Rhynchophorus ferrugineus) and other borer pests of tree and fruits crops.

22.34.2 A formulation has also been made against sucking pests like mealy bugs, aphids and leaf eating caterpillars. This formulation has to be commercially produced. Details are available in the Section 32.7

22.35 Policy 133: Demonstration of improved production technologies such yam minisett technique, yam staking methods, root/tuber based crops mixtures are to be adopted in departmental farms and farmers' fields.

22.35.1 It is proposed to lay out demonstration plots in the potential areas at block level/ Gram Panchayat level during the coming years. Each demonstration plot will be an area of 1000 m2 which will demonstrate the cultivation of popular roots and tuber crops (Tapioca, Sweet Potato, Colocasia and Yams) in order to popularise the newer technologies in crop production and there by increasing the area, production and productivity. The area available in between the tree crops would be taken for demonstration to spread the message of "tubers are excellent" intercrops.

22.36 Policy 134: Nucleus planting material production of improved varieties of tubers are to be carried out at Departmental farms.

22.36.1 Traditional source of multiplying and distributing planting materials is by picking from farmers' own farms, as well as other peoples' farms. Some of the challenges facing the traditional sources of tuber planting materials are: low yield (5-6ton/ha); low income level; multiplication and spread of diseased planting material; use of long stem cuttings (resulting in low multiplication ratio and scarcity of planting material at the beginning of the planting season); random planting (making post planting activities difficult with low planting density).

22.36.2 At the primary level, few materials from breeders are multiplied under optimal agronomic conditions in the Departmental Farms to produce clean and healthy foundation planting materials. The planting materials are inspected in the field on two occasions by a team of experts, to ensure quality and standards, before spreading them to secondary fields.

22.36.3 The secondary level which is also in the Departmental farms involves further multiplication of certified materials by contracted or commercial planting material producers for distribution to tertiary farmers. Secondary fields are also inspected by a team of experts to ensure quality and standards.

22.36.4 The tertiary level is where certified planting materials from secondary fields are distributed to farmers mainly for production as food.

22.37 Policy 135: Processing and value addition of tuber crops is to be treated as a priority area.

22.37.1 Value addition technology enhances the marketability of the tuber crops. Compared to selling the raw harvested produce, value addition requires more financial inputs, proper guidelines, and backup technologies to ensure success. It is possible to add value to the tubers by creating 33 different varieties of products from them such as sweets, pickle, mouth-freshner, and brewing powders similar to the tea. They can be processed into a variety of value-added products such as gari, dried chips and flour for both home consumption and agro-industrial applications. The processing of tubers requires special attention.

22.38 Policies related with spice crops in Kerala

22.38.1 Kerala is a major producer of spices that form the cash crops of the state. Kerala's spice trade is about 7000 years old and it is well known how the fresh aroma of the superb quality Kerala spices lured foreigners into this country in the medieval ages. Kerala produces 96% of the country's national output of pepper. The important spices are cardamom, cinnamon, clove, turmeric,nutmeg and vanilla. Cardamom is exported and brings great revenues to the country.

22.38.2 The history and destiny of our country, perhaps the whole world were influenced unbelievably by the spices. It was the taste of the 'Black gold' pepper and the flavour of the 'Queen of spices' Cardamom, which attracted the Arabs and Europeans to this country and ultimately led to the foreign domain.

22.38.3 The spices that are grown traditionally in the state include pepper, cinnamon, ginger and cardamom. But now there is an increasing trend for the farmers in Kerala to grow spices that are used worldwide. Such spices include vanilla, oregano, rosemary, thyme, basil, mint, bay leaf and sage.

22.38.4 Unfortunately, spices sector is really suffocating due to a variety of problems. Generally, the price of a commodity must be either cost based or demand based. However a close observation of the prices trends show that this principle does not have much significance in the case of major spices including pepper and cardamom. Similarly, any upward vend in the prices of spices should benefit the producers. But it is paradoxical to see that the producers of spices never get the benefits of price hikes but they have to bear all the evils of adverse market conditions. This is a clear evidence to believe that there is something wrong with the present marketing system of spices.

22.39 Policies related to pepper crop

22.39.1Black pepper (Piper nigrum L.) famous as "Black Gold" and also known as "King of Spices" is one of the important agricultural commodities of commerce and trade in India since pre-historic period. The crop is the major source of income and employment for rural households in the predominantly pepper growing State of Kerala where more than 2.5 lakh farm families are involved in pepper cultivation.

22.39.2 Kerala accounts for 80-90% of the total pepper production in the country. Idukki and Wynadu are the two major pepper producing districts in Kerala. The estimated area under pepper in India is 2,36,180 hectares (2006-07) and the estimated production is 50,000 tons (2007-08). The production of Indian pepper has come down from 80,000 tons (2002) to 50,000 tons (2007-08 estimates).

22.39.3 The commonly observed cultivation system in Kerala is the "extensive homestead cultivation" where pepper cultivation is taken up as a secondary crop interspersed with several other crops.

22.40 Policy 136: Area under pepper crop in the state is to be extended on a war footing to cater the domestic and international demand.

22.40.1 If Indian production decline further and current supplies could not cater the domestic demand, the low cost imported pepper from ASEAN countries will affect the Indian pepper producers' economy further. The sustenance of Kerala pepper is mainly due to its intercropping conditions. Price volatility and increase in cost of production tempts the pepper growers of the major pepper growing districts of Kerala viz. Idukki and Wynadu to switch over to other crops. In addition to this, low productivity of pepper to the tune of 267 kgs./hectare (National Average) is another challenge which has to be met with. The productivity of Vietnam and China is around 2000 kgs/hectare. The low productivity is mainly due to poor farm management, incidence of diseases & pests, senility of plants, non-popularization of elite cultivars as well as ill maintained farms with traditionally available high yielding cultivars, depletion of soil fertility, damage of live standards due to pest attack etc. Scattered cultivation by small holders, lack of long term investments for improving the crop are some of the added perils.

22.40.2 The State Government may launch suitable programmes to extend the crop to at least 20000 ha per year for the coming five years.

22.40.3 Pepper is a fragile plant, especially when it is young, and requires great care, being quite vulnerable to variations in the weather. It needs rain, scattered and at specific intervals, and sun and warmth, in almost the same measure. If needed, the cultivators have to spend much time watering the plants during the summer and draining out the water during the monsoons. And, there is no yield from the plant for the first three years, or more, when the crop is most vulnerable and is usually ravaged by severe ailments. So the programmes should have the component of managing the gardens with utmost care.

22.41 Policy 137: Availability of sufficient quality planting material is to be assured for guaranteed production and productivity.

22.41.1Scarcity of planting materials is a major hurdle in the State's attempts to revive its pepper gardens. The Department of Agriculture, IISR and the State Horticulture Mission (SHM), which has the mandate to produce pepper saplings, do not have enough planting materials of good quality pepper to meet farmers' demands.

22.41.2 Most of the pepper plantations are very old, senile and have become uneconomical. The availability of disease-free planting material with lower fruit-bearing age and the financial assistance on easy terms would help the farmers to replant for realizing increased crop yield and profitability. Under such circumstances, the role of Department of Agriculture needs to be widened and more supportive role towards pepper-growing farmers seems to be warranted.

22.41.3 The Government would launch a project to produce sufficient quantity of diseases-free saplings using tissue culture and conventional rooting technology. High-yielding indigenous varieties such as the Wayanadan, Kottanadan and Kaniayakkadan types are to be promoted. It would be desirable to produce pepper planting materials bearing DNA based bar coded tags for assuring the varietal fidelity.

22.41.4 The planting materials would be produced on a decentralised nursery production plan by the partner institutions at the Indian Council of Agriculture Research, KAU and the Department of Agriculture.

22.42 Policy 138: A serious attention as until new and diversified export markets are not exploited, the farmers would face crash in farm gate price due to the surplus stock.

22.42.1 Idukki and Wayanad, were once famed in the world market for their pepper quality. But now, the production of this spice has become an unremunerative proposition due to depressed prices in the domestic and/ or global markets coupled with increasing input costs. Further, from the projections for the production and demand for the period 2005-2015, it is evident that the pepper production is going to outpace the domestic demand in a big way. This requires a serious attention as until new and diversified export markets are not exploited, the farmers would face crash in farm gate price due to surplus stock.

22.42.2 The specific focus on quality through adoption of improved cultivars for export and processing perspectives, value-addition in the light of high demand of derived products like oleoresin and spice oil and ensuring quality of international standards of this premium spice in raw as well processed products forms will garner a larger share in the international export market.

22.43 Policy 139: A support price mechanism for the pepper crop is to be introduced for meeting the vagaries of price volatility.

22.43.1 A majority of the pepper growers in Kerala are small and marginal farmers. For them, a better price is the best incentive to remain in cultivation of this crop and huge volatility, particularly in

southward direction discourage them to use better inputs. The only way to ensure remunerative price to the farmers while maintaining export price at competitive level is to increase the yield of the crop.

22.43.2 The assured price mechanism as extended to other cash crops will fetch a great deal in assuring the economic profit realization by the farmers and will retain their interest, as they are hard hit in the event of any eventuality on the price front.

22.44 Policies related to nutmeg

22.44.1 Nutmeg. It's a spice with a history, and its share of mystery. Famed for its flavour, and medicinal properties, this two-in-one spice – the fruit has two spices, the black coloured nut and the bright red coloured mace that covers it – found extensive use in European cuisine from medieval times. But the fat price that the Europeans paid for the spice, only tempted the Arab traders who supplied it to conceal its origin.

22.44.2 Current prices of nutmeg are promising farmers just that - a fortune. The average price of nutmeg with shell increased three times from Rs.113.42 in 2007-08 to Rs.348.18 last fiscal. Mace which fetched Rs.398.86 on an average in 2007-08 is today priced at Rs.1190. But a trend of falling to Rs. 400/- is seen now a days.

22.44.3 Enthused by the price, farmers are turning to the crop in huge numbers. The area under nutmeg cultivation in the country went up to 16,400 hectares in 2008-09 from 11,270 hectares in 2005-06. The figures would be higher as most of the price rise, and hence intensive planting, happened in the last three years.

22.44.4 Kerala today accounts for more than 90 per cent of the total production of nutmeg. Nutmeg cultivation in Kerala is concentrated in the Thrissur, Ernakulam and Kottayam districts. Much like for rubber, the climatic conditions of Kerala suit nutmeg. It cannot withstand heat and needs the cover of shady trees. This makes it an ideal intercrop in coconut, clove, coffee or arecanut plantations. It is difficult to calculate the area under nutmeg cultivation in the State, as it is grown in homesteads and as an intercrop.

22.45 Policy 140: The area expansion programme of nutmeg is to be done with caution, since the price of the produce began to show a declining trend.

22.45.1 The main nutmeg exporters in the world are Indonesia and Grenada. Grenada is the second largest exporter of spices after Indonesia. The hurricane named Ivan, destroyed 90% of the nutmeg trees in Grenada during 2004 and the country was put in deep distress as this was the main foreign exchange earner. The better price for nutmeg at present may be due to this fact. But at present, after nine years of devastation, the country is gaining its foot hold and getting sufficient share in the international market.

22.45.2 The current trend is the requirement of nutmeg oil. Eventhough India had mastered the technology to produce it, no serious attemt was seen done towards the export of processed products.

22.45.3 There are improved varieties developed by the research institutions like the 'Vishwasree' and are to be provided to the farmers without any time delay. Nucleus planting materials are to be procured by the Government and mother gardens are to be established at the Departmental farms.

22.46 Policies related to ginger and turmeric

22.46.1 Cochin ginger and Alleppey finger turmeric, still considered the finest of ginger and turmeric varieties by exporters, may soon vanish from the scene. Dwindling acreage, low prices, soft rot disease and the spread of crops like rubber and pepper have combined to herald the passing away of one of the softest and `yellowest' varieties of ginger and turmeric in the world.

22.47 Policy 141: If measures are not initiated soon, Cochin ginger and Alleppey turmeric will soon be crops of the past.

22.47.1 Though ginger and turmeric make small contributions to the booming spices business, their uniqueness should not be lost. The farmers are calling for measures from the State Agriculture Department to extend cultivation of Cochin ginger and Alleppey finger turmeric.

22.47.2 Cochin ginger is second only to the legendary Jamaican ginger for its suitability for drying. While most of the ginger available in India now is suited only to be used as a vegetable, low fibre content has made the Cochin ginger an all-time favourite with exporters. Ginger is extensively cultivated in the north-eastern states, Sikkim, Maharashtra and Andhra Pradesh.

22.47.3 Alleppey finger turmeric is known for its high content of curcumin - a yellow colouring substance. Its bright yellow colour has been preferred by spices importers in Europe and other continents. Currently, Andhra Pradesh, Maharashtra, West Bengal, Orissa and Tamil Nadu lead the list of big turmeric producers in the country.

22.48 Policy 142: Measures for encouraging ginger cultivation should be oriented in the context of regional disparities and location specific strategies are to be made.

22.48.1 The factors influencing area under ginger are different in different districts. Studies reveal that decreased price and area are the key factors favouring the growth of ginger area. In Emakulam where the area under ginger is declining, current area under pineapple is found to have affected the ginger cultivation. It is because of the comparative economic advantage of pineapple over ginger in Ernakulam district.

22.48.2 In Wayanad where there has been a significant expansion of area under ginger, the decreased area and turmeric price are the major factors favouring ginger cultivation. Thus price of ginger and comparative advantage of substitute crops are important factors, influencing the acreage responses of ginger. Therefore, measures for encouraging ginger cultivation should be oriented in the context of regional disparities.

22.49 Policy 143: Institutional arrangements should be made to provide quality seeds and other package of inputs to the farmers to boost the output of ginger.

22.49.1 The recent studies indicates that the growth performance of ginger has varied from state to state in India and from district to district in Kerala. The major contributor to increase in production in Kerala has been productivity. While area under ginger increased in all other major producing states, it has declined in Kerala. Three factors are

responsible for the decelerated growth of ginger production in Kerala. Firstly, there is only limited scope for increasing ginger cultivation as a monocrop due to the general crop shift in Kerala; ie .from annual crops to perennial crops. Secondly, emergence of substitute crop like pineapple has influenced the area under ginger in Ernakulam, one of the major ginger producing districts of Kerala. Thirdly, the yield per hectare in Kerala is substantially lower than the average yield.

22.49.2 Thus, the prospects for attaining growth through extension of cultivated area are diminishing fast. The wide difference in current yield rates among the states indicate the scope for increasing yield rates. Institutional arrangements should be made to provide quality seeds and other package of inputs to the farmers to boost the output of ginger.

22.49.3 Yield can be increased by the timely supply of disease-free seed to farmers. The Government should undertake the responsibility of distribution of healthy seeds through Grama panchayat level Krishi Bhavans. Productivity increase is needed not only to increase the output but also to improve the cost competitiveness and profItability

22.50 Policy 144: Since there is only limited scope for increasing area under ginger in Kerala as a monocrop, the existing potentialities of cultivating ginger as an intercrop in coconut, arecanut and young rubber plantations may also be exploited to the maximum possible extent.

22.50.1 In ginger cultivation, emphasis should, therefore, be placed on both productivity increase and area expansion. Moreover, studies from Kearala Agricultural University indicates that ginger is a shade loving plant and can be effectively planted in the interspaces of coconut garden.

22.51 Policy 145: To protect cultivators from incurring loss the Government should announce a support price for ginger.

22.51.1 Side by side with crop research, marketing research may be taken up with the help of the Price Fixation Authority as described in the Section 20.6 of Agricultural Development Policy so that enough data are available to the policy makers to fix prices and formulate developmental policies.

22.51.2 There should be a balance between demand and supply. For efficient marketing, it should be ensured that market does not suffer due to short or excess supply. When supply exceeds demand, the state and central level cooperative organisations should enter the market and purchase the surplus.

22.52 Policy 146: Technological upgradation of processing is very much essential to improve the quality of dry ginger.

22.52.1 Ginger is a food item and considerable importance is attached by importing countries to hygiene part of the produce. Traditional method of processing will result in loss of flavour and quality. Scientific drying facilities should be made available by the Spices Board in collboration with State Government and LSGD, especially in major producing districts like Wynad, Ernakulam and Idukki for producing clean and

good quality product retaining the original flavour. This would encourage buyers' confidence, help the farmers to get better price for the commodity and would result in increased export.

22.52.2 There is a lot of potential for the export of value added products like ginger oil and oleoresin especially to the developed countries. This potential needs to be tapped fully with the help of FPOs as per Section 18.3 of the Agricultural Development Policy.

22.52.3 Adequate International Marketing Information System should be developed so as to help formulate suitable strategy to develop exports.

22.52.4 Attention should be paid to the diversification of the export products and markets. Steps may be taken to introduce ginger in syrup and ginger candy in the export market. For this purpose, suitable ginger varieties should be identified and up-to-date scientific processing techniques may be imparted to the farmers and manufactures.

22.53 Policies related to main cash crops

22.53.1 The main cash crop of the state are Rubber and cashew. However, the rubber crop is well looked after by the other agencies, the latter needs a thorough improvement in the policy statements of the Government.

22.54 Policies related to Cashew

22.54.1 Among the Agricultural - Horticultural commodities getting export from India, Cashew retain top position. Cashew cultivation is confined to peninsular India. Kerala State stood first in the extent of area under cashew. But with the expansion of area under Rubber, large area under cashew in the northern District were converted to Rubber plantation, and at present Kerala Stands 5th among other sates viz., Karnataka, Maharashtra, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal.

22.54.2 There are around 800 registered Cashew nut processing units in Kerala employing around 3 lakhs Workers of which 95% are women. It generates employment in the processing and agrarian sector employing over 3 lakh persons with 95% of them being women.The cashew industry is facing problem related to availability of raw nuts. The down fall in the domestic production of raw nut has lead to this situation.

22.54.3 India has a creditable record of attaining good amount of foreign exchange by way of export of cashew kernels. Among the Agri-Horticultural commodities getting exported from India, cashew ranks the 2nd position. During the year 2009-2010, India could export 1,08,120 mt of cashew kernels valued at Rs.2,90,582 lakhs. USA, Netherlands, UK, Japan, UAE, France, Canada, Saudi Arabia, Singapore, Italy, German Fed. Republic, Austria, Israel and Spain are the major international buyers of Indian Cashews.

22.55 Policy 147: The policy initiatives towards promotion of cashew growers' FPOs (for procurement of raw nuts, supply of inputs, credit and infrastructure, small scale processing, value addition and marketing), and cashew apple processing will definitely widen the perspective of cashew growers.

22.55.1 Establishment of cashew clusters in the form of FPOs among the processors may facilitate the expansion of market linkage and improvement of quality of kernel. Cluster approach would also facilitate setting of other ancillary units like CNSL, units producing jam, pickles, etc. from cashew apples.

22.56 Policy 148: The Cashew Corporation should enter the market to prevent owners of private cashew processing units from controlling the procurement price.

22.56.1 Though cashew nuts had been fetching Rs.260/- per kg in the London market till December, the `monopoly lobbies' are controlling the price as they procure the nuts from here for their processing units in neighbouring States to exploit cheap labour there. Entry of the Corporation will be expected to promote competition in the market.

22.56.2 The role of middlemen in the market should be reduced and Government procurement system should be strengthened so as to motivate farmers to grow this crop on a sustainable basis and ensure a better price.

22.57 Policy 149: There is a need to increase domestic production to substitute imported raw nuts in order to derive the maximum benefits from a strong processing and marketing capability developed over the years by the cashew industry.

22.57.1 Over the years, the share of imported nuts in the total raw nut processing has been 40-45 percent. There is a need to increase domestic production to substitute imported raw nuts in order to derive the maximum benefits from a strong processing and marketing capability developed over the years by the cashew industry. Increased domestic production would reduce imports, which will in turn reduce the volatility in the prices of raw nuts.

22.57.2 Recently, Cashew Export Promotion Council (CEPC), Cochin organised "Kaju India 2006" and launched "Mission 2020" programmes, with the objectives of achieving self sufficiency in raw nut production. More such programmes may be organized to create awareness among the stakeholders.

22.58 Policy 150: Value addition and product diversification should receive adequate attention of the Government for having competitive edge and higher returns in the years to come.

22.58.1 Major export from India is only through cashew kernels at present. The export of value added cashew kernels like salted and roasted kernels from India is insignificant. This is mainly due to the reason that the importers and packers in the major markets like United States do not want the Indian suppliers to send value added products, which they consider, would adversely affect their packing industry. However, there is a scope for increasing the export of value added cashew kernels in the non- traditional markets like West Asian countries. Value addition and product diversification should also receive adequate attention for having competitive edge and higher returns in the years to come. Sweetened and flavoured cashew spread, etc. may be prepared from cashew kernel baby bits.

22.58.2 Cashew apple preparations like jam, jelly, chutney, juice, syrup, etc. need to be popularized and commercially exploited, as it will increase the income of cashew cultivators and also enhance rural employment. Except in Goa, cashew apple is wasted in almost all the states in India. There is also a need to popularise the techniques of manufacturing the value added products from cashew apple among the SHGs.

22.58.3 Scientific processing techniques to recover cashew shell liquid oil may be used in the processing of raw nuts.

22.59 Policy 151: Production and productivity of cashew in the state can be enhanced through a phased replanting programme.

22.59.1The price fall in the open market is set to aggravate the growers' situation. It is feared that the problems may accelerate the conversion of cashew-growing areas into rubber plantations. Rubber fetches a higher price than cashew. A major reason fro the unpredictability of cashew cultivation is the fact that nearly 70 per cent of the cashew trees in the region are aged, local varieties, which start yielding late in the season.

22.59.2 Senile plantations adversely affected the productivity and competitiveness of cashew. Production and productivity can be enhanced through a phased replanting programme. Farmers are hesitant to take up re plantation in the due to the expected crop loss and negative returns during the initial years. Inter cropping may be practiced by cashew growers as it helps in obtaining returns from cashew. Crops and trees like groundnut, cowpea, tapioca, casuarina, turmeric, black gram, etc. can be effectively grown as inter crop during the initial 4-5 years. Strong extension activity and credit support is required to make the farmers rejuvenate old plantations as well as to practice intensive cultivation practices.

22.59.3 Technologies like use of vegetative propagated planting materials may be used for increasing the production and productivity of cashew. The present level of productivity is 860 kg/ha whereas the new varieties have a potential of 2000 kg/ ha. Efforts need to be taken for replacement and new plantation with clones of these varieties. Trials with different density and spacing in cashew have proved that net profit realised from high tree density planting (384 trees/ ha, 6.5 x 4m) was high for the first 10 years compared to normal tree density (156 trees/ha). Better management practices like pruning, top working for rejuvenating cashew trees, improved planting material, adequate disease and pest control, etc. are required to increase the yield.

22.60 Policy 152: All the Cashew development agencies are to be effectively co-ordinated under the Department of Agriculture.

22.60.1 There are many agencies functioning in the state for the promotion of cashew. But it is a known fact that the area under the crop is decreasing. In order to have a proper co-ordination of all the activities, they must be co-ordinated by the Department of Agriculture, which is the main functionary in agricultural development. Otherwise, the resources will be wasted and will not be able to put a co-ordinated effort on the development of cashew.

22.61 Policies related to Pineapple

22.61.1 Pineapple may become yet another good revenue earner for Kerala after plantation crops with the recent granting of geographical indication (GI) status to Vazhakulam pineapple.

22.61.2 The Vazhakulam variety accounts for 50 % of the 3.25 lakh tonnes of pineapple produced in Kerala every year. This popular variety of pineapple, characterized by a special aroma, extra sweetness and low acidity, was first grown in Vazhakulam about 30 years ago; it is now cultivated in a larger area covering parts of Idukki, Kottayam and Pathanmthitta districts as well. Pineapple is the third most canned fruit behind applesauce and peaches.

22.62 Policy 153: Standardization of technology to bring down cost of production of fresh pineapple and its adoption by growers, and technology to produce pineapple throughout the year may go a long way in promoting pineapple cultivation in Kerala.

22.62.1 The seasonality of the pineapple crop affects returns obtained by the farmers. Technology for producing the crop year round would help the processing industry and thereby helping the farmers to get a better price for the produce. Th e small and medium producers generally lack experience in pineapple growing. Th is translates into poor entrepreneurial management because of their ignorance of basic aspects such as production costs. There is little organizational tradition and limited integration between the links driving the production chain. For example, better coordination in seed provision is needed to achieve significant reductions in production costs.

22.63 Policy 154: Steps should be taken to popularise pineapple cultivation as an intercrop in the coconut gardens and rubber plantations to increase the production and income of the farmers.

22.63.1 There is immense potential to increase the area under pineapple in Kerala as it can be grown as an intercrop in coconut and rubber plantations. Coconut is grown in about 9 lakh hectares and if pineapple is grown as an intercrop in coconut garden it will give an additional income, especially in root wilt affected areas it will be a solace to the farmers. Special attention can be given for intercropping pineapple in coconut in root wilt affected areas.

22.63.2 Out of the current area of rubber grown, about 15000 hectare is replanted every year. Pineapple is grown as catch crop for the first three years in rubber at the time of replanting. Pineapple cultivation in rubber will give income to farmers during the period when there is no income from rubber. However, only less than two percent of the potential area in Kerala is cultivated with pineapple. At present pineapple cultivation in Kerala is generating employment of about 45 lakh mandays among farmers, agricultural workers, people involved in loading, unloading, transporting, traders, retailers etc. By doubling the area under pineapple cultivation, an additional 45 lakhs work days per year can be created.

22.64 Policy 155: The marketing of pineapple needs immediate attention as to improve the export potential of the crop for assuring better returns to farmers.

22.64.1 The pineapple cultivation in Kerala is dependent on fresh fruit market, supplying most of its produce to outside Kerala. The Mauritius variety grown in Kerala is marketed in about 10 states in India including New Delhi. It is also exported to Gulf countries in limited quantities. It is possible to increase its marketing by exploring new markets and techniques and also by increase in quality and quantity of fruit produced. It is essential to explore the possibility for marine exports to reduce cost. Consumer preference and marketing strategies are to be taken into consideration. The annual value of pineapple produced in Kerala comes to about 170 crores which may be next to cardamom and coffee. But it is doubtful whether it is getting sufficient attention it deserves.

22.64.2 Steps like regulation of markets for pineapple and integration of production, marketing and processing ctivities would go a long way in decreasing marketing cost and thereby encouraging cultivators for self marketing. In recent times, grower's marketing co-operatives have come into service in Kerala, which need support from the Government.

22.65 Policies related to floriculture

22.65.1 India has a blooming future as far as floriculture is concerned. Enormous genetic diversity, varied agro climatic conditions, versatile human resources etc offer India a unique scope for judicious employment of existing resources and exploration of avenues yet untouched. India with a population of over a billion is a big market. Domestic industry is growing at an annual growth rate of 15-20% per annum. Flower consumption in the cities and major town is reportedly growing at 40% per annum. The total business of floricultural products in India in 2005 increased from Rs. 8,174 lakh to Rs. 14,117 lakh in April 2009. In India, Kerala with its humid tropical climate has a promising future indeed in the field of floriculture.

22.65.2 In the yesteryears, every house in Kerala had at least a little yard where jasmine, roses, hibiscus, marigold, chrysanthemum and ashoka were grown. There grew a lot of wild flowers on the fences and sidewalks. Kerala was dotted with water bodies full of water lilies and lotus. But today concrete has engulfed them. So, just as every essential article from rice to sugar and consumer products from soap to electronic gadgets, Kerala gets its flowers from its neighbouring States. The situation has become so grim that if flowers from Tamil Nadu or Karnataka stop coming, no wedding or 'pooja' can take place in Kerala.

22.65.3 But Kerala has developed a new-found love for two groups of flowering plants-the orchid and the anthurium. Both produce exquisite and delicately hued flowers. Most of the orchids and anthuriums grow well in the tropical climate of Kerala. Above all, the cut flower culture of the modern age has created good market for the orchids and anthuriums as hotels and other commercial establishments prefer these flowers which are long- lasting compared roses, dahlias and gladiolas which stay only for a day in flower vases. Some progressive farmers are making a fortune out of flower cultivation in Kerala.

22.66 Policy 156: Establishment of model nurseries should be done in the state either in the public and or in the private sector to address the issue of shortage in the

availability of new and good quality planting materials which is the most important limiting factor in the development of floriculture in Kerala.

22.66.1 The establishment of model floricultural nurseries is very important for timely supply of quality planting material. Hi-tech floriculture industry can be successful only if enough support is provided for procurement of genuine planting material either domestic or global and marketing of production by the government. The new seed policy had already made it feasible to import planting material of international varieties.

22.67 Policy 157: Traditional Flower FPOs are to be established like cut flower growers' association for traditional flower growers.

22.67.1 There is also a need to establish FPOs for the traditional flower growers. This will help for minimum support price for the flowers they produce. The lotus cultivation done. in Thirunnavaya and the recent trend noticed in Vellayani in Thiruvananthapuram will be benefitted from these types of initiatives. The blooming business of lotus flowers here has made many traditional paddy farmers in the State to opt tend lotus in the village ponds.

22.67.2 Farmers are always worried about the domestic market rates of flowers. During festivals and wedding seasons the rates are very high, but for the rest of the year the prices vary and are comparatively very low. If government could control the Value added tax (VAT) on cut flowers (presently 9-12%), and solve the marketing problems; farmers will be satisfied.

22.67.3 The flower growers' FPOs are to be established in the state need to be strengthened both financially as well as functionally so that these could operate in the areas to expand flowers' cultivation and to safeguard the interests of flower-growers.

22.68 Policy 158: Specific attention is to be given to the development of traditional flowers by assisting traditional farmers in terms of bank loans, proper marketing facilities, and dissemination of information through training and media support on improved varieties.

22.68.1 The cut-flowers' marketing like other commercial crops is more critical than the production itself. This is mainly because of the fact that market decides the profitability and economic sustainability per se of the product and floriculture is no exception. Like scanty and scattered production, the cut-flowers' marketing is also unorganized and under developed. The high price-spread on account of exorbitant margins, no specilized packaging due to lack of packing material, no open auction for sale, less number of flori-traders in the market, few flori-markets and no existence of primary market in the producing area amply speak of the deplorable state of market/marketing system. In this backdrop, it is suggested that flower marketing system should be brought under the ambit of regulation and control. This requires the establishment of producers' co-operatives or FPOs as under Section 18.3 of the Agricultural Development Policy.

22.69 Policy 159: An insurance mechanism for the floriculturists against natural calamities of the state is to be formulated.

22.69.1 The flori-business has been found to be highly capital intensive and risky. It may not be possible for an ordinary farmer to bear the risk of crop failure that may lead him to complete ruin/economic disaster. To warrant against such type of situations, the flori-business needs to be insured.

22.70 Policy 160: It is emphasized that the subsidies on poly/green-house, planting materials and specialized equipments should continue.

22.70.1 The floriculture avocation in the state is yet at its infancy stage and there is dearth of desired infrastructure both at the farm as well as institutional level. Hence, it is emphasized that the subsidies on poly/green-house, planting materials and specialized equipments should continue. Further, liberal funding is also required to strengthen R & D programmes in the institutions like Kerala Agricultural University, State Department of Agriculture, ICAR Institutes, KVKs, etc.

22.71 Policy 161: Efforts should be made to encourage small stakeholders to patronize flower cultivation for enhancing their income and employment avenues.

22.71.1 The cut flowers' cultivation mainly orchids and anthuriums in the state has been picked up mainly by the well-endowed families and not by the resource-poor marginal and small farmers. Therefore, efforts should be made to encourage these small stakeholders to patronize flower cultivation for enhancing their income and employment avenues. For this cause, some of the pre-requisites like, location and approach of farm, distribution of quality planting material, easy term loans from institutions and assured market outlets, need to be expedited, stream lined and strengthened.

22.72 Policies related to medicinal and aromatic plants.

22.72.1 Medicinal Plants constitute an important component of the plant resource spectrum of Kerala. Recent analysis shows that out of estimated 4600 flowering plants in Kerala, about 900 possess medicinal values. Of these, 540 species are reported to occur in forest ecosystems. Over 150 species of plants that are either indigenous or naturalized in Kerala are used in the Indian system of Medicine like Ayurveda and Sidha. The rural folk and tribal communities make use of about 2,000 species of lesser-known wild plants for various medicinal uses. About 60 to 65% of plants required for Ayurvedic medicine and almost 80% of plants used in Sidha medicine are found in the forests of Kerala.

22.72.2 With respect to medicinal plants, a well planned approach is required for its commercial cultivation and utilization. Presently, organized cultivation in medicinal varieties are lacking in majority of the cultivated medicinal plants. In order to make cultivation profitable the plant should have to be high yielding and its officinal part should contain medicinally active principles in economically acceptable level and should meet the quality standards of the industry.

22.72.3 The use of plant-based medicines is expanding rapidly worldwide and any economic activity relating to the growing of medicinal plants for commercial purpose is bound to be a viable enterprise. The process from plant to pharmacy shelf takes up to 20

years involving their toxicological, pharmacological, and clinical tests and requires heavy capital investments, in the case of modem medicines. Even after these processes, the search for new medicines may not come to fruition in all cases. Medicinal and aromatic plants can be developed as a mean for sustainable economic development, safe and affordable health care and conservation of biodiversity.

22.73 Policy 162: New avenues like contract farming and forest farming are to be explored as sustainable way to ensure the steady and constant supply of quality raw materials for drugs.

22.73.1 It is necessary to initiate systematic cultivation of medicinal plants in order to conserve biodiversity and protect endangered species. In the pharmaceutical industry, where the active medicinal principle cannot be synthesised economically, the product must be obtained from the cultivation of plants. Systematic conservation and large scale cultivation of the concerned medicinal plants are thus of great importance. Efforts are also required to suggest appropriate cropping patterns for the incorporation of these plants into the conventional agricultural and forestry cropping systems. Cultivation of this type of plants could only be promoted if there is a continuous demand for the raw materials.

22.74 Policy 163: In order to initiate systematic cultivation of medicinal and aromatic plants high yielding varieties have to be selected.

22.74.1 In the case of wild plants, their demonstration would require careful development work. Sometimes high yielding varieties have also to be developed by selective breeding or clonal micropropagation. The selected propagation materials have to be distributed to the farmer either through nurseries or seed banks. Systematic cultivation needs specific cultural practices and agronomical requirements. These are species specific and are dependent on soil, water and climatic conditions. Hence research and development work has to be done to formulate Good Agricultural Practices (GAP) which should include proper cultivation techniques, harvesting methods, safe use of fertilizers and pesticides and waste disposal.

22.75 Policy 164: Efforts to develop, use and promote the green technology for a sustainable production system of Medicinal and Aromatic Plants are to be made.

22.75.1 The green technology is more necessary for MAP cultivation because of their use in health care system which requires zero pesticide residue limit to be a safe drug. The success of cultivation of MAP using green technology such as GAP and also success of good quality raw drug supply through implementation of GACP would largely depend on how effective technology transfer system we have to take these developments in to the grassroots level workers such as farmers and collectors. Development of various technology transfer tools will have to be attempted and also demonstrated through organizing training programme for various stakeholders. Attempts will also have to be continued to transfer technologies developed at the KAU and assess their impact by using modern ICT tools.

22.76 Policy 165: Small and marginal farmers will be organised into Self Help Groups and cooperative societies of medicinal plants growers or as producer companies to enable them to take up medicinal plants cultivation

22.76.1 The cultivation of medicinal and aromatic plants is to be done in conjunction with the processing facilities and markets available for medicinal plants. This is to be done in clusters identified by Department of Agriculture through individuals, Self Help Groups, Cooperative Societies of medicinal plants growers. Thus, small and marginal farmers will be organised into Self Help Groups and cooperative societies of medicinal plants growers or as producer companies to enable them to take up medicinal plants cultivation, which presently they are unable to do. Financial assistance and technical guidance will also be provided to them for mobilizing the Growers cooperatives/ Federations as well as for preparation of cluster specific project reports/business plans.

22.77 Policies related to fodder production and fodder crops.

22.77.1 Though livestock sub sector makes significant contribution to the State's economy, it is facing serious constraints due to inadequate fodder base as a result of sharp and continuous decline in the area under livestock-supporting seasonal crops especially paddy and the limited scope for fodder cultivation in the State.

22.77.2 One major problem faced by Kerala is the weak feed and fodder base. With the shift in cropping pattern of Kerala, the area under rice cultivation has come down by more than 50 percent over the last two decades leading to drastic reduction in the availability of straw for feeding cattle. It is estimated that the state produces only 60 per cent of the roughage requirement for cattle in Kerala. As a result roughage in the form of straw is being brought in to the state from adjacent states at an exorbitant rate.

22.77.3 About 18% of total geographic area in Kerala state lays underutilized. Self help groups and other unemployed youths can venture in to production of green grass, legume crops or tree fodders by adopting various silvi pastural systems and sell it to farmers as preserved form or fresh. The required technical know how should be provided to them. Many such endeavors have been known started in many parts of Kerala.

22.78 Policy 166: Increasing fodder production and availability within the state through the intervention of co-operatives, SHGs and FPO's should be explored.

22.78.1 The scope for individual initiative by farmers in fodder cultivation seems rather limited. It is very difficult for the state to enforce strict land utilization laws so as to prevent the decline in the availability of dry fodder. What is more feasible will be to encourage farmers to take up fodder cultivation as a commercial programme with the support of the local bodies who should also incorporate fodder production as one of their major activities in the rural development sector. New varieties like CO3 and KKM1 are found promising for commercial fodder production and marketing.

22.79 Policy 167: The State Government, in collaboration with agricultural universities and research institutes, will be responsible for developing, promoting and extending nutritious and high yielding varieties of fodder species for cultivation on agricultural lands.

22.79.1 Depending upon the need, the varieties with high protein content, palatability, fast growth, high adaptability etc., are to be developed and promoted for the improvement of the small farmers. Rehabilitation and productivity enhancement of degraded forests through silvi-pastoral practices of integrating grasses and fodder trees under the instruments of Joint Forest Management.

22.80 Policies for minor millets promotion.

22.80.1 There are different types of minor millets viz. finger millet, little millet, foxtail millet, proso millet, kodo millet and barnyard millet. Like other cereals, minor millets also supply a significant amount of energy to the body. Millets contain more digestive fiber compared to rice and wheat. This enhances slow release of energy, thereby increasing physical efficiency. Compared to rice and wheat, millets contain higher proportion of minerals. Finger millet contains 30 times more calcium while other millets posses 2 time more calcium than rice and wheat. Little millet and foxtail millets are rich in iron. Thus Minor millets can form a good solution for quality food. Apart from that they can be grown under climatically very stressful conditions.

22.80.2 Despite their nutritional benefits, tolerance for difficult growing conditions, and ease of storage, small millets have consistently been neglected by agricultural policy in the state, which has put the emphasis on cash crops and other cereals.

22.81 Policy 168: There must be programmes to reintroduce minor millets to regions where they were once more popular.

22.81.1 There were regions in Kerala where the cultivation of these crops concentrated. It was recognised that these crops are rich sources of nutrients and capable to fight with climatic changes. Hence the Government should formulate programmes for their reintroduction to the areas where they were grown freely. Newer varieties are also needed for the programme. Value added products from these crops would fetch a high price in the shopping malls of the State and outside.

22.82 Policies for pulses promotion

22.82.1 Kerala produces only a very little portion of pulses required. Pulse productivity in India is a matter of concern and is declining year after year. Pulses are not commonly cultivated in Kerala, whereas it is an inevitable component in Kerala Cuisines. These crops fetches lucrative prices in the market. The pulses required for Kerala comes from nearby states. With a view to putting maximum area under pulse production, introduction of suitable varieties for this region needs to be done. So introduction of pulse crops to non traditional area is of great importance.

22.83 Policy 169: There must be programmes for promoting pulses in the traditional as well as no traditional tracts utilising the paddy fallows.

22.83.1 The pulse crops like red gram, black gram and grain cowpea are cultivated in Kerala in some traditional belts. They are to be intensified and area of the same is to be expanded to other non traditional areas of cultivation utilising the rice fallows of the State.

22.84 Policies related to bee keeping in Kerala

22.84.1 Kerala was contributing major share of honey produced in India till 1990s. There is great potential for beekeeping in the State due to the diversified flora available which is suited to bees. Extensive geographic variation is exhibited by honey bees and there are four species of bees (viz., Apis dorsata, Apis florea, Apis cerana indica and Apis mellifera) in the State. The indigenous species A. c. indica is being utilised for commercial beekeeping. Another promising species, the stingless bee Trigona iridipennis is also being commercialised in the state.

22.84.2 Successful beekeeping depends on the availability of pollen and nectar which are essential for the growth and development of bees. Coconut, is an abundant source of pollen to honeybees which is grown in 9.3 lakh ha. A single inflorescence provides 272 million pollen grains and 12-16 inflorescence bloom in a healthy palm per year. Coconut palm provides pollen through out the year and hence there is no scarcity of pollen to bees. More over, the rubber plant Hevea brasiliensis grown in 5.5 lakh ha is a potential nectar source to bees. Research findings of AICRP on Honey Bees and Pollinators revealed that maximum honey yield per hive was recorded when 10 colonies were placed per hectare in rubber plantations.

22.85 Policy 170: There should be programmes to increase the number of bee hives from the present 6 lakh numbers to 30 lakh numbers in five years.

22.85.1 Considering the floral source there is ample scope for rearing about 55 lakh Indian bee colonies. But there is only about 6 lakh Indian bee colonies at present. There is scope for rearing 49 lakh colonies additionally. Conservation of bee species and encouraging beekeeping will also help bee pollination in various agricultural and horticultural crops which in turn will help in yield enhancement and food security. Hence a policy for increasing the number of bee hives to at least 30 lakhs within five years to be made.

22.86 Policy 171: Bee keeping should be promoted as a vocation for women, youth, marginal farmers and self help groups and the number of bee keepers are to be doubled to two lakhs from the present one lakh and the concept of 'Honey Villages' has to be put in to reality.

22.86.1 At present there are about one lakh beekeepers who adopted apiculture as a main stream job or as a side business/ hobby. The annual honey production in the State is about 6000 tonnes. Large number of unemployed youth, women, self help groups are coming forward to take up the industry through which they can improve their livelihood and attain women empowerment.

22.86.2 Augmentation and conservation of honey bees will definitely be benefited to the farming community by enhancing crop productivity through pollination by bees. In cardamom plantations, honey bees are the sole agent of pollination. Coconut, cashew, coffee, vegetables are other crops benefited by bee assisted pollination which in turn supplement for yield enhancement to a tune of 20-40 per cent. Food security, food diversity and productivity enhancement can be ensured through beekeeping in all the districts. Beekeeping may be considered as an essential component of crop husbandry practices and thus an integral part of agriculture. Hence steps for increasing the number of beekepers in five years should be doubled to two lakhs.

22.87 Policies related to plantation crops

22.87.1 Plantations form a very rich asset of Kerala. The state is identified as attract which gave birth to the concept of plantation industry in the country. Almost 27% of the gross cropped area is still covered by plantation crops. The revenue they generate is billions of rupees per annum. The foreign exchange earned by plantation industry in the last financial year was approximately Rs.60,000 crore and import substitution done by the rubber industry alone works out to about Rs.7,000 crores. This should be viewed in the backdrop of the contribution of the agriculture sector to state GSDP of about Rs.40,000 crores. Evaluation of plantations identifying the Western Ghats area is undertaken by natives but under the pressure of Europeans and today plantations are rated as a dependable source of various types of central and state government taxes providing employment and best livelihood care to the lack of plantation labour.

22.87.2 In a land hungry state like Kerala bringing more land under plough is very difficult to even imagine and plantation crops require ideal environment situation to survive and plantations are really centres where large scale monocropping is practiced and the produce are processed, packed and sent for domestic marketing and export. It was a creation of colonial rule and so had a special stature since it is owned by foreign companies especially British. This kept it aloof from local farming population. Truly plantation comes under the farming sector i.e. crop culture division.

22.88 Policy 172: On no account area under plantations should be used for growing any crop which is not notified before.

22.88.1 A new development approach is urgently required regarding the preservation of plantations. Ecologically and climatologically all the conducive areas for growing plantation crops like tea, coffee, cardamom and now rubber has been brought in the state. Considering the strategic nature of the crops in its management and processing while passing the land reform act Kerala has given a special status to the plantations. In short they are exempted from the land ceiling. In the present context through a policy it must be insisted that in all the cultivable land belonging to the plantations the notified plantation crops should be planted since fresh planting areas are unavailable. On no account it should be used for growing any crop which is not notified before. Since land suited for cultivating the specific crops are unavailable it should not be used even for large scale cattle rearing or tourism or entertainment related centres. This is a must and plantations must be encouraged with soft loans, tax concessions and technology upgradation for the purposes like replanting, water conservation and value added products. Such an approach is necessary since the plant population in most of the estates has even crossed its biological life span. In several estates one could see 100 year old tea bushes still maintained.

22.88.2 Plantations provide great wealth to Kerala not as an agro produce alone it provides employment to several thousand common people and also as a money spinner since different taxes the state and central government are getting several crores of rupees annually. Hence plantation must be treated as a part of agriculture in its real sense and it must be preserved and helped to develop to meet the fast growing needs of the society, trade and exports, all bringing wealth to the state and nation.

22.89 Policy 173: The rate of lease on Government land given for plantation purpose should be scientifically revised in every five years.

22.89.1 The State Government is losing large sums consequent to its failure to revise lease rents on thousands of hectares of revenue and forest lands.

22.89.2 The rates on lease has to be assessed scientifically and revision is needed in every five years. Rules are to be amended using the provision in the Kerala Grants and Leases (Modification of Rights) Act, 1980, that empowers the Government to issue directives to the collectors on fixing the rent.

23. POLICIES FOR LIVESTOCK DEVELOPMENT

23.1 Kerala State is having about 17.5 lakh bovines according to the 2007 census. It would be of the responsibility of the State Government to address each and every animal as an entity and the farmers as the prime stake holder of the developmental programmes of the Animal Husbandry Department. The policies of the Government have to be framed with this objective of considering the animal and its (owner) farmer as equally important if any developmental activity is planned. The following policies is expected to help in achieving this objective in full.

23.2 Policy 174: The farmers of the state would be helped for the improvement of their present resources by assessing the present potential of the livestock status and employing an 'Animal Performance and Control' mechanism to monitor, evaluate and upgrade the livestock population of the State.

23.2.1 For the first time in India, the database of the bovine population of the State would be codified for efficient animal health control and vaccination programmes, proper traceability in the case of outbreaks of trans-boundary diseases, genetic improvement and cross breeding, with the help of modern technologies such as RFID would be formed.

23.2.2 With the present population of livestock, the state could achieve 27.13 lakh tonnes of milk / year, 3.4 lakh tonnes of meat and 170 crore eggs during 2011-12. The requirement of the same during 2011-12 was 33.72 lakh tonnes, 4.95 lakh tonnes and 594 crores of milk, meat and egg respectively. It would be possible to fill up the gap in requirement and production if an authentic database and control over the population is established. The RFID based data identification and retrieval mechanism suggested here would prove to be an effective tool in this regard.

23.2.3 By employing the RFID assisted animal performance, evaluation and control mechanism, it would be possible for a Veterinary Surgeon to identify and monitor the strategic operations including utilisation of a better performing breed to be used more for the cross breeding programmes, provision of timely vaccination and AI, track the movement of animals for ensuring the health, updating of realtime data on the production, etc. It would serve as a baseline for all the developmental initiatives of the State. Moreover, it is possible for the policy makers to address the current situations in a more realistic way.

23.2.4 If the RFID technology is coupled with the Android based applications and Cloud Computing, the field level officers can get the data of the animals in their jurisdiction, with the help of Tab Computers and mobile phones and can act in a time bound manner in the case of disease control, AI, feed advices etc.

23.2.5 So the Government may form the policy of implementing an ICT based 'Animal Performance and Control' mechanism without any further delay as the first step in the improvement of farmers 'animals.

23.3 Policy 175: All the livestock farmers of the state should be provided with 24 hour Veterinary Emergency Assistance Service.

23.3.1 It was estimated that about Rs. 0.5 lakhs is being spent for the production of a high yielding cross bred cow in Kerala. There are instances where the animal or its productivity is lost due the absence of access to veterinary services in time during some critical situations such as difficulty in parturition, mastitis, mineral deficiencies, prolapse of uterus, poisoning etc. It was also found that about Rs. 500 crores is being lost annually due to the difficulty in access to veterinary services in the off hours during these critical situations.

23.3.2 In order to eliminate this huge loss and to protect the farmers' interests, emergency veterinary services on round the clock basis to be provided with the active cooperation of the concerned Local Self Government institutions and the Department of Animal Husbandry.

23.3.3 Mobile Veterinary Clinics may be established in needy places based on animal population to cater to the need for emergency veterinary care. The Government should formulate Veterinary Emergency Assistance Programme (VEAP) at the earliest. The required infrastructure with professional staff may be created and put in place. It is very essential to assure the farmer that his valuable animal will be provided with all the required veterinary health care in case of clinical emergency at his doorstep.

23.4 Policy 176: The farmers of the State would be assured with a livestock population free of all the contagious diseases by universal vaccination and necessary steps would be taken to declare as Animal Disease Free Zone.

23.4.1 Kerala State with its unique geographical position is very conducive for developing as an Animal Disease Free Zone (ADFZ). But the state do not have a perfect database of the animals which are vaccinated against the dreadful contagious diseases. The Animal Disease Control Project (ADCP) will be strengthened to achieve this. If the Animal Registration and Control Mechanism as described in Section 31.2 is employed, it would be possible for individually track and vaccinate the entire animals of the State effectively and the data would be generated in retrievable manner for future use.

23.4.2 Based on this, the Government may chalk out programmes for vaccinating the entire animals, so that the farmers are assured about healthy and good performing animals in their possession.

23.5 Policy 177: The farmers of Kerala are to be provided with yield and sex assured animals as a result of the cross breeding Programme.

23.5.1 Assuring a female calf by the cross breeding was a consistent demand from the farmers of Kerala over years. It would be much more effective if they can be provided with yield assured offspring from the cross breeding programmes.

23.5.2 There are improved technologies in all the developed countries for assuring the yield of offspring as a result of the genomic selection programmes for 'Bull Evaluation' and production of sexed semen. It is possible to assure the farmers the sex of the offspring and its expected yield. This would surely add momentum to the genetic stock improvement.

23.5.3 Kerala is the only state in the country having a structured, operational, self sustainable breeding policy for cross breeding of animals. At present the document is being reviewed every 4 years with the active consultation of the stake holders including farmers.

23.5.4 The animal per day average production has reached 9.02 liters, which is well above the national average. But even after 40 years of operation the outcome is not satisfactory. Hence it can be the accepted policy of the state and have a review every 4 years with department of Animal Husbandry as the custodian of the policy and others like Kerala Veterinary and Animal Sciences University (KVASU), Dairy Development Department, Kerala Livestock Development Board (KLDB), Kerala Co-operative Milk Marketing Federation (KCMMF) and Livestock Farmers as the major stake holders.

23.5.5 Since Kerala is in a commanding position in cross breeding in India it is high time to introduce yield guaranteed sexed semen to achieve a state average production of 15 litres of milk per day and 36 lakh Mt by 2025 and this should be adopted as a policy.

23.5.6 A separate breeding policy should be created and adopted for other food animals like goat, pig and rabbit. The primary objective should be breed conservation, refinement and improvement.

23.6 Policy 178: The low yielding animals of the State must be used as Foster Mothers' for the production of improved breed by the embryo transfer technology.

23.6.1 There are about 5000 numbers of low productive cattle are being produced in the state annually which is an un-avoidable scientific phenomenon in every breeding programme. The farmers in those cases would be put in distress, but they may not sell the cow for slaughtering it. This is a tricky situation where the breeder has to be cautious in protecting the sentiments of the farmer. But the fact is that this accounts for about a loss of Rs. 25 crores per annum.

23.6.2 This massive loss can be very well minimized by the simple and accurate technology of 'embryo transfer' where the low productive cow would be treated as a foster mother who carry the embryo of high yielders which will give an assured performer. The main advantage for this technique is that, the waiting period for the high yielding cow from the low productive cow is apparently nil and thus the sentiments of the farmer towards the cow can also be safe guarded.

23.6.3 For the better development of the offsprings, the 'foster mothers' shall be assured of a nutrient rich feed.

23.7 Policy 179: The farmers of the State may be allowed to rear indigenous and accepted breeds of cattle for conservation purpose with guidelines from the Department of Animal Husbandry.

23.7.1 The State has an accepted and defined breed of local or indigenous cattle 'VECHUR' that can be conserved and a farmer willing to rear the same can be allowed to continue rearing them. The breeds of cattle should be approved by National Bureau of Animal Genetic Resources.

23.7.2 National Bureau of Animal Genetic Resources, Karnal (NBAGR) is the nodal agency for registration of newly identified germplasm of the livestock and poultry of the country. Total number of indigenous breeds registered in the country is 144, which include 37 cattle, 13 buffalo, 23 goat, 39 sheep, 6 for horses& ponies, 8 camel, two pigs, one donkey and 15 chicken species.

23.7.3 State should initiate steps to identify, characterize, define and conserve other native breeds of cattle, goat and poultry if any and put in a mechanism to conserve them with the approval of NBAGR, Karnal.

23.7.4 But at any cost it should not be allowed to be used for cross breeding with the crossbred population of the state. The propagation can be left to the farmer and if necessary the germplasm can be provided. The crossbreeding activity of the indigenous cattle should be carried out under the supervision of a registered Veterinarian only.

23.7.5 The domestic goat alternates as a good source of milk, meat, fibre and skin. Goats contribute to the agrarian economy by offering livelihood security to the marginal farmers, including women. Limited information on the existing diversity in indigenous goat breeds has lead to their underutilization, replacement and dilution through cross breeding. This necessitates conservation, refinement and improvement of the existing breeds such as Malabari, Attappady Black, etc.

23.7.6 Pigs are ideal suppliers of good quality meat. Pigs excel all other meat producing animals except well kept broiler. Three main types of the Indian domesticated pigs have been described by the researchers: Desi, Gahuri and Ankamali, inhabiting northern India, north-eastern India and Kerala province located in southern India respectively. Although the growth rate and feed conversion ratio of native Indian pigs including Ankamali pigs is less than those of the exotic or crossbred pigs, they have unique features such as disease resistance, heat tolerance and ability to produce meat with less fat when compared with exotic breeds.

23.7.7 The aim of this policy is to genetically characterize the Ankamali pigs for the effective utilisation of the resistant genes in the ensuing breeding programmes.

23.7.8 An act should be evolved to restrict the import of animals for breeding from any other part of the country to Kerala. This is to avoid the spread of diseases that are prevalent in other part of the states and not in Kerala. This primarily aimed at preservation of genetic purity of the breeds in Kerala. If any farmer wants to import animals and new breeds the same has only to be permitted by the Director, Department of Animal Husbandry, Govt of Kerala.

23.8 Policy 180: The farmers of the state are to be assured with one calf per year per animal.

23.8.1 Cross bred animals are prone to temporary infertility and 99% of these types of cases can be treated and cured. It is estimated that about Rs. 200 crores per annum is lost due to the infertility of cattle in Kerala. Infertility of bovine is a major problem affecting the farmer's income in a state like Kerala where the animal rearing is playing dual role of income generation and milk production. The present estimates shows that as an average one animal losing one month due to infertility will cause a loss of Rs 8000/ per annum due to loss of production and unproductive feed consumption.

23.8.2 When the animal is found infertile, the farmer will resort to distress sale of his cross bred high producing animal which leads to the loss of germplasm and reduction in the number of high yielding cross bred animals.

23.8.3 Hence a comprehensive fertility management policy for bovines must be put in place. There should be early detection of infertility, treating them with necessary medicines/ drugs/ supplements at free of cost to the farmer. The department of Animal Husbandry should take up modern scientific methods and tools to diagnose and correct such situation thus minimizing loss to farmers. Such activities should be a part of the plan allocation every year in the department.

24. POLICIES RELATED TO ANIMAL NUTRITION

24.1 Nutrition is the foundation of a livestock production system and proper nutrition is imperative for achieving high and sustained livestock productivity. The success of animal reproduction and health programmes rests on proper nutrition. According to FAO, in most developing countries, ruminant animals usually survive on crop residues and natural herbage, which do not provide adequate nutrients for improving productivity. Low quality crop residues are deficient in fermentable nitrogen, carbohydrates and minerals. The productivity of dairy animals in the State is greatly constrained by the lack of green fodder and good quality feed, due mainly to low availability and high cost. Social security and food security is being assured by animal or livestock population. The policies related to animal nutrition are therefore be based on the above facts.

24.2 Policy 181: Every calf born in the state out of cross breeding programme should be guaranteed a well balanced feed to utilise the genetic potential of the calf for converting in to economic value.

24.2.1 Food for animals are of great importance and hence its feed should be assured. The state is composed of cows with a wide range of genetic potential of production. Cows with a higher genetic potential may produce more milk and thus require more nutritional inputs. Generally farmers fail to give feeds meeting these standards of cross bred cows. This can affect the productivity and fertility of the calves resulting in the impaired production of the future generations. Thus nutritional gap not only affects the current production, but also the coming generation which may manifest in the form of loss to farmers in many folds.

24.2.2 Considering these situations, the Government may launch programmes which is aimed at providing assured feed and mineral supplements to all the female calves born in the state as a result of the cross breeding programme.

24.2.3 The cross breeding activities is the state launched is the late 1960's has yielded tangible results. The process has to be made more sustainable by providing healthy and conforming replacement stock for the state animal wealth. The replacement rate is 15-20 % of the total breedable cattle population. Only option available is to produce the replacement stock indigenously.

24.2.4 The value of raw milk produced by the cows of Kerala accounts for about Rs. 7000 crores per annum. In order to maintain this cattle population with an annual replacement of 20%, we need 140000 cows be added to the existing animal in milk. If this is not achieved, there will be drastic fall of animal population which in turn will result in the decreased production. So the population of animals are to be kept in the desired level as mentioned.

24.2.5 It is estimated that there are 14.5 lakh Artificial Insemination during 2011-12 and 4.5 lakh calf births and 2.25 lakh are female calves. Plan should be in place adopt the calf from the date of birth and provide it with

scientific care and feeding to ensure optimum growth and attainment of puberty by at least 14-16 months of age. This will cater to the need of replacement of animals and prevent the drastic reductions in animal population experienced now. All the female cross bred calves born in the state should be adopted under a calf adoption programme

24.2.6 Over the past five years on an average 50,000 are being supplied with balanced compounded feed at subsidised rate. The advantages of this programme are listed as early maturity, early age at first calving, better yield and confirming to one calf a year norm. If an animal attains these parameters it is suppose to contribute to the economy positively. If we adopt all the female calves born in the state (2 lakh numbers) under such programme, the per day increase in milk production will be 20 lakh litters per day. This in turn adds 610 lakh litres annually which will be valued at Rs. 2135 crores.

24.3 Policy 182: Male calf fattening programmes are to be taken up by the Government for assuring nutrition to the male calves and for assuring wholesome meat to the consumers and thereby assuring better returns to the farmers.

24.3.1 Beef is a major source of protein for the population of Kerala. But the definition of Beef and the one available in the market has no connection. The meat of bovine that are specially reared for meat purpose can considered as Beef. Unfortunately the beef available in the market is from Bovines that are otherwise rendered useless due to age and loss of productivity. The meat will have more of fiber rather than soft tissues that can be considered as meat. It is high time we utilize the male calves around 2.5 lakh born in the state. Fatten them to the age of 18 months or till they attain 150 Kgs of body weight and slaughter them for meat. This meat will be wholesome, healthy and tasty. Assistance can be accorded for such ventures to encourage farmers to take up this activity on a commercial basis. Aim should be to produce at least 30% of requirement of meat through this system by adopting the male calf fattening programmes.

24.3.2 The feed for the same has to be sourced locally as far as possible and KVASU should bring out technologies for local feed production and feeding methodologies especially for the male calf fattening programmes.

24.4 Policy 183: The farmers of the state must be assured of getting quality cattle feeds and feed for other classes of livestock.

24.4.1 The production of an animal depends on two major facilities as its breed and feed. The output of right breed with right feed will be optimum. The breed will be taken care of by the breeding policy and the quality of feed is the other major factor that has to be attended to.

24.4.2 There are technical specifications for each class of feed for different class of animals. At present there is no mechanism to check whether the feed available in the market to be purchased by the farmer is having the required quality. Whether there are any malpractices in its manufacture and marketing. There aspects have a direct bearing on the farm output and profitability of the farmer.

24.4.3 The state would promulgate the standards of feed in tune with BIS or GOI specification for feed of each class and put in a mechanism to ascertain the quality of feed marketed in the state. This will check malpractice and cheating and will instil confidence in the minds of the farmer. The Animal Feed Regulatory Authority must be created by the Department of Animal Husbandry. Also there should be a state of the art Laboratory to analyse and certify feed sample that are despatched to the Authority.

24.4.4 The farmer can send feed sample for analysis and also the department can collect such samples and conduct analysis on the same. An act should be formulated on the lines of the national fertilizer and insecticide act 1968 and implement it.

24.5 Policy 184: Fodder cultivation would be promoted on a mission mode on a commercial scale to ensure its availability to the farmers at affordable cost.

24.5.1 The land devoted for fodder cultivation in Kerala is very negligible—only 1% of the cultivable area or 5,395 ha (Government of Kerala, 2011). It is estimated that out of the requirement of 23.2 million (M) t of fodder, only 5.1 M t is produced in Kerala. The only immediate opportunity is to increase productivity per unit area. Raising fodder as an intercrop within existing crop systems can be a common solution to this problem. Though feed and fodder is one of the most important contributing factors for the growth of livestock sector, development of this sector has not received the required level of focus in the past. It is estimated that the 60-70% of total cost in livestock production is due to feed and fodder. Any attempt towards enhancing feed availability and economizing the feed cost would result in increased margin of profits to livestock owners.

24.5.2 Fodder production on commercial basis does not exist in the state in spite of huge demand. At present the requirement of fodder is being met by dry fodder/straw import from other states apart from domestic production. But there is ample scope for fodder production with all the existing constraints i.e. lack of land and other inputs. Fodder cultivation on barren land, cultivable fallow land, lease land, any strip of land that can be used for fodder production and intercropping with any other type of crop especially coconut plantation must be encouraged. Along with assisting an individual, an area based approach has to be adopted, create cluster or group for the purpose in the area, assist them with capital and other resources, produce and market them in needy areas by levying a reasonable profit.

24.5.3 The APCOS and Milk societies should make it as a mandate and make green and dry fodder available for the dairy farmers of the area. NGOS, and SHGS can also play a very active role in this activity. This will enhance fodder production, income generation, and employment and arrest lands lying uncultivated. For lease land farming necessary safeguards should be evolved to assure the landowner that under no circumstances the land will be forfeited /lost. The safe method is to put in a leasing mechanism that will expire automatically after a fixed tenure. The lease deed must be signed between the Govt. Official in his official capacity and land owner. Once this assurance can be guaranteed more and more land will be available for fodder production.

24.5.4 Fodder banks must be created in every Panchayath by utilizing barren land for cultivation and storing them in flesh season as silage or fodder blocks to meet the requirement during lean season. Non consuming producers can be encouraged on commercial scale with financial incentives so that fodder will be available for the needy at affordable cost.

24.6 Policy 185: Area specific mineral mixture for dairy cattle should be formulated and made available to the farmers in order to correct mineral deficiency and effect production enhancement.

24.6.1 Considering the abundant, cheap and locally available ingredients for the production of blocks, the beneficial effects on improving the productivity of animals and the growing demand for the supplement, there is a potential that the technology will attain its sustainability. It has been proven that the block is a handy supplement that can be immediately given to animals in the event of calamities where availability of feeds and grasses for animals are affected. Concerned agencies, both Government and private must work hard together to ensure sustainability. Technology promotion through training and information dissemination should be supported further by the concerned agencies to enhanced its adoption.

25. POLICIES RELATED TO MECHANISATION IN ANIMAL HUSBANDRY & DAIRY

25.1 A governing principle of livestock machinery design has been to create an overall environment that maximizes production efficiency. The overall environment includes thermal, physical and social environment. Thermal environment includes the temperature, humidity, air velocity and radiation surrounding the animals. Physical environment includes the building shelter, pens, floors, bedding, feeders, stalls, cages and waste handling systems that physically constrain the movement of the animals. Social environment includes animal density in a pen or in a building, difference of ages in the same group, and ability to choose companionship and interaction with other animals. It is important to understand the environmental needs of animals when designing facilities and machineries.

25.2 Today's world is after quality food products. The best way to achieve quality assured foods of animal origin is by mechanising it. Moreover, the labour availability is less and costlier, which in turn add to the cost of production can be reduced to a very considerable extent by employing suitable machineries in the animal management and production. This inevitable requirement cannot be met by the resource poor farmers and an intervention from the part of the Government is necessary. So policies of the Government may be aimed at the small scale mechanisation of the resource poor farmers' animal production ventures.

25.3 Policy 186: Portable milking machines should be provided to milkers and farmers for the production of better quality milk in a shorter period and preventing the spread of contagious and managemental diseases.

25.3.1 The milking machine is a nearly automatic machine installation for milking cows. There are two methods of milking a cow: by hand or using a milking machine. When milking a cow, hands may become contaminated with mastitis-causing pathogens. Mastitis is an infection of the breast that can cause pain, swelling, and redness, and makes the milk from the cow unfit to consume.

25.3.2 Milking Machines are extensively in demanded by various dairy farms across the state. Portable Milking Machine Systems are provided with single Milking Machine & double bucket Milking Machines. Small and Medium Dairy Farms can avail these machines in different patterns and specifications to cater to the varied needs of dairy Industry. These Milking Machines help in extraction of milk more effectively.

25.3.3 Milking Machines are Ideal for Small farmers and Medium Dairy farms and it helps to produce better quality milk. With the help of these Portable Milking Machines it is easy for small Dairymen for Milking 8 to 10 cows per hour.

25.4 Policy 187: Chaff cutters are to be provided to farmers for the better utilisation of crop residues and minimising the cost of production.

25.4.1 A chaff cutter is a mechanical device for cutting straw or hay into small pieces before being mixed together with other forage and fed to cattle. This aids the animal's digestion and prevents animals from rejecting any part of their food. Utilisation of chopped fodder will be high when compared with that of un-chopped ones. This will reduce the wastage and

even un palatable crop residues can be converted as useable fodder if chaff cutters are employed. It is estimated that around 400 million tonnes of crop residues are being generated in India. If proper technology is used for converting them to fodder blocks, it will serve as a good source for the cattle population.

25.5 Policy 188: Automatic drinkers are to be established in each and every farm for ensuring production and improving animal health.

25.5.1 Dehydration or inadequate water consumption in dairy cows or cows with calves reduces milk production. Overall health is also affected by improper water intake.

25.5.2 Cattle that are healthy as a result of good nutrition and proper water consumption tend to avoid disease and sickness. Proper minerals and proper amount of water consumption are required for a healthy immune system. The ability for cattle to absorb minerals and nutrients is greatly enhanced with proper water intake. Sickness and disease are avoided with good water nutrition. Without adequate water levels in the body, cattle are at a disadvantage in just about every way. With the introduction of automatic drinkers the State's top mission is to help the farmers to keep the cattle's water consumption at proper levels which in turn adds their income and reduce the risks.

25.6 Policy 189: There must be steps at least to prevent the hoof ailments and accidents happening to cattle in their sheds thereby reducing the veterinary costs and loss of production.

25.6.1 The rubberised floor mat is particularly advantageous in areas where cows spend most of the time, because it reduces the pressure on the hooves and legs. The floor mats have a slip-resistant surface and that provides a rough great friction as a function of movement, provide maximum traction facilitating greatly the movement of cows in the shed. Studies and tests have shown in fact that cows walk faster and slip much less on the rubber floor. 70% of cows walking on concrete floor glide at least slip once, but only 20% slip when walking on the rubber mats.

25.6.2 The rubber mats ensure a drier and cleaner environment for hygiene optimum improves the condition of the hooves and reduces the incidence of mastitis and is easy to install anywhere. The rubber mats, even more than the technical characteristics and peculiarities, practices recognized by farmers met, showed a significant reduction in accidents and veterinary costs.

26. POLICIES FOR QUALITY IMPROVEMENT IN ANIMAL FOOD PRODUCTION

26.1 The bacteriological quality of raw milk at the time of milking in the state is comparable with that in the advanced dairying standards. Subsequently, however, the quality deteriorates due to improper handling of milk and lack of availability of infrastructure like cooling facilities, potable water, regular electric supply and sewage disposal. A holistic approach will be taken to address the issue of clean milk production, which is imperative for marketing and promoting export of dairy products.

26.2 It is essential that all meat-processing operations, whether slaughtering, cutting or further processing, be carried out in a clean area and, as much as possible, that the products be protected from contamination from all sources. When meat-processing operations are carried out within a facility specifically built and maintained for meat processing, sources of contamination can be much more easily and adequately controlled.

26.3 The development of a marketing network and remunerative price support to the producers are great incentives for higher animal productivity and these will be encouraged for all types of livestock products. Even the advanced countries are giving direct and indirect price support to livestock farmers. Priority attention should also be given to improve processing, marketing and transport facilities for livestock products and value addition thereon.

26.4 Policy 190: The potential for milk purchasers to misrepresent the quality of the milk and cheat farmers out of a fair price would be eliminated by the introduction of the Automatic Milk Collection System.

26.4.1 The Automatic Milk Collection System provides several advantages over the traditional manual method which was time taking and due to that the milk got spoiled. The Automatic Milk Collection System speeds up the entire process, thereby reducing the spoilage of milk. Wait time for the farmers decreases from 45 to 10 minutes. Automation of the measurements eliminates the potential for milk purchasers to misrepresent the quality of the milk and cheat farmers out of a fair price. The automated system is more transparent and minimizes the role of the collection agent, reducing the likelihood of mistakes or fraud. Far from just having economic consequences, automation gives freedom to the farmers from the burden of having to fear cheating or corruption in their daily business dealings. Physical transparency and simplicity of the process are the keys to the success of such an endeavour.

26.4.2 Automated system makes entire milk collection process automated. Right from weighing and measuring the fat of the milk to make payments to the farmer and generate analytical reports. All the steps are taken care of in the solution.

26.4.3 Kerala produces about 78 lakh liters of milk a day. Of this about 20% is being collected or procured by Milma and rest is marketed as local sales and as domestic consumption. A dynamic market and transparent transaction will drive the growth of the sector as this will attract more investments and production. The discontent percieved mainly lies with the measure and quality assessment of milk which leads to pricing. More transparency is being expected by the farmer in these transactions. Hence Automatic Milk Collection Units are more an

answer than an increased liability. This will analyze the milk for its quality and will fix the price automatically without any favor or otherwise. The farmer can have the quality and price fixed immediately and can calculate the value of his produce immediately. Technologies have reached a stage where the money due for a farmer will be automatically deposit the money in the bank of his choice.

26.5 Policy 191: The meat sold in Kerala should originate from an approved slaughter house. Cleanliness at slaughter minimises the potential risk to human health, contributes to the production of safe meat, improves the shelf life of the meat, and consumer confidence.

26.5.1 Kerala in spite of having 90% population as non vegetarian don't have any mechanism for clean meat production or any regulation in place. The number of large slaughter houses under organized sector are very less or less than five. It is high time that the Government put in place appropriate mechanisms to inculcate the habit of humane organized slaughter of animals in a scientific and hygienic manner. For this there should be organized slaughter house in Taluk Head Quarters at least and slaughter places in all the local bodies. Such facilities should be supervised by aqualified veterinarian and the mandatory Ante Mortem and Post Mortem examinations should be carried out. The slaughter houses should be established in border areas with other states so that the transport of live animals for slaughter can be restricted and instead wholesome meat can be transported in refrigerated vehicles to the retail outlets. This will meet the twin objective of clean meat production and animal disease prevention and control. Public should be enlightened about the necessities of hygienic meat production and consumption. The slaughter houses and slaughter places should be constructed as per the plans approved by the Department of Animal Husbandry.

26.5.2 The Rules and Acts in place with regard to specification of animals that can be slaughtered should be strictly enforced. Animal transportation norms should be strictly adhered to. Errant transporters should be fined heavily and Department of Animal Husbandry, Department of Motor Vehicles, Home Department and Sale Tax Department should act in unison for this purpose.

27. POLICIES FOR INCREASING PROFITABILITY IN ANIMAL HUSBANDRY

27.1 Livestock related interventions are found to be a successful strategy for poverty alleviation all over the world and large percentage of rural population depend on livestock rearing to earn their livelihood. According FAO, the livestock wealth of India is mostly distributed among the marginal and small landholders, any growth in the sector would be beneficial to the poor people of rural India.

27.2 The existing polices and programmes in the sector are not effective in finding lasting solutions to the persisting problems in this sector. Many a time programmes are planned and executed by officials without necessary grass root level consultation with farmers and their organizations. Animal Husbandry is not granted an equal consideration with agriculture in terms of subsidies and other services from the governmental and banking institutions.

27.3 It is also observed that there is no proportionate return from dairying due to the increased cost of milk production. The cost of milk production has gone up in the state with the escalating cost of cattle feed and fodder. The governmental regulation of the price of milk in the market has also affected the profitability of farmers from dairying. The inadequate governmental support and the emerging adverse grass-root situation in the dairy sector are endangering the livelihood option of the marginal framers.

27.4 Policy 192: The dairy cooperatives and Departments of the Government related to dairy development have to plan programmes to attract youth and sustain the present farmers towards dairy farming and dairy based enterprises.

27.4.1 Now after 30 years the scenario of dairying is changing. Medium and small units are getting a foothold in the sector. The days of single cow or two cow unit are vanishing gradually and medium units with 10-20 cows are taking the space. Hence instead of viewing large unit as more profit making unit, considering their contribution, adequate assistance as incentives should be allocated for such units. They will have a sizable contribution to the sector in terms of production and employment generation especially in the case of youths. But the micro unit should be continued with the maximum assistance that will help to generate livelihood for the farmer. All these are aimed at increasing farmer income, employment generation, livelihood support and increased production. Proper checks and balance have to be put in place to prevent exploitations and environmental degradation while allowing assistance.

27.4.2 When very large enterprises with high end commercial motives are established by the private sector, assistances from the Government in the form of money shall be restricted at its maximum but assuring all the technical support and guidance from the concerned Departments for the establishment.

27.5 Policy 193: A good incentive plan recognizes that individuals can make a real difference in the operation and its profitability.

27.5.1 The present planning process involves providing assistance to a farmer as financially supporting him which has no linkage to the production of any produce. But it could be borne in mind that any assistance disbursed to an individual should result in commensurate increase in production. This can be better achieved by making effective changes in the present way of assessing and the selection of a beneficiary. In the new method the sole criterion will be the production potential of the person associated. His/her eligibility is the assets he/she has put to increase productions. Fix a rate of incentive/unit of productions for any commodity and release the assistance on assessing the quantum produced. This will increase the income of the farmer and will result in concomitant increased production. There should be a fool proof procedure or mechanism and should be neutral and unchallengeable / undisputable. The assistance should be paid in cash to the bank account of individual through e-payment as described in the Section14 of the Agricultural Development Policy and should be released prudently without any hardships to the beneficiary.

27.6 Policy 194: Since the farm sector aims at food security of the state, there must be an immediate end to the "division" of people on the lines of below poverty line (BPL) and above poverty line (APL) for receiving the financial assistances in the Animal Husbandry sector.

27.6.1 Production of any commodity whether produced by APL/BPL category is going to be pooled with the main pool to assess the production increase. Hence the mere reason that APL individual has more resources, the production need not be viewed as different from that of BPL individual and equal opportunities need be allowed to all participating in the process. One restriction that can be put in place is that no BPL applicant should be left out before selecting an individual from the APL category. This is to ensure that all BPL are included in the fold and adequately assisted. No change in rate for two different categories of farmers.

27.7 Policy 195: Input allocation plans of the Animal Husbandry sector must be in line with the holding capacity of the locality so as to develop a sustainable strategy for 'zonation of inputs'.

27.7.1 The geographical area of the state is now divided or classified into different Agro climatic Zones and develop projects/schemes suitable to that area. The concept of everything to all should be done away with. The inputs for one area or an enterprise for one area may not suit well for the rest of the area and unsuitable areas should be avoided for such enterprise. Such left out areas should be supplemented with projects that can thrive well in that zone. This will avoid wastage of resources and effort and will help to augment productions and improve efficiency and profitability.

27.8 Policy 196: The present method of calculation of loss in the event of a natural calamity like flood, landslip, lightning, drought, disease outbreak, manmade disaster should be modified in such a way that the farmer gets the real value / market value as compensation rather than a token amount.

27.8.1 The aim of providing compensation is to develop an alternative/ replacement for the asset he has lost and that will support him to earn his livelihood. The disbursal should also be speedy and the bureaucratic processing should be hastened.

27.9 Policy 197: Financial assistance for feeding is necessary to bring down the cost of production and improving the profit of the farmers.

27.9.1 Dairying in Kerala is 75 % under intensive system and 25 % under semi intensive system. Intensive system requires the entire feeding expenses like concentrate and roughage to be fed to the animal by the owner. This in turn constitutes to 80% of the cost of production. Spiralling cost of concentrates is a matter of major concern for the farmer. The cost of the same was hiked by 35 % recently and without proportional increase is the procurement cost of milk. This has reduced the already narrow gap between cost of production and procurement resulting in low profitability. The matter should be urgently addressed by evolving a mechanism to subsidize the cost of concentrate by making available the concentrate feed through rationing apparatus. The quantity due for a farmer can be decided based on the number of heads of cattle he rears or the volume of production he contributes. There can be cap on the total subsidy a farmer can be entitled in this regard for year. The amount of subsidy thus applicable for a farmer can be transferred to his/ her Bank Account through e-payment as per the Section 14 of the Agriculture Development Policy.

27.10 Policy 198: An advisory and technical Committee at Local Self Government level should be constituted for increasing the profitability of different enterprises connected with animal husbandry and assuring better returns to farmers.

27.10.1 Animal production system, efficiency, market and cost of production varies from area to area. Hence as a uniform pattern of planning cannot be taken up, the local body being the smallest administrative set up has been chosen as a unit for evolving a mode of evaluation and assessment of quantum of production and market.

27.10.2 The present system of carpet subsidy can be replaced with production linked incentive. The contribution of each farmer is quantified and based on that the subsidy or incentive will be decided. In order to fix the quantum of production it is necessary that a Panchayat / Local body level committee be formed. The President/ Chairman/ Mayor/ Head of the local body will be the Chairman. Two standing committee chairpersons can be its member. The veterinary / Senior Veterinary Surgeon will be the convener and 5 farmer representatives will also be the members. The farmer representatives should be real farmers having any one of the milk, meat or egg producer type venture. 6 of this 3 can be from dairy, 1 each from goat/ pig/ rabbit producer and on egg producing farmer.

27.10.3 There should be minimum 3 women apart from the convener even if women. This committee will collect the details of farmer. Collate the production and quantify than and decide the incentive due to the farmer. The method of quantification can be based on

technical data and received as and when necessary. This committee can also take up marketing of the produce and can fix price of the commodities to be marketed through them.

27.10.4 The production data arrived at by the committee should form the basis quantification and disbursal of incentives to the farmer. Any kind of malpractice brought to be notice of the committee by any farmer should be corrected forthwith and ensure smooth functioning of the system.

27.11 Policy 199: Pricing of milk is to be done in a more scientific manner that the farmers should receive remuneration well above the cost of production.

27.11.1 Milk production in the state is being managed by small holder units. The animals are being maintained under intensive system which needs 100 % hand feeding. The feeding consists of two parts as concentrate and roughage. The compound feed or concentrate price varies frequently based on the price of ingredients. Also roughage cost varies with time and transportation cost. Hence it is mandatory that cost of production of milk be calculated at least once in a year based on an approved methodology and published after required consultation with stake holders. The procurement price should be fixed based on this cost of production. The procurement price needs to be fixed considering the cost of production and the market potential. However, maximum efforts should be taken to ensure a procurement price covering the cost of production.

27.11.2 Procurement process should be made more transparent and automation will be completed within 5 years in a phased manner.

28. POLICIES RELATED WITH DAIRYING

28.1 India is the world's largest milk producer with a total production of 128 million tonnes of milk. Kerala has marked tremendous growth in milk production with an average annual growth rate of 5% against all India growth rate 4.4%. In the previous year Kerala produced 27.13 lakhs MT milk.

28.2 It is estimated that about 7 lakhs dairy farmers working under this sector. But only 15 to 16% of milk is collected from 3 lakhs farmers through dairy co-operative Societies in Kerala, and the rest is handled by this unorganised dairy farmers. The per capita availability of milk in the state is 210 gm against the per capita availability of 281 gm in India. Since milk is a balanced diet, its production has to be enhanced. At the same time the quality of the product should be maintained with the standard prescribed by the authority.

28.3 Compared to other states of India land availability is much less in Kerala. So the total production of roughage in Kerala meet only 60% of the total requirement. The land availability, depletion of organic manure resources and degradation of surface soil due to erosion, non availability of crop residue . added the situation worse. So special focus has been given for adequate roughage for cattle in Kerala to overcome this situation. Even though cattle population in Kerala shows a decreasing trend due to the high productivity of milch animal state can achieve self sufficiency in milk production.

28.4 The State produces 78 lakhs liters of milk and has a shortage of 7 lakhs liters /day. Our immediate goal is to achieve self sufficiency in milk production and thereafter production shall be export oriented.

28.5 Dairy co-operative societies and the local self government can play vital role in maintaining animal population. Farmers are promoted to cultivate new verities of fodder crops ie perennial fodder and fodder tree crop and more of the farmers are taken up fodder cultivation. But availability and sustainability of this crop of fodder is dependant on drought and flood. Entrepreneurs to take up fodder cultivation have been come forwarded to cultivate fodder on massive scale. Priority should be given to cultivate plants and fodder trees which is suited to human and animal to meet food security. We need a rigid policy to achieve self sufficiency in milk production and animal feed security for cattle population. since Dairy sector gives more self employment opportunity the following points should be taken in account to protect this sector.

28.6 Policy 200: Provision for loans to dairy farmers for purchase of animals considering it as a farming activity.

28.6.1 Dairy farming is an agricultural based activity where very poor farmers are involved. At present the Bankers, (nationalized) private & co-operatives give loans to Dairy farmers for purchase of cow for interest rate between 13%-17% per annum. Dairying is an activity which provides only meagre profit. It is also highly risky, since live stocks are involved the loan is associated an amount of insurance

premium also. The Government and the Bankers usually give priority for agriculture and sanction agricultural loan and crop loans at lower interest rates between 3% to 8%. Dairying should also be included as a priority sector in this regard.

28.6.2 Dairy farmers should also be given interest subsidy by Government so that more farmers make a livelihood out of dairy farming, bringing more farmers into this enterprise.

28.7 Policy 201: Electricity on reduced rate than the industrial tariff should be provided to milk co-operative societies for chilling of milk.

28.7.1 India even though is the largest milk producer in the world , Our milk products are not acceptable in the foreign markets because of the quality constraints. Milk is an agricultural produce which is highly perishable. It is necessary that milk shall be preserved as soon as it is produced. Hence it is essential that chilling facility shall be provided at the milk society level, which procures a minimum of 500-1000 litres of milk per day. It is also essential to provide chilling facility at milk society level on the health point of view of the citizens, particularly children. The profit margin for the milk co-operatives is meagre and hence it is necessary to provided low cost electricity to the milk co-operatives for preserving the milk produced by farmers. Hence electricity shall be supplied to milk co-operatives at lower rates for the chilling units only under the tariff - electricity for agricultural purposes.

28.8 Policy 202: Providing Insurance coverage to all dairy farmers and their milch animals

28.8.1 Dairy farmers keeping crossbred cows which are susceptible to various diseases due to low resistance power. Health care causes high financial loss to the Dairy Farmer. In addition to his poverty he has to bear additional burden for this. In order to safe guard from this threat he must be provided by social security schemes. So it is required that the diary farmers pouring milk to dairy co-operative societies shall be insured along with their animals.

28.9 Policy 203: Utilisation of unutilised land under Local Self Government for fodder cultivation

28.9.1 The economic viability of a dairy farming largely depends on the availability of fodder grass. The Cost or production of milk in Kerala ranges from 50 to 60%. Kerala produces only 60% of the roughage required for cattle feeding. The land availability is the major problem in the cultivation of fodder grass. For a healthy sustainable agriculture it is advisable that at least 5% of the total cultivatable land is spared for fodder cultivation where as in Kerala it is less than 2%. So to reduce the feed cost of the animal, the available cultivable and unutilized land with the State and Local self government should be utilized for fodder cultivation as intercrop by individual farmers /self help group. The procurement and marketing of these produce can be done by milk societies or through Kudumbasree units.

28.10 Policy 204: Providing production incentives to dairy farmers on every litres of milk produced

28.10.1 Because of the high cost of production of milk and milk products state Government provides incentives to dairy farmers for every litre of milk produced. But till now no incentives are given to dairy farmers in Kerala . Compared to other states the cost of production of milk in Kerala is much costlier, like other state our state also should provide adequate incentive to dairy farmers for every litre of milk they produced. At least 10 % of the cost of production of milk as incentive shall be allowed to dairy farmers who pour milk at the primary co-operative societies. This will be much more helpful than increasing the milk price which in turn helps the consumers also.

28.11 Policy 205: An appeal committee with experts from Dairy Development Animal Husbandry and pollution control board shall be constituted to dispose of disputes regarding License and Pollution Certificate for Dairy Farming

28.11.1The rearing of more than five cattle is stated as 'HAZARDOUS JOB' in building act. Farmers require license from the local self Government and as per pollution Control Act certificate from the pollution control Board is also required. Because of this reasons farmers are facing difficulties to continue the job. An appeal committee with experts from Dairy Development Animal Husbandry and pollution control board shall be constituted to dispose of such disputes. Biogas plants can do a better option for the waste disposal. Various schemes for helping farmers to protect them from these acts are essential. And to reduce the dispute which may occur due to the provisions of these acts it is recommended that each local body shall constitute an appeal committee for the disposal of such disputes.

28.12 Policy 206: Enhancement of cattle feed subsidy rate to 25% of cattle feed cost

28.12.1Since cost of concentrate feed is increasing day by day due to high cost of ingredients department have taken up to give cattle feed assistance to those farmers who are pouring milk to dairy society at the rate of Rs. 0.80 for1 litre of milk poured and one kilogram of cattle feed purchased . Tthis ceiling should be removed and subsidy shall be raised to at least 25% of the cost of cattle feed.

28.13 Policy 207: Provision for financial assistance to dairy co-operatives for running milk chilling plant/Bulk Milk Coolers.

28.13.1 Milk is a highly perishable farm produce and it is the need of the dairies to make the milk produced to reach the consumers safely. It is necessary that milk shall be preserved as soon as it is produced to avoid spoilage and loss to producers and producer co-operatives. Bulk milk coolers shall be installed at milk co-operatives handling more than 500 litres of milk per day. A financial assistance is to be given to those milk co-operatives handling more than 500 liters of milk per day.

28.14 Policy 208: Strengthening of Dairy Advisory Services and Restructuring of Dairy Department

28.14.1 Dairy Sector is undergoing rapid change and our state may reach self-sufficiency in milk production soon. Also the milk shall reach our consumers with nutritional standards and safety in health point of view. For this awareness among the farmers for safe milk shall be created and also three axis pricing policy has to be introduced to reach the international standard in milk production. To improve milk production in the state and improve the quality of milk to international level it is necessary to strengthen the dairy advisory service. More field leve officers may be appointed and thus the dairy department shall be reconstructed and more extension services shall be established in Panchayats, to increase employment oppourtunity and milk production.

28.14.2 In the dairy sector the farming activity is mostly women oriented. But hardly any women come out for training or organizing good scientific knowledge about dairy farming. Hence a women dairy promoter if provided at each village /Panchayat level, it would be useful and may disseminate scientific knowledge through extension service. Every potential dairy Panchayat shall be provided with a woman dairy promoter.

28.15 Policy 209: Farmers having up to five animals and farmers who market the milk through dairy co-operatives which is registered under co-operative law shall be exempted from the registration under Food Safety and Standards Acts

28.15.1 It is essential to protect the citizens as consumers of milk. At the same time the interest of the diary farmers and the primary milk co-operatives shall be protected. Under this central act every milk co-operative shall register or to take license. It is recommended that farmers having up to five animals and farmers who market the milk through dairy co-operatives which is registered under co-operative law shall be exempted from this registration.

28.15.2 The milk co-operative shall be given financial assistance for renewing the society premises conforming to food safety requirements. The milk co-operatives shall be given financial assistance to make the society and the premises to conform to the food safety requirements.

28.16 Policy 210: Every Primary school children upt o 5th standard shall be provided with a glass of (200 ml) of milk daily on schooldays.

28.16.1 Maximum physical and mental growth of children occurs at the age of up to 12 years. Poor children studying at the Government schools and aided schools may not have balanced diet at their home. But they are the future of our country and therefore, their health is the concern of the Government. Hence financial provision shall be made to supply 200 ml of pasteurized /boiled milk to each child in Government and aided schools up to 5th standard through local dairy cooperatives. The quality shall be ensured by the dairy department officials of the respective area.

28.17 Policy 211: Where ever possible new cooperative can be registered thereby more farmers can be promoted to take up dairying.

28.17.1 For collecting surplus milk produced in the rural areas is procured by the functioning primary cooperative society and sent to dairies for processing and marketing of milk and milk product. By strengthening all the co-operative society and good quality milk can be collected by proper guidance. Where ever possible new cooperative can be registered thereby more farmers can be promoted to take up dairying.

28.18 Policy 212: Crossbred calves born out of AI Program shall be purchased and brought up by selected farmers or a milk co-operative societies in the area under the heifer parks in every Block.

28.18.1 Ensuring enough milch animal required for milk production is one of the main criteria since calves are butchered for meet purpose.

Cost of rearing a high yielding calf into a full grown cow is a very high and farmers usually cull out the calves born out of Artificial Insemination (AI) programme in of the state often meet vendors. Hence it is advisable that crossbred calves born out of AI Program shall be purchased and brought up by selected farmers or a milk co-operative societies in the area under the heifer park. So that high yielding crossbred cows are available for maintaining milk production in the state. Cattle feed and green fodder shall be made available to the owner of the park at subsidized cost. And other amenities will also be provided. Such parks shall be started at least in every potential Grama Panchayat or Block Panchayat.

29. POLICIES FOR POULTRY DEVELOPMENT

29.1 Kerala consumes about 2.4 lakh tonnes of poultry meat every year. This alone makes for a market of Rs 3,360 crore in size. Internal production is just 90,000 tonnes, which necessitates the dependence on outside sources.

29.2 The market for eggs is estimated to be about Rs 1,800 crore. Poultry meat and eggs make for a massive annual demand of Rs 5,400 crore. Lion share of this is going outside the state.

29.3 The requirement of egg and its production are become wider and only about 28% of the egg required in the state is being produced domestically through backyard / free range system. This system of poultry production is not at all suitable as the fast urbanization and shrinkage of percapita land availability in the state are concerned. Hence alternative systems of egg production have to be adopted. Empowering the small farmers with micro cage layer system whereby small number of birds can be reared by them in prefabricated metal cages, through intensive rearing and the egg collected, branded and marketed.

29.4 All these operations can also be carried out through units of women joint liability groups with adequate marketing facilities. The costly inputs such as feed has to be sourced locally for bringing down the cost of production as well as for adopting good rearing practices. For this purpose the Amul model procurement and distribution outlets as described in the Section... of the Agricultural policy can be replicated.

29.5 Policy 213: Kerala needs an action plan combining homestead and commercial production to achieve self-sufficiency in eggs.

29.5.1 Kerala was self sufficient in egg production in the 1970s. We were exporting eggs to other regions including New Delhi. Kottarakara and Chengannur railway stations were famous as egg exporting stations. At that time, Kerala was a role model for the country in low-cost egg production through backyard rearing.

29.5.2 The annual internal production of eggs in the State was 150.02 crore against a demand of 450 crore. The balance eggs are sourced from neighbouring States, especially Tamil Nadu.

29.5.3 There is a need to take up specific rural backyard poultry production programs to meet the requirements of the rural consumers while constituting a source of subsistence income as a subsidiary occupation by taking up coloured bird units ranging from 40-50 birds per family in their backyards in micro cage layer system. Such units require very little hand feeding and can give a fairly handsome return. Within a span of three years the existing backyard poultry system will be replaced with high input technology birds in micro-cage layer system.

29.6 Policy 214: Considering the fact that demand for chicken meat registers 40 to 45% growth across the state annually, broiler farming can be a main source of family income or can provide subsidiary income and gainful employment to farmers throughout the year.

29.6.1 Poultry meat is an important source of high quality proteins, minerals and vitamins to balance the human diet. Specially developed varieties of chicken (eg. hybrid broilers) are now available with the traits of quick growth and high feed conversion efficiency. Depending on the farm size, broiler farming can be a main source of family income or can provide subsidiary income and gainful employment to farmers throughout the year.

29.6.2 The state Government has to formulate different schemes under the Department of Animal Husbandry and KEPCo for supporting the farmers in the areas of construction of broiler sheds and purchase of equipments, cost of one day old chicks, feed, medicine and labour cost for the first cycle. Cost towards land development, fencing, water and electricity, godowns, transport vehicles, broiler dressing, processing and cold storage facilities can also be considered for providing financial assistance. Cost of land is to be excluded from the financial assistance programmes. However, if any Government land is available and found suitable for farming, that should be leased only to the JLGs formed by the approved SHGs of the Department.

29.6.3 Internal production of broiler poultry is to be addressed in a priority basis by the state Government to assure quality meat to the people of Kerala and also to assist the farmers in the state to raise their income.

29.7 Policy 215: Promote and propagate farming of diversified poultry species through technological development for their sustainable and profitable production.

29.7.1 The prevailing socio-agro-economic scenario of the State calls for some kind of cafeteria approach for poultry production; scientists should develop and offer a broad spectrum of poultry alternatives to meet the different local requirements. The availability of such diversification possibilities would maximize the returns from a given level of inputs and also minimize the risks and hazards to the environment. In this context, importance of alternate poultry species is being rediscovered. Production of alternate poultry may never rise enough to compete with commercial chicken, but these birds could become a significant source of food for the masses and also a source for substantial supplement income.

29.7.2 The traditionally raised guinea fowl and turkey ensure reasonable returns at insignificant cash inputs, while quail production is a distinct diversification offer. Intimate understanding of the basics of domestication; disease control, nutrition and genetics has helped farm production of these avian species.

29.7.3 Such types of interventions require promotion from the part of the Government in empowering the small farmer.

29.8 Policy 216: Entry tax should be levied on imports and domestic production be exempted for broiler chicken .

29.8.1 In order to boost up production of internal broiler poultry, there must be regulatory mechanism for the birds which are coming from outside the state and the domestic production shall be exempted from taxes.

29.9 Policy 217: Turnover tax per broiler chicken farmer of the state may be fixed at Rs. 10 lakhs per annum.

29.9.1 Due to the high cost of inputs, the margin realised by the broiler farmers are at a decreasing trend. Hence the turn over tax per farmer shall be raised to Rs.10.00 lakhs per annum. Only turn over of above Rs. 10.00 lakhs has to be put under tax regime.

29.10 Policy 218: Considering broiler farming as an agricultural activity, the electricity rate shall be fixed at agricultural tariff.

29.10.1 In order to reduce the cost of production, the most needy input of power is to be provided at a cheaper rate. Now the KSEB has lifted the concession, raising the tariff nearly four times which is not affordable by the poultry farmers. Fears are there as expressed by them that the neighbouring states would bring birds produced at a cheaper rate than Kerala which would ruin the existing farmers' livelihood.

30. POLICIES RELATED TO SEEDS AND PLANTING MATERIALS

30.1 Seed is the most important determinant of agricultural production potential, on which the efficacy of other agriculture inputs is dependent. Seeds of appropriate characteristics are required to meet the demand of diverse agro-climatic conditions and intensive cropping systems. Sustained increase in agriculture production and productivity is dependent, to a large extent, on development of new and improved varieties of crops and an efficient system for timely supply of quality seeds to farmers.

30.2 It has become evident that in order to achieve the food production targets of the future, a major effort will be required to enhance the seed replacement rates of various crops. This would require a major increase in the production of quality seeds.

30.3 This seed policy deals with issues surrounding the quality of seed and vegetative planting material, whether be it agricultural, ornamental or for forestry. It focuses on the development and implementation of seed programmes in order to avail adequate high quality seed and planting material to the farming community. The policy underscores the principle that both the private and public sector offer invaluable potential to accelerate development within the agricultural and forestry sectors. It is geared towards achieving increased agricultural productivity, food security and assured production through good governance, transparency and accountability. All these issues are spelt out in the context of the national development objectives. The primary objective is to enhance availability of good quality seed and thereby ensure household food security.

30.4 To meet the State's food security needs, it is important to make available to the farmers a wide range of seeds of superior quality, in adequate quantity on a timely basis. Public Sector Seed Institutions like KSSDA, VFPCK, University seed production farms and Departmental Farms will be encouraged to enhance production of seed towards meeting the objective of food and nutritional security.

30.5 Policy 219: The Government has to ensure that Quality Declared Planting Materials (QDPMs) are produced and sold to farmers and treated as a right of farmers.

30.5.1 Ensuring that farmers have timely access to seed and planting material of good quality is one of the most important elements of successful agricultural production and development. Despite this reality, seed and planting material available to small-scale farmers in the state is often of insufficient quality, which undermines potential yield and performance of crop production.

30.5.2 The Seeds Act was enacted in 1966 to ensure that farmers get good quality seeds. Quality is ensured through variety development. Seed legislation provides notification of varieties/kinds of crops, certification, labelling of seeds, seed testing; and the Seeds (Control) Order, provides

licensing of dealers, display of stock etc. It must be ensured by the Government that the seeds and planting materials supplied in the state conforms to the provisions in the Seeds Act to ensure quality.

30.5.3 The Ministry of Civil Supplies through an order dated 24 February 1983 had declared the seed for sowing or planting of food crops, fruits, vegetables, cattle fodder and jute to be essential commodities in exercise of power conferred by Section 2(a)(viii) of Essential Commodities Act, 1955. It was followed by the issue of Seeds (Control) Order dated 30 December 1983 by the Ministry of Agriculture, Department of Agriculture and Co-operation in exercise of powers contained in Section 3 of Essential Commodities Act which deals with Central Government's power to control and regulate production, supply and distribution of essential commodities.

30.5.4 Utilising the provisions of these laws or by making necessary legal provisions in the State Government laws, the Government has to assure QDPMs to farmers.

30.5.5 In order to enhance the availability of quality seed and planting material, the system has to ensure that the non-performers in the chain of activities be eliminated, or help their better performance through inputs such as awareness and training.

30.6 Policy 220: The planting materials including seeds produced and distributed by the Department of Agriculture, PSUs and other Government agencies shall bear bar-coded tags for assuring the quality and traceability.

30.6.1 Bar coded tags are used for data retrieval for ensuring the parentage and accountability. The data regarding the procurement of parent material, production details including the farm, the officials responsible etc can be traced back at any point of its life if the tag is available with the farmer.

30.6.2 Necessary steps are to be taken to launch a new software for meeting this objective in the Departmental Farms for issuing bar coded labels for assuring the quality and for accountability.

30.7 Policy 221: High-tech nurseries for the production of quality planting material are needed in large numbers and standards for different planting materials needs to be put in place.

30.7.1 High tech nursery is a combination of poly green house and agrinet house. Vegetative reproduction is used in such nurseries to ensure genetic similarities with the source. High tech nurseries over come the limitations like poor control over climatic factors, low germination percentage, longer duration, and high cost involved in conventional methods of plant raising.

30.8 Policy 222: It is important to produce quality planting material of pepper, banana and ornamental crops through clonal multiplication and in vitro micro-propagation. Sensitive diagnostic assays such as ELISA and PCR for indexing and certification of clonally propagated and tissueculture plants have to be used.

30.8.1 Clonal propagation has long been used by man, mainly for multiplying most tuber-bearing plants. Moreover, fruit trees, ornamental plants and many flowers are propagated from cuttings or scions. Although clonal propagation is traditionally used for plant multiplication, new techniques are now available (including tissue culture) that take recent findings on fundamental mechanisms involved in plant embryogenesis and organogenesis into account.

30.8.2 Clonal propagation has been greatly improved through in vitro culture, which allows massive multiplication of plants and eradication of viruses by meristem culture. Moreover, somatic embryogenesis can be induced for rapid multiplication of many species.

30.8.3 It is now possible to manage different plant multiplication strategies through sexual or vegetative reproduction. Clonal propagation can thus be obtained by the production of artificial or natural seeds through somatic embryogenesis and apomixis, respectively. These tools offer new opportunities for improving crop plants and accelerating the release and dissemination of improved genotypes.

30.8.4 The banana viruses primarily spread through the use of infected suckers but the secondary spread also occurs through aphid vectors. Field spread is much faster if virus free suckers are not used as initial planting material. An annual loss of about Rs. 40 million has been reported due to banana viral attacks in the Kerala state alone. So the clonally propagated materials are to be certified by ELISA and PCR methods as virus free.

30.9 Policy 223: The production of quality seed of major vegetable crops and seed spices should be given priority in collaboration with ICAR Institution, SAU's and PSUs of vegetable seed industry.

30.9.1 The vegetable seed production programme envisages to produce genetically pure quality seeds and to store them in a viable condition for a reasonable period of time, until it reaches the farmers. The seeds should have genetic purity, uniformity in size and shape, high germination and vigour. The seeds should be free from mechanical damages, insect and fungal infestation and other crop and weed seeds.

30.9.2 Promising varieties of seed spices and aromatic plants acceptable to the region alone are to be considered for large scale multiplication.

30.9.3 Many at times, the farmers obtain seeds from the private industry by paying exorbitant prices. This is mainly due to the failure of the Public Sector institutions in providing the same material at a low cost. This has to be addressed at the earliest.

30.10 Policy 224: The certification of quality seed based on quality parameter should also be needed to advocate to progressive vegetable growers and farmers engaged in production of vegetable crops and seed spices. There is need to promote such farmers/vegetable growers for quality seed production.

30.10.1 The additional income earned through seed production helping the farmers to start other enterprises like bee keeping, vermicomposting and dairy farming and opening avenues for further development of farming community.

30.11 Policy 225: Crop to crop seed quality control systems should be designed and established and Seed coating and pelleting are essentially required to protect the seeds from various diseases and pests as well as to enhance germination.

30.11.1 Many disease problems in a seed operation can be traced indirectly and sometimes directly to purchased seed. This is especially true with bacterial ring rot, although leaf roll and mosaic viruses are also frequently problems in purchased seed.

30.11.2 One of the factors that cause reduction in germination percentage and seedling establishment, is seed disease. It's possible to control these diseases by treating the seed before planting it. Coating the seed with pesticides, is one of the ways to gain this goal. Seed coating is a technique in which several material as fertilizers, nutritional elements, moisture attractive or repulsive agents, plant growth regulators, rhizobium inocolum, chemical & pesticide etc, add to seed by adhesive agents and cause to increase seed performance and germination. Seed coating, leads to increase benefits in seed industry, because seeds can use all of their genetic vigor

30.11.3 Seeds have to be pretreated with a coating of bio-pesticide preferably. This coating will help prevent the seed from rotting in the soil before germination and help protect the emerging seedling from a harmful "damping off" pathogen that girdles and kills young plants shortly after they emerge.

30.12 Policy 226: Varieties/hybrids should be developed for protected cultivation and protected production of seeds and planting materials should be standardized.

30.12.1 Important aspect of protected cultivation is crop production technology which involves development of high-yielding varieties and hybrids of crops suitable for protected cultivation. This aspect has not yet been given due attention in the state. The research system is to attend to it urgently and seriously in order to provide crop hybrids/varieties bred indigenously for protected cultivation. This will not only save foreign exchange being spent on import of large quantity of seeds of hybrids and varieties for protected cultivation but open up avenues for foreign exchange earnings by exporting seeds meant for it. Besides, development of varieties, the production protocol for protected cultivation is different than that practised for open field production.

30.13 Policy 227: Nurseries growing and producing notified varieties should be exempted from taxes.

30.13.1 In order to provide seeds to farmers at a lower price, the nurseries dealing with notified varieties are to be exempted from Value Added Tax (VAT).

30.14 Policy 228: Large scale integration of conventional and innovative techniques of micro-propagation, aeroponics, etc is the need of hour to step up production of disease free planting material.

30.14.1 Tissue culture is one of the important new methods of plant propagation available to growers. The use of tissue culture technique in seed production has resulted into mass production of plants in a very short period of time.

30.14.2 Aeroponics is the process of growing plants in an air or mist environment without the use of soil or an aggregate media. Aeroponics method of propagation is one of the most rapid methods of seed multiplication. Using aeroponics for cloning improves root growth, survival rate, growth rate and maturation time.

30.15 Policy 229: For better disease diagnostics in vegetatively propagated crops, cheaper alternative technologies in place of expensive chemicals should be developed. Production of cheaper diagnostic kits for use at farmers' level is the requirement of the day

30.15.1 Lab tests are available for most plant pathogens. Tissue isolations are commonly used to detect fungal and bacterial plant pathogens. The planting materials received at farmers fields are to be tested for quality in terms of disease freeness. So low cost, user friendly technologies for testing the same are to be popularised.

30.16 Policy 230: Tissue culture should not become a tool for spreading of diseases, and due care and regulations need to be in place. Cost effectiveness of tissue culture plants needs focus of attention.

30.16.1 Plant Tissue Culture Technology offers great promise for the production of quality planting material on account of disease free and true to type plants produced through micropropagation techniques. The need for a certification programme for the tissue culture plants is imperative since inadvertent micropropagation of virus infected plants will not only result in its poor performance, but also in undesirable spread of viruses wherever such plants are grown. Also, failure to use prescribed standard protocols will result in variations in the plants produced. The most deleterious variants in tissue culture raised plants are those that effect yield, genetic fidelity and carry infection of viruses, and other fastidious pathogens, which are difficult to diagnose. This is an area of great concern, and requires a well-structured system be put in place to provide support to the tissue culture industry for the commercialization of tested virus free and high quality planting material.

30.17 Policy 231: There is need to develop reproducible and efficient protocols for recalcitrant plant species such as mango, cashew, and coconut.

30.17.1 Mango seems to be difficult plant material with respect to tissue culture response. The main problem in tissue culture of mango is the development of axenic cultures , phenol leaching , browning of tissue explant , poor conversion rate of somatic embryoids and poor shoot and root development. Various groups have demonstrated in vitro regeneration of mango through nucellar embryogenesis. However, field establishment of micropropagated plants of mango has not been successful.

30.18 Policy 232: Production of seedlings of specific varieties of coconut needs to be strengthened for establishing gardens for promotion of product diversification.

30.18.1 More than 80 hybrid combinations have been evaluated over the years in India and so far eleven coconut hybrids were released for commercial cultivation and establishing seed gardens.

30.19 Policy 233: Establishment of mother gardens and scion block with high density planting is highlighted in cashew, black pepper and tree spices and has to be practiced for increasing the production of planting material.

30.19.1 For the establishment of varietal bank, poly clonal seed gardens are to established in the case of cashew in the state. It is a foundation for production and making available of true to type improved cashew planting material both at research and farmers. Naturally cashew propagates by seeds that result in genetically heterozygous progenies. Vegetative propagation creates crop genetic uniformity hence predictability of individual tree and orchard performance.

30.19.2 Kerala is known for the different pepper varieties. But the labelled planting material production does not concentrate on any varietal preference. In order to produce 'DNA bar code assisted rooted pepper cuttings' to prove the varietal fidelity, establishment of varietal gardens is a must. This is to be undertaken in the Departmental farms on an urgent basis.

31. POLICIES RELATED TO FERTILIZERS AND PLANT NUTRIENTS

31.1 Fertilisers replace the natural nutrients that are removed from fields with each harvest. They help to bridge the gap between those required for optimal crop growth and those present in the soil.

31.2 Without adequate and timely fertilizer usage, farmers often cannot meet the food needs of their own families, much less to set of a rapidly growing population. To feed themselves and the nation, farmers will need to shift from low-yielding, extensive land practices to more intensive, high-yielding practices, with increased and sustained use of fertilizers in most judicious manner.

31.3 Policy 234: For sustained agricultural growth and to promote balanced nutrient application, it is imperative that fertilizers are made available to farmers at affordable prices.

31.3.1 Partial deregulation of retail prices of P and K fertilizers (urea under control) would lead to imbalanced use of fertilizer nutrients. Deregulation of farm gate prices of fertilizers might help in cutting the subsidy burden of the government but the resulting increase in fertilizer prices would hurt the farming community in general and small and marginal farmers in particular.

31.3.2 Of the two price policy instruments, affordable fertilizer prices and higher agricultural commodity prices, the former is more powerful in influencing fertilizer consumption . The high product price support policy benefits the large farmers who have net marketed surplus while low input prices benefit all categories of farmers. It should also be recognized that fertilizer subsidy ultimately benefits consumers of farm products and not only farmers. Therefore, in order to ensure self-sufficiency in foodgrains production in the country, availability of fertilizers at affordable prices to the producers is of utmost importance.

31.3.3 Strategies and policies have to be evolved for assured and regulated supplies of essential quantities of nutrients both from internal and external sources as the future of agriculture depends on them. Government should formulate programmes for supplying fertilisers at a reduced rate for the small and marginal farmers of the state.

31.4 Policy 235: An appropriate policy that encourages balanced use of fertilizers (organic and inorganic) including micro- and secondary nutrients is a must.

31.4.1 Inefficient management of nutrients has led to multi-nutrient deficiency in Indian soils. In addition to macro-nutrient deficiency, there is growing deficiency of micro and secondary nutrients in soils. Use of organic matter including organic fertilizers is an important instrument for improving crop productivity but there is anecdotal evidence which suggests that use of organic manures is declining in the country.

31.4.2 The latest study released by the state planning board shows that 88% of the soil is acidic in nature and it is deficient in many micro-nutrients essential for a good yield. The result of micro-nutrition study of soil will be

effectively used by farmers and there will be customised distribution of fertilizers based on the nature of soil. This will save crores of rupees for the state exchequer and also increase crop productivity.

31.5 Policy 236: The most critical issue concerns the quality of the fertilizers provided to the farmers, and therefore, the quality control system that ensures delivery of good quality fertilizers must be effective and efficient.

31.5.1 It is clear that productivity is affected by poor quality fertilizers to a large extent. Yet, in spite of the presence of an elaborate mechanism for quality control in India, the problem of spurious fertilizers is rampant. The Central Fertilizer Quality Control Testing Institute (CFQCTI), Faridabad, claims that around 70 percent of the problems in quality control is due to adulteration or misbranding, another 20 percent of the problems due to the deliberate manufacturing of low quality fertilizers and the remaining 10 percent due to the difference of the content of the bags and black marketing.

31.5.2 A major role is played by fertilizer inspectors appointed by the Central and state governments who draw random samples of the fertilizers and send them to laboratories for testing.

31.5.3 The system of quality testing in the state is to be reinforced so that the fertiliser that reaches farmers must be of good quality as specified in the Fertiliser Control Order. There should be an adequate number of full time fertilizer inspectors as in the case of the states like Haryana, J & K, Gujarat, Maharashtra and Orissa who play the lead role in the entire testing process. This will ensure effectiveness of the quality control mechanism. Full Time Regular Inspectors are to be appointed by redeployment from the existing agricultural officers of the state.

31.5.4 Based on the identification of problem fertilizers at micro level in the States, the stress should be made on the problem fertilizers for sampling and analysis. Adequate training to Fertiliser Inspectors are required in both technical and legal aspects of quality control for proper presentation of cases in courts of law for successful convictions.

31.5.5 To instill the confidence of farmers in the fertilizers purchased by them and also to help the enforcement agencies in segregating the suspected stocks in the field for quick follow up action, the Quick Testing Kit developed by CFQC&TI, need to be popularized at the gross root level.

31.6 Policy 237: The use of single-nutrient fertilizers provides flexibility, lower cost per unit of nutrient and the advantage of applying only those nutrients that are needed and will generate an economic benefit.

31.6.1 The new product pattern should be nitrogen as Urea, Phosphate as DAP, SSP and Nitrophosphate and Potash as MOP. The other grades of NP/NPK complexes having common nutrient ratio, need to be restricted to the barest minimum with high nutrient value.

31.7 Policy 238: In tune with the new subsidy regime of fertilizers, site specific nutrient management needs to be promoted based on soil testing results and Krishibhavan needs to be made as the centre to promote the concept and soil testing labs needs to be equipped to take up the challenge.

31.7.1 The recent decisions by the central government on fertilizer policy have resulted in brought in major policy changes. These include for instance: (i) nutrient-based pricing and subsidy, (ii) allowing additional cost of fortification and coating on approved subsidized fertilizers to manufacturers (5-10 per cent above the MRP), (iii) paying freight subsidy for all subsidized fertilizers on an actual basis instead of uniform basis, and (iv) allowing higher rate of concession to single superphosphate (SSP) fertilizer to revive the SSP industry. Considering that an imbalanced use of fertilizers is seen as the main reason for a decline in the crop response ratio, soil test-based site-specific nutrient management is a way forward.

31.7.2 Therefore, initiatives on the setting up of adequate capacity for soil testing and for the adoption of information technology based systems to generate and communicate suitable advisories based on soil test crop response data to farmers in the country. Unbalanced use of fertilizers may be one of the factors responsible for the low productivity of Indian agriculture.

31.8 Policy 239: The use of micro nutrients should be encouraged in food crop to address the issues of micro nutrient deficiencies in soil, cattle as well as human being.

31.8.1 The existing subsidy framework does not encourage the production and use of micronutrients, customized fertilizers, or more efficient forms of existing fertilizers. To increase productivity, the need to subsidize urea should be balanced with other concerns, such as the need to subsidize the use of micronutrients, better soil testing, and other technological improvements, and educating farmers about appropriate fertilizer products, dosage, and time and method of application.

31.9 Policy 240: As High Tech Farming and precision farming are gaining momentum in the state, the specific fertilizers for the ventures should find a place in the Government fertilizer subsidy programmes.

31.9.1 At present the state is enjoying the fertiliser subsidy, for the traditional fertilisers - straight, complex and mixtures- by the existing procedures. It is necessary that, the most costly inputs such as the soluble fertilisers should be made to the farmers at reduced price. So the Government should take up this matter to avail fertiliser subsidy for soluble fertilizers used in the High Tech Farming.

32. POLICIES RELATED TO PESTICIDES

32.1 In well managed farming systems, crop losses due to insects can often be kept to an acceptable minimum by deploying resistant varieties, conserving predators and managing crop nutrient levels to reduce insect reproduction. Recommended measures against diseases include use of clean planting material, crop rotations to suppress pathogens, and eliminating infected host plants. Effective weed management entails timely manual weeding, minimized tillage and the use of surface residues. When necessary, lower risk synthetic pesticides should be used for targeted control, in the right quantity and at the right time.

32.2 Crop Health Management can be promoted through farmer field schools, local production of bio control agents, strict pesticide regulations, etc. With liberalization of trade, the threat of increased risk of introduction of exotic pests and weeds in the country with the potential to cause serious economic loss has to be countered effectively by the plant quarantine system.

32.3 Availability of safe and efficacious pesticides and their judicious use by the farming community is critical to a sustained increase in agricultural production and productivity. Per hectare consumption of pesticide in India is 381 g which is low as compared to the world average of 500 g. Only 25-30 percent of the total cultivated area in the country is under pesticide cover. India's consumption of pesticides is only 2 percent of the total world consumption.

32.4 Policy 241: A regular watch on computerized Online Pesticide Registration System and take action against companies and products which are marketed in the state without proper licensing under central Insecticides Board and strong regulatory frame work needs to be created and monitored within state for the same.

32.4.1 A computerized online pesticide registration system was introduced in July 2008 in the Secretariat of Central Insecticides Board & Registration Committee (CIB&RC), Faridabad.The system enables pesticide companies to apply for registration of pesticide products and receive any query about deficiencies online. The status of the application is also visible to the applicant online. The system is designed to increase efficiency and reduce transaction cost with greater transparency.

32.4.2 Quality of pesticides is monitored by the central and state insecticide inspectors who draw samples of insecticides from the market for analysis in the 68 State Pesticide Testing Laboratories (SPTLs) that have a total annual capacity of 68,110 samples in 23 States and one Union Territory. For the states which do not have facilities for testing pesticides, the facilities of testing samples are available at two Regional Pesticides Testing Laboratories (RPTLs), set up by the Central Government at Chandigarh and Kanpur. In case of disputes, the samples are referred to the Central Insecticides Laboratory (CIL), Faridabad.

32.5 Policy 242: There is the need for an approach in the State which would minimise the use of hazardous pesticides.

32.5.1 The welfare of farmers should be given due importance while charting out a policy that minimise the use of hazardous pesticides. Necessary mechanism should be evolved to meet the demands of the farmers that they must be assured of chemicals of biological origin with effectiveness. The use of biological agents should be promoted for this purpose. The state has to continue the restrictions imposed on the hazardous pesticides.

32.6 Policy 243: Health costs can be mitigated considerably by reducing the dose of pesticides used and the approach of the extension workers should be oriented in that way.

32.6.1 The researchers explains that the toxicity level and dose of pesticides can exert a significant effect on the health of pesticide applicators. This can be effectively managed by reducing the dose of application. This can be achieved either through restricting the quantity of formulation or by increasing the dilution of the spray fluid by using water at recommended volumes. An extension strategy focusing on this aspect alone would result in an improvement in the health of pesticide applicators. Support could be provided by subsidizing the supply of protective gear, and by setting up general awareness-creation programs.

32.7 Policy 244: Cheap, quick and non-destructive methods of detecting pesticide residues in raw fruits and vegetables should be made more popular.

32.7.1 The Kerala Agricultural University has found dangerous levels of pesticide residue in key vegetables like cabbage, cauliflower, vegetable cowpea, amaranthus red, small red onions, tomatoes, green chillies and curry leaves, among others. The residue includes that of the banned Profenofos, which falls into the yellow category (second level of pesticides in the toxicity classification) and which has translaminar action.

32.7.2 Hence there is need for finding out cheap and quick residue testing mechanism. The consumers can use the facility of quick test and this can act as a market force for better production management among farmers. At present the residue analysis can be done only by specialised laboratories and trained personnel. KAU has to look in to this matter and technology for on the spot testing is to be developed by seeking international collaboration.

32.8 Policy 245: Kerala is having a well defined policy on 'Organic Farming' and on this light, organic pesticides are to be made freely available and the recent technology developed by CTCRI needs an intensified production.

32.8.1 Organic pesticides use natural ingredients to fight pests, many of which are biodegradable and less toxic to the environment. Some organic pesticides, such as diatomaceous earth, however, work mechanically to destroy pests, thereby eliminating the possibility of resistance which the synthetic pesticides can not do.

32.8.2 The research institutions connected with the development of pesticides work together to

make this research a success to provide farmers with organic pesticides. A remarkable achievement in this matter was done by CTCRI in developing a tapioca based bio-pesticide which was successfully tested against pseudostem weevil of banana. A plant for the mass production of this pesticide is to be established immediately.

32.9 Policy 246: Pesticide dealers should be made aware of the properties of the products they sell and workers engaged in spraying of pesticides should be trained and put through periodic and free medical examinations to determine their health status.

32.9.1 The training provided on the subject is mostly targeted at the farmers, while the actual spray operation is conducted by the farm workers, unsupervised. Along with this, the awareness of the direct human health impacts of unscientific pesticide handling among the farm workers is revealed to be very low, and does not match with their own experiences in this regard. The data from micro level studies reflects several cases of pesticide poisoning and resultant health damages.

32.9.2 The pesticide traders are to be made aware of the toxic properties of the chemicals they sell. Before selling the product they should tell about the safety measures to the farmers and make them aware about the toxicity of the chemical. Training programmes in safe pest control mechanism may also be focussed on farm workers, traders as well as general public.

32.10 Policy 247: The sale of pesticides and weedicides should made based on the prescription issued by a competent officer of the Department of Agriculture.

32.10.1 The State Government has once notified guidelines which render sale of pesticides illegal in the State unless supported by prescriptions from agriculture officers. The guidelines had been issued in the context of indiscriminate use of pesticides in farms having allegedly posed a health hazard in various parts of the State.

32.10.2 An officer of the Department of Agriculture not below the rank of 'Agricultural Officer should be required to write a prescription for authorising sale of pesticides. The prescription should indicate the particular crop on which the pesticide would be applied, the nature of the disease targeted, the quantum of the pesticide needed and its chemical name.

32.10.3 Necessary legal provision shall be created for strict compliance from the part of the executives and traders. The aim here is to protect the farmer from indiscriminate use of pesticides and dreadful diseases like cancer. Ecologically safe agricultural management system can only be achieved with combined policy efforts which include adequate legal support, effective monitoring and voluntary action by the stakeholders.

32.11 Policy 248: A strong provision should be created to Monitoring of Pesticide Residues in food and Department representatives should be a party of the food safety team which is formed in the State to enact Food Safety Bill 2012.

32.11.1The State Government is to take necessary action including intensifying promotion of an integrated pest management approach, which emphasizes a safe and judicious use of pesticides. The AGMARK

lab should be equipped to address the food safety standards and department representative should be part of the food safety team created by the State Government to govern food safety issues.

32.12 Policy 249: Crop Health Management Centres should be taken up which can also look into pest and disease surveillance.

32.12.1 Crop Health Management is the science and practice of understanding and overcoming the succession of biotic and abiotic factors that limit plants from achieving their full genetic potential as crops. Although practiced as long as agriculture itself, as a science-based concept, plant heath management is even younger than integrated pest management (IPM), and includes and builds upon but is not a replacement for IPM.

32.12.2 A holistic approach is needed for the crop management and hence a Centre for Crop Health Management is to be established in the State with the intention of utilising the expertise of retired Scientists, Professors, Officers and extension functionaries for the effective field level interventions.

33. POLICIES FOR REVAMPING DEPARTMENTAL FARMS

33.1 The Government owned farms has ensured availability of improved planting materials to farmers in the state. Through the supply of HYV seeds and various quality planting materials like coconut seedlings and vegetable seeds, the departmental farms has assisted in the raising of income of small and medium scale farmers. It is estimated that the planting materials produced from the departmental farms covers an area of more than 5 lakh hectares per annum.

33.2 There are 61 farms including 10 special farms, 10 District Agricultural Farms, 33 State Seeds Farms and 8 coconut nurseries under the Department of Agriculture. The State Seed Farms are being operated by the respective District Panchayats under the Panchayti Raj Act. The farms covers an area of nearly 2100 ha.

33.3 It is imperative to form policies which would aid in the revamping of State owned farms for the production of Quality Declared Planting Materials (QDPMs) as well as demonstration of improved technologies in the agricultural sectors such as the protected cultivation and precision farming.

33.4 Policy 250: The infrastructure facilities of the farms are to be improved for meeting the objective of mass production of quality planting materials and seeds for the timely distribution to farmers.

33.4.1 It was observed that, many Government owned farms lack proper roads to the work sites, buildings, godowns, equipment shelters, sales counters, rain shelters etc. Immediate attention should be given for improving the infrastructure facilities of the farms for the proper utilisation of the available land.

33.5 Policy 251: Mechanising the Government owned farms to the fullest extent (100% mechanisation) will be the only tool to tap the efficiency of the labourers in full.

33.5.1 Many at times the low productivity of the farms are attributed to the low efficiency level of the farm labourers. The age and health of the labourers especially the permanent labourers sometimes affect the efficiency level. But they are very experienced in the skilful activities like grafts and layers. The farm operations which depend on human labour should be replaced by suitable machinery and efficiency of the same is to be improved. There are modern technologies and equipments available like post hole diggers, bund formers, different types of planters, irrigation equipments, automated machinery systems for packing, filling etc. Those should be adopted at a mission mode and all the Government owned farms are to be 100% mechanised to give shape to 'modern farms'. This would improve the efficiency of operations and drudgery on labourers would be the minimum.

33.5.2 Trainings are to be imparted to the farm labourers for the machinery operation and they can be termed as 'Machine operators' rather than addressing as farm labourers. This will add their morale and improve efficiency.

33.6 Policy 252: A definite planting material production plan has to be developed taking in to consideration the scheme of the Government and the local requirement through an online system every year.

33.6.1 The planting material production should be carried out in a realistic manner considering the requirement which would arise due to the implementation of different schemes of the Department and the requirement of the public. The idea behind this is that, the farms should produce according to the demand for planting material only. If a system is there by which advance booking of the planting material can be done, there is possibility of producing the planting material according to the demand.

33.6.2 The production plan should be in accordance with this principle and should be advocated while preparing the forecast of expenditure of every Departmental farms.

33.7 Policy 253: Demonstration of improved technologies are to be done in every farm.

33.7.1 The Departmental farms should serve the purpose of instructional function by providing demonstration of improved technologies like open field precision farming, fertigation, High Tech Farming, hydroponics, aeroponics etc. They must be a place of interest for the progressive farmers. They can visit and get their doubts clarified by the experts.

33.8 Policy 254: Shortage of labourers in farms is to be addressed immediately by the Government.

33.8.1 Many of the prestigious farms under the Department are facing the acute shortage of farm labourers. The permanent labourers are retiring fastly, and appointments are in a slow pace. To keep the farm on the tracks, farm labourers are a must. The assets of the farm, infrastructure facilities, machineries etc., would be wasted if labourers at the correct strength are not employed. The issues regarding the appointment are to be immediately sorted out by the Government. The Government should hold a policy that, no vacancy of farm labourers would exist in a farm for more than two months. Necessary freedom shall be assured to the appointment authorities.

33.9 Policy 255: Since there is the need for many emergency activities including the disposal of perishable farm produces and immediate repair works, delegating more powers to the sub officers would aid in the more speedy actions in Departmental farms.

33.9.1 The financial powers at present shall be amended and more powers are to be delegated to the Sub Officers so that, the time delay in many crucial transaction can be avoided. This will add to the efficiency improvement and the decisions can be taken locally without much time delay.

33.10 Policy 256: The Orange and Vegetable Farm, Nelliyampathy and Horticulture Development Farm, Malampuzha are to be elevated to the position of Centres of Excellence.

33.10.1 The O & V Farm, Nelliyampathy is one of the prestigious farms of the Department. It has unique characteristics such as the climate, very vast area of fertile land, water availability, different cropping pattern etc. It has many facilities for processing and value addition,

high tech farming, training and growing temperate crops. These factors calls for developing the farm as a centre of excellence in the field of high tech farming and processing of fruits and vegetables.

33.10.2 The HD Farm, Malampuzha is having the unique advantage of nearness to the well known Malampuzha Gardens. It is a pace of tourist interest and has to be developed accordingly. Further, it is having a huge collection of ornamental plants, mango varieties, cashew progenies etc. It would be of worth developing it in terms of the ornamental crops. This farm has to be made as the centre having the largest number of ornamental plant accessions in the State. The HD Farm has to be transformed as a Centre of Excellence in Ornamental Gardening.

34 POLICIES RELATED TO VALUE ADDITION & PROCESSING

34.1 India is today the second largest producer of food in the world and has all the potential of becoming number one if the emerging problems after the green, white and blue revolution are properly addressed. The problem of improvement in agriculture needs to be tackled from two different angles, First, to increase productivity of agriculture and delivery system and Second, to increase the farmer's earning through efficient and effective value addition.

34.2 Value addition to raw food material in India is only 7 per cent while it is 23, 45 and 188 per cent in China, Philippines and UK, respectively (as per National Food Processing Policy, Draft Document, 2000). Studies also reveal that more than four dozen value-added products are produced from derivatives of paddy in a small country like Japan, which produces only 2 per cent of the total world production of paddy. We process less than 2 per cent of fruits and vegetables as compared to 30 per cent in Thailand and 80 per cent in Malaysia.

34.3 Value addition is often understood in the context of adding value to the product. A new dimension from the consumer point of view is added to the existing understanding of value i.e. how a consumer perceives the value delivered to him through a bundle of product services. This new approach of value addition through the consumer's mind needs special attention. All the activities now must be seen from the consumer point of view. Keeping this approach in mind, the policies regarding the value addition and processing of the Government are proposed.

34.4 Policy 257: Enhancing income of farmers through value addition, product diversification, and entrepreneurship development must be the thrust areas of the development Departments.

34.4.1 Very often value addition and product diversification are easier said than done because of numerous constraints in micro scale rural enterprises. The biggest constraint is the mindset of farmers. They lack confidence. Lack of technological know-how, high cost of machinery, insufficient capital, absence of hassle-free credit, taxation rules and food safety concerns create fear in their minds.

34.4.2 The available value addition technologies by and large are found amenable for either lab scale or for very large scale production. Therefore, wherever necessary, technologies are to be tailored to fit into the micro-scale environment and refined to result in quality production.

34.5 Policy 258: Creation of a food chain starting from the farm gate to retail outlets is inevitable for farmers to earn a greater share of the product sale revenue after adding value to their own produce.

34.5.1 In fact, the chain should start from agricultural research institutions and laboratories to help farmers in scientific cultivation, particularly to produce quality raw material for specific end use, proper post-harvest management, storage, transportation and marketing. There is also need for application of more and more mechanisation

and automation in post-harvest management and processing operations; utilisation of agriwastes generated during onfarm processing; agro-industrial systems development; and bio-process technology for conversion of raw agricultural produce to useful products.

34.6 Policy 259: To meet the emerging challenges, agriculture must diversify in favour of high-value enterprises and the pricing policy must be based on the quality of the produce rather than quantity for motivating the farmer to orient his production qualitatively.

34.6.1 The emphasis should be on production of high value commodities e.g.,fruits, vegetables and milk with enhanced quality and specific nutritional and processing characteristics, than increasing production per se as in the past. Pricing policies also need to be changed, linking it with the quality of the produce or a product is the basis for fixing per unit price, just as fat content in milk; higher sugar quality/quantity in mango; better aroma, colour or cooking quality in rice and shelf life of fruits and vegetables.

34.7 Policy 260: Since marketing of processed products is more remunerative than raw commodities, farmer processor linkages are needed to add value as per demands of the consumers.

34.7.1 There is a great scope of developing some of our traditional food items from cereals, fruits, milk and fish. Appropriate and cost-effective packaging technology for these items is needed to ensure safety and prolonged shelf life. Effective linkages need to be built between farmers and processors on a mutually beneficial contractual agreement, particularly when a large number of small farmers are to be involved in this type of farming.

34.8 Policy 261: Storage and handling technologies and infrastructure should be designed in a manner that losses are minimised and the produce retains its original quality.

34.8.1 Current post-harvest handling of grains results in high losses and leads to deterioration of quality. Storage and handling technologies and infrastructure should be designed in a manner that losses are minimised and the produce retains its original quality. Post-harvest care involving grading, storage and phyto-sanitation of the produce should meet the needs for export market.

34.9 Policy 262: The New Generation Cooperatives (NGC) model and FPOs are ideal since it binds both farmers and processors to honour commitments and agreements.

34.9.1 This should be applied in our cooperative enterprises. Collective farming involving small farmers should be promoted rather than involving a few big farmers. Small cooperative processing units should be promoted in rural areas. These could undertake primary processing, grading and cleaning of produce for adding value. The pattern of Town and Village Enterprises (TVEs) of China, could be used, with necessary modifications. Rural processing and value-addition groups should be promoted. This will allow small and marginal farmers to be part-time farmers and work in rural enterprises for enhanced income and returns on their produce.

34.10 Policy 263: There is a large potential for setting up of modern slaughter facilities and development of cold chains in meat and poultry processing sector.

34.10.1 India ranks first in world cattle population, 50 per cent of buffalo population and one - sixth of total goat population of the world. There is vast scope to set up modern slaughter facilities and cold store chains in meat and poultry processing sector. Compared with meat, poultry industry has registered significant growth. India ranks fifth in the world and both poultry and egg processing units have come in a very big way in the country. India is exporting egg powder, frozen egg yolk and albumin powder to Europe, Japan and other countries. Poultry exports are mostly to Maldives and Oman. Indian poultry meat products have good markets in Japan, Malaysia, Indonesia and Singapore. Presently there are only five egg powder plants in India which is considered insufficient in view of growing export demand for different kind of powder - whole egg, yolk and albumin.

34.10.2 There is a large potential for setting up of modern slaughter facilities and development of cold chains in meat and poultry processing sector in Kerala. There is no restrictions in killing and processing the animal meat in the State. This opens up avenues for meat production which can be exported to other parts of the country and abroad. The market has not been tapped for ready to eat and semi processed meat products in the domestic market as well as for exports to neighbouring countries especially to the Middle East. Buffalo meat is surplus in the country and has good export potential and Kerala can be a model in this regard.

34.11 Policy 264: It is high time we give the jackfruit its due recognition. The versatile fruit of Kerala 'Jack', once Kerala's life-saver in months of scarcity, has immense scope for value addition.

34.11.1 Apart from the daily menu, now various institutions and non governmental organisations (NGO) have come up with various products based on the jackfruit. Fully ripened jackfruit bulbs can now be used to prepare jams, squashes, syrups, candy, fruit bars, fruit leather, ready-to-drink beverages, halwas, payasams, puddings, toffee, wine, kulfi and ice-cream. Half-ripened bulbs are processed to jackfruit powder and used for the preparation of bakery items such as burfi.

34.11.2 The fruit has high nutritional value and is rich in calories, fibre, calcium, phosphorous, iron, and vitamins. It is used as an ingredient of baby food in certain regions. Jacalin, the major protein in jackfruit seed, has got many applications in immuno-biological research.

34.11.3 Jackfruit chips are in great demand and fetch good prices in the domestic market and abroad, especially the 'Gulf' countries. Even the leaves of the jackfruit are said medicinal properties.

34.12 Policy 265: The provisions of the National Mission on Food Processing (NMFP) has to be utilised for the evelopment of food processing sector, which in turn would help in Increase in farm productivity thereby increase in farmers' income.

34.12.1 It is known that, the Central Government has already accorded approval and communicated to all States for taking up preparatory activities / advance action by States for implementation of NMFP during 12th Plan and released Rs. 29.81 crore to states for taking up preparatory activities / advance action for implementation of NMFP. The Government should take a serious step towards the implementation of NMFP in the state.

34.13 Policy 266: Small Farmers Agri-business Consortium (SFAC) should be strengthened to support the initiatives on value addition in the State.

34.13.1 The core mission of SFAC is focussed on increasing the productivity of small and marginal farmers, value addition and efficient linkages between producers and markets. SFAC deals with agriculture in its wider connotation, including fisheries and horticulture. The vision of the SFAC is to facilitate the process by aggressively promoting agri-business projects through its Project Development Facility and Venture Capital Assistance schemes, establishing forward and backward linkages with farmers, providing assured market to their produce thereby generating rural employment and enhancing farmers' income. This is seen as a new chapter in the history of agriculture where farmers/producers groups yield not only more foods but more products, jobs and higher income in the rural areas.

34.13.2 There must be serious steps from the Government to make SFAC a nodal agency for value addition and processing by providing funds, man power and policy guidelines and address its dearth of funds.

35. ENERGY-SMART AGRICULTURE RELATED POLICIES

35.1 High and fluctuating prices of fossil fuels and doubts regarding their future availability mean that agri-food systems need to shift to an "energy-smart" model to decouple food prices from fluctuating and rising fossil fuel prices.

35.2 Agriculture has a dual role as an energy user and as an energy supplier in the form of bioenergy. This energy function of agriculture offers important rural development opportunities as well as one means of climate change mitigation by substituting bioenergy for fossil fuels.

35.3 Availability of adequate farm power is very crucial for timely farm operations for increasing production and productivity and handling the crop produce to reduce losses. With the increase in intensity of cropping the turn around time is drastically reduced and it is not possible to harvest and thresh the standing crop, on one hand, and prepare seed bed and do timely sowing operations of subsequent crop, on the other hand, in the limited time available, unless adequate farm power is available.

35.4 Similarly for precision farming, increasing area under irrigation, conservation tillage, straw management and diversification in agriculture, more power is required for water lifting and precision placement/application of agricultural inputs—seed, fertilizer, irrigation water, plant protection chemicals etc and meeting the requirements of diversified agriculture.

35.5 Policy 267: The food sector both requires energy and can produce energy - an energy-smart approach to agriculture offers a way to take better advantage of this dual relationship between energy and food.

35.5.1 The agriculture sector needs to learn how to use energy more wisely. At each stage of the food supply chain, current practices can be adapted to become less energy intensive.

35.5.2 Such efficiency gains can often come from modifying at no or little cost existing farming and processing practices. Steps that can be taken at the farm level include the use of more fuel efficient engines, the use of compost and precision fertilizers, irrigation monitoring and targeted water delivery, adoption of no-till farming practices and the use of less-input-dependent crop varieties and animal breeds.

35.5.3 After food has been harvested, improved transportation and infrastructure, better insulation of food storage facilities, reductions in packaging and food waste, and more efficient cooking devices offer the possibility of additionally reducing energy use in the agriculture sector.

35.6 Policy 268: Using local renewable energy resources along the entire food chain can help improve energy access, diversify farm and food processing revenues, avoid disposal of waste products, reduce dependence on fossil fuels and greenhouse gas emissions, and help achieve sustainable development goals.

35.6.1 Where good solar, wind, hydro, geothermal or biomass energy resources exist, they can be used as a substitute for fossil fuels in farming, animal husbandry, dairying and aquaculture operations. They can also be used in food storage and processing.

35.6.2 Energy-smart agriculture is an approach based on three pillars: (i) providing energy access for all with a focus on rural communities; (ii) improving energy efficiency at all stages of the food supply chain; and (iii) substituting fossil fuels with renewable energy systems in the food sector.

35.7 Policy 269: The government should promote `conservation agriculture' which replaces mechanical soil tillage by `biological tillage' for reducing the energy requirement and making farming sustainable.

35.7.1 Reduction of mechanical tillage and promotion of soil organic matter through permanent soil cover is an approach to reverting soil degradation and other environmental impacts of conventional agriculture, achieving at the same time a high agricultural production level on truly sustainable basis. n this approach, crop residues remaining on the soil surface produce a layer of mulch which protects the soil from the physical impact of rain and wind, and also stabilizes the soil surface layers moisture content and temperature. This zone becomes a habitat for a number of organisms which macerate the mulch, mix it with soil and assist its decomposition to humus. Agriculture with reduced mechanical tillage is only possible when soil organisms take over the task of tilling the soil. This leads to other implications regarding the use of chemical inputs since synthetic pesticides and mineral fertilizers have to be used in a way that does not harm soil life. Conservation agriculture can only work if all agronomic factors are equally well managed.

35.8 Policy 270: Huge volumes of agricultural wastes in the form of livestock manure, kitchen wastes, rice husks, etc., can be converted into potential sources of energy and the resultant biogas can be plowed back into agricultural production and processing activities.

35.8.1 Biogas comes from animal manure, and is perhaps the ultimate win-win energy source, allowing farmers to produce their own electricity and reduce the water contamination, odour pollution, and global warming emissions caused by animal waste.

35.8.2 Biogas is most commonly used on the farm where it's produced, mostly for cooking or electricity generation. Any excess electricity thus can often be sold back to the grid. Large dairy and swine operations have the greatest potential to produce cost-effective biogas. Biogas recovery systems can handle liquid, slurry, or semisolid manure, and these operations can collect and store enough of this manure to produce large amounts of biogas.

35.8.3 With this objective the Central Government is now operating a 100% CSS scheme on National Manure Management and Biogas production through the State Government for the installation of biogas plants. However, the subsidy pattern is to be made attractive by providing state share from

the budget provision. This has to be given priority as waste management is a societal need. It was also found that, LSGDs, other organisations etc are following different subsidy pattern for the same. It must be made uniform for the smooth implementation of the programme.

35.9 Policy 271: The use of wind power for agricultural production activities is practically adaptable for residents located along coastlines Kerala.

35.9.1 Kerala has a long costal line of about 600 km. The shores are known for the constant winds throughout the year. If small wind mills for generating electric power are established along these regions they would be useful in reducing the human energy involved in activities such as winnowing, pumping, etc.

35.10 Policy 272: Establishment of solar and wind hybrid power generating equipments wherever possible will reduce the power requirement for agriculture to a great extent.

35.10.1 In Kerala electricity charges for agriculture is met by the Government. Since the power requirement is increasing day by day and so also is the price, there must be alternative energy generating areas.

35.11 Policy 273: An incentive is to be provided for the farmers who runs an Energy Smart Farm for the promotion of energy smart agriculture.

35.11.1 Energy expenses are normally a significant portion of a farm's budget, accounting for up to 10 percent of total costs. Accordingly, energy ranks sixth out of total production expenses. In addition, profit margins on farms especially small farms have continued to shrink, leading to an interest in minimizing expenses. Agriculture has been hit hard by recent energy price increases. Of course, the smallest farms feel these effects the most.

35.11.2 Since operating margins for small farms are typically well under 10 percent, energy costs can have an enormous impact on the economic viability of a farm. Lowering these energy costs can be achieved through the adoption of energy efficiency on the farm. Energy efficiency is the streamlining of energy use through technology and behaviour in a way that minimizes energy use and cost while maximizing productivity.

35.11.3 In this context, for the promotion of 'energy smart agriculture' an incentive may be provided to farmers who runs his farm in the most energy efficient way.

36 . POLICIES RELATED TO HIGH TECH FARMING

36.1 Since the cultivated area cannot be increased, the increased production will be possible only by increased productivity and increased intensity of cropping. This will call for precision farming and timely farm operations which will require high capacity and precision equipments.

36.2 Precision farming is all about employing technology in agriculture. It uses scientific tools to understand the character of every plot of land and identify the suitable plant to grow on it. It recommends the right amount of inputs such as fertilisers and water, and delivers them in the right measure using sophisticated systems. It tends crops in highly optimised environments and hence could cut costs, make cycles shorter, harvests faster and productivity and yield higher. It uses labour, one of the major factors which will decide the fate of agriculture in the State, minimally.

36.3 Policy 274: Promotion of high-tech agriculture is important as climatic extremes are affecting normal cultivation.

36.3.1 Hi-tech farming will help overcome the difficulties posed by climate change. Crops can be raised irrespective of external factors such as climate. This is the main advantage of the method. Adding productivity and quality of produce would increase under scientifically created conditions.The initial scepticism towards the method has been replaced by trust. If the cost of irrigation implements and building greenhouses is brought down, more people will take up protected farming. The KAU should develop easy-to-use agricultural implements, and cheaper, lighter alternatives to components being used now.

36.3.2 The high capital intensive High Tech Farming is to be popuarized among farmers in such a way that the technology has to be developed as a less capital intensive one and could be adopted by the resource poor farmers to increase their net income.

36.4 Policy 275: Starting with a market study to determine the crops that will fetch a good price in a particular season and go for Hi Tech Farming of the same would assure huge profits to farmers.

36.4.1 Among the strategies, market study and producing off season crops would be the effective steps in getting huge profits to the farmers. The objective of precision agriculture is the optimization of input use to facilitate maximum output helping to save valuable resources like water and energy. So huge production is assured. It is a modern method of farming that takes adequate care of technology upgradation if marketing support to farmers are established.

36.4.2 Branding and marketing are needed for the success of the programme. So adequate market study has to be ensured.

36.5 Policy 276: The produces got from poly houses could be branded as safe to eat since they are produced in insect free conditions which eliminates the chance of using pesticides.

36.5.1 The advantage of precision farming is that the required quantity of water and fertilizers could be administered under controlled

environment so as to get maximum yield. Hybrid varieties could be used in hi-tech farms where the labour requirement would be lesser in comparison to conventional farms. Pest menace would be minimal in such farms. The harvesting period would also be longer which would benefit the farmer. The programme assumes importance as the State is not able to meet even half of the demand of vegetables.

37. POLICIES FOR FARM INFORMATION & COMMUNICATION

37.1 Knowledge is power and agriculture is no exception. Knowledge and innovation are now widely regarded as key drivers of economic growth. Access to appropriate information and knowledge is an overriding factor for successful natural resource management (NRM) planning, implementation and evaluation processes, and it is known to be one of the biggest determinants of agricultural productivity.

37.2 As a result of increase in literacy rate, the changing agricultural scenario and fast changing technologies which needs to be disseminated at a faster rate for rapid agricultural development calls for publication of farm magazines / agricultural journals. Thus, the farm / agricultural journalism is concerned with: (i) carrying agricultural information to the farming community and (ii) to get genuine problems of farmers as feed back to researchers.

37.3 The Agricultural Information Service complements the extension work done by the field staff. It conditions the farmer to adopt better farming methods by offering him the technical knowledge needed for it. Above all, it instills in him a desire towards better farming and home living

37.4 Since Kerala is having a higher literacy rate, several farm information providing systems are established and are running very effectively. The Farm Information Bureau (FIB), the Karshaka Information Systems Services And Networking (KISSAN), different programmes through All India Radio, Door Darshan etc., are the farm information service providers in the state. The policies for improving the information communication services offered by these institutions is discussed in this Section.

37.5 Policy 277: The prestigious publication 'Kerala Karshakan' has to ensure greater accuracy and coverage regarding the newer technologies and could be used by the farmers for further reference.

37.5.1 The publication has improved a lot during these periods but some content improvement is necessary. A reader sample survey is required before fixing the theme and contents of the magazine. This will help to get a wider acceptance from the readers for giving the information at the right time to the targeted readers. The content should have a technical nature rather than orienting towards success stories and mere popular articles. The language digestibility should be at its maximum since it is targeted for different sections of the society.

37.5.2 The content should be such that this publication should be treated by farmers as a reference book for future use. The over emphasis on success stories without technical content and opinion based articles may loose the reading interest of the farmers who are looking for ways to improve their livelihood. Prime focus in content should be given for the small farmer's agriculture rather than making wide coverage about the programmes, inaugurations and functions though they are also inevitable components of information. A well balanced content should be assured in this publication and should become the reference book for farmers and those who love farming.

37.6 Policy 278: Establishment of 'Virtual Class Rooms' to link Educational Institutions like Agricultural Universities both within and abroad for dissemination of best practices in agriculture.

37.6.1 The aim of this venture is to get best available resources from the universities, ICAR Institutions, and other national and international research institutions to the common farmer living at the last mile of connectivity.

37.6.2 The centers should be created at least one in block level in a potential Panchayat to enable the knowledge dissemination. The centre's should equipped with books and library facility, collection of videos which demonstrate cultivation practices, post harvest handling practices and processing. The centre should also provide knowledge on Animal Husbandry, fisheries, apiary, sericulture etc. The centre should have capacity to build capacity on precision farming, green house cultivation, hydroponics and other modern cultivation practices. They should conduct short term classes for making them scientific cultivation practices and convert ordinary farmers as professionals.

37.6.3 The centres also should provide investment advisory on agricultural and related business and link with commercial banks. The centre should have a CEO as well as team members who are capable of providing various skills. The centre should offer short tem vocational courses in which 80% is practical and 20% theory so that the person comes out will successfully do agriculture. The Centre should equipped with 2 GBPS broad band connection to enable interactive class rooms and digital class rooms which connect remote Universities and research stations can also do interactive sessions with experts in various fields. All the staff should be posted on contract basis during the pilot phase.

37.6.4 This ventures are to be implemented with a view that information flow through extension workers should also be designed in such a way that the delay is minimized and hence improve timely access to information by farmers. They should be under the joint control of Krishibhavans and Veterinary Hospitals.

37.7 Policy 279: Most of the extension services to farmers could be automated to reduce weakness of human factors in communicating information with minimum language, technical and socio-economic barriers.

37.7.1 Regular updates and alerts in case of abnormal environments are communicated easily through specialized computerized information and communication platform. Further studies need to be conducted to understand farmers interface for accessing information and knowledge using computerized services in agriculture so that farmers enjoys the fruitful of modern ICT.

37.8 Policy 280: Support to KISSAN KERALA.NET is to be extended to keep up its professional standards.

37.8.1 Karshaka Information Systems Services And Networking (KISSAN) is an integrated, multi-modal delivery of agricultural information system, which provides several dynamic and

useful information and advisory services for the farming community across Kerala. It is one of the leading citizen centric e-governance projects of the Department of Agriculture, Government of Kerala. The project was conceived, developed and managed by the Indian Institute of Information Technology and Management-Kerala for the Department of Agriculture, Government of Kerala.

37.8.2 KISSAN is implemented and managed by a group of core experts in the field of management, software engineering, network management, agriculture and media journalism. The integration of highly skilled and dedicated human resources, flexible and robust technological solutions and flexible environment, has helped KISSAN for its various achievements since its inception.

37.8.3 Make Kisan Krishi Deepam the agriculture based weekly television program of KISSAN more detailed and explanatory, incorporating all stages of the subject / crop, like Animal Planet / Discovery / National Geographic Channels.

37.8.4 To make the services offered by the system a core routine activity, man power is needed. During the beginning period there were six posts of agricultural professionals in the cadre of Agricultural Officers. The same strength has to be replaced with three more Agricultural Officers who are having the basic aptitude on mass media production.

37.8.5 The programme should be operated in the project mode in collaboration with the IIITMK for maintaining the efficiency and semi autonomy. Necessary budget provision shall be earmarked for the sustenance of the award winning programme.

37.8.6 The content needs a purely technical and professional approach for the popularisation of different technologies in the field.

38. AGRICULTURAL PLANNING & BUDGETING RELATED POLICIES

38.1 Agricultural planning involves balancing the protection of the agricultural and natural environmental resources with development pressures. Agricultural policies in the Regional Policy Plan, significant studies, information reports and an advisory committee provide insight into how agriculture and allied sectors in the production front will be preserved for the enjoyment of future generations.

38.2 Policy 281: Agriculture will continue to be the first priority for the Government.

38.2.1 The Kerala Budget for 2013-14, presented to the Assembly by Finance Minister K.M. Mani is with full of newer ideas to boost the agricultural sector of the State. The salient features like rice and rice products are exempted from tax and levies eased for items such as agro-shade nets, individuals will not have to pay agriculture income tax from next year, interest-free agricultural loans to small and marginal farmers and waiver of interest dues on NABARD loans, an integrated agricultural garden scheme for small farmers, model hi-tech villages, farmers' markets, and an integrated crop insurance are indicative that agriculture would be the priority area of the State Government and it would be continued in the years to come.

38.2.2 The government has to place agriculture on top priority list such that its position within the sectoral allocation could be substantially enhanced. Furthermore, such allocation when released must be properly monitored to ensure it is being expended on the purpose for which such money has been released. Also, in furtherance of support for agricultural programme, the government must endeavour to subsidise agricultural sector to encourage the farmers.

38.3 Policy 282: A separate agricultural budget should be presented for greater thrust and allocation of funds and schemes on agriculture.

38.3.1 By way of definition, a budget is a financial plan, which embodies estimates of proposed expenditures for a given future period and the proposed means of financing them. It is an instrument used by organizations to allocate expected resources to its various activities such as distribution, stabilization, development and growth with a view to achieving equilibrium efficiency and effectiveness.

38.3.2 A separate agricultural budget for Kerala state is needed because agriculture is a State subject, and the role of state government in the development of agriculture sector is very important. It was found that most of the investment currently made is farmer's own. This investment is substantially less than investments in other sectors. Besides, the farmers do not easily get the required capital assistance through financial institutions. So an agricultural budget is necessary for assuring sufficient investments, welfare measures and popularising and supporting newer technologies in production.

38.3.3 The separate agriculture budget is aimed at providing a more focussed approach to the farm sector and in handling allied sectors of horticulture, animal husbandry, inland fisheries, dairy, food processing among others.

38.3.4 Integrated agricultural budget has to be aligned with agricultural calendar. Presently, budget approval happens in March, and actual flows to departments usually happen by June or July. However, preparations for agri-production have to be made in March to June period. Hence, financial year planning has to be aligned with agricultural seasons.

38.3.5 Thus the Agricultural Budget has become an absolute necessity.

38.4 Policy 283: While formulating the Departmental programmes, a regional plan at the watershed basis should form the basis for planning every year.

38.4.1 A State Agricultural Plan as envisaged in the Section 14.6 of the Agricultural Development Policy must be formulated before making the scheme allocations and new schemes for the financial year. A regional plan has to be chalked out with the help of the different departments on a watershed basis and that has to be brought at the State level for making plan and budgets well in advance.

38.4.2 Watershed has become an acceptable unit of planning for optimum use and conservation of soil and water resources. The watershed may be of any size, but for proper planning and implementation in two to three years, the size of the viable watershed may be about 1000-5000 ha.

38.4.3 Recognize watersheds as the natural planning and operational units for integrated rural and agricultural development programmes for sustainable development.

38.5 Policy 284: Sufficient allocation for agriculture should be made in the LSG budgets at least 40%, and that should be made mandatory for assuring the farmers, the assistance they need.

38.5.1 During the sittings conducted by the Committee in different districts, the farmers made a vehement plea that the Grama Panchayts should mark at least 40% of their budget provisions for agriculture alone. Hence, the Government should take it as a policy that, the LSG institutions should provide at least 40% of their budget to the agriculture sector alone. A recent trend of not putting any funds for agriculture was also been observed by the Committee. However, this was an unhealthy practice which was to be checked at the very moment it appeared.

38.5.2 Keeping the implementing officer under the control of LSG institutions and putting no fund for the required sectors should not be tolerated by the Government. If any such cases arise in future, necessary provision has to be created legally for withdrawing their control over the 'handed over institutions and officials'.

39 NEW POLICY GUIDELINES, PRINCIPLES AND STRATEGIES FOR THE BEST SERVICE DELIVERY BY THE DEPARTMENT OF AGRICULTURE

39.1 The Department of Agriculture is multifaceted. It has many responsibilities that include production, agriculture support and trying to help make sure State's farms remain efficient, capable of supporting the needs of the farmers which in turn supporting the whole State for food and income, and also providing an important part of State's economy in terms of export and domestic sales and contribute immensely to the economic health and well-being of the State.

39.2 The Department of Agriculture has grown into a huge organization with duties that have evolved over a long period of time. The efforts of the Department in bringing to the public a safe, affordable food supply are commendable.

39.3 Policy 285: The Department of Agriculture will be modernised and renamed as 'Agriculture Development and Farmers' Welfare Department'.

39.3.1 The purpose of the new policy adoption is to provide the State Government with the necessary guidelines, principles and strategies to streamline and reorganize the Department of Agriculture to achieve greater efficiency, effectiveness, and economies in the organization and management of the programs and activities carried out by the Department. Since the new programmes of the Govenrment like farmers' pension schemes are oriented more towards the welfare of the farmers, the Department needs to be renamed accordingly. The motto of the Department should be 'no farming is possible without the farmers'.

39.4 Policy 286: The Department of Agriculture must continue to rely upon the most versatile form of decentralized Grama Panchayat level Krishibhavan offices and staff support has to be re-organised based on work load and number of farm families.

39.4.1 Kerala is the only State in India having a well defined agriculture system starting from the Grama Panchayts. This system is supposed to be the most effective structure for agricultural extension. In fact, the Department makes a presence in all the Grama Panchayat through Krishi Bhavans.

39.4.2 The Krishi Bhavan established at Panchayat level functions as grass root level functional as well as technical facilitator agency to farming community via schemes implemented through local bodies and the Department of Agriculture. Each Krishi Bhavan is manned by technically qualified Agricultural Officers and supported by 2-3 Agricultural Assistants. The staff strength has to be assessed based on the number of farm families and the intensity of crops grown and necessary improvements are to be given . This system is to be strengthened and continued for the effective service delivery of the Department of Agriculture at the Grass root level.

39.5 Policy 287: Make the Department a better place for employees to carry out their jobs of serving farmers will result in a more productive and satisfied work force.

39.5.1 The employees are to be informed and trained in the mandated mission of Department of Agriculture and provided with proper incentives to carry out their jobs of serving farmers will result in a more productive and satisfied work force. A working partnership between employees, Government, and farmers needs to be developed.

39.5.2 The soft aspects and skills of human resource management, such as employee satisfaction and morale, would considered to be the most important drivers of performance.

39.5.3 The image of the Department has to be improved in terms of the work environment and remuneration. The relatively unattractive image that the public service is considered to have in the state encourages many talented students to pursue careers in the private sector which is a brain drain and does not reflect directly in the services offered to farmers.

39.6 Policy 288: The methods used for technology dissemination and personal approaches are to be restructured in lieu of the changing face of the ICT based tools, instruments and techniques

39.6.1 The technology and users have changed considerably during this decade and this needs a change in the structure and organization of the Department of Agriculture which is the largest technology provider of the state. The methods used for technology dissemination and personal approaches are also to be restructured in lieu of the changing face of the ICT.

39.6.2 Currently the field officials such as the Agricultural Officer and his assistants are performing two main duties- Technology Transfer and assistance distribution. The latter involves money transactions and is done manually following the procedures of a Government transaction. This actually takes up most of the time of these professionals and their expertise is being lost by concentrating on the assistance distribution and connected record keeping. It would be helpful if the entire operations of office administration be done with the help of software. The e-payment mechanism now being followed is well accepted here. But a fully fledged and mandatory software like the 'SPARK' which would be able to do the routine office functions. The policy measures suggested in the Section 14.5 of the Agricultural Development Policy is applicable here.

39.7 Policy 289: The state level monitoring of Decentralised planning programmes have to be monitored by the Department of Agriculture by creating a separate wing which work hand in hand with LSGD Department and KILA.

39.7.1 Now the decentralised planning is under the full control of LSGD Department and there is no state level mechanism to monitor the programmes and expenditure to monitor the state level programmes.

39.7.2 A separate wing needs to be created under the leadership of an additional director to work hand in hand with LSG Department on monitoring and evaluation of technical programmes being implemented in the Grama Panchayats.

39.7.3 The District level programme should be entrusted with a Deputy Director, who will have full involvement in the programme.

39.7.4 KILA should also avail support of faculty from Agriculture Department for the preparation of projects and plans related to agriculture and allied fields.

39.7.5 Project implementation at Corporations and Municipalities needs to be under the full supervision by an Assistant Director at District level.

39.7.6 The innovative schemes and projects, location specific projects, and special projects on agri-entrepreneurship development should be encouraged and mechanism should be created to hasten the approval speed.

39.8 Policy 290: A 'Knowledge Centre' at the district level has to be constructed for effective farm advisory services and empowering the small farmers with technology.

39.8.1 An important element in the Farm Service Center or Knowledge Center will be the ability to take advantage of improved technology and to share data between the Department, farmers, the research institutions and experts. A joint Working Group of Departmental higher authorities such as the Principal Agricultural Officers and technology specialists from the field offices are to work full-time to develop the systems to support the Field Service Centers such as the Krishi Bhavans. This Group is also aimed looking at innovative ways to reduce the paperwork burden on the farmers, yet assure the agency has the help in documentation it needs to. Support program activities related to the disbursement of funds or delivery of tangible benefits to the farmers. A total of 15 such centers are to be established in the State. In all the 14 districts such units are to be established in suitable locations. One unit is proposed at the State level to co ordinate the activities of the district level units.

39.9 Policy 291: The Department aims at establishing effective formal liaison and cooperation with all institutions involved in agricultural development in the State.

39.9.1 These include the Central Institutes, the Krishi Vigyan Kendras, Commodity Boards, Agricultural University, Research Stations under KAU, different Public Sector Undertakings etc. For this purpose the duties of the Knowledge Centre proposed in the Section 39.8 of the Agricultural Development Policy should also be put in line. An interface where these institutions and representatives of organised agriculture discuss matters of mutual interest is to be assured. This cooperation will promote the optimal utilisation of available sources and knowledge.

39.10 Policy 292: The staff pattern of the Assistant Directors' Office is to be strengthened by providing additional man power support depending up on the work load of the Office.

39.10.1 The role of Assistant Directors in the Department is of the administrative, technical and co-ordinative in nature. The existing staff pattern of the Asst. Directors of Agriculture is one Assistant Director and a clerk. He is the drawing officer of all the schemes of the Department of Agriculture and controlling officer of the Agricultural Officers of his Block. Due to multiplicity of schemes and roles the expertise of this professional is also can not be tapped fully. So the staff

structure of the Assistant Directors' Offices needs an immediate attention from the part of the Government.

39.10.2 There is practice of re-deploying the clerical staff to the LSG institutions and has to be stopped. The Department faces acute manpower shortage and at the same time its staff are being sent to other Departments. Instead of re- deploying them, they have to be deployed at the needy Assistant Directors Offices. This will solve the problem of manpower at the Block level to a considerable extent.

39.11 Policy 293: Modernization at all levels of the Department including administration, communication, reporting, technology transfer, scheme administration, implementation, feedback, monitoring and midterm correction should be the motto of the Government.

39.11.1Department of Agriculture is one of the biggest Departments under the State Government. It hosts about 3118 number of Agricultural Assistants, 1193 number of Agricultural Officers, 289 number of Assistant Directors, 112 number of Deputy Directors, 26 number of Joint Directors and six Additional Directors in the Technical Cadre and 1075 number of clerical staff, 142 Superintends, 16 Administrative Assistants, 16 Accounts Officers and 1467 other staff. For the proper functioning, the Department has to be modernised, so that the services can be delivered at a shorter time and functional reorganisation can be achieved. Computerisation and e-governance should be given priority. ICT based application tools such as the Office Automation and 'Paperless Offices' in the case of Krishibhavans as described under the Section 14.5 of the Agricultural Development Policy would be made in to reality for serving the farming community in the desired way.

39.11.2The employee records need to be modernized and 'Smart Card' system should be adopted for effective staff management and administration. Entire functioning of the Department needs to be based on a web platform where online reporting and administration can be done. This will revolutionize the entire system functioning with respect to economy, efficiency, transparency and accuracy.

39.11.3Modernisation of the Department of Agriculture with modern technologies in administration and use of ICT tools as per Section 14 of the Agricultural Development Policy must be carried out immediately at this juncture as the farmers and public are very much eager in getting the things done at the right time, in the right way and for the right person.

39.12 Policy 294: The auditing system followed in the Department needs a thorough reorientation for improving the Departmental Quality Management System.

39.12.1 Presently there are three audit systems in the Government to be faced by the Agricultural Officers, viz., Department level accounts and audit, Accountant General's audit and Local Fund Department audit. Auditing, when effectively implemented, can arguably be considered the most important tool in the quality system "tool box." It is the

primary continual monitoring process of Departmental Quality Management System (QMS). The output from auditing is critical to the growth of the QMS – identification of system ineffectiveness, corrective action and ultimately continual improvement. But, it was observed by the committee that many at times the auditing system focusses mainly on the accounts alone rather than finding ways to improve QMS. However, when auditing is poorly deployed, its ineffectiveness leads to increased, non value-added costs, many hours of wasted resources and an eventual, inevitable QMS breakdown. In the Departmental front, as far as agriculture is concerned auditing has now become acquired the position of a 'necessary evil'!. The professionals of the Department are now put in pressure and wasting their quality time in defending the objections raised by the team who looks only in to the 'black and whites' in the administrative procedure.

39.12.2 The Government would hold the policy that the audit process is just as critical and important an activity as any other process within the quality management and improvements and not just observing the procedures and accounting rules. The organisation that understands and supports its internal audit system keeps its quality performance edge sharp. These auditors have acquired the skill to identify system effectiveness rather than compliance alone. Hence the auditing system must be equipped with quality professionals who are capable of deriving mechanisms for continual improvements and corrections during the course of implementation of various programmes of the Government.

39.12.3 Many a time the auditing system at present was seen to be of a punishing type rather than a guiding one, the primary objective of establishing the same. So increase the internal audit focus on areas that are root cause or otherwise not performing to expectation. The present system is to be reorganised with the inclusion of technical staff, external experts for efficiency improvement and guidance and representative of the beneficiaries.

39.12.4 Effective audit schedules are to be published annually, so that, the time delay in auditing can be avoided. In fact, concurrent auditing system should be made mandatory.

39.12.5 The auditing system should address primarily the guiding principles rather than trying to find out the mistakes alone which could lead to efficiency deterioration. At the same time the system must think of alternatives such as 'Automated and Computer Assisted Financial Transaction Tools' for checking the fraudulence that can happen in the account management. Fraudulence at all levels is to be eliminated by employing efficient soft wares which carry security at all levels of transaction.

39.13 Policy 295: A Department of Agriculture Manual is to be published by the Government immediately to provide guidance and serve as a reference to employees which will result in the efficiency improvement.

39.13.1 A Departmental manual is intended both to provide guidance and serve as a reference to employees of the Agriculture Department. It is the responsibility of each member of the

Department to comply with the policies and procedures set forth within this publication. The Department of Agriculture is more than 100 years of age and till now no departmental manual is seen published. This would be treated as an immediate requisite and manual is to be designed to equip both employer and employees with a means to ensure compliance with all relevant rules and regulations.

39.14 Policy 296: The District Soil Test Laboratories under the Department of Agriculture play an important role in the soil test based nutrient application and they have to be strengthened as Soil Plant Health Clinics for including the diagnostic services along with routine analytical service.

39.14.1 Researchers say that the lack of awareness about the importance of soil and water conservation measures and unscientific crop management practices lead to an alarming decrease in the plant nutrients present in soil as well, fall in production and increase in incidence of diseases. For the integrated nutrient management soil testing is necessary.

39.14.2 Steps are to be taken for strengthening the laboratories for exploiting their potential. The current capacity of analysing soil samples are 2.88 lakh numbers and at present only 1.319 lakh samples are being anlysed per year. The man power shortage is attributed as the main problem and this has to be addressed at the earliest.

39.14.3 The policy envisages improving the facilities for quality control of organic manure and of irrigation and drinking water, analysis of soil and plant samples for major and micro-nutrients, including heavy metal toxicity and to make the District Soil Testing Laboratories as Soil Plant Health Clinics. A Plant Health Clinic can do the diagnostic services such as pest & disease identification, nutrient deficiency diagnosis, soil problems etc. The microbiological works can also be undertaken by them for the proper quality monitoring of the bio fertilisers which are going to be a boom in the coming period in the light of organic farming.

39.14.4 All the most modern labour and time saving machineries, equipments and protocols are to be provided to the Laboratories for ensuring accuracy, efficiency and timely delivery of the results.

39.14.5 Selected DSTLs (the proposed Soil Plant Health Clinics) would have the pesticide residue testing facility for ensuring a healthy food to the people. The suggested DSTLs are Alappuzha, Ernakulam, Palakkad, Kozhikode and Kannur. Necessary man power support should be extended to all the existing units and proposed units for running these institutions smoothly and serving the farming community with accurate and timely results.

39.14.6 All the DSTLs (the proposed Plant Health Clinics) are to be provided with micronutrient analysis facility, since the micronutrient deficiency problem is widely seen in Kerala. Micro nutrients are to be applied with extreme caution because the higher concentration may lead to toxicity.

39.15 Policy 297: Fertiliser Quality Control Laboratories are to be strengthened or upgraded to give accurate results in minimum time so that the farmers are assured of good quality fertilisers.

39.15.1 In order to test the quality of the fertilizers sold in the country, at present there are 2 FQCLs working under the control of Department of Agriculture. Since quality testing is a statutory requirement under the Fertilizer Control Order (FCO), it is imperative to maintain all the instruments and equipment and to ensure supply of quality chemicals and glasswares for the analysis. This requires time-to-time upgradation and replacement of the equipment. Therefore, in order to maintain the high standard of analysis potential, it is proposed to upgrade and strengthen the existing FQCLs in the State.

39.16 Policy 298: The bio control agents and parasites used in the biological control of pests and diseases are to be made freely available to the farmers of the State by strengthening the State Bio- Control Laboratory and developing the Parasite Breeding Stations as its sub-centres for the mass multiplication.

39.16.1 Mass rearing and distribution of biocontrol agents suited for pests of major crops of Kerala is the mandate of the State Bio-Control Laboratory. Release of biocontrol agents help in the increase of population of natural enemies in the field ecosystem, there by strengthening the natural mechanism of pest control, which is a major objective under Integrated pest management system. The present capacity of the laboratory is 50 t of Trichoderma viride, 70 t of Pseudomonas fluorescens and 39,000 cc Tricho cards annually. As the State is having a well defined policy on organic farming and trying to make it 100% organic in the near future, there will be a huge need for the bio control agents. The production capacity has to be increased to 5-6 fold for meeting this demand.

39.16.2 In this context, the need for developing support institutions for the mass multiplication of the bio-control is inevitable. The nine Parasite breeding stations in the districts of Thiruvananthapuram, Kollam, Alappuzha, Kottayam, Ernakulam, Thrissur, Malappuram, Kozhikode, and Kasargod are to be reorganised to become the regional laboratories under the State Bio-Control Lab. The mother cultures are to be distributed by the State Bio-Control to its Regional labs for the mass multiplication. Necessary man power support and equipments have to be provided to these institutions to strengthen the bio-control agent production in the State.

39.17 Policy 299: The The Bio-technology and Model Floriculture Centre (BMFC), Kazhakuttam functioning under the Department of Agriculture is to be upgraded as a Centre of Excellence with semi - autonomous powers.

39.17.1 The Tissue culture Laboratory at BMFC is well equipped and has a production capacity of above 15 lakhs plantlets per year. The Centre carries out the micro propagation work in Banana, Orchids, Anthuriums and Pepper. Crop improvement work in Orchids, Anthuriums and Hibiscus is also in progress and a limited number of their planting materials are also being produced.

39.17.2 This is the only bio-technology centre under the Department of Agriculture. Considering the importance of micro propagation, the laboratory has to be put in a top position. This institution has to be converted to a Centre of Excellence in bio-technolgy and Floriculture. Thus BMFC can offer trainings to farmers, Officers and for the

educated youth as a part of providing them employment and assuring the farmers the good quality tissue cultured plantlets of banana, pepper, orchids, anthuriums, medicinal plants etc.

39.17.3 The BMFC is an institution which require a special attention from the Government. For the smooth fucntioning and to have the proper equipments, chemicals, nuclear planting materials, human labour etc., put in place, this centre should have an autonomous power like that of State Agricultural Management and Extension Training Institute under ATMA. It is high that BMFC should be strengthened with autonomous powers and elevated to the position of a 'Centre of excellence'.

39.17.4 This centre can provide technology oriented support to the tissue culture labs in the state for the production of quality planting materials. The present capacity of tissue culture plantlets have to be raised to 50 lakh to one crore within a span of 5 years.

39.18 Policy 300: Strengthening the Department's Agricultural Engineering Division by providing it the necessary technical and engineering support to carry out the smooth and expeditious implementation of mechanisation, popularisation of improved machinery and agricultural infrastructure projects.

39.18.1 Agricultural engineering inputs have played an appreciable role in improving farm productivity. Appropriate mechanisation not only saves time and labour but also cuts down crop production costs and reduces post-harvest losses. It promotes sustainable use of natural resources through machine assisted resource-conservation farming.

39.18.2 The agricultural engineering division should accord priority to develop light-weight and low-cost power tools and machinery, to improve field operations. Availability of skilled labour to meet mechanisation of farming is also vital. Many promising technologies and machineries had been successfully tested by the RTTC (Regional Testing and Training Centre) and they need to be demonstrated extensively for the adoption by the farmers. In this context, the RTTC needs to be strengthened by providing modern equipments for training. There is no hostel facility associated with RTTC, Vellayani and that should be provided to the Centre for imparting trainings to make a skilled operator population.

39.18.3 Presently te responsibilities of Agriculture Engineering Division include the preparation of engineering designs, plans, specifications, project studies and estimates for agricultural amchinery, and product machinery, machinery testing, certification etc. They are also tasked to manage or supervise agricultural buildings and structures, farm electrification and energy systems, agricultural machineries equipment, irrigation and soils conservation systems and facilities, agricultural waste utilization systems and facilities. Apart from these the offices associated with this division are doing training programmes and extension activities. There exists a huge shortage of man power in some offices and that has to be addressed by the Government immediately as this is a vital component of the Department of Agriculture dealing with the most important issue of mechanisation in the state.

39.19 Policy 301: An adaptive research mandate should be attributed to the Department of Agriculture to carry out research on location specific technologies in the farmers fields.

39.19.1 At present the Department of Agriculture is conducting Farmer Field Schools (FFSs) under the ATMA programmes and Central Sector Schemes. Farmer field schools are a popular education and extension approach worldwide. Such schools use experiential learning and a group approach to facilitate farmers in making decisions, solving problems, and learning new techniques. The two important components such as experimental learning and learning new techniques offer the Department the scope of conducting regional experiments for the refinement as well as the testing of the local farmers' practices. There exists a large bundle of Indigenous Technical Knowledge (ITK) in the farmer community. Under the present system of research and extension there exists a complex issue of testing the new machineries and technologies by an approved agency which in turn will be transferred to the Department for extension. This creates a long time lag in providing technologies to the farmers. In this context there is the need to promote Departmental Research Programmes in farmers fields regarding newer technologies around the world, newer machineries, ITKs etc. This will offer a bright opportunity for the farmers to get the technology as and when it is released and the development of region specific technologies.

39.19.2 The farmers should be provided with incentives in the case of positive results and compensation in the case of crop loss due to negative results. At least 100 micro level research programmes should be taken in an year.

40. REVAMPING THE ANIMAL HUSBANDRY DEPARTMENT FOR BETTER SERVICE DELIVERY

40.1 Animal Husbandry sector accounts for nearby 40% State Domestic Product (SDP) of Agriculture & allied activities. This sector has ample potential to substantially enhance the production of milk, egg and meat to meet the domestic market demands as well as to create employment and income generating opportunities for the rural poor for better livelihood support. Keeping in view the above aspects, a long term action plan and policy initiatives are suggested for revamping the Department of Animal Husbandry for better service delivery.

40.2 It is necessary to streamline and strengthen the Directorate of Animal Husbandry by putting in place an organizational structure for meeting the new challenges in the field of livestock development and veterinary health care.

40.3 The major emphasis has been given for optimal utilization of Veterinarians including subject area specialists who are experts in various disciplines, to meet the functional needs of the Department effectively.

40.4 All functions performed by the Department could be grouped into two groups i.e., Technical Functions and Administrative-Fiscal Functions. Technical functions such the treatment, breeding, feeding, management etc. are performed by the District and Panchayat level officers and employees through dispensaries, hospitals, polyclinics and laboratories, where as the Administrative and Fiscal functions are carried out by the state and district level supervisory offices.

40.5 Policy 302: It is proven beyond doubt that to maintain the quality of performance and efficiency of key activities, staff attitude and behavior has a major contribution and this principle is to be put in practice at the earliest.

40.5.1 The HRD section has a role to play in their policy of recruitment, their development plans in terms of training, postings, transfers and promotions or their career planning. The modifications in recruitment rules with psychological tests and multi-skilled behavioral assessment are specialized tasks. Therefore it is necessary to establish full-fledged HRD cell at the Directorate level.

40.5.2 Training and equipping the staff with exposure in the best institutions or centres of excellence, both within and outside the country should be taken up to improve the skill, attitude, aptitude and work output for creating a quality workforce for the betterment of the farming community.

40.5.3 The staff in regular posts also need specialized training viz. fresh veterinary graduates posted as extension officers have completely different training needs than those posted at a dispensary. Similarly, with a transfer of staff into newer areas of operations, training should be obligatory to understand the intricacies of new posts and responsibilities. Such training plans will motivate the staff for better performance. The present training facilities within the department can fulfil the induction level training needs, provided that the overall changes to this very vital component of Human Resource development are carried out.

40.5.4 The staff who qualify for post graduate studies are to be sent for post graduate courses in Universities, Centres of Excellence, and Deemed Universities in India and abroad and Central Institutes for sharpening the knowledge which will in turn add to the quality of the Department. Moreover, it is possible to create a task force on different issues as and when required with the experts. It is to be seen that, at least 15 officers every year shall be sent for this programme.

40.6 Policy 303: The Animal Husbandry Department staff can be classified into general staff and those having a specialized knowledge and skill, to maintain the quality of performance and efficiency of key activities.

40.6.1 To fulfil the department mission on quality parameters specialized staff has to be a part of the long-term policy. It is recommended that to maintain the quality of performance and efficiency of key activities, the posting of specialists with required qualification and experience should be on top priority. Their future development plans in terms of postings, transfers and promotions have to be planned in their specialized subject area by the HRD section. The recruitment rules of such specific posts should be modified, mentioning the required qualification for the identified posts.

40.7 Policy 304: Establishment of Department level service providers at the Taluk level for better monitoring and effective plan formulation and implementation.

40.7.1 At present the grass root level functionary in the Panchayt level is having two sets of institutions, viz., Veterinary Hospital/ Dispensary and Sub Centre. The Panchayat level institution has no administrative control over the Sub Centre due to the administrative control exerted by the regional institution namely Regional Artificial Insemination Centre which is headed by an Assistant Director. The Sub Centres of the State has a manpower of about 1400 Livestock Inspectors. Due to the lack of administrative control of the Panchayat level institutions this huge man power could not be used effectively for the important regional programmes.

40.7.2 Hence, the Regional AI Centres should be restructured in to a new system of administration at Taluk level / Block level which has administrative control over both the institutions. Since the Panchayat level institutions are headed by Assistant Directors also, the proposed mechanism at the Taluk Level is to be headed by a Deputy Director so that a miniature office of the Directorate at State level can be replicated for effective service delivery and co ordination.

40.8 Policy 305: Quality should be ensured in all Government purchases of drugs rather than low cost to assure the farmers good drugs.

40.8.1 It is recommended to form a State-level technical committee of minimum 3 field-level technical officers and a technical assistant of the Directorate of Animal Husbandry to look into the quality aspects at the time of procurement. Substandard drugs, instruments and other technical inputs seriously reflect on the

effectiveness of treatment given. This technical committee should scrutinize bulk purchases as well as specialized purchases. There should a mechanism to ensure the approval of rate contracts within two months of the every financial year. Purchases should be effected before the end of first quarter. The indents need to be inbuilt from the lowest working unit, considering the past performance and history. The product approved for procurement should be easily available in local market.

40.8.2 Since the resource poor farmer is the ultimate beneficiary of all the Government programmes, while purchases regarding medicines, vaccines, instruments, other essential items etc., are initiated; quality should be ensured rather than going for the low priced items. The Government should make necessary legal provisions for doing the same.

41. STATE AGRICULTURAL RESEARCH POLICY

41.1 The Kerala Agricultural University is the primary and the principal research instrumentality of the Kerala State in providing human resources, skills and technology, required for the sustainable development of its agriculture, defined broadly encompassing all production activities based on land and water, including crop production, animal husbandry, forestry and fishery through conducting, interfacing and integrating education, research and extension in these spheres of economic endeavour.

41.2 The research contributions of KAU are well known and appreciated by the farming community. Whether it be rice varieties like Jyothi and Uma or two hundred odd varieties of other crops, including vegetables and spices or farming technologies, the contributions of KAU are invaluable.

41.3 Most rice varieties cultivated in the State including Uma, Jyothi and Prathyasha were developed by the university over the years. It has also developed 56 varieties of vegetables including bitter gourd and ladies finger. Six banana varieties, seven pepper and salinity-resistant rice varieties are the contributions of the university. Besides Kerala, a large number of farmers in the neighbouring States of Karnataka and Tamil Nadu are using varieties developed by the university.

41.4 It has also been serving the State and its farmers through various extension activities. Small farm mechanisation, precision farming, improvement of productivity, value addition to agriculture produces and promoting agri-business will be the future thrust areas of the university.

41.5 Policy 306: The Kerala Agricultural University has to redefine its mission, taking into consideration the present stage of agriculture scenario in the State.

41.5.1 The drastic reduction in agriculture holdings, reduced productivity and falling income are deterring youngsters from taking up agriculture. The ever increasing cost of labour and acute shortage of farm workers too dissuade even those interested in farming from the field. In the light of these facts the new mission statement should recognise that Kerala agriculture now has expanded clientele including NGOs and the private sector, and above all, a faster-growing middle class population of more than 16.8 million people with increased purchasing power in the state.

41.5.2 The mission of the University must be to assure technologies to the small farmers of the state to deliver an income for a decent living of which social status of them is to be improved.

41.6 Policy 307: The debt burden of the University has to be addressed by the Government by providing a one time grant.

41.6.1 The present difficulties experienced by the Agriculture University mainly due to the acquired debt of above Rs. 265 crores should not be treated as an obstacle which could not be erased out making the university self reliant result producing and as an institution which could face any challenge and provides solution to the problems faced by farmers as well as

the State. We observe that its present financial burden though acquired due to undesirable and unfortunate reasons must not be allowed to wither one of the resource rich institutions we have built up at a huge cost. Kerala's farming sector according to certain estimate is contributing physical produce worth over Rupees one lakh crore. An institution like Kerala Agriculture University should be treated as a part of this great effort and it should be made capable to help the farmers to make the returns from farming sector cross two lakh crores in another two decades. The agricultural university may not be treated as a commercial organization and its contributions must be evaluated using different norms.

41.7 Policy 308: The present practice of proliferation of agricultural universities through creation of new universities, campuses, colleges and through bifurcation of existing universities is indeed counterproductive and not in the interest of quality education.

41.7.1 This practice needs to be stopped at the state level. On the other hand, there is an obvious need for the consolidation and downsizing of existing institutions for efficient utilisation of limited resources.

41.7.2 The trifurcation of the KAU into Kerala University for Fisheries and Ocean Studies and the Kerala University for Veterinary Sciences was expected to shed the liabilities. However, it has only increased the burden of the KAU. Under the trifurcation package, it parted with some of its holdings and staffers. While 75 staffers opted for the Fisheries University, 160 went to the Veterinary University. However, the KAU continues to pay the pension and other retirement benefits to around 4,800 persons including those who served the fisheries and veterinary faculties of the undivided university.

41.8 Policy 309: The state government must ensure proper financial support to the agricultural university by allocating at least 15 per cent of the total budget of the departments of agriculture, animal husbandry, fishery, social forestry and any other related to agriculture additionally.

41.8.1 Burgeoning debts, massive spending on salary and pension of the staff and insufficient allocation from the Government are pinning the University to the ground.

41.8.2 The KAU is one of the biggest employers of the State with around 4,500 persons including over 2,500 farm workers and 1,800 ministerial staff in its pay rolls. After splitting the annual plan fund between pensions and salaries, precious little is left for the university for its projects. So the state Government should allocate sufficient funds for the research and development initiatives by the University for the betterment of the farming community.

41.8.3 The State Governments should devise a mechanism to provide agricultural university a lumpsum grant as core fund to be used in future, exclusively for the maintenance and renewal of existing infrastructural facilities on the campus. This will mitigate the effects of uncertain funding.

41.9 Policy 310: The disciplines and emerging areas must find a place in the teaching programmes of the agricultural universities.

41.9.1 With social, economic and scientific changes, several new disciplines such as agri-business management, biotechnology, molecular taxonomy, environmental sciences, plant and animal genetic resources, intellectual property rights in relation to World Trade Agreement, Biodiversity Convention and other international commitments have become important. These disciplines and emerging areas must find a place in the teaching programmes of the agricultural university.

41.9.2 With the technological revolution, which is recently getting a momentum through effective use of genetic engineering and molecular biology, basic research is assuming pivotal importance to provide a sound base for competitive technological advances. Basic sciences, therefore, need to be given adequate importance by agricultural universities both in terms of resource allocation and faculty involvement.

41.9.3 Social and behavioural science components need to be given specific emphasis in view of our understanding of the interdisciplinary character of the problems of the farming community.

41.10 Policy 311: A favourable environment is to be created in the University for improving the quality in research.

41.10.1 Success in research depends to a very large extent on the abilities and motivation of the individual scientist as well as the opportunities afforded to him for carrying out his work within a favourable environment.

41.10.2 Continuous professional improvement of the available scientific talent in the university through providing opportunities for exposure to modern scientific fields and also providing adequate training for the research personnel will improve the efficiency.

41.10.3 Make available of adequate manpower and infrastructure to carry out the research works in time.

41.10.4 The research personnel should be exempted from non-research tasks like administrative work so that they can concentrate more on the actual research work.

41.11 Policy 312: The research needs to be redefined based on the technological advancements and farmers' requirements.

41.11.1 One of the basic causes of farm problem is the failure of agriculture to keep abreast of industry in research and development. Farmers have concentrated on learning how to increase their yields, leaving it up to the Government to worry about their surpluses, while hundreds of new industrial discoveries have pushed the farmer out of much of his market.

41.11.2 The university has to address this problem in the new perspectives that natural and organic products are gaining momentum in the new world. The research should be oriented in such a way that the farmers should ultimately gain from their production.

41.12 Policy 313: The University should focus on the new areas of research.

41.12.1 Advancements in the newer areas like

- Retention, enhancement or restoration of soil productivity
- Responding to challenges posed by novel pests and pathogens, including exotic species

or species expected to be a greater problem because of changing field conditions.

• Decreasing the need for water or fertilizers by improving the efficiency of applying these inputs or developing more use-efficient crops, equipments and cropping systems

• Developing automation and mechanization to enhance the efficiency, safety, and economic sustainability of food production and processing systems.

• Increasing water and air environmental quality as part of sustainable agricultural production systems.

• Improving agricultural and environmental practices at the urban-rural interface.

• Decreasing the chemical or microbiological contamination of food.

• Improving the understanding and application of knowledge about functional foods aimed at improving health and nutrition.

• Developing production, marketing, and distribution systems to support emerging regional and local food systems.

• Developing new or improved mechanisms (i.e., criteria or indicators) for assessing sustainability of practices, production systems, and/or industries.

• Developing new crop varieties for shade tolerance and increased productivity such as hybrid varieties of rice.

41.13 Policy 314: The Agricultural University is to be made a goal oriented organization and the autonomous nature of the institution is to be assured by making improvements in the general administration focussing only on research accomplishments. ICAR Model Act should be enacted soon.

41.13.1 It was observed that there are some problems associated with the general administration of the University. Sometimes the administrative mechanism like the different councils are deviating from the main functions of the University and thus making serious obstructions in the efficient functioning. ICAR Model Act for Agricultural Universities is actually a solution for the same. The policy approach from the part of the Government would be to make the Agricultural University a platform of expertise rather than a mere academic institution. For making a big leap in the academic excellence, quality in research and efficient extension; ICAR Model Act should be enacted for redesigning the administrative mechanism so that the required technical expertise is being put in place for the efficient functioning.

42. POLICIES FOR RESEARCH PRIORITIZATION IN LIVESTOCK SECTOR

42.1 The livestock sector globally is highly dynamic. In developing countries, it is evolving in response to rapidly increasing demand for livestock products. In developed countries, demand for livestock products is stagnating, while many production systems are increasing their efficiency and environmental sustainability.

42.2 Historical changes in the demand for livestock products have been largely driven by human population growth, income growth and urbanization and the production response in different livestock systems has been associated with science and technology as well as increases in animal numbers. In the future, production will increasingly be affected by competition for natural resources, particularly land and water, competition between food and feed and by the need to operate in a carbon-constrained economy. Developments in breeding, nutrition and animal health will continue to contribute to increasing potential production and further efficiency and genetic gains.

42.3 Policy 315: If past changes in demand for livestock products have been met by a combination of conventional techniques, such as breed substitution, cross-breeding and within-breed selection, future changes are likely to be met increasingly from new techniques.

42.3.1 The KVASU should develop technologies for mass production of sexed semen for use within and outside the state. This would become a major revenue generating technology for the KVASU.

42.3.2 The modern facilities and expertise needed in the breeding front has to be imparted to the University by international collaboration programmes.

42.3.3 Rates of genetic change achieved in beef cattle and goat populations are substantially lower than what is theoretically possible. The technologies in the genetic improvement sector is to be formulated by an intensive research and development programme by the University.

42.4 Policy 316: A considerable body of work exists associated with the dynamics of digestion, and feed intake and animal performance and has to be undertaken by the KVASU.

42.4.1 A large agenda of work still remains concerning the robust prediction of animal growth, body composition, feed requirements, the outputs of waste products from the animal and production costs. Such work could go a long way to help improve the efficiency of livestock production and meeting the expectations of consumers and the demands of regulatory authorities. Advances in genomics, transcriptomics, proteomics and metabolomics will continue to contribute to the field of animal nutrition and predictions relating to growth and development. Better understanding of the processes involved in animal nutrition could also contribute to improved management of some of the trade-offs that operate at high levels of animal performance, such as those associated with lower reproductive performance.

42.4.2 Considerable work is under way to address some of the issues associated with various antinutritional factors. These include methods to reduce the tannin content of tree and shrub material, the addition of essential oils that may be beneficial in ruminant nutrition and the use of other additives such as enzymes that can lead to beneficial effects on livestock performance.

42.5 Policy 317: The infectious disease threat will remain diverse and dynamic, and combating the emergence of completely unexpected diseases will require detection systems that are flexible and adaptable in the face of change.

42.5.1 New diseases have emerged, such as avian influenza H5N1, which have caused considerable global concern about the potential for a change in host species from poultry to man and an emerging global pandemic of human influenza. This necessitates the development of a detection system which is fast and accurate.

42.5.2 Over the long term, future disease trends could be heavily modified by climate change. For some vector-borne diseases such as malaria, trypanosomiasis and bluetongue, climate change may shift the geographical areas where the climate is suitable for the vector, but these shifts are not generally anticipated to be major over the next 20 years. There is evidence that climate change, especially elevated temperature, has already changed the overall abundance, seasonality and spatial spread of endemic Helminths in the country. This has obvious implications for policy-makers and the goat and cattle rearers, and raises the need for improved diagnosis and early detection of livestock parasitic disease, along with greatly increased awareness and preparedness to deal with disease patterns that are manifestly changing.

42.5.3 The future infectious disease situation is going to be different from today's , and will reflect many changes, including changes in mean climate and climate variability, demographic change and different technologies for combating infectious diseases. So the University has to develop concurrent research strategies for meeting these challenges.

42.6 Policy 318: Compared with the biophysical environment, the social and cultural contexts of livestock and livestock production are probably not that well understood and an integrated research approach is needed on this line.

42.6.1 The research undertaken by the research system sometimes becomes quality eroded and research oriented. It should be reoriented in such a way that by doing the research in public domain, the ultimate beneficiary should be the farmer who is producing food for all.

42.6.2 Inevitably, the cultural and social roles of livestock will continue to change, and many of the resultant impacts on livelihoods and food security may not be positive. Social and cultural changes are likewise taking place everywhere and the research should contemporarily change.

42.6.3 The results thus generated has to be disseminated to the field by the most effective extension methodology so that the ripe fruit of the research should become consumable to the farmer at the right time without decaying.

43.POLICIES FOR MOTIVATING FARMERS

43.1 The Awards are designed to promote a positive image of Kerala farmers and farming families, inspire and encourage career choices and investment interest in agriculture. The awards acknowledge farmers who demonstrate a highly professional, innovative and sustainable approach to agricultural production, successfully increasing returns and decreasing input costs. Those focused on the future sustainability of their farming enterprise and the advancement of the wider agricultural canvas will be highly recognised for motivating them as well as others.

43.2 The State Government introduced awards in agricultural sector during 1993 as a part of the approved policy of the Government. The system was a novel one and not being found anywhere in India. But due to a host of reasons the efficacy of the awards was found to be in a declining mode. If the proposed growth in agriculture sector is to be made a reality, the motivational aspects have a decisive role. Hence the Government should take strict policy initiatives for disbursing the awards in agriculture sector to those who really deserves it and in a time bound and impartial manner.

43.3 Policy 319: The state agricultural awards must be distributed in the same week along with the 'Farmers Day' celebration in every two years.

43.3.1 The agricultural awards are the prestigious awards in Kearala, which is initiated by the Government of Kerala for the first time in the country. The awards aim to highlight the important role of farmers and the good work they are already doing, providing excellent examples that others can learn from. It is also intended to promote cooperation around the region in order to further the application, and promotion, of good cultural practices in the agricultural sector.

43.3.2 In order to provide sufficient time for preparing themselves for the awards, the State Agricultural Awards are to be presented once in two years with periodic revision in the prize money. It shall be distributed in the week in which the 'Farmers' Day' is celebrated every year.

43.4 Policy 320: The selection criteria should be modified and codified based on the modern principles and assessment should be done impartially and flaw free.

43.4.1 The criteria for selection has to be modified based on the modern principles. The effort of the farmer and the output generated in his livelihood is to be considered while codifying the procedures.

43.4.2 The members of the selection committee should be selected based on their expertise in the different components and they should personally be present at the time of field visits and scrutiny. At any cost the work should not be delegated. There must be earnest effort to make it a flaw free exercise.

44. BIOTECHNOLOGY AND GM CROPS RELATED POLICIES

44.1 For about 10,000 years , farmers have been improving wild plants and animals through the selection and breeding of desirable characteristics. This breeding has resulted in the domesticated plants and animals that are commonly used in crop and livestock agriculture. In the twentieth century, breeding became more sophisticated, as the traits that breeders select for include increased yield, disease and pest resistance, drought resistance and enhanced vigour. Traits are passed from one generation to the next through genes, which are made of DNA. Recently, scientists have learned enough to begin to identify and work with the genes (DNA) that are responsible for traits.

44.2 Agricultural biotechnology is a collection of scientific techniques used to improve plants, animals and microorganisms. Based on an understanding of DNA, scientists have developed solutions to increase agricultural productivity. Starting from the ability to identify genes that may confer advantages on certain crops, and the ability to work with such characteristics very precisely, biotechnology enhances breeders' ability to make improvements in crops and livestock. Biotechnology enables improvements that are not possible with traditional crossing of related species alone.

44.3 Government of Kerala announced its Biotechnology Policy in 2003. The BT policy for Kerala is designed to catalyze the development and application of BT, taking advantage of the State's resources and emphasizing its specific needs while meeting global requirements. The policy is aimed to ensure the rapid exploitation of pipeline technologies and opportunities available in the State to products and processes and to promote the sustained build-up of an elite knowledge cadre and knowledge base.

44.4 During 2008 Govt. of Kerala has reconstituted both the Kerala State Biotechnology Board and Kerala Biotechnology Commission. The Kerala Biotechnology Commission is responsible for the implementation of the BT policy and other guideline laid down by the BT Board.

44.5 Hence the policies regarding the Bio Technology and GM crops are not dealt in detail. However, the policies may be framed for protecting interests of the farmer who are the guardians of agriculture, to feed the millions. The research has to continue and environmental, biological, economic and social impacts are to be worked out before launching the GM crops for field trial and widespread adoption.

45. POLICIES FOR EMPOWERING THE WEAKER SECTIONS

45.1 Research studies indicated that the weaker sections were at risk like tribal among the regions, marginal farmers among the size groups and women among the gender in Kerala. However, complementarity of enterprises ensured livelihood. Hence policy intervention is required to prevent further marginalisation.

45.2 Throughout the world, lion's share of unpaid work is undertaken by women and work in the family constitutes majority of such occasions. Economic activities of family in the farm or backyard are also shared by women. Role and share of women in decision making, work performance and pattern of time use highlights gender dimensions in agriculture.

45.3 The tribal population in Kerala State estimated to be more than 1% of the total population is the most economically and socially deprived class. Majority of the tribals live in rural areas and within the forestl ands of the Western Ghats. Most of the tribal people are engaged in agriculture and related sector. The economy of the tribals can be treated as 'agrarian' since the tribals depend on primary occupations like cultivation, livestock, hunting, fishing etc. There are also concerns about the failure of traditional agricultural sector of the tribals which has caused a setback in the financial status of the people there.

45.4 Policy 321: The Government would soon take urgent steps for reviving traditional agricultural sector of tribals by a massive programme combining the traditional knowledge and modern technologies.

45.4.1 Any effort towards improving the socio-economic condition of the tribal population to attain self sufficiency and self reliance should begin with the proper utilization of the land base at their disposal for developmental activities. Through the watershed studies a more realistic, comprehensive and effective soil conservation strategy have to be devised where ever necessary to protect the lone natural resource at the disposal of tribals – their agricultural land.

45.4.2 There are creative ways to adapt to given situations. Pressures on land and water can be reduced through new practices and techniques that boost yields, use soils and water more sensibly, and reduce their reliance on inputs – techniques such as drip-feed irrigation, water harvesting, agroforestry, intercropping, and the use of organic manures. The intercropping methods that combine trees and other plants in a manner that takes advantage of natural ecological niches are another adaptation.

45.4.3 Setting up seed - grain banks at the tribal village level has been one of the important methods adopted by communities to overcome the problem of seed and grain shortages when they are required. Such decentralized system where tribals themselves plan, manage and undertake all stages of food production, storage, distribution and management are found to be more sustainable in providing food security at local level.

45.4.4 A cluster approach in this regard is necessary. The tribal communities are to be prompted to make suitable self managed groups

for the effective implementation. Modern technologies like High tech Farming and precision farming are to be introduced in the barren lands and refined traditional knowledge in the traditional fields. An integrated approach with livestock, backyard poultry and inland fisheries along with crop husbandry is to be adopted. The approach should be to make them open to the modern world with hand holding support of the development agencies and bringing them to the main stream.

45.4.5 This entire programme is to be operated in a project mode and a Special Officer with good capability should be posted soon.

45.5 Policy 322: Appropriate farm tools, improved crops, integrated pest management techniques, conservation agriculture, biological nitrogen fixation and other context-specific technologies should be targeted for development and for enhanced access by women.

45.5.1 There is a need for effective empowerment of women among the membership and leadership positions in producer organizations, cooperatives, workers' unions, and outgrower schemes to ensure that rural women have a stronger voice and decision-making power. At the same time, it is necessary to promote gender sensitivity within representative bodies through the training of both men and women representatives, as this does not derive automatically from women's participation. A majority of routine work of livestock rearing is done by women. Hence it is of utmost importance to bring awareness among them about the scientific dairy farming by giving them on-farm trials.

45.5.2 Extension services are important for diffusing technology and good practices, but reaching female farmers requires careful consideration. In some contexts, it is culturally more acceptable for female farmers to interact with female extension agents, and hiring female extension agents can be an effective means of reaching female farmers. This preference is not universal, however, so in many cases properly trained male extension agents may be able to provide equally effective services. Whether male or female, extension agents must be sensitive to the realities, needs and constraints of rural women. Extension services for women must consider all the roles of women; women's needs as farmers are often neglected in favour of programmes aimed at household responsibilities. Extension systems will also have to be more innovative and flexible to account for social and cultural obstacles and for time and mobility constraints.

45.5.3 Appropriate farm tools, improved crops, integrated pest management techniques, conservation agriculture, biological nitrogen fixation and other context-specific technologies should also be targeted for development and for enhanced access by women. Conducting baseline surveys of households and communities before new technologies are introduced may help predict how men and women will be affected by them. Greater involvement of women in agricultural research and higher education could also enhance the development of female-friendly technology.

46. POLICY FOR STREAMLINING PSUs IN AGRICULTURAL SECTOR

46.1 Farming sector in Kerala has the advantage of several public sector undertakings formed for providing more assistance to the farmers as well as doing agro business and generate non tax revenue. They have mainly two roles to perform, one as ideal business enterprises and other as agencies providing assistance to the farmers mostly in the post harvest handling of crops and processing livestock wealth. 16 corporations are functioning under the Department of Agriculture and 5 corporations are functioning under the Animal Husbandry Department. Due to various reasons the functioning of these organizations have not produced success at the desired levels when compared to the huge investment and hopes put on them by the state and the farming and consumer population.

46.2 Policy 323: Radical change is necessary to make PSU's functioning more farmer and consumer friendly and no more PSUs are to be made in the light of FPOs.

46.3 As a policy, the state Government would not not give shape to any more public sector organizations in future, on the grounds that, the idea of Farmer Producer Companies have already gained acceptance of Government of India at the national level. Farmer producing companies are expected to be more farmer' friendly and beneficial to the farmers rather than going in for making huge profit. Even the famous co-operative organizations are accepting the concept of farmer producers companies and it is high time to have a strict policy measure in this arena of activities.

CONCLUSION

Agriculture is expected to fulfil a variety of functions. It contributes to the supply of safe and high quality food in a competitive market, to maintain valuable cultural landscapes across the State through sustainable land management and to help rural areas to remain attractive and viable. At the same time, agriculture is undergoing fundamental changes which require farmers to adapt to new conditions and seize new opportunities.

Farmers face the challenge of providing food in a more and more open market. They are expected to produce at competitive prices and, at the same time, to respond to societal expectations concerning high product quality, high levels of food safety, animal welfare, and environmentally sound farming practices.

Thus, the Government understand that an economically sustainable agricultural sector in the State depends, among others, on developing the farmers' capacity for adapting to new market situations and responding to new economic and technological opportunities. For this purpose the Agricultural Development Policy of the State is framed.

The role and impact of the State and related institutions and functioning of the agriculture systems expressed principally through policies, programs, institution, services and public investment in farming. Farmer is needed for sustaining the agriculture. Every nations are eagerly looking at India for the food production. The State of Kerala has all the natural resources making the name meaningful - 'God's Own Country'. It is capable to produce any product which is grown in India. It is being remembered here -

"if India is going backward in agriculture, there would not be any country in the world to produce food for India".

We salute
the farming community
who strive hard to
Sustain Humanity..