EXTENSION STRATEGIES FOR THE MAJOR FARMING SYSTEMS IN THE CONTEXT OF THE CHANGING AGRICULTURAL SITUATION IN KERALA

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DECLARATION

I here by declare that this thesis entitled "**Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala**" is a bonafide record of research work done by me during the course of research and that this thesis has not previously formed the basis for the award to me of any degree, diploma, associateship , fellowship or any other similar title of any other university or society.

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CERTIFICATE

Certified that this thesis entitled " **Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala**" is a record of research work done independently by Sri. N.G.Balachandranath (2001 – 21 – 09) under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to him.

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LIST OF ABBREVIATION

AoA	-	Agreement on Agriculture
AA	-	Agricultural Assistant
ADA	-	Assistant Director of Agriculture
AO	-	Agricultural Officer
AMS	-	Aggregate Measures of Support
CBFS	-	Coconut Based Farming System
CSS	-	Centrally Sponsored Scheme
DDA	-	Doha Development Agenda
DDA	-	Deputy Director of Agriculture
ETB	-	Environment related Trade Barriers
GATT	-	General Agreement on Tariff and Trade
GIS	-	Geographical Information System
HSBFS	-	Homestead Based Farming System
IPR s		Intellectual Property Rights
ISO	-	International Standardization Organization
ICT	-	Information Communication Technology
LPG		Liberalization, Privatization, Globalization

MMAS	-	Macro Management of Agriculture Scheme
MMAF	-	Macro Management of Agriculture Funds
NAP	-	National Agricultural Policy
NARP	-	National Agricultural Research Project
NEP	-	New Economic Policies
NGO s	-	Non Governmental Organization
OECD	-	Organization for Economic Co-operation and Development
PESP s	-	Private Extension Service Providers
QR s	-	Quantitative Restrictions
RBFS	-	Rice Based Farming System
RI	-	Relevancy Index
SWOT	-	Strength, Weakness, Opportunity, Threat
TBFS	-	Tapioca Based Farming System
TRIPS	-	Trade Related Intellectual Property Rights
WTO	-	World Trade Organization

INTRODUCTION

1. INTRODUCTION

Yesterday is a dream, tomorrow but a vision.
But today well lived: makes every yesterday
a dream of happiness, and every tomorrow
a vision of hope. Look well, therefore, this day.

-Sanskrit proverb

Development of agriculture is the key to ensure food security, eliminating hunger, eradicating poverty, generating demand for industrial goods, reducing unemployment and promoting overall development. India's long-term economic prospects depend heavily on agricultural sector which literally feeds the process of development. An increase in production and productivity in agriculture will create more jobs and raise the volume of work to be done. Besides direct employment in the sphere of crop raising, agricultural expansion also provides work in other spheres like agro-industries. In addition, large employment opportunities are created in many activities related to agriculture, like storage, transportation, banking etc. Performance in agricultural sector has a close bearing on the performance in all other sectors. In the five decades since independence, however the Indian economy has undergone some major transformation. Share of agriculture in Net Domestic Product came down from 56 to 32 per cent (Menon, 2002).

Samanta (2002) reported that in the present context of liberalized economy and globalization of agriculture time has come now for agricultural extension to cope up with the changing scenario with its new strategy and approach to reach farmers not only with basket of technological options, but also with information of new market opportunities and gain more profit and sustainability of income. Agricultural extension with its advanced possibilities for effective technology transfer can function as a key to augment productivity of crops

to a great extent and should begin to broad base its programs by utilizing farming system approach, marketing and value addition.

1.1. KERALA'S CHANGING AGRICULTURAL SCENARIO.

The state of Kerala stands apart in respect of its sensitivity to change in the national and international trade environment. The situation prevailing in the state with regard to agriculture is marked by the existence of a series of agricultural microenvironments suited to different kinds of mixed farming and by a large proportion of perennial crops in total agricultural output. More than 80 per cent of the state's agricultural commodities are dependent on home and international markets. The state accounts for 45 per cent of the plantation crops in the country, which provide daily employment to nearly four lakh workers. Nearly 20 per cent of its population depends on plantation crops for livelihood. Kerala is the only state in the country having a substantial stake in the major plantation crops viz., tea, coffee, rubber and cardamom. Kerala is also a major state in the production of marine products for the international market.

Kerala's agriculture is in a phase of transition as a result of globalisation of economies and liberalization of trade. The emerging scenario will call for productivity, quality and value addition (Swaminathan, 2001). Following the era of trade liberalization in farm products as a result of the implementation of the Agreement on Agriculture (AoA) of the World Trade Organization (WTO) from 1995 onwards, Kerala's agriculture has been facing unprecedented changes.

The WTO offered a set of agreements offering a framework of rules for multilateral trading system. The Agreement on Agriculture (AoA) was also reached by the member countries for the first time. This forms a part of the Final Act of the Uruguay Round of multilateral trade negotiations. The AoA was signed by the member countries in April 1994 at Marrakech, in Morocco and came into force on the 1st January 1995.

Agriculture in Kerala is passing through a very difficult period as a result of the steep fall in prices of most of the farm commodities. Recent developments in global trade have adversely affected a wide spectrum of economic activities. Being a major cash crop producing state in the country, Kerala is perhaps the worst hit on account of the new agenda for trade liberalization. The agenda fails to recognize the concerns for food security to the masses and livelihood security to the marginal farmers. The economic reform process has not even helped to improve the country's market access to global trade. In spite of substantial increase in the production of most of its major agricultural commodities, there has been income loss consequent to the fall in price of agricultural commodities. The loss is estimated to be of the order of Rs. 4,000 crore which works out to average of Rs. 7,400 per farm family (Mokeri, 2001).

Through the Export-Import Policy 1997-2002 announced by Government of India in March 1997 and the modifications and amendments introduced in April 1999 and 2000, Quantitative Restrictions (QR's) on the import of 1948 commodities have been removed. The items listed in the free import category under the open license system include most of the important agricultural commodities produced in Kerala such as marine products, spices, green pepper, turmeric, fruits, rubber products. Natural rubber has been placed under the category of restricted imports against a license. Obviously the producers of natural rubber have been placed at a greater disadvantage, as manufacturers are free to import rubber with the intention to depress the domestic prices. Although copra and coconut oil are included among items which can be imported only under license, other edible oils including palm oil which is a close substitute for coconut oil have been included in the freely importable list.

The share of commercial crops in total area under cultivation in the state has been rising at the cost of food crops like rice and tapioca. The

major reason for the change in cropping pattern in favour of commercial crops are (1) low profitability of food crops (2) export prospects of commercial crops (3) increase in number of absentee land owners (4) inter crop variation in land prices (5) shortage of agricultural labours.

The brunt of this crisis has been borne by cultivators belonging to the small and marginal farmers category who contribute a major segment of the rural workforce. It is important to note that a vision of how to address the crisis in the spheres of employment and production in Kerala and to exploit the opportunities that the new trade regime might offer to a state so heavily dependent on domestic and export markets must necessarily draw on the special resources with which the state is endowed.

1.2. ORGANIZATION OF AGRICULTURAL EXTENSION IN KERALA.

The agricultural extension program implemented earlier, laid more emphasis on individual crops rather than on farming system approach. Eventhough the state is blessed with diverse agro-climatic zones, soil, cropping pattern, culture and distribution of assets, the actual potential has not been fully exploited. This is mainly due to several inherent weakness and constraints namely (1) shortcomings in the pre and post harvest operations and management (ii) low productivity of crops (iii) lack of adequate and updated knowledge on developments taking place in the potential and existing overseas markets and (iv) infrastructure constraints.

Hence an effective policy for the amelioration of the above constraints in agriculture and efficient utilization of state's own resources is essential for boosting the agricultural growth in the state. It is necessary to restructure the existing pattern of agricultural production and marketing so as to realize the benefits of foreign trade in the context of globalization.

The differences in the organization of Department of Agriculture, their resources as well as overall agricultural development of Kerala has

widened after nineties. Agricultural development of the state depends upon a number of physical factors such as availability of irrigation, technology and inputs. Further the organizational efficiency of Department of Agriculture also contributes towards production and productivity. The reasons for different levels of agricultural development could be attributed to availability of irrigation, infrastructure facilities and other resources apart from an efficient agricultural administration. Though various committees and few studies have pointed out the general problems of agricultural development, none has studied the structure, process and efficiency of agricultural administration. Does the organizational efficiency play a vital role in the development process? There is a need to find answer to this question which will help in taking steps to increase the overall efficiency of the Department of Agriculture especially in the changing agricultural situation.

The globalization of agriculture throws the greatest challenge to the extension personnel of the state. It is time to assess and refine the available technologies and evolve new high- tech packages. It is necessary to build up the present level of extension organizations to cope up with the situation. If an objective assessment is made on the functioning of the Kerala State Department of Agriculture, it can be found that the approaches used have not come up to the desired level of satisfaction. Jinraj (1999) reported that the performance of the Krishibhavans was average to poor. This highlights the need of the study of SWOT (Strength, Weakness, Opportunity, Threat) and efficiency of extension organization.

In order to improve the conditions of farmers especially small resource poor farmers and to sustain the development in the farming sector, it is the need of the hour to formulate suitable strategies by examining the SWOT of agriculture and the agricultural extension organization in the state as well as the dimensions of organizational efficiency in the liberalized regime.

Therefore the present research study entitled "Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala" was formulated with the following objectives.

1.3. SPECIFIC OBJECTIVES

1. To assess the impact and implication of the economic reforms in agriculture on the economic performance of farmers.
2. To analyze the SWOT of agriculture in Kerala.
3. To identify and analyze the SWOT of extension organization in the State Department of Agriculture, Kerala.
4. To delineate the dimensions of organizational efficiency in the State Department of Agriculture, Kerala.
5. To develop an extension strategy on the basis of the above to meet the changing agricultural situation in Kerala.

1.4. IMPORTANCE OF THE STUDY

India would need to produce an additional food grain production of 100 and 160 million tonnes by 2030 and 2050 AD respectively to feed its projected population. More than 85 million, out of 105 million operational holdings in India are with less than 2 ha farm size, necessitating intensive cultivation involving the modern concept of time and space. The future of Indian agriculture depends mainly on the development of appropriate farming system as it fits to resource poor farm families of different agro-ecological zones.

There was no effort made in this line in the state. The pilot study conducted by the researcher in Thiruvananthapuram district revealed that most of the farmers were aware of the current changing situation and they were in dilemma as to how to cope up with this present scenario. In this situation the major farming systems and the NARP zones are selected as locale for the study.

Economic liberalization induced demand based agricultural production necessitates moving away from a stable price support system forwards exposure and adjustment to unstable international price.

The domestic agricultural products have to compete with cheaper imports due to increasing liberalization of import regulations.

The strategies set out a road map for the development of agriculture in the State. This would continue to lay focus in the directories of further export facilitation with a view to ensuring increased country's /state share in world exports.

1.5. SCOPE OF THE STUDY

With the introduction of WTO, India's agriculture especially Kerala's agriculture is now facing new challenges. The results of the study will throw light to facts both on the extent of opportunities and threats. The economic performance of farmers, the organizational efficiency, SWOT of agriculture as well as extension organization will be analyzed in detail. The study will reveal the present status of agriculture in Kerala, organizational efficiency which would help to formulate appropriate extension strategy. This would be of much help in the effective implementation of schemes so as to suit the needs of the farmers as well to motivate the functionaries involved in the implementation of the program. It is hoped that the findings of the study would help planners, policy makers, scientists as well as extension personnel in streamlining and popularizing new development programs / projects.

1.6. LIMITATIONS OF THE STUDY

The present research formed a part of the Doctorate degree program and hence it has all the limitations of time, money and other resources. These limitations determined the restricted selection of districts and panchayats as the locale of the study and also forced to restrict the sample size.

This being the pioneer study in the field in Kerala, the important limitation was the dearth of sufficient literature pertaining to liberalized era in the state. In a study of this nature, one cannot hope for comprehensive and exhaustive analysis of the subject of the topic concerned. However, careful and vigorous procedures has been adopted to carry out the research systematically.

1.7. PRESENTATION OF THE STUDY

The report of the study has been spread out under five chapters as given below. The first chapter deals with the introduction wherein, the scenario of Indian agriculture, agricultural situation in Kerala, farming systems, objectives, scope and limitations of the study are discussed.

The second chapter covers the review of the study related to the investigation. The third chapter relates to the details of the methodology used in the process of investigation. In the fourth chapter, the results and discussions are clubbed and in the fifth chapter, the summary and conclusion of the study are given. Finally the references and appendices are furnished.

THEORETICAL ORIENTATION

2. THEORETICAL ORIENTATION

This chapter deals with the review of past studies conducted on this line. This study helps us in delineating the problem area, and provides basis for developing a conceptual frame work for the study. This will also help in operationalizing the variables and concepts, on the basis of which required data could be collected. Since the study is a new area, there is a dearth of literature of research studies in this field for exhaustive review work. In the circumstance, everything possible has been done by the researcher to use websites and collect references of international literature relevant to these areas.

In accordance with the specific objectives of the study, this chapter is framed under the following subheads.

2.1. Agricultural situation in India and Kerala

2.2. Trends in area, production, productivity of crops

2.3. Agro ecological situations / NARP Zones

2.4. Farming systems

2.5 Economic reforms, LPG, GATT, WTO,

2.6 Impact and implication of economic reforms

2.7 Economic performance

2.8 SWOT analysis of agriculture in Kerala and SWOT of extension organization in the State Department of Agriculture

2.9 Delineation of the dimensions of organizational efficiency

2.10 Extension strategy

2.1. AGRICULTURAL SITUATION IN INDIA AND KERALA.

India has inherited a rich and flourishing civilization spanning over thousands of years with very few parallels in the world.

2.1.1. Land Resources

India with a land area of 3288000 sq.km. has the benefit of the perennial rivers viz. Ganga, Bramaputhra, Mahanadi, Godavari, Krishna, Pennar, Palar, Cauvery, Vaigai, Bharathapuzha etc. to make agriculture flourish.

With an arable land of 162 million hectares India has the second largest arable land in the world.

2.1.2. Agro Climatic Advantages

The agro climatic conditions are conducive for cultivation of a number of agricultural and horticultural crops through out the year. When entire Europe reels under tight grip of snow during the winter months when no agricultural crops can sustain India has an enviable agro climatic condition.

2.1.3. Water Resources

With 400 million hectare meters of rain water each hectare of arable land can have over 2.5 hectare meters of rain water to irrigate the land. We have created irrigation potential only for about 50 million hectares of land.

2.1.4. Human Resources in Agriculture

Over 70 per cent of the population is dependent on agriculture for sustenance. However, no serious efforts have been taken to harness the human resources engaged in agriculture. Agriculture which sustain over

two third of the population should be made a core subject of study in our high schools.

Today, India is the fifth largest economy in the world behind only to the US, Chinese, Japanese and German, measured in purchasing power parity terms. India was one of the ten fastest growing economies in the world during the eighties and moved up to eight fastest during the period 1980 - 88, measured in terms of GDP growth rates. According to World Development Report (1998-99) for about 80 countries there are only 15 countries in the world, which have a better consumption, income distribution as compared to that of India (Kavitha, 2003).

Agriculture and allied sectors have been for decades, India's core competence. The post WTO era offers tremendous scope for increasing India's agricultural exports. India is the leading producer of several agricultural commodities, in addition the sector is highly diversified. India's sub continent has diverse climatic conditions suitable for the production of a range of products. However, it has been noted that global competitiveness is the ability to produce globally acceptable quality at globally comparable cost. Currently, many of the Indian farm goods do not pass this test.

After a good South West monsoon, the agricultural sector has rebounded with a 4.1 per cent growth during the first half of 2003 - 04 as compared to a nil growth during the same period last fiscal (Vijayachandran, 2004).

2.1.5. Agricultural Situation in Kerala

2.1.5.1. The post-liberalization scenario

The marginalization of agricultural holdings consequent to extreme sub division and fragmentation, high degree of dependence on the farm

front for livelihood and the decreasing trend in family participation in the farm operations with resultant increase in paid out costs make the Kerala farm front more vulnerable to the onslaught of global competition.

Agriculture in Kerala, which had the highest gross income per net cropped area at the very beginning of the plan era, could not sustain this prestigious position largely due to the failure of the productivity of major crops to keep in pace with the growth rate recorded in other important agricultural states in the country. In respect of gross income per hectare Kerala has been pushed down by other states to fourth position. The overall average growth rate recorded by the Kerala farm front between 1960 and 1990 is estimated to be around 1.66 per cent against the national average of 2.71 per cent. The growth rate in agriculture is lower than the average population growth recorded during the period thereby making the average per capita income originating from agriculture still lower in spite of substantial investment of plan resources during the last four decades.

Kerala's plantation and field crops mix includes paddy, tapioca, coconut, banana, rubber, pepper, cashew, coffee, cardamom and arecanut . Kerala is also the only state in the country having a substantial stake in all four major plantation crops, viz., tea, coffee, rubber and cardamom.

Unlike other states, the agricultural sector in Kerala is dominated by commercial crops like coconut, rubber, tea, coffee and spices. The state has a significant share in the export of cashew, spices, coir and coir products and marine products.

Jeromi (2003) reported that the share of commercial crops in total area under cultivation in the state has been rising at the cost of food crops like rice and tapioca. The share of area under rice the major food crop of Kerala, in the total cropped area declined from 27.8 per cent in 1980-81 to 11.6 per cent in 2000-01. Similarly tapioca declined from 8.5 per cent to 3.7 per cent during the same period. On the other hand area under

commercial crops increased. For example the area under rubber almost doubled from 8.2 to 15.8 per cent.

2.1.5.2. Agricultural development in Kerala

As observed in Government of Kerala (2004) the overall performance of agriculture in Kerala during the last 50 years could be summarised as below.

1. In spite of rich resource endowments and high intensity of cropping the productivity of most of the crops grown in Kerala is lower than those in the other producing states in the country. The productivity of some of the crops during 2001-02 are shown in Appendix - I

2. The contribution of the agricultural sector to the state GDP declined from 66 per cent in the early fifties to 30 per cent in the mid-nineties and it is 13.72 per cent in 2002-03.

3. The population, dependent on the sector has remained more or less same in proportionate terms during the period. In absolute terms it has increased. The pressure of population has further marginalized the size of holdings from an average of 0.73 ha to 0.27 ha.

4. Area under food crops declined from 14.8 lakh ha to 8.8 lakh ha while that of non-food crops increased from 7 lakh ha to 19.6 lakh ha.

5. Overall agricultural growth was positive but it was not all pervasive and was mainly confined to few selected commodities in particular rubber, milk and fisheries sector.

6. Internal production of food grains declined from 14 lakh tonnes in the mid of seventies to 6.8 lakh tonnes making the state increasingly dependent on external sources for meeting her requirements.

7. Even in the midst of a declining phase in area and production, the important food crops such as rice and tapioca recorded increase in productivity mainly because of the shrinkage of its area to more productive lands.

2.1.5.3. Changes in agricultural economy

Several changes in the agricultural economy have affected job creation in the sector (Government of Kerala, 2004). They are

(1) Aversion to manual labour by the newly educated youth.

(2) Keeping of land fallow by even small land holders due to absence of tenancy provision as well as due to high wages.

(3) The low growth rate of agriculture in the 1970's and 1980's

(4) Changes in cropping pattern towards more perennial crops has reduced labour absorption. Area under paddy declined by 40 per cent in the nineties and area under tapioca by 24 per cent during the same period.

(5) The pace of modernization of agriculture has been very slow. Kerala was ranked 13th among the states in the index of agriculture modernization in 1998.

(6) The relatively faster growth of agricultural wages in comparison to output prices has made farming less attractive. For example in 1960 one quintal of paddy could purchase 29 man days of labour while 40 years later the same quantity could purchase only about five man days.

2.2. TRENDS IN AREA, PRODUCTION AND PRODUCTIVITY OF CROPS

2.2.1. Area

The trend in area under the various crops during the recent period reveals that the urge for replacing seasonal and annual crops by perennial crops is persisting. Seasonal/annual crops, namely rice, sugarcane, ginger, turmeric, tapioca, groundnut and sesamum recorded decline in area by 13499 ha in 2002-03. On the other hand the area under perennials such as arecanut, coconut, coffee, tea and cardamom, cashew also declined by 7588 ha. Among the perennials cashew nut is the only crop which has suffered reduction in larger area (-3095 ha). Plantation crops as a category are expanding and the lead crop among them is rubber which has recorded an increase of 1008 ha (Government of Kerala, 2004).

2.2.2. Productivity

In contrast to the area coverage, the performance of the seasonal and annual crops in respect of productivity recorded during 2002-03 is promising. The crops, which have improved their productivity levels during the year include rice (+36 kg/ha), sugarcane (+588 kg), plantains (+250 kg), tapioca (+619 kg), ginger (+95 kg), turmeric (+24 kg) and sesamum (+13 kg). However, perennial crops present a mixed trend. Pepper (+11 kg), arecanut (+85 kg) and rubber (+28 kg) recorded increasing trend while in respect of cardamom (-57 kg), cashewnut (-3 kg), Coconut (-154 nuts), Coffee (-20 kg) and tea (-4 kg) there was decline in productivity during 2002-03. The declining trend in the productivity of cardamom has to be taken note of. The crop recorded improvement in productivity more than 150 per cent during 1999-2000. So also the declining trend of coconut which support vast majority of the small and marginal farmers in Kerala (Government of Kerala, 2004).

2.2.3. Production

Indices of area, production and productivity of crops in Kerala for the year 2000-01, 2001-02, and 2002-03, comparing it to the base level index for the triennium ending 1979-80 reveal that the overall index, for the crop sector has recorded a marginal increase of 1.23 points during 2002-03 over 2001-02. A further analysis of the different categories of crops shows that the food crops shows a negative trend and the non food crops a positive performance. When the overall index during 2001-02 was compared with 2000-01 it shows marginal decrease of around six points. Both food and non-food crops have contributed in the negative direction. In the non-food category production of oil seeds and condiments and spices have recorded regular declining trend over the period. The decrease in the production index has been contributed by the overall productivity index which has moved from 136.62 to 135.61 during 2000-01 to 2002-03. The area index shows only a marginal increase from 166.11 to 168.33 points in 2002-03 (Government of Kerala, 2004).

2.2.4. Crop Wise Analysis

Kumar (2000) stated that Kerala accounts for 84 per cent of the area under rubber in the country. India is the third largest producer of natural rubber with a share of nine per cent in the world after Thailand and Indonesia relegating Malaysia to the fourth position. India is at the same time the fourth largest consumer of natural rubber after China, USA and Japan.

Siddiq (2002) observed that rice production accounts for 97 per cent of total food grain production in the state. Rice production during 2000–01 is 7.51 lakh tonnes which is 41 per cent lower than in 1980 – 81. As a result the share of Kerala in all India rice production declined from 2.4 per cent in 1980 –81 to 0.9 per cent in 2000 –01 and increasingly depend on other states.

Edison (2002) reported that tapioca is the major tuber crop cultivated in India. It is interesting to note that though India is not having a major share in area at world level, its productivity is the highest in the world (24 tonnes/ha). In Kerala the area under tapioca is 0.13 million has which is 50 per cent of national area and the production is 2.4 million tonnes.

Kumar (2003) observed that India is the pioneer in production and processing of cashew. Area under the crop in Kerala has been declining steadily from 1.25 lakh hectares in 1988-89 to 0.9 lakh hectares in 2001-02. Kerala's share in production at national level is 15 per cent. Maharastra is the leading producer with 22 per cent share in production. Area increased was to the tune of 431 per cent during last decade.

Jayalekshmi (2003) reported that the production of vegetable in India is 82.7 million tonnes from an area of 5.98 million ha. India contributes 14.4 per cent of world production. Seventy types of vegetables are cultivated in India.

Nampoothiri (2003) noticed that Kerala's share in area (54.7 per cent) as well as production (42.3 per cent) of coconut in the country is declining over a period.

2.3. AGRO- ECOLOGICAL SITUATIONS AND NARP ZONES.

The four broad agro climate based regions identified by ninth plan were High Productivity Zone (HPZ), Low Productivity High Potential Zone (LPHPZ), Low Productivity Zone (LPZ) and Ecologically Fragile Region (EFR). This is in contrast to the common strategy based on schematic approach of government to lend succour and support of various agencies / state presently doing work for agricultural development.

2.3.1.National Agricultural Research Project (NARP)

The NARP has been launched by ICAR on Ist January, 1979 with the main objective of strengthening the regional research capabilities of State Agricultural Universities (SAUs). The project was funded by ICAR from its plan allocation and is supported by the World Bank to the extent of 50 per cent of the expenditure. The aim of NARP was (a) rationalization of university's research program and research organization and (b) strengthening the capacity of the agricultural universities to undertake research on location specific problems in all parts of the state.

2.4. FARMING SYSTEM

Farming system is a complex interrelated matrix of soils, plants, animals, implements, power labour, capital and other inputs controlled in part by farming families and influenced to varying degrees by political, economic, institutional and social forces that operate at many levels. The farming system, therefore, refers to the farm as an entity of interdependent farming enterprises carried out on the farm.

Any farming system, however, is subject to what is potentially possible in technical terms. It is the human environment that provides sufficient condition for development and utilization of a particular system. A farming system obviously is very complex.

Therefore, any agricultural technology well suited to a particular agro-ecological situation and socio economic environment may not be adopted by other farmers.

2.4.1. Farming Systems Research (FSR)

The Farming Systems Research (FSR) originates from recognizing the inter-dependence and inter-relationships of natural environment within the farming system. In FSR the farmers by participating in the research

process help in the identification of the research problem as well as take part in testing the possible solutions.

2.4.2. Classification of Farming Systems Research

2.4.2.1. Farming System Analysis (FSA)

FSA is an in-depth, quantitative analysis of an existing farming system. The objective of FSA is to understand the structure of interactions within the system and to quantify stocks and flows. FSA is basic research on the structure and functioning of a farming system, which contributes to the general 'body of knowledge' upon which FSR depends.

2.4.2.2. Farming Systems Adaptive Research (FSAR)

FSAR is an interdisciplinary, on farm, adaptive research targeting a defined group of relatively homogenous farming systems characterized by similar constraints. FSAR is location- specific and is most appropriate for the national and regional levels of agricultural research. The objective is to increase productivity of the farming system through the development of relevant technology.

2.4.2.3. Farming System Component Research (FSCR)

This term designates the more focused, station based, applied and adaptive research on farm sub-systems or components designed to support FSAR. It is distinct from mainstream agricultural research because it responds specifically to problems identified in small-farm systems and endeavours to produce prototype technologies relevant to the circumstances and needs of small farmers. The unit of analysis is the field or plot and not the farming system.

2.4.2.4. Farming Systems Base-Line Data Analysis (FSBDA)

In FSBDA, basic data on an agro climatic zone is collected and analyzed with the objective of diagnosing major constraints and developing a classification of major types of farming systems. It is executed on a much larger scale and greater emphasis is placed on biological and physical, rather than socio-economic variables.

2.4.2.5. New Farming Systems Development (NFSD)

NFSD is fundamentally a top-down approach to agricultural research and technology development, which seeks revolutionary, rather than evolutionary change. The ultimate product being a radically new farming system, it is neither location specific nor farmer-oriented. Rather, it attempts to generate broad-based technology designed to overcome major constraints in large agro climatic zones.

2.4.2.6. Farming Systems Research and Agricultural Development (FSRAD)

FSRAD refers to farming system program, which integrates agricultural research and development strategies. The objective is the long-term transformation and development of agriculture in a designated sub region through technological development for major farming systems and institutional and economic reforms in the environment. It thus, unites mainstream agricultural research, FSCR, FSAR and sometimes NFSD with development of agrarian infrastructure and services as a means of increasing overall agricultural productivity of the sub-region.

Lal and Miller (1990) reported that the farming system is a resource management strategy to achieve economic and sustained production to meet diverse requirement of farm household while preserving resource base and maintaining a high-level environment quality.

Annadurai *et al.* (1994) pointed out that the Integrated Farming System (IFS) is the answer to the problem of increasing food production and farm income and for improving nutrition of the small-scale farmers with limited resources without any adverse effect on environment and agro-ecosystem.

2.4.3. Farming System Concept

Farming system is a developing concept and hence courses have to be designed and offered at the undergraduate level in the Agricultural Universities and Farming Systems Research methodology has to be taught at the post-graduate level. Scientists belonging to various disciplines but involved in systems research should be given crash training on FSR without further delay for immediate manpower requirement. Farmers training is also equally important.

Farming system refers to a particular arrangement of farming enterprises (eg. cropping, livestock keeping, processing farm products) that are managed to respond to the physical, biological and socio-economic environment and in accordance with the farmer's goals, preferences and resources (Shaner *et al.*, 1982)

Fresco and Westphal (1988) reported that the farming is a process of harnessing solar energy in the form of economic plant and animal products. System implies a set of interrelated practices and processes organized into functional entity, i.e. an arrangement of components or parts that interact according to some process and transforms inputs into outputs. Farming system is therefore, designated as a set of agricultural activities organized into functional unit(s) to profitably harness solar energy while preserving land productivity and environmental quality and maintaining desirable level of biological diversity and ecological stability. The Farming system is a decision-making unit comprising the farms

household, cropping and livestock systems, that transforms land, capital, labour into useful products that can be consumed or sold.

Integrated Farming System is a mix of farm extension viz., crop, livestock, aquaculture, agro forestry, etc. to which a farm family allocates its resources in order to effectively manage and utilize the existing farm environment for attachment of required goals (Manimekalai, 1997).

2.4.4. Farming Situations

Rangasamy *et al.* (2002) observed that unlike industries, agriculture is practiced by 105 million farm families who live in 0.6 million villages. More than 40 per cent of them are below the poverty line. Nearly 85 million farm families belong to small and marginal categories. In spite of increase in food productivity after the independence of the country, only in NorthWestern India, per capita food production has increased and it has declined in other parts of the country. Only 25 to 30 per cent of the modern agricultural technology has reached the farmers. This is often because the technology has not been consistent with conditions of the farm situations. The benefits of modern technology have been restricted to favourable farming situations. Only 44 out of 453 districts are contributing half of the total food grain basket of the country. This clearly suggests that the technology supposed to be scale and resource neutral has been confined to the districts with favourable farming conditions. The new farming system research strategy should therefore, necessarily concentrate on developing technology with participatory approach within the biophysical and socio-economic environments in which the farmers operate.

2.4.5. Homesteads

Fernandes and Nair (1988) suggested that the homesteads are very complex systems with a very sophisticated structure and a large number of

components. This type of system display many agro forestry concepts; the intimate mix of diversified agricultural crops, and multi purpose trees, livestock's and other enterprises, which fulfills most of the fundamental needs of the local population.

Iqbal and Perumal (1998) opined that Indian farming can be termed to be an integrated farming in as much as the integration of livestock, poultry, sheep rearing etc. as the case may be and are interwoven with crop husbandry in one way or the other according to the local situations. At this juncture, it is imperative to study the approach from several view points and the extension personnel's view point is one of the important aspects

2.4.6. The Emerging Farming Systems

On the threshold of the new century four parallel farming systems are emerging in Kerala's agriculture.

1. Heterogenous resource - based, multiple opportunity endowed, crop - livestock - tree systems comprising small and tiny homestead agro-forestry systems.

2. Homogenous single crop dominant / dependent small and medium sized crop livestock farming systems.

3. Monocrop plantation crop sector of both farmer and estate management spread over the high ranges, high lands and spilling over to the midlands.

4. Scattering of skill and labour intensive land and water based small enterprises such as vegetables, fruits, commercial flowers, aqua-culture etc.

2.5. ECONOMIC REFORMS

Reeta (2002) stated that the Indian Economic scenario in 1991 was very much depressing as the economy was on the brink of collapse. Inflation was out of control and export were declining, foreign exchange reserves had declined to no more than two week's imports and industry was virtually crippled. Foreign lenders and Non Resident Indians had lost confidence in our economy and investment capital was flying out of the country. Never before had the Indian economy been gripped by a crisis of this magnitude.

2.5.1. New Economic Policies or Economic Reforms Since 1991

It was increasingly realized that many of the controls and regulations on economic activities have outlined their usefulness and were infact hampering, rather than helping, growth and development. The need was, therefore, to give the highest priority to restore macro-economic stability and to bring the economy back to a path of rapid and equitable economic growth.

A set of stabilization and structural adjustment measures started since July 1991 in response to the emerging crisis is termed as New Economic Policies (NEP) or 'New Economic Reforms'.

2.5.2. Major Economic Reforms

Economic Reforms of 1991 can broadly be classified into two groups:

1. Stabilization Measures.

2. Structural Reforms Measures

It must be noted that the stabilization policies were intended to restore viability to the balance of payments, to bring inflation under control and to put the house in order in the short run.

On the other hand structural reform policies were aimed at improving the efficiency of the economy and increasing its international competitiveness.

2.5.3. Main Features (or Facets) of NEP

The main features or facets of NEP are Liberalization, Privatization and Globalization (LPG).

2.5.3.1. Liberalization

An economic policy which gives relaxation to enable entrepreneurs to make their decisions themselves and open freedom to economic activities at all level is termed as policy of economic liberalization.

2.5.3.2. Economic Liberalization

Government of India (1996) in a study reported that the process of economic liberalization in Indian economy started gathering momentum from 1985 onwards. An assessment of agricultural prospects for India by the Finance Ministry revealed that, Indian agriculture is beginning to appear globally competitive and this welcome change seems to have been made possible by the following two important policy reforms introduced in the liberated regime. (a) reduction in the excessive protection earlier accorded to the manufacturing sector, which in turn improved the relative profitability of agriculture and (b) appropriate increase in the relative price of major farm products which aimed at ensuring market oriented prices to the farming community, resulting in more equitable terms of trade for the agricultural sector.

Sathyanarayanan (2003) stated that Economic liberalization is of two kinds. Macro-liberalization or liberalization at global level. Micro-liberalization or liberalization at national or sub national levels. While the first kind of economic liberalization is known as globalization, the second

kind is known as liberalization per se or as the composite of liberalization and privatization. Thus liberalization of economy as a whole, both domestic and global, could be more meaningfully termed as Liberalization, Privatization and Globalization or LPG in short

2.5.3.3. Trade liberalization

Krueger (1986) reaffirmed the above general definition and argued that even a (real) devaluation in the presence of quantitative restrictions constituted a liberalization episode.

Bhagwat (1988) in a study reported that a liberal episode was defined as a more extensive use of the price mechanism that would reduce the anti-export bias of the trade regime.

Papageorgion (1991) included both neutrality and liberality in their definition of trade liberalization. Libaralization encompasses not only reduction in the anti-export bias of the trade regime, and an increase in reliance on the price mechanism, but also a reduction on the level of intervention. Inclusion of these concepts in the definition of trade liberalization means that a large number of policy changes like lowering average nominal tariffs, narrowing the range of nominal and effective tariffs, a shift from Quantitative Restrictions (QR's) to tariffs, a real devaluation, an unification of multiple exchange rates, removal of export taxes, removal of export QR's, implementation of export subsidies, rebates or compensation schemes form part of liberalization.

Rajaram (1992) referred trade liberalization as the dismantling of an existing pervasive system of trade controls – QR's, import tariff, export taxes etc - which distort the allocation of resources between tradable and non tradable sector and within the tradable sector.

Goldar (1994) defined trade liberalization as the removal of QR's on imports and their replacements by tariffs, followed by reduction in the general level of nominal tariffs, more towards a more uniform tariff structure and a more appropriate exchange rate policy.

Singh (2000) reported that since India is one of the important partner in business through World Trade Organization (WTO), new challenges are being faced by Indian economy in general and agricultural economy in particular

2.5.3.4. Agricultural trade liberalization

Agricultural trade liberalization in India consisted of three components, abandon the channeling of trade except for few commodities, dismantling of most of the QR's and some reduction in tariffs.

2.5.4. Privatization

Privatization may be defined as transfer of ownership and control from the public sector to the private sector.

Privatization refers mainly to three things:

(a) Sale of all or some of the assets of public enterprises.

(b) Leasing of public enterprise to private sector.

(c) Transfer of the management of public enterprises to the private sector.

2.5.5. Globalization

Globalization means the integration of economies worldwide through trade, financial flows, technology spillovers and information networks.

Globalization refers to the growing economic interdependence of countries worldwide through the cross-border transaction in goods and services and of international capital flows, and also through the more rapid and widespread diffusion of technology.

In short, globalization means the unification or integration of domestic economy with the rest of the world through trade, capital and technology flows.

2.5.5.1. Globalization: The positive side

It is said that globalization promotes specialization, the theory of comparative advantage and increased production and productivity. It also helps to remove world poverty through trade and the trickle down effect. It unifies different people by sharing prosperity as well as the common miseries thereby reducing the incidence of wars that are now capable of annihilating mankind due to advances made in weapon technology through atomic, chemical and biological sciences. Globalization is also being pursued by many nations as it is considered to be in furtherance of democracy and freedom of the individual. It also enlarge the scope for countries to benefit from different opportunities arising around the world.

2.5.5.2. Globalization : The flip side

Globalization unleashes the market forces. It is an important tool of modern state for not only governance but also for distribution of goods and services. In its functioning it is ruthless because it obeys the command of money powers. Paul Samuelson, the Nobel Laureate Economist, remarked that in an efficient market economy the dogs of the rich will be provided with enough milk, while the starving children of the poor will be deprived of it. This basic truth underlying globalization is also its weakness. In a world where majority of the people are poor and income and wealth are unequally distributed, the spread of knowledge and rising

aspirations are fuelled by democracy. Globalization tries to perpetuate a system where the poor are always kept deprived and craving for more. The urban bias which will lead to lop sided development in developing countries and increases the rural urban disparities and regional tensions.

2.5.5.3. Globalization and its consequences

Petras (1999) characterizes globalization as a phenomenon that has historically been linked to the concentration of capital, wealth and power. Further globalization involves globalization of nations as well as classes. He also views it as a process embedded in a system of hierarchy of power, exchanges and benefits.

Singh (2001) reported that about 800 million in the world to be food insecure and every six person to be hungry. About 185 million children under age of six are seriously underweight and more than one billion do not get clean water.

Shakya (2003) said that there are two main elements of globalization viz., liberalization and privatization. The liberalization on the one hand, has directly affected the small farmers and petty producers, where as on the other hand disinvestments process is closely linked in the employment of youths.

2.5.6. Features of LPG

Bagchi (1999) culled out nine distinct features of LPG as follows: Spread of international trade in goods and services; migration of people between countries or regions; exchange of money and means of payment on increasing scale across countries or regions; flow of capital from one country to another to help produce goods and services; flow of finance (not necessarily linked to the production of goods and services) between different countries; emergence of TRANS NATIONAL Corporations

(TNCs) engaged in the activities listed above; international trade in technology; spread of print and electronic media; and growth in international trade and production of services of all kinds - shipping, insurance, banking, finance and healthcare

2.5.7. GATT

The GATT (General Agreements on Tariffs and Trade) is the out come of several years of negotiations in which 110 nations participated. The GATT is an international forum which was established in 1948 initially with 23 countries including India as original signatories to oversee the smooth conduct of world trade, that is to promote the world trade by reducing barriers to it such as customs duties and quotes with some special and differential treatment to developing countries.

2.5.8. Genesis of WTO

The developed countries in the world had initiated talks regarding export and import of various commodities very long back in the Berne convention in 1886. After that it was revised in 1928 and 1948. During 1947 – 48 they established a working understanding for export and import of various commodities through a common agreement called the General Agreement on Tariffs and Trade (GATT).

The eighth round of talk, known as Uruguay Round, formally began in September 1986. Arthur Dunkel, the then Director General of GATT and Chairman of the Trade Negotiation Council meeting submitted a comprehensive document known as Dunkel Report on December 10, 1991. Here, there was major change from previous rounds by including new areas such as agriculture, textiles, investments, intellectual property right and services. The eighth round of GATT had been finally signed on 15 –4-1994 by 125 countries including India and was effected from January 1995. In order to supervise the globalization operations of various

economies and settle their mutual disputes, the GATT henceforth will be replaced by World Trade Organization (WTO), which will have independent machinery for consultation, evaluation, implementation, negotiation and punishment.

2.5.8.1. Functions of WTO

The establishment of World Trade Organization is an important landmark in the history of international trade. Installed as comprehensive dispute settlement machinery with a wider ambit covering international trade in both goods and services, it contains the single most important set of governing rules.

The WTO is embodied with five specific essential functions.

1. Administering and implementing multilateral trade agreements and legal instruments negotiated in connection with the Uruguay Round.
2. To provide a forum for multilateral trade negotiation.
3. Administering the understanding on rules and procedures governing the settlement of disputes.
4. Review national trade policy mechanism.
5. Co- Operating with other international institutions.

2.5.8.2. The present status of WTO negotiations on agriculture

The Agreement on Agriculture (AoA) was a part of the Uruguay Round (8th Round) of agreements which were negotiated during the period 1986-1993 and was signed in April-1994 at Marrakesh in Morocco. It came into force on 1-1-1995. The Final Act of Uruguay Round signed by 120 countries brought in for the first time the liberalization of world trade in agriculture. It was decided at the time of signing of the agreement in

1994 itself those negotiations for further progressive liberalization and to take care of problems, issues and concerns arising from the existing agreement on April should start on 1.1.2000. Accordingly, such mandated negotiations have commenced. Initial proposals for negotiations are being received in the WTO. As agriculture is the bone of contention for developed and developing countries WTO-watchers feel that the negotiations are likely to continue for a few years as there are serious differences amongst the major players.

2.5.8.3. Cancun Meet

The fifth ministerial meeting of the World Trade Organization was held in Cancun, Mexico (September 2003). This was to impart a true development dimension to the Doha Development Agenda (DDA), the Official name for the ninth round of trade negotiations of the GATT/ WTO for the member countries. The Cancun does not mark a mid- course correction in the Doha round, since the completion of the WTO talks by the scheduled date of January 2005 is very much in doubt.

2.5.8.4. Agreement on Agriculture (AoA)

Madan (2003) reported that the AoA contains provision in three broad areas of trade and agriculture policies: market access, export subsidies and domestic support.

2.5.8.4.1. Market access

Market access for agricultural products is to be governed by a tariff only regime. That is to say, the agreement states that there can be no restrictions on farm trade except through tariffs. This means that non-tariff barriers such as quantitative restrictions on imports. (i.e. quota, import restriction through permits, import licensing etc) as were in existence before the Agreement came into being, were to be replaced by tariffs on

imports to provide the same level of protection and then were to be followed by progressive reduction of tariff levels.

2.5.8.4.2. Domestic Support

Domestic support measures according to the Agreement, are meant to identify acceptable measures of support to farmers and curtailing unacceptable trade distorting support to farmers. These measures are targeted largely at developed countries where the levels of domestic agricultural support had risen to extremely high levels. Domestic support is divided into two categories viz., (a) support with no or minimal distortion effect on trade (often referred to as "Green Box" and "Blue Box" measures) and (b), trade distorting support (often referred to as "Amber Box" measures).

Green box support has minimal impact on trade. It includes research, pest and disease control, training and advisory services, market intelligence, promotional services, infrastructure services, food security, buffer stock operations, relief from natural disasters etc.

Blue box support is product-limiting subsidy and covers the fixed costs of the farmers indirectly. This is exempted from reduction commitment and related to developed countries only.

The trade distorting domestic support is measured in terms of what is called the "Aggregate Measures of Support" (AMS ie.**Amber box**), which is expressed as a percentage of the total value of agricultural output and includes both product specific and non-product specific support. The domestic support given to the agricultural sector up to 10 per cent of the total value of agricultural produce in developing countries and 5 per cent in developed countries is allowed. In other words, AMS within this limit is not subject to any reduction commitment.

In India product specific support is negative, while the non-product specific support i.e. subsidies on agricultural inputs, such as power, irrigation, fertilizers etc is well below the permissible level of 10 per cent of the value of agricultural output.

Special and Differential Treatment Box Support is related to developing countries only and is exempted from reduction commitment. It includes (i) investment subsidy to agricultural sector on farm development work ie field channels, land leveling, shallow wells etc.

(ii) Agricultural inputs services to low income or resource poor farmers.

2.5.8.4.3. Export subsidies

Developing countries are free to provide certain subsidies, such as subsidizing of export marketing costs, internal and international transport and freight charges etc.

2.5.8.5. Positive and negative aspects of WTO

Rathore (2001) pointed out the positive and negative aspects of WTO. The positive aspects are increase in diversification of activities, faster technology transfer, quality of produce can be increased, reduction in post harvest losses, farmer's income will go up since they are insisted for commercial cultivation and increase export opportunities. The negative aspects are high competition in international market, small farmers will suffer because of quality and sanitary measures, increase import of cheap products and foreign companies may set patent of Indian plant material.

Bhattacharya (2002) reported that a study of 11 of foreign trade revealed that more than 70 per cent of Indian agriculture exports has shown positive growth trend during 1999-2001 while only 27 per cent agro exports has shown a negative trend. This study has made an extensive

analysis of global competitiveness of eight commodity groups namely marine products, cashew, spices, tea, coffee, castor oil, oil meal and rice (basmati and non basmati). These products on an average account for about 80 per cent of Indian total agricultural exports.

2.6. IMPACT AND IMPLICATION OF ECONOMIC REFORMS

Jayaramaiah and Bisaliah (1998) observed that the globalization of agriculture throws the greatest challenge to extension professionals to identify the extension approaches which can provide continuous, relevant, modern technology messages to commercially export oriented farmers by making use of the latest information technology.

Krishna and Shivamurthy (1998) stated that in a traditional farming system like ours, globalization has little or no impact on small farm holdings. Small farm holding in India is highly diverse, complex and risk-prone located mostly in rainfed areas of the country. Globalization is highly specific to resource – rich farmers.

Dorward *et al.* (1999) reported that while economic reform program that began in 1983 has provided a political environment conducive to business and efforts have been made to make finance available specifically for the cotton sector, the impact of the price slides have resulted from economic reforms have been complex and variable for the cotton sector. They have affected the cotton sector directly via their impact on other agricultural activities in Northern Ghana.

Ansari (2000) inferred that presently in the global agriculture trade, India's level of export is of miniscule proportions. Against an overall world trade of $ 438 billion in 1998, India's contribution was just $ 5.8 billion, which is 1.32 per cent of the total world trade. Although India being the third largest producer of food products in the world, it's significant presence in the world trade of agro-products may be alarming

Balakrishnan (2000) in a study examined that the principal development in agriculture since 1991 raises issues that have a bearing on the Indian standard of living and welfare. Some have argued that the economic reforms since 1991 have not targeted the agricultural sector directly, and hence not much may be expected of it under the new policy regime.

Carlos (2000) stated that the number of patents on biotechnological inventions has grown significantly since the first grant at the end of the seventies. Between 1990 and 1995 around 25,000 biotechnological patent are granted throughout the world. Thirty seven per cent of biotechnology patents originated from the US and a similar percentage came from Japan. The developing countries only accounted for less than seven per cent. This is one indicator of the dramatic North - South asymmetry existing with regard to the innovative capability in modern biotechnology. Patents relating to agriculture represented 11 per cent of the total for 1992-95 and those specifically covering modified plants six per cent of the total.

Chaudhari (2000) reported that under the World Trade Organization's (WTO's) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), member countries which did not provide product patent protection, when the TRIPS Agreement came into force (on January 1, 1995) are required to grant such protection within 10 years, i.e. by January 1, 2005.

Government of India (2000) stated that the customs duty on tea, coffee, copra and coconut, as well as desiccated coconut has been increased from 35 per cent to 70 per cent in the budget 2001-2002. The rate of duty on crude edible oils, except soybean oil, which ranged from 35 per cent to 55 per cent has been increased to a uniform rate of 75 per cent. Similarly the duty on refined oils, which ranged from 45 per cent to 65 per cent has also been hiked to 85 per cent.

Ravisankar and Archak (2000) observed that apart from investment in agricultural research, Intellectual Property Rights (IPRs) have profound impact on technology development, and its transfer. Besides, Trade Related Intellectual Property Rights (TRIPs) impact trade relation between countries in myriad ways.

Saptarshi (2000) pointed out that the plantation crops are either export oriented or import substituting and therefore assume special significance from the national point of view. Consequent to the removal of quantitative restrictions on import of these commodities, plantation crops in general are facing the threat of unbridled inflow of these commodities.

FAO (2001) reported that the domestic support given to the agricultural sector up to 10 per cent of the total value of the agricultural produce in developing countries and 5 per cent in developed countries is allowed. AMS within the limit is not subject to any reduction commitment.

Koshy (2001) inferred that the export – import scenario shows a contrasting trend. In India the export during 1999-2000 was increased to 9.7 per cent from 6.16 per cent in 1990-91. But the import has almost doubled to that of export that is from 8.18 per cent to 15.57 per cent.

Prakash (2001) reported that the liberalization of the world trade in agriculture under the present circumstances is going to benefit developed countries rather than the developing countries.

Vasudevan (2001) noted that import of coconut oil increased almost five fold from 1997 to 1999 ie. 4250 tonnes to 22439 tonnes. During 1999 April to October alone, 16.7 tonnes of edible oil was imported. These have an adverse effect on coconut farmers.

Emami and Tarzi (2002) reported that WTO embodies the key principles of GATT which provides the foundation for the multilateral or global trading system. One of the key principles is non-discriminations i.e. any barrier to trade should apply equally to all member countries. There are four important exceptions to this vital principle. (1) Developed countries can give tariff preference to least developed countries. (2) Countries entering into regional free trade agreement do not need to extend the preference negotiated in this context. (3) Countries can invoke a temporary safeguard protection to one of its industries suffering serious injury due to a surge of import. (4) Temporary quantitative restrictions are allowed to deal with serious balance of payment problems.

Ganesan (2002) pointed out that the global economy is characterized by greater integration, a more liberalized international trade regime following the set up of the World Trade Organization, a rapid pace of technological change especially in some high-growth areas such as information and knowledge based industries and intensified international competition.

Peter and Nybe (2002) stated that due to liberalization of trade, the spices industry had a set back. The prices have gone down to an alarming situation, especially in pepper where it decreased from Rs.205 during 1999 –2000 to Rs.73 / kg in 2002.The low tariff structure prevailing in the country facilitate cheaper import thereby reducing the price in the domestic market.

Singh (2002b) observed that in Kerala, roughly 40 per cent of the total production of coconut is used as raw nuts and the rest is used for making copra. Due to removal of quantitative restrictions in the light of globalization, the import of coconut oil and palm oil has increased. It

adversely affected the coconut industry specifically in Kerala. The import tariff applied to edible oils in India range from 65 to 85 per cent. It is far below the bound rate (i.e. 300 per cent) fixed for the commodity. This has also resulted in cheaper import of edible oils thereby increasing the plights of coconut farmers.

Srivatsava (2002) opined that one of the main problems we encounter in the WTO is that the subsidy levels in the developed countries are very high and our country does not have a level playing field. The developed countries are required to reduce their high domestic support and export subsidies.

Venkataraman (2002) opined that in the wake of the WTO compulsions, investment possibilities in several areas have become severally restricted. It is being realized that India has to focus on appropriate areas of growth and work out the strategies accordingly, to sustain its economic growth. Many industries in India are now reeling under the adverse impact of WTO regulations and are facing intense competition from the developed as well as developing countries.

Ajjan and Raveendran (2003) stated that during post WTO period, the share of India in agro exports in her global exports has declined from 19.2 percent in 1995-96 to 13.4 percent in 2001-02.

Arnold (2003) stated that Indian agricultural exports are stagnant at 1997-98 level, even though total merchandise exports have grown 50 per cent during the same period. As a result, the share of agricultural exports in total exports have fallen from 19 per cent in 1997-98 to 12 per cent in last fiscal. Among the individual product categories wheat, sugar and molasses, fresh vegetables and marine products were the only ones to show a positive growth. India's traditional export items including tea, coffee, non-basmati and basmati rice, tobacco, cashew, meat and meat products and oil meal on the other hand witnessed stagnant or declining export growth during this period. Basmati rice declined from $ 454 million in 1997-98 to $ 358 million during 2002-03. Non basmati $ 752.9 million to $ 454 million, tea $ 505.5 to $ 336 million, coffee $ 456.9 million to $

201.8 million, oil meal $ 925.4 million to $ 285.4 million, cashew $ 377 million to $ 416 million (stagnant), wheat from nil to $ 352 million, fresh vegetables $ 84 million to $ 128 million (50% jump), marine products $ 1.2 million to $ 1.4 million.

Chaturvedi and Nagpal (2003) observed that at the global level 185 products have been identified, which face Environment related Trade Barriers (ETB) in at least one importing country. World imports in these products amount to US $ 286 billion of which 49 per cent of the total value are affected by this ETB. Agro products are the most affected one. In India 62 per cent of the total agricultural export come under this status. Of this 26 per cent goes to USA, seven per cent to EU and five per cent to Japan.

Government of Kerala (2003c) reported that after the removal of quantitative restrictions in April 2001, one of the major threats faced by the tea industry is the increase in import of low priced tea into India. Import of tea into India increased by 31.5 per cent from 16.6 million kg in 2001 to 21.0 million kg in 2002.

Ingeo (2003) noticed that world agricultural markets continue to be distorted by government actions in Europe, North America and several developing countries. In 2001, protection and subsidies for agriculture in the Organization for Economic Co-operation and Development (OECD) countries amounted to US $ 311 billion compared to US $ 302 billion in 1986-88.

Malcolm (2003) pointed out that the EU strongly urge the largest and most advanced developing countries like India, China and Brazil to provide preferential access to their markets to the much larger number of developing countries in need. In short, the G-20, led by these three countries, should open their markets on a preferential basis to the G-90. This group like the G-20, emerged at the WTO ministerial meeting in

Cancun in September 2003. The G-90 includes the least developed countries, such as Bangladesh and 70- odd developing and least developed African, Caribbean and Pacific countries.

Merlinda and Ingeo (2003) opined that developing countries possibly have the most to gain from a substantial reduction of existing export subsidies and removal of other trade impediments, but these countries have been the most powerless and the most ineffective.

Damodaran (2004) stated that livestock contribute 25 per cent of total farm GDP and Horticulture contributes to 18-19 per cent.

Nybe *et al.* (2004) reported that in view of the economic liberalization and being a member of the WTO, certain macro and micro level changes are expected to take place in Indian agriculture. In the case of coconut and its products, India is in a disadvantageous position since the domestic prices of these commodities are higher than the international prices. In a free trade regime after 2000 AD, Indian entrepreneurs related to coconut industry may import these products from other competing countries which could drastically alter the domestic prices of coconut and its products. To face the challenges of liberalization and to meet the increasing demand for organically produced products in coconut and spices, a combination of integrated cropping system and organic farming practices would be the better option.

2.6.1. The Export and Import Baskets.

Alamar and Murali (2003) reported that Indian export, as a percentage of world exports in 1951, was two per cent only. During 2001-2002, it was less than one per cent. It is decided to boost the export from $ 46 billion to $ 80 billion in 2002-2007.

John (2003) pointed out that exports have acquired much importance under economic liberalization. The trend towards market economy in almost all countries of the world has increased the significance of exports. Exports have become the vital indicator of a nation's social, political and economic growth. This means that an increase in economic activity, would result in a greater income and a higher standard of living. Export is a must for India's economic development. Export growth and economic development are thus interrelated. Agricultural exports have been the backbone of India's export effort and continue to be the beacon for future export growth.

Kavitha (2003) observed that agricultural exports declined from 20.5 per cent in 1996-97 to 13.5 per cent in 2000-2001. Major commodities under the group are basmati rice, cashew, castor oil, coffee, marine products, non-basmati rice, oil meals, spices and tea. In 1991-92 these commodities accounted for 74 per cent in total export of agriculture which went up to 77 per cent in 1995 - 96 but declined to 76 per cent in 1999-2000.

Potty (2003) observed that food exports form a sizeable chunk of the country's international trade though significant volume of food is also imported. Out of US $ 45 billion exports, food constitutes about 17 per cent valued at US $ 6.1 billion annually. More than 75 per cent of this export basket is made up of agricultural commodities with very low value addition and technology content.

2.6.2. Indian Share in World Trade

There are two ways of looking at Indian share in the world trade for major agricultural commodities. One way is to see the share of India in the total value of exports in the world market at international prices and the other is to look at India's share in the total physical quantity of exports / imports in the world.

Chadha (2002) opined that floriculture is one of the major areas of agribusiness in recent years. The international trade in floriculture is estimated as 5 billion dollar per annum. The Indian share is only 10 million dollar

Singh (2002a) reported that India stands in the 22nd position, in terms of export of floriculture produces. The demand for cut flower will increase by 60 per cent in 2005. In coffee, tea and spices the share of India in the total world trade has continuously decreased from 5.1 per cent in 1970 to 2.7 per cent in 1994, despite the fact that absolute value of exports from India is showing an increase.

Dua *et al.* (2003) reported that during the second half of nineties Indian exports of agricultural commodities have been less than satisfactory. Total export of India have declined from US $ 6.8 billion in 1996-97 to about US $ 5.5 billion in 1999-2000.The share of agriculture in export has also declined from 20.4 per cent in 1996-97 to 14.6 per cent in 1999-2000.

2.7. ECONOMIC PERFORMANCE

2.7.1. Components of Economic Performance

2.7.1.1. Innovation proneness

Anantharaman (1991) reported that innovation proneness is the interest and desire of persons to seek changes in techniques and introduce such changes in their avocations. Innovative farmers are more inclined to try new methods and ideas in the endeavour of managing enterprise.

Chakravarthi (1993) stated that more than two third of the respondents had high level of innovativeness and 31.25 per cent with low level of innovativeness.

Thomas (1998) reported positive and significant relationship between innovation proneness and participation in watershed development programmes.

2.7.1.2. Economic Motivation

Athimuthu (1990) observed a highly significant relationship between economic motivation and adoption of nutrient use technology.

Gowda (1996) found that a negative and significant relationship between economic motivation and susceptibility of rice farming.

2.7.1.3.Sustained profit

Jeya (1999) reported that majority of the respondents (92.00 per cent) achieved medium level of profitability, where as 4.80 per cent was under low level and 3.20 per cent under highest level of profitability. The characters such as education, risk orientation and extent of involvement in farming activities had positive and significant correlation with profitability.

2.7.1.4. Productivity

Productivity is a word that often puzzles and sometimes frightens people. The concepts and definitions of productivity vary, so do the variety of measurement techniques and opinion as to what is responsible for its increase.

Leo (1986) revealed that productivity has most commonly been defined as ratio of output to input.

Jacob (1990) reported that the initial survey of group farming in paddy cultivation in Kerala indicated that the cost of cultivation was found to be reduced by five to seven per cent. Productivity of rice increased from 2949 kg /ha during Kharif 1988-89 to 3916 kg /ha in Kharif 1989-90.

Vedat and Eyler (1990) observed that productivity may be viewed as a measure of performance for the production activity and return to the amount of output produced per unit of input.

Hussain (1992) inferred that 79.41 per cent of the farmers got medium yield and 17.65 per cent got high yield for paddy under group management program.

Oostrum (1998) reported that participatory approach helped small farmers association to increase food production and generation of more returns from their lands.

2.7.1.5. Effective supply of inputs

Uquillas and Navas (1993) reported that farmers organizations have undertaken a service role which provided member's access to agricultural support services which facilitated the adoption of new technology.

MANAGE (1997) reported that in Assam, the farmers group, called Pathar Parichalana Samity (PPS) evolved an innovative input acquisition system to back up technological messages into adoption. A few members of the Executive Committee form the input procurement group. This group assesses the member's demand for seeds, fertilizers and procures the same from the dealers in the district, thereby ensuring timely availability at the farm gate and deriving economics of sale through centralized operation.

Peterson (1997) opined that farmers need inputs to increase production but timely access to these are often a major problem to the majority of the farming community.

Saran *et al.* (1998) found that farmers got more than half of their requirement of agricultural labour in time. They got hardly 10 to 20 per cent of their seeds and fertilizers in time. More than 80 per cent of the inputs are not available at all. Resources like irrigation, seeds, fertilizers,

plant protection chemicals, scientific knowhow, marketing facilities and agricultural labour are available in varying degrees in time but with difficulty.

2.7.1.6. Diversification of activities

Diversified farming is not only profitable from the economic point of view but also important due to its ecological consideration. Of late, the focus has shifted from creating agricultural revolutions to making agriculture sustainable. Alternate land use system, by way of reducing crop intensification and promoting allied activities at farm level, will help in conservation of scarce resources.

Thrupp (1991), Pandey (1992), Patil and Kalyanker (1993) and Canchaya (1996) viewed that farm diversification would improve the sustainability of agriculture.

Gomez (1992) observed that diversification means mixed farming, or the integration of crop and livestock production on the farm. In this way, cyclic process and interaction in the agro ecosystem can be optimized, for example, using crop residue in animal husbandry and manure for crop, production.

Ammour (1994) observed that young and women members of community organization were particularly interested in diversifying local production system.

Ashby *et al.* (1995) found that farmers with a desire to diversify their activities identified alternatives, to traditional cash crops (coffee and cassava) and increased their food sufficiency by growing crops like potatoes, beans and maize.

2.7.1.7. Information backstop

Bebbington (1993) reported that farmer's organization in Equador trained their members on modern agricultural technologies through contract agronomists and guest lectures to increase their knowledge.

Sumana and Reddy (1998) found that training undergone was significantly related to participation of farm women in watershed development program.

2.7.1.8. Market perception

Marimuthu (1998) stated that majority of banana growers (84.17 per cent) had high level market perception, followed by low level (15.83 per cent) market perception. None were identified under medium level market perception.

2.7.1.9. Market behaviour

Krishnarajan (1994) reported that adoption of a cropping system by the farmer is greatly influenced by various factors including profitability, household needs, resource base, market and input supply.

Anand (2003) stated that majority (45.83 per cent) of banana growers had high level marketing behaviour, followed by low (41.67 per cent) and medium (12.50 per cent) levels.

2.7.1.10. Market intelligence

Surilliappan (1997) stated that there existed low level of market intelligence with majority (58.33 per cent) of maize growers.

2.7.1.11. Market demand

Market demand refers to the capacity of the respondent to position the cultivation and marketing activity according to demand of the produce.

2.8. SWOT ANALYSIS OF AGRICULTURE IN KERALA AND EXTENSION ORGANIZATION IN THE STATE DEPARTMENT OF AGRICULTURE.

Prakash (1989) reported that the poor performance of coconut crops in the state is due to lack of irrigation facilities, severe incidence of disease like rootwilt, high palm density and senility of the existing palms.

Subbian *et al.* (2000) found out that as of now, out of 326.73 million ha of geographical area, approximately 18 per cent is under forest and 13.5 per cent is not available for cultivation. Total problem area constitute 173.65 million ha which include areas subject to soil and water erosion (145 million ha), water logged areas (8.53 million ha), pokkali soils (3.58 million ha), saline and coastal sandy areas (5.50 million ha), ravine and gullies (3.97 million ha), shifting cultivation (4.91 million ha) and reverine torrents (2.73 million ha). Besides, 40 million ha are prone to flood and 260 million ha are drought prone. Thus, the net sown area is 136.18 million ha (41.42 per cent of the total geographical area).

Surendran (2000) reported that land degradation is a major concern in Kerala. The main causes are soil erosion, coastal salinity, land slides, sea erosion, stream bank erosion, degraded forests, drought and floods. It is estimated that 9.52 lakh ha of land is subjected to moderate to severe soil erosion.

Chaturvedi (2002) indicated that one of the major constraints in agriculture is related to farm productivity. Productivity of most of the food crops has been stagnating since early 1990's. Lowering of productivity growth in agriculture would have a bearing on per capita food availability especially for the growing population in developing Asia, where population is expected to grow to 3,926 million by the year 2010.

Massania and Behera (2002) pointed out that low productivity of various agricultural crops, aberration in weather, rapid soil erosion,

inadequate supply of nutrients and lack of trained and skilled farm workers constitute the liabilities of our agricultural sector.

Nair (2002) in a study revealed that Kerala produces only 20 per cent of the requirement of rice. There is a strong school of thought that Kerala should concentrate on commercial crops and depend on other states for the supply of rice. This argument cannot be accepted as such not only from the point of view of self-sufficiency in rice production but also due to the significant role of the paddy field in maintaining the ecological balance. This includes sustenance of drainage system, conservation of ground water, preservation of the flora and fauna.

Seetharaman (2002) reported that new challenges have emerged along with development, which implies availability and accessibility of food, clothing, health etc. The challenges include equity issues, uneven development across regions, lack of infrastructure facilities, inadequate capital formation, constraints on movement and storage, environment issues, unsuitable agrarian structure, post harvest losses, highly fluctuating and unrewarding price regime, weak market support, low value addition practices, farming risks in the form of new pest and diseases, GM crops etc besides globalization of Indian agriculture through WTO.

Government of India (2003) reported that the major constraints in agricultural export were distorted domestic prices, weak storage, post handling facilities, no sound and efficient infrastructure for post harvest operations, no large scale processing technology, export quota restrictions, inadequate brand building and absence of standard certification system.

2.9. DELINEATION OF THE DIMENSIONS OF ORGANIZATIONAL EFFICIENCY

2.9.1. Job autonomy

Davis (1984) reported that the research study on job autonomy showed that very high autonomy is not associated with high productivity. That is effectiveness tends to decline with too much autonomy norms. The effectiveness declines with both excessive use and miserly use of autonomy.

Robbins (1993) stated that more the presence of job autonomy greater would be the employees performance, and lower the autonomy more would be his absenteeism and likelihood of leaving the company.

2.9.2. Job satisfaction

Rizvi *et al.* (1994) observed that commitment to work and job satisfaction are directly proportional to each other and therefore recognizing good job and giving incentives, brings the success of the program.

The variables which indicate nature of relationship with job satisfaction and the categories of respondents are presented below.

Author	Year	Respondent	Variable	Relationship
Sundaraswamy	(1987)	AAO	Job performance	+ ve
Halkathi	(1991)	AA	Job performance	+ ve

2.9.3. Job involvement

The variables which indicate nature of relationship with job involvement and the categories of respondents are presented below.

Author	Year	Respondent	Variable	Relationship
Radhakrishnamoorthy	(1987)	VEO	Job performance	+ ve
Singh & Patiraj	(1987)	Industrial worker	Job performance	Not significant
Kalavathy	(1989)	Agricultural Graduate	Job satisfaction	Not significant

2.9.4. Guidance and Supervision

Uphoff (1992) reported that extension agents and institutional organizers were important in the foundation and development of farmer groups.

Garforth (1993) and Smith (1994) stated that the extension agent is no longer seen as the expert who has all the useful information and technical solutions. The scale of extension support required is thus often larger than individual farm and extension workers, need new skills of negotiation, conflict resolution and the nurturing of emerging community organizations.

Ammour (1994) found out that community organization projects succeeded because the coordinators worked closely with community leaders and farmers to identify an economic activity around which farmer could organize.

2.9.5. Facility and Resources

The variable which indicate nature of relationship with facility and resources and the category of respondent is presented below.

Author	Year	Respondent	Variable	Relationship
Reddy	(1990)	AO	Job performance	+ ve

2.9.6.Organizational involvements

The variables which indicate nature of relationship with organizational involvement and the categories of respondent are presented below.

Author	Year	Respondent	Variable	Relationship
Veerabhadraiah	(1980)	Employee	Job performance	+ ve
Romzek	(1989)	Employee	Job satisfaction	+ ve

2.9.7. Achievement motivation

Ravichandran (1993) found a positive and significant relationship between achievement motivation and perceived organizational climate in Anganwadi workers and Agricultural officers respectively.

Jamatia (1999) revealed that 40.67 per cent of the respondents had medium level of achievement motivation followed by 36.00 and 23.33 per cent of them with low and high achievement motivation levels, respectively.

2.9.8. Decision making ability

Gubbels (1993) reported that the tendency to adopt traditional structure of decision making was one of the reasons for the failure of farmers' organizations.

Jayasree (1993) reported that 8.48 per cent and 75.76 per cent of the farmers were distributed in medium and low involvement in decision making categories respectively.

Alex (1994) defined decision making as the process of judiciously choosing course of action from available alternatives for the purpose of crop production.

Bebbington *et al.* (1994) revealed that the members of farmer's organization involved at bottom and top end of the decision making process helped to define research and extension agenda and set priorities.

Rivera (1997) observed that participatory decision making in extension has shown to increase commitment to programs associated with extension systems.

Sindhu (1997) reported that majority of the cut flower growers in the group exhibited high level of involvement in decision making.

2.9.9. Organisational Commitment

Nagneur (1992) reported a positive and significant relationship between organisational commitment and perceived organisational climate

2.9.10. Job perception

Somasundaram (1983) reported that the role perception of Agricultural Officers was better in the present extension system of Tamil Nadu than past.

Susilkumar (1984) stated that the perception of job duties were positively and significantly related with overall performance of Assistant Agricultural Officers.

Gulothungan (1986) found that perception of job duties and job satisfaction was having positive and highly significant association with job performance of Field Agricultural Officers in Tamil Nadu.

Dudhani and Jalihal (1987) reported that the Deputy Directors of Agriculture in Karnataka State perceived all the extension role functions as highly satisfactory or satisfactory.

Siddaramaiah and Gowda (1987) found that 53.33 per cent of the extension guides in Karnataka belonged to high job perception category. The mean job perception scores were highest in the area of planning of the extension programs, followed by maintenance of reports, educating clientele group and co-ordination.

2.9.11. Job Performance

Gibson (1980) observed that an individual's performance on the job is a joint function of his or her individual personal characteristics and his or her motivation to do a good job.

Rao and Sohal (1982) reported that there was little similarity in the ratings of self, subordinate and superior beneficiaries in the performance of extension workers in Andhra Pradesh.

Bharadwaj *et al.* (1989) defined job performance as the extent of performance of the job in view of expectation as stated in job chart.

Mishra (1990) used a combination of self rating and rating by superiors for measuring the role performance of Village Extension Workers.

Perumal (1994) inferred that about 15.75 per cent of Agricultural Extension Officers of Tamil Nadu were above average, 70.08 per cent of

them were average and 14.17 per cent below average in their job performance

2.10. EXTENSION STRATEGY

2.10.1. The Emerging Scenario

The state agriculture is in a phase of transition as a result of the impact of globalisation and liberalization. The emerging scenario will call for productivity, quality and value addition revolutions.

Ramaswamy (2002) reported that the new millennium will be one of genetics and biotechnology. In biology, it will be an age of cloning, cultivation of biological organs, their transplantation and surrogate motherhood. In crop cultivation, it will be genetically manipulated crops that are disease resistant, high yielding and immune to the vagaries of weather. The genetic revolution has already shown its effectiveness in increasing agricultural production in China. By the year 2000, China had genetically modified 141 agricultural plants, approved 45 for field trials and 31 for commercialization. In India, comparable figures are only 16, 10 and 4 respectively. The coming age will be one of knowledge in which the poor and uneducated will be side-lined and exploited. If the developing countries do not unite, educate and empower their people, they will become the testing grounds for Western ideas, their genetically modified seeds, artificially cultivated organs, medicines and plant varieties. The new agricultural strategy according to Swaminathan (2001) will have as its foundation, the integrated and sustainable management of factors like soil, water, biodiversity and forests.

2.10.2. Agri – Trade strategy & Diversified farming systems.

If agricultural trade goes wrong nothing else would have chance to go right. According to the "Report of the Commission on WTO concerns

in Agriculture, it is need of the hour to have a strong focus on home, regional and global trade strategy.

This strategy should pay greater attention to cost and quality of the home market, trade relationship among the neighboring developing countries on a mutually beneficial mode and to boost trade particularly with countries in West Asia, Africa, the European Union, Russia and the North America.

Diversified farming system is essential for adding value to the time and the labour of rural men and women. Much of the employment generation now has to take place in the farm sector. Farming systems diversification and value addition are essential for promoting job-led economic growth. Therefore any initiative in promoting horticulture and knowledge – intensive farming techniques in the present context is a timely one.

2.10.3. Multiple Strategies

As envisaged in the ninth five year plan, under Regionally Differentiated Strategy, multiple strategies based on agro-climatic regional planning, taking into account agronomic, climatic and environmental conditions, are being followed in different regions of the country. This will be differentiated by broad regional characteristics of agro-climatic situations. The thrust of such strategy is an ecologically sustainable use of land water and vegetation in such a way that it serves the objectives of accelerated growth, employment and alleviation of hunger.

2.10.4. Macro Management of Agriculture Scheme (MMAS)

In pursuance of government's effort to double the food production in a time bound manner and the recommendation of the ninth plan to adopt

RDS, the National Agricultural Policy (NAP) emphasized on Macro Management of Agriculture Funds (MMAF) principle. Under MMAF principle, 27 Centrally Sponsored Schemes (CSS) have been merged to launch a new scheme called Macro Management of Agriculture Scheme for supplementation/ complementation of state's effort to work plans giving thereby to the states the desired level of flexibility and freedom to allocate the funds under various agricultural development schemes and programs. The conventionally followed schematic approach to extend support to the states was mainly based on proportional area and production principle limiting the state's choice to utilize the funds under the specific components.

Vyas (2001) suggested that development strategies should focus in the following areas in the light of globalization era. This include

(a) Increase in value added per hectare, more so on the small and marginal holdings.

(b) Improvement in productivity of inputs especially purchased inputs, such as fertilizer and irrigation water.

(c) Prevention of environmental degradation, especially degradation of land and water resources and

(d) Encouraging farmer self-help institution, particularly at the grass root level.

2.10.5. Need for Value Addition

Acharya and Agarwal (1999) reported that India is the second largest producer of fruits and vegetable with 132 million tonnes. Only 2 per cent of the annual production is processed in India. It is 23 per cent in China, 45 in Philippines and 188 per cent in UK. In India, 40 per cent goes waste which incurred a loss of Rs. 40,000 crores.

Alam (2002) inferred that the current post harvest loss viz., storage (10 to15 per cent), food grain (10 to 12 per cent), fruits & vegetables (20 to 40 per cent), milk, meat, poultry and fish (10 to12 per cent) worth Rs. 8,70,000 million per year, can be reduced half by scientific management. That is by timely harvest, right kind of harvesting and threshing equipments, protection against adverse weather condition, safe storage, prophylactic and curative measures to check insect infestation, chilling and use of appropriate cold chain for fruits & vegetables and other perishables.

2.10.6. Prosperity through value addition

Most of our agriculturists dispose of their produce without processing at the field itself as soon as the crop is harvested. As a result, our agricultural produces do not fetch an economic realization to the farmers. They continue to suffer miserably due to poor realization. Our agricultural produces have to be processed, converted into value added products, packaged and sold to the consumers through a network of marketing out lets.

Ansari and Ashok (2002) reported that the Asian Development Bank and the World Bank have estimated that the economic loss incurred due to micronutrient deficiencies is in the range of 3 to 5 per cent of the gross domestic product. In the Southern states, it is 14,400 crores per annum. Of this, Andhra Pradesh accounts for Rs. 4,511 crores, Karnataka Rs. 3,322 crores, Kerala Rs. 2,178 crores and Tamil Nadu Rs. 4,431 crores

Kumar and Bakde (2002) stated that in India, the food processing industry is still in the nascent stage. As such the quality and standardization aspects often take a back seat. However, as India has become part of global economy and aims to compete in the world market it must pay attention on these aspects. The global food processing industry is governed by very strict quality parameters. International Standardization

Organization (ISO), Geneva is the premier organization governing them at the global level.

Sinha (2002) inferred that after WTO, our standards for bench marking quality will have to be aligned with the international standards. This is essential if we want to be competitive in the international market. As per the conditions of WTO, the processed products should specify the place of origin and the rules of origin, so that the consumer can know where the product was manufactured.

2.10.7. Private Extension

Saravanan *et al.* (2001) suggested that the strategies of privatization of agricultural extension in India includes giving partnership rights and more responsibility to private sector and NGO's. They may be given more responsibility in agricultural technology transfer.

Ansari and Ashok (2002) viewed that the definition of Agricultural Extension varies from simple transfer of information to facilitating process of total human development. The services are mainly funded and delivered by government in the Indian context. But there are private players who also fund and deliver extension services. The process of funding and delivering the extension services by private individual or organization is called private extension. However, the privatization is the act of reducing the role of government or increasing the role of private sector in an activity or in the ownership of assets. In agriculture sector, private extension and privatization are often viewed similarly. Private extension is solely the act of private individuals or organizations where the decision of privatization solely rests with government implemented in liaison with Private Extension Service Providers (PESP's).

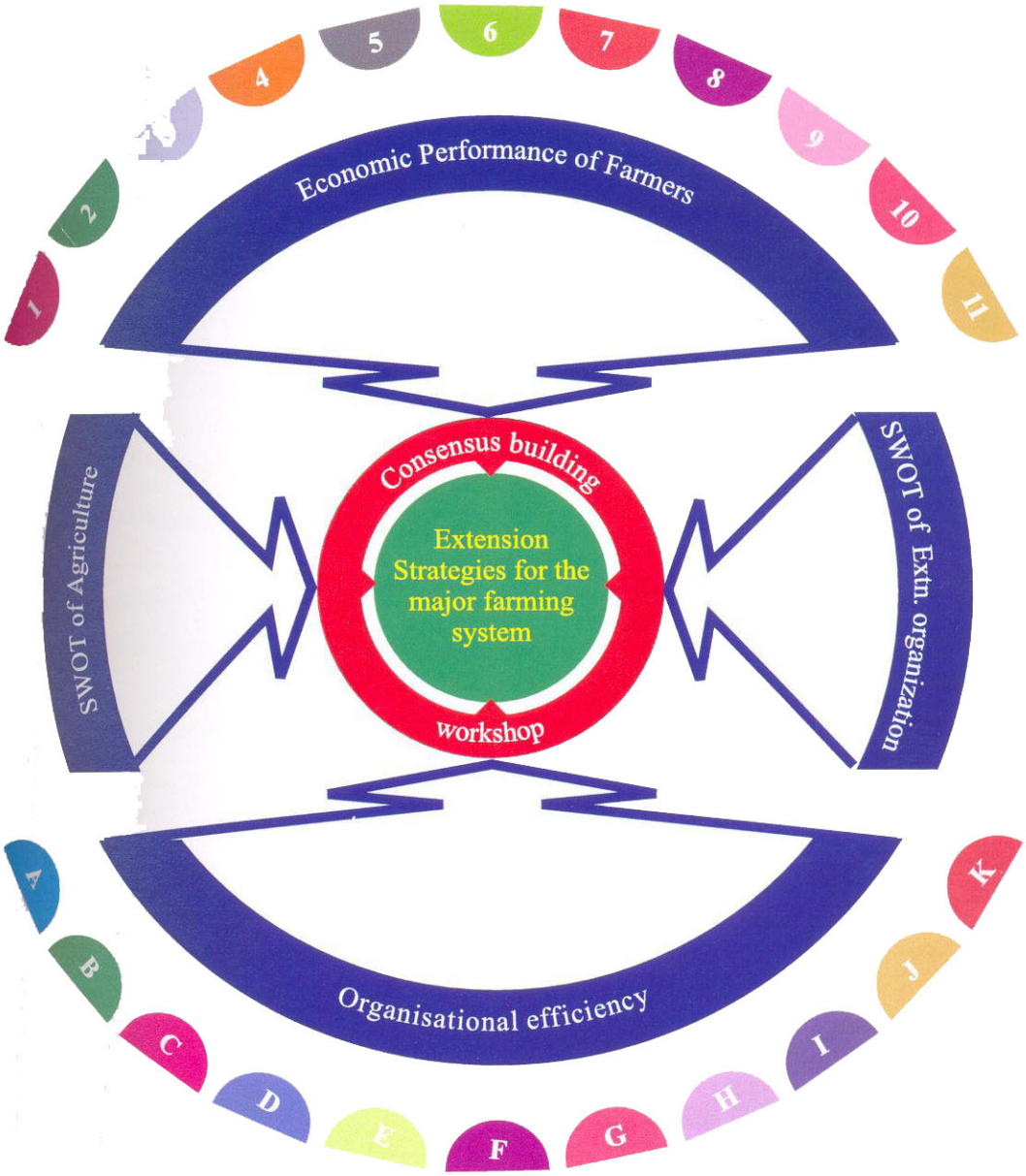
2.10.8. Theoretical Frame Work for the Study

The foregoing review indicates the presence of multiplicity of problems in the changing agricultural situation in Kerala. A deeper analysis of these reveals that there is a sequential order of occurrence of these problems indicating a temporal and cause effect relationship among the problems. These problems interact with one another to form a complex thereby impeding higher levels of economic performance. The conceptual model illustrated as Fig. 1 is the culmination of an effort to summarize the research findings related to the formulation of extension strategies for the major farming systems.

From the above reviews, the following inferences could be drawn:

1. Economic performance of almost all the crops show a declining trend during the post liberalization period.
2. Many types of farming system approaches have been formulated to promote agricultural growth.
3. Globalization has both positive and negative effects.
4. Several dimensions contribute towards organizational efficiency.
5. Different components influence economic performance of farmers.
6. Kerala's agriculture is weak in many aspects to cope up with the changing situation.

Fig .1. CONCEPTUAL FRAMEWORK OF THE STUDY



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METHODOLOGY

3. METHODOLOGY

The methodology employed in this study are presented under the following major heads.

3.1 Selection of locale for the study.

3.2 Sampling procedure employed.

3.3 Impact and implication of economic reforms on the economic performance of farmers.

3.4. SWOT analysis of agriculture in Kerala

3.5. SWOT analysis of extension organization in the Kerala State Department of Agriculture.

3.6. Delineation of the dimensions of organizational efficiency in the Kerala State Department of Agriculture

3.7. Consensus building workshop

3.8. Tools for data collection

3.9. Statistical tools used for the study

3.1. SELECTION OF LOCALE FOR THE STUDY

3.1.1. Brief Description about the Study Area.

The total geographical area of Kerala is 38.85 lakh ha. Of this, 10.81 lakh ha is under forest. The net area sown is 22.59 lakh ha. The gross cropped area is 29.17 lakh ha (Government of Kerala, 2003a). The major crops grown in the state are rice, coconut, pepper, rubber, arecanut, banana, cashewnut, tapioca, spices etc.

3.1.1.1. NARP Zones

A brief description about the five NARP zones are given below.

1. Northern Zone

The zone consists of four districts namely Malappuram, Kozhikode, Kannur and Kasargode. The total geographical area of the region is 28.2 per cent area of the state. The major soil types are coastal alluvium, laterite and forest loam. Nearly 88 per cent of the population of the region depends on agriculture and allied activities. Rice, coconut, arecanut, pepper, cashew, banana, vegetables and rubber are the important crops grown in the region.

2. Central Zone

The Central Zone consists mainly of three districts, Ernakulam, Thrissur and Palakkad excluding the high ranges, central saline tracts and other isolated areas like kole lands with special soil and physiographic conditions. Geographical area of the zone is 25 per cent area of the state. The soil type is generally laterite. The zone is the major rice-growing tract of this state. Coconut, arecanut, banana and vegetables are the other important crops grown in the region.

3. High Range Zone

This zone comprises of Wayanad and Idukki districts, Nelliampathy and Attappady hill ranges of Palakkad district, Thannithode and Seethathode panchayats of Pathanamthitta district, Ariyankavu, Kulathupuzha and Thenmala panchayats of Kollam district and Peringamala, Aryanad, Vithura, Kallikad and Amburi panchayats of Thiruvananthapuram district. The total geographical area of the region is 28.12 per cent area of the state. Pepper, cardamom, tea and coffee are the important crops grown in the region.

4. Special Zone of Problem Areas

This zone comprises such regions namely Onattukara, Kuttanad, Pokkali and Kole spread over the six districts viz., Alappuzha, Kollam, Kottayam, Ernakulam, Thrissur and Malappuram. Rice, coconut, sugarcane, vegetables and sesamum are the important crops grown in the region.

5. Southern Zone

The Southern Zone comprises of the districts of Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha and Kottayam with total geographical area of 18.68 per cent area of the state. The soils are generally laterite, the texture ranging from sandy to sandy loam. The major crops grown in the region are rice, coconut, tapioca, pepper, arecanut, rubber, banana and vegetables

3.1.1.2. Agro-ecological Zones of Kerala

The state has been delineated into thirteen agro-ecological/climatic zones. The four parameters which determined the agro-ecological zones are altitude, rainfall pattern, soil type and topography. These together evolve distinct agronomic environments wherein a distinct cropping pattern flourishes. The levels of each parameters are broadly determined to avoid complexity in the process of land evaluation. The delineated thirteen zones are named as onattukara, coastal sandy, southern midlands, central midlands, northern midlands, malappuram type, malayoram, palakkad plains, red loam, chittoor black soil, kuttanad, river bank alluvium and high ranges.

3.1.1.3. Farming System

There are four major farming systems existing in Kerala (KAU, 1989). They are coconut based, rice based, tapioca based and

homestead based farming system. These farming system were identified for the study. All these farming systems are existing in all the NARP zones.

3.1.2. Selection of the Study Area

The study was undertaken in five NARP zones of Kerala. One district each, from five NARP zones were identified. The selection procedure of district in these zones was based on existing farming systems and agro-ecological zones. The district with maximum area under agro-ecological zone was selected from each NARP zone. The selected district were, Kozhikode (North Zone), Thrissur (Central Zone), Idukki (High Range Zone), Alappuzha (Special Zone of Problem Areas) and Thiruvananthapuram (South Zone).

3.2.SAMPLING PROCEDURE EMPLOYED

The sampling procedure involved in the selection of Panchayats and the respondents are described below.

3.2.1. Selection of Panchayat

Four panchayats based on the farming systems of each selected district from the five NARP zones were selected. Accordingly 20 panchayats with key features of the farming systems were purposively selected based on the discussion with extension personnel of the concerned district.

3.2.2. Selection of Respondents

The study aims at assessing the economic performance of farmers on major crops, SWOT analysis of agriculture and extension organization in Kerala and organizational efficiency of the Kerala State Department of Agriculture. Hence different categories of respondents were selected and the details are given below.

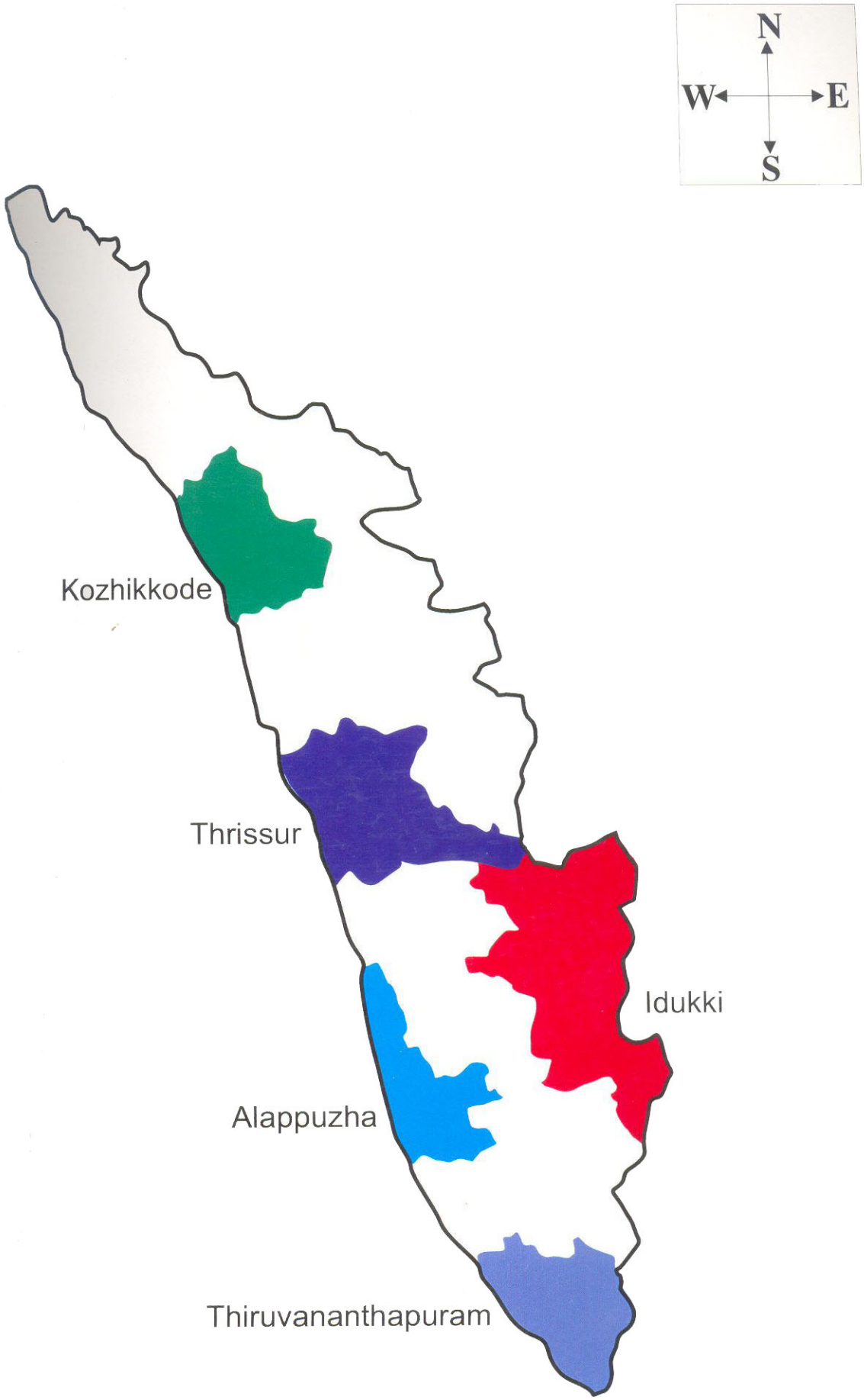


Fig. 2 Locale of the study area

3.2.2.1.Selection of farmers

The following criteria were used to define the population for the study.

1. Respondents should be progressive farmers including marginal (below 1 ha), small (1 to 2 ha) and large (above 2 ha) farmer categories.
2. They should have been in farming activities for at least last fifteen years. Since the study was pertaining to two reference periods viz., early reforms periods i.e. reference period - I (1990-1995) and post liberalization period i.e. reference period - II (1996-2001), after the implementation of World Trade Agreement.

Keeping these criteria, list of farmers in each panchayat was collected from Krishibhavan. Fifteen farmers, five each from each category, were randomly selected from each panchayat. Thus, a total sample of 300 farmers were selected for the study at the rate of 60 farmers from each district. The selected districts and panchayats are presented in Table–1.

3.2.2.2. Selection of stakeholders

For the purpose of SWOT analysis stakeholders were identified from agriculture and allied fields. They include extension personnel, scientists, farmers and experts. Altogether 60 stakeholders were identified based on discussion with experts in agriculture from all the five NARP zones.

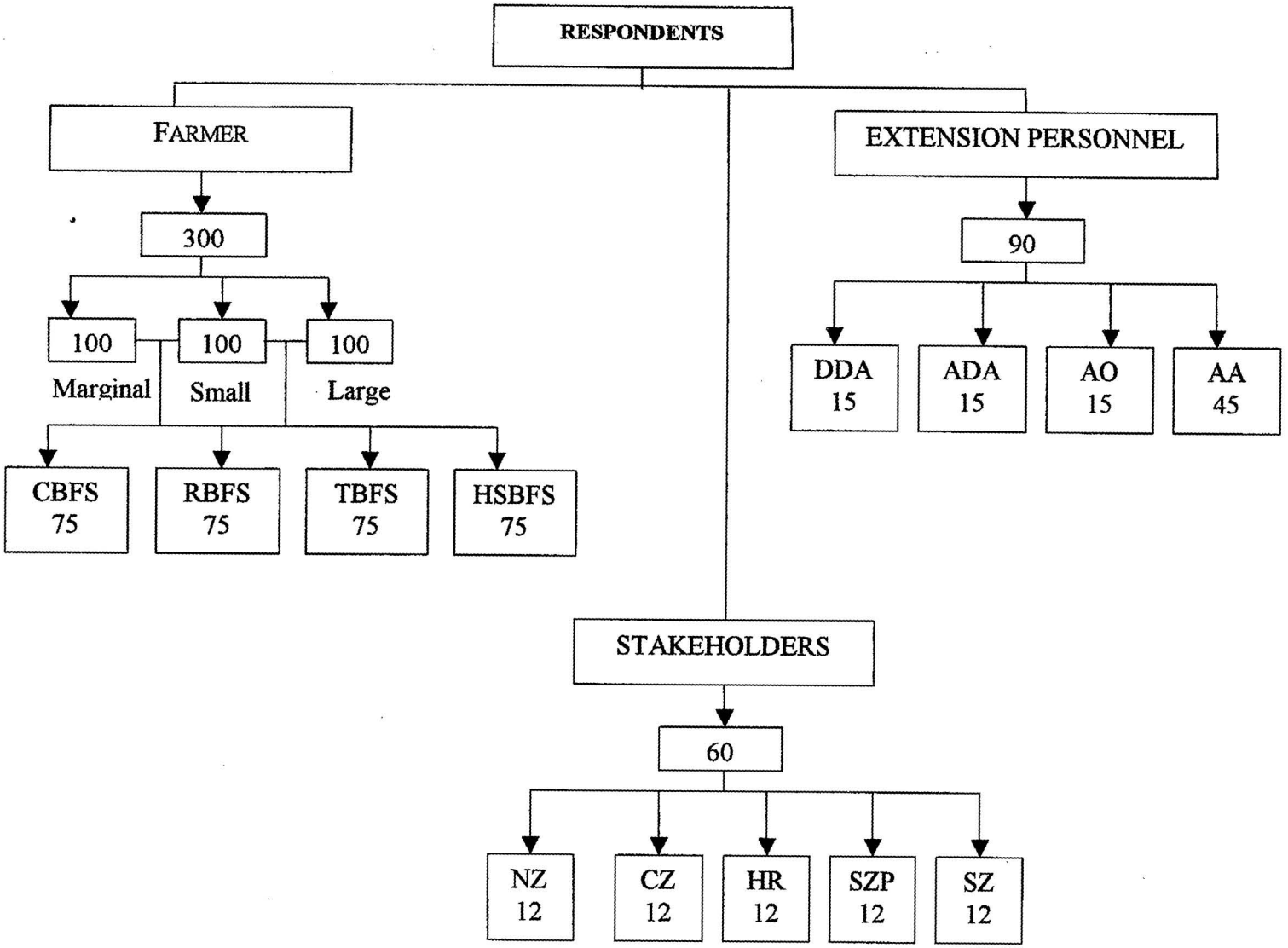
3.2.2.3.Selection of extension personnel

In Kerala, under the State Department of Agriculture, there are 14 offices of Principal Agricultural Officer (District level), 152 Offices of Assistant Director of Agriculture (Block level) and 991 Krishibhavans (Panchayat level offices of Agricultural Officer).

Table. 1 Details of sampling area.

Name of Zones	Name of Districts	Name of Panchayats
Northern	Kozhikkode	Kunnamangalam
		Peruvayal
		Mavoor
		Mukkom
Central	Thrissur	Nadathara
		Ollukkara
		Puthur
		Panamchery
High Range	Idukki	Alacode
		Krimanoor
		Edavatty
		Manacaud
Special Zone of Problem Areas	Alappuzha	Bharanikkavu
		Chennithala
		Thazhakkara
		Vallikunnam
Southern	Thiruvananthapuram	Kottukal
		Athiyanoor
		Chenkal
		Venganoor

Fig.3 Sampling Frame



Delineation of the dimensions of organizational efficiency of extension organizations was undertaken in this study. Extension personnel viz., Deputy Directors of Agriculture, Assistant Directors of Agriculture, Agricultural Officers and Agricultural Assistants from each zone/ district were selected. Deputy Directors and Assistant Directors were selected randomly from the list collected from the concerned district office. Three Deputy Directors and Assistant Directors each, from each district was selected. Three Agricultural officers and nine Agricultural Assistants were selected from the study area of each district at random. Thus the total respondents of 90 extension personnel for the study consisted of 15 each Deputy Directors, Assistant Directors, Agricultural Officers and 45 Agricultural Assistants.

3.3 IMPACT AND IMPLICATION OF ECONOMIC REFORMS ON THE ECONOMIC PERFORMANCE OF FARMERS.

3.3.1. Selection of Variables for the study

3.3.1.1. Dependent variable

Economic performance of farmers is the dependent variable for the study.

3.3.1.2. Independent variables

The socio – economic and psychological factors of farmers are selected as the independent variables in the study and the procedure adopted for the selection of these variables are as follows.

3.3.1.3. Relevancy rating

An exhaustive list of socio- economic and psychological variables likely to influence the economic performance was prepared. The identified factors were subjected to relevancy rating by a panel of judges

on a three point continuum as most relevant, relevant and least relevant with scores ranging from 3 to 1. The complete list of the variables with proper instructions for judgement were sent to 60 judges comprising the extension personnel of the State Department of Agriculture, scientists, teachers of various Agricultural Universities and IARI, New Delhi. The list of variables are shown in Appendix II.

Out of the 60 judges, responses were obtained from 44. Of these, four responses were incomplete and hence rejected. Thus, 40 responses were finally considered for the study. Each factor was compared on the basis of relevancy rating, for consideration in the study. The factors were selected based on the Relevancy Index. Relevancy Index was worked out as follows.

$$Relevancy\ Index\ (RI) = \frac{Actual\ total\ score\ obtained\ by\ the\ factor}{Total\ maximum\ possible\ score\ that\ factor\ could\ secure} \times 100$$

In this study, the relevancy index of the items factor ranged from minimum 70.60 to a maximum of 90.00. The average of minimum and maximum was taken as the cutting point for the selection of factors for inclusion in the study. Thus 11 factors which secured a Relevancy Index above the cutting point (80.30) were selected for inclusion in the study.

The list of independent variables finally selected are shown in Appendix III.

3.3.2. Operationalization and Measurement of the Variables

3.3.2.1. Dependent variable: Economic performance

The dependent variable in this study refers to the net income obtained from each crop enterprise by the farmer respondents

An attempt has been made to take stock of the different approaches and measurement tools developed to measure economic performance in

various fields like industry, business organizations, agriculture etc. and the same are furnished below. This was found essential, so as to facilitate the construction of a economic performance scale conceptualized under the study on a sound footing.

3.3.2.2. Approaches and measurement tools developed

Performance analysis studies used different samples and empirical approach. They seem to share a common methodology in the construction and usage of data. A study on bank performance evaluated mainly on the basis of various financial ratios. These ratios are usually computed from the bank balance sheets and income statements.

The studies analyzing bank performance revealed that bank performance is determined mainly by general economic and financial conditions, regulatory policies, difference in regional economic conditions and bank specific or internal factors.

Different methodologies have been used to investigate the validity of these propositions. Generally, multivariate statistical techniques, principally simple multiple regression analysis, based on single equation models have been more popular. Zimmerman (1996) used a single equation model. Hunter and Srinivasan (1990) used a regression methodology to investigate the determinants of De novo Bank performance. This is a class of Binary Choice Model that assumes that an individual firm is faced with two alternatives, that is good performance and poor performance, and that the outcome is dependent on a number of factors exogenous as well as endogenous.

3.3.2.3. Measurement of dependent variable

The dependent variable, economic performance was measured by "self – anchoring striving scale" developed by Cantrill (1965) with some modifications. The steps followed in this study are detailed below.

The method involves a ladder which consists of nine steps. Each step carry a score ranging from 1 to 9 starting from the bottom. The step five is neutral and it indicates that the net income was neither increased nor decreased. The steps from four to one denotes the declining trend and six to nine, the increased performance. These were expressed as percentage decrease or increase of performance. Thus, the steps 4,3,2 and 1 were indicated as less than 25 per cent, 26 to 50, 51 to 75, and more than 75 per cent decrease respectively. The steps 6,7,8 and 9 were represented as up to 25 per cent, 26 to50, 51 to 75 and above 75 per cent as increasing trend respectively.

The respondent farmers were asked to place their level of crop performance on any of these steps on the ladder by asking the following questions.

1. Where on the ladder do you feel, you personally stand at, with reference to the economic performance of the crop during the post reform period?

2. Where on the ladder do you feel, you personally stand at during early reform period?

The economic performance score for major crops were collected separately for the two different periods. The collected data were made available for meaningful interpretation among zones, farmer's category and farming systems.

3.3.2.4. Independent variables

The operationalization and measurement of the selected 11 independent variables are given below.

3.3.2.4.1. Innovation proneness

Refers to the keenness of the respondent in accepting new ideas and seeking changes in farming techniques and to introduce such changes in their farming operations which are practical and feasible.

In this study innovation proneness was measured by using the scale developed by Moulik (1965). The scale consisted of three sets of statements, each set containing three separate statements with weights 3,2 and 1 for the most liked choice and the reverse for the least choice respectively. After obtaining the most and least choice for each of the three sets of statements, the score was arrived at by summing up the weights of the most liked and the least liked statements. The score ranges from 6 to 18.

3.3.2.4.2. Economic motivation

Refers to the extent to which a farmer is oriented towards profit maximization and relative value he places on monetary gains.

The scale developed by Supe (1969) was used to measure economic motivation. The scale consisted of three statements. Each statement was provided with five point response categories namely 'Strongly Agree', 'Agree', 'Undecided', 'Disagree'and 'Strongly Disagree' with scores of 5,4,3,2 and 1. The summation of the scores of all the three statements formed the score for economic motivation.

3.3.2.4.3. Sustained profit

Refers to the extent to which farming activities of the farmer provide continued profits and monetary benefits to him.

It was measured by applying the schedule developed for the study. The schedule consisted of four questions. The answer to the questions were obtained in 'Yes'or 'No'options with score of 2 and 1 respectively. The summation of the score of all answers form the score of sustained profit.

3.3.2.4.4. Productivity

Productivity refers to the output from unit area cultivated.

The productivity was measured in terms of increase or decrease of yield in percentage for major crops owned by the farmer. The scoring procedure followed is given below.

The procedure adopted by Hardikar (1998) was followed in this study with slight modification.

This was measured in terms of percentage increase/ decrease of yield of major crops cultivated by the farmer respondent. The scoring procedure followed is given below

Yield	Score
More than 75 per cent decrease	0
51 to 75 per cent decrease	1
26 to 50 per cent decrease	2
Less than 25 per cent decrease	3
Unchanged	4
up to 25 per cent increase	5
26 to 50 per cent increase	6
51 to 75 per cent increase	7
More than 75 per cent increase	8

3.3.2.4.5.Effective supply of inputs

This refers to the availability of critical production inputs like seeds, fertilizers, pesticides, irrigation water and credit in correct time and sufficient quantity.

Effective supply of inputs was measured in this study by using the procedure adopted by Surendran (2000) for the purpose. Availability of five essential inputs were measured in the range of Always, Sometimes and Never. The scoring pattern was as follows. The maximum and minimum scores are 30 and 10.

Availability of inputs	Score
Always in correct quantity	3
Always in correct time	3
Sometimes in correct quantity	2
Sometimes in correct time	2
Never in correct quantity	1
Never in correct time	1

3.3.2.4.6. Diversification of activities

This refers to the extent to which crop production activities are diversified to generate additional income.

In this study diversification of activities was measured by the schedule adopted by Surendran (2000). The schedule consisted of two items and the responses were obtained as 'Yes' or 'No' which carried a score of 2 for 'Yes' and 1 for 'No'. The summation of the score of all items formed the score of the diversification of activities.

3.3.2.4.7. Information backstop

Refers to the availability of facilities and opportunities to the respondent for updating of information regarding farming activities.

It was measured by applying the schedule adopted by Surendran (2000). The schedule consisted of four items. The respondents were asked to respond to the items in a three-point continuum as 'Always', Sometimes' and' Never' which carried a score of 3,2 and 1 respectively. Summation of the score of all the items gave the score of the respondents on information backstop. The score range from 4 to 12.

3.3.2.4.8. Market perception

Market perception refers to the capacity or tendency of an individual farmer to identify the market trend to sell the harvested produce for greater returns.

It was measured by getting response for four items related to market trend with separate response category. The scoring procedure is given below. The scores obtained for all the answers were summed up to form the market perception score. Meaningful interpretation was also made based on the obtained answers.

The scoring procedure adopted by Marimuthu (1998) with slight modification was used for the study.

Item	Response category	Score
1	Yes	2
	No	1
2	Low price	1
	Same price	2
	High price	3
3	Very difficult	1
	Difficult	2
	Easy	3
	Very easy	4
4	Soon after harvest	1
	When in need of cash	2
	When the price is attractive	3
	Pre- harvest contract	4

3.3.2.4.9. Market behavior

Refers to the capacity or tendency of an individual farmer to identify the market trend to sell the produce for greater return based on the marketing dimensions viz., mode of transport, place and sale, mode of sale, terms and conditions for sale and distance of market (in km).

The scoring procedure adopted by Marimuthu (1998) with slight modification was used for the study.

The scoring procedure followed is given below.

Sl.No	Market	Response category	Score
1	Mode of transport	Head load	1
		Bi-cycle	2
		Bullock cart	3
		Autoriksha/moped	4
		Bus	5
		Tempo van	6
		Lorry	7
		Train	8
2	Place of sale	In the village itself	1
		Nearby town	2
		Distant town	3
3	Mode of sale	Local merchant	1
		Retailers	2
		Commission agent	3
		Contractor	4
		Wholesale merchant	5
4	Terms and conditions of sale	Auction	1
		Credit	2
		Contract	3
		Immediate payment	4
5	Distance of market (km)	Up to 5	1
		5 to 10	2
		10 to 15	3
		15 to 20	4
		20 to 25	5
		Above 25	6

3.3.2.4.10. Market intelligence

Market intelligence is operationalised as the capacity of the respondents to reasoning, get alert, well informed and knowledgeable and independently perform the marketing of his farm produce. A three point

continuum was given to each item with the score values of 3 to 1 for the most to least capacity.

The scoring procedure followed is given below.

Item no.	Response category	Score
1	More capable	3
	Somewhat capable	2
	Not capable	1
2	More alert	3
	Somewhat alert	2
	Not alert	1
3	Frequently get	3
	Occasionally get	2
	Don't get	1
4	Adequate knowledge	3
	Somewhat knowledge	2
	No knowledge	1
5	Always	3
	Sometimes	2
	Never	1

The scoring procedure used by Suruliappan (1997) was used for the study. The sum of all scores form the total of the market intelligence score.

3.3.2.4.11. Market demand

Refers to the capacity of the respondent to position the cultivation and marketing activity according to demand of the produce. This was measured by arbitrary scale developed for the study. This consisted of three statements regarding market demand and the responses were obtained as 'yes' or 'No' which carried a score of 2 for Yes and 1 for No.

The summation of the scores of all items formed the score of the market demand.

3.4. SWOT ANALYSIS OF AGRICULTURE IN KERALA.

3.4.1 Definition of SWOT

SWOT as an acronym stands for strength, weakness, opportunity and threat of an organization. These four attributes are also called SWOT parameters.

SWOT analysis is a management tool for analyzing the Strengths, weaknesses, opportunities and threats in a system.

3.4.2. Concept of SWOT

Strength is the basic asset of the organization that would provide competitive advantage for its growth and development. Weakness is the liability of an organization that can create a state of time and situation-specific disadvantage for its growth and development. Opportunity is the ability of the organization to grow and achieve its specific objective in a given situation. Threat is a situation that blocks the abilities of the organization to grow and develop for meeting its ultimate goal.

SWOT parameters may differ from organization to organization, company to company and government to government. These parameters are otherwise called as potential internal strengths, potential internal weaknesses, potential external opportunity and potential external threats.

3.4.3. Scope of SWOT

The concept is meant to help in taking appropriate decisions for the development of an organization in a particular operational environment. It has also an application for strategic decision in personal lives, organizational environments and even in politics. The analysis would help

the policy makers and strategy planners to formulate effective development programmes.

3.4.4. SWOT – An analytical Review

3.4.4.1. Industry

The literature on SWOT analysis indicate its use in industrial management in European and other advanced countries since the year 1910. It's use was essentially restricted to industrial organizations for a long time.

Many industrial scientist, managers and technical personnel applied the SWOT analysis frequently on systems and organizations for taking appropriate decisions for their smooth running. In the process of using technology for developing a product based on objectives of the system and organization, Anderson (1982), Cristensen (1983), Walter and Choate (1984), Delmount (1987) and Bryson and Roering (1987) applied it as a tool essentially in strategic management for State Governments. Steward (1986) effectively used this tool on business environment and resources. Espy (1986) applied SWOT analysis on competition, development of the marketing plan and also in building evaluation mechanisms. Leonard *et al.*(1993) introduced SWOT concept on performance audit and contingent planning involving the development of specific action when lower probability events would have important consequences for the organization.

Hatten and Hatten (1987) employed SWOT analysis for strategic evaluation of the organization. They also applied to arrive at its evaluation framework. Cook (1984) applied SWOT analysis for strategic planning. He also developed simple worksheets systematically to arrive at the pros and cons and enable taking appropriate decision for any type of organization to overcome hurdles. Indiresan (1990) systematically used

SWOT analysis for economic development. Kothai (1993) employed SWOT analysis on three development projects viz., Farm clinic, Sri Kshetra Dharmastala Rural Employment Project and Integrated Rural Development Program and indicated its importance for consolidation of strengths for harnessing the available potentials further.

3.4.4.2. Strategic management

Strategic management is a continuous process of effectively relating the organization's objectives and resources to the opportunities in the environment. SWOT analysis is one of the effective tools of strategic management which may help policy makers and managers in shaping the strategic directions of a specific agency operating within a given situation or context. It was inferred that strategic management should be treated as a blue print for achieving organizational needs (Thomson and Stickland, 1987).

3.4.4.3. Agriculture

Practically, no literature was available on SWOT analysis concerned with agricultural research and development till the year 1994 (Venkateswaralu, 1998). However, a maiden attempt has been made by Paroda (1995) on its application in agricultural research and development while formulating the perspective plan for the entire Indian Council of Agricultural Research set up. Considering the possibility of using SWOT analysis for strategic planning in agriculture research and training, the concept was applied in various training programs at the NAARM which included foundation courses, programmed of policy level training, distance education, R and D and international training, workshops, seminars and outreach programs.

3.4.4.4. SWOT application

Besides industry and agriculture, the SWOT analysis, in general, is applicable in many walks of life viz., Individuals, households, private organizations, government organizations and politics.

Rajagopal and Arulraj (2002) did SWOT analysis on coconut cultivation in India based on the rich experience gained by them over the years, findings obtained from various studies/surveys and observations made from different reports / meetings etc.

Sasidhar (2003) conducted SWOT analysis of Veterinary and animal science education.

Ravikumar *et al.* (2002) examined the strengths, weaknesses, opportunities and threats (SWOT) of the agricultural export potential of Andhra Pradesh State.

The basic assumption that the people who are associated either directly or indirectly with agriculture will be better judges to pin point the SWOT. So the data for this study had to be generated from the people representing agricultural and allied fields. These people who have experienced the situation must identify the SWOT, break them into components, if any, and rank them according to importance. It was essential to follow a procedure which will be appropriate for generating data from a panel of experts. The Delphi technique was used in this study to obtain data on SWOT.

3.4.4.5. The Delphi Methodology

Brown (1968) points out that, "The Delphi method" is a name that has been applied to a technique used for elicitation of opinions with the object of obtaining group response of panel of experts. Delphi replaces direct confrontation and debate by a carefully planned, orderly program of

sequential individual interrogation usually conducted by questionnaires. The series of questionnaires is interspersed with feedback derived from the respondents. The technique emphasizes informal judgement. It attempts to improve the panel or committee approach by subjecting the views of individual experts to each others criticism in ways that avoid face to face confrontation and provide anonymity of opinion and of arguments advanced in defense of these opinions.

3.4.4.6. Policy Delphi methodology.

It was first introduced and reported by Turoff (1970). It represented a significant departure from the understanding and application of Delphi technique as practiced to that point in time. Delphi, as it originally was introduced and practiced, tended to deal with technical topics and seek a consensus among a homogenous group of experts. Here, in the policy Delphi, there are only informed advocates and referees for a policy issue.

The Policy Delphi should be able to serve any one or any combination of the following objectives.

- to ensure that all possible options have been included for consideration.

- to estimate the impact and consequences of any particular option.

3.4.4.7. Phases of Policy Delphi

In practice most Delphi on policy try to maintain a three or four round limit by utilizing the following procedure.

(i) The study team devoting a considerable amount of time to carefully perform the obvious issue.

(ii) Sending the list with a initial range of options but allowing for the respondents to add to the list.

(iii) Asking for the position on an item and underlying assumptions in the first round.

With the above simplification, it is possible to limit the process to three rounds. It is necessary that the informed people, representative of the many sides of the issue under consideration are chosen as participants. The initial design must ensure that all the 'obvious' issues and sub- issues have been included and the respondent is being asked to supply the more 'subtle' aspects of the problem.

3.4.4.8. Application of Delphi method

In this study, the Policy Delphi procedure was followed with slight modification. It consisted of three steps of which two were for the identification of SWOT and the third was for rating the importance.

Step – 1

In this phase, the respondents were asked to list SWOT of agriculture in Kerala (Appendix – IX). Open-ended questionnaires were supplied to the respondents and was collected through mail and personal interview.

Step – 2

All the SWOT obtained during the first phase were pooled and again fed to the respondents. They were asked to-

- state their agreement or disagreement to all the expressed SWOT.

- list out any other SWOT which is / are not in the list.

Step –3

In this stage, all the collected SWOT were again pooled together and fed to the same respondents. They were asked to put quantitative values for each element of SWOT. The maximum quantitative value fixed for

each element was ten. The average value was worked by summing up the values of all the respondents and ranked.

3.5. SWOT ANALYSIS OF THE EXTENSION ORGANIZATION IN THE KERALA STATE DEPARTMENT OF AGRICULTURE.

3.5.1. State Department of Agriculture

The Kerala State Department of Agriculture, State Government owned extension organization has been performing a wide range of activities in the agricultural field. It is one among the 104 Government departments functioning in this State. This organization has witnessed much transformation in its organizational pattern within the last four decades. Now it is supposed to have reached the maximum bifurcation stage with a grass root level functionary unit at every Panchayat known as the KRISHIBHAVAN.

At the time of Travancore – Cochin regime it was Travancore - Cochin Department of Agriculture. During 1955 - 1956 the department had one Director, one Assistant Director and 35 Agricultural Inspectors. In June 1956 the post of Joint Director was created. The administration of Agricultural college and soil conservation department were linked to this department in the same year. The following posts were also created, namely, Deputy Director (Agricultural production), Rice specialist, Plantation Specialist and Agricultural Specialist in each district.

The first re-organization of the department was effected in the year 1969 –1970. Just below the rank of Director two Additional Director post were included. The Principal of Agricultural College was given the status of Additional Director. Then four zonal Joint Directors, District Agricultural Officers for each district assisted by Additional Agricultural Officers and Subject Matter Specialist. For assisting Rice Specialist a post of Deputy Director was also created.

From 1972 February onwards the administration of the Agricultural College was de –linked from the Department of agriculture and brought under the newly formed Kerala Agricultural University.

During 1976 –1977 the second major re – organization took place. It was effected in connection with the implementation of World Bank assisted scheme namely T&V. At this time the number of Additional Director was raised to four. Apart from that eight Joint Directors, Fourty Deputy Directors, 167 Assistant Directors, 975 Junior Agricultural Officers and 2385 Demonstrators posts were created.

The present level of organizational set up was achieved during the year 1987. This was the major and crucial revamping of the department effected ever since its formation. It was given importance to grass root level administration. Krishibhavans are the grass root level functionary which is located in each and every Panchayat of the State. Further by the implementation of the People's plan the local bodies partially have the control of this department at the grass root level.

The State Department of Agriculture, constitute fourteen Principal Agricultural Offices in each district, 151 Assistant Director Offices in blocks, 990 Krishibhavans at Panchayat , three at Corporation and 55 at Municipality levels. The other units include Quality control laboratories (3), Seed testing laboratories (2), Soil testing laboratories(14),Mobile laboratories (9), Agmark grading laboratories(10), Sales cum service depots (8), Parasite breeding stations(9), Farmers training centers (2), RATT Centers (5), Engineering offices (2), RTT center, Engineering work shops (11), Mobile agroclinics(10), Biotechnology center, State bio-control laboratory, Bio fertilizer laboratories (2), Operational research project office, District Agricultural Farms(10), Special farms (10), State seed farms(33) and Coconut nurseries(8) (Government of Kerala, 2003b).

3.5.2. SWOT application

The procedure followed for identifying SWOT of extension organization in the State Department of Agriculture was the same (Appendix – X) as in the case of SWOT of agriculture in Kerala.

3.6 DELINEATION OF THE DIMENSIONS OF ORGANIZATIONAL EFFICIENCY OF EXTENSION ORGANIZATION IN THE STATE DEPARTMENT OF AGRICULTURE.

In this investigation, dimension of organizational efficiency of extension organization in the State Department of Agriculture means the important factors that can influence or affect the organizational efficiency of extension organization in the State Department of Agriculture.

Organization is social invention for accomplishing goals through group efforts. This covers a wide variety of groups such as business, schools, hospitals, fraternal group, religious bodies, government agencies and the like.

3.6.1. Selection of variables for the study

3.6.1.1. Dependent variable

Organizational efficiency of the extension organization of the State Department of Agriculture is the dependent variable for the study.

3.6.1.2. Independent variables

The dimensions of organizational efficiency are referred to as independent variables for the study. The procedure adopted in the selection of these variables is as follows.

By viewing the available literature on organizational efficiency, conducting discussions with resource persons in the field of agriculture

and management and web sites, a comprehensive and exhaustive list of items associated with organizational efficiency was prepared. The collected dimensions were then subjected to a through sifting and sieving based on discussion with a group of extension personnel for its appropriateness.

3.6.1.3. Relevancy rating

The list consisting of the different dimension (Appendix – II) were sent to judges comprising experts in the field of agriculture extension from different Agricultural University, IARI and officials of state department of agriculture. They were asked to rate the items critically and also to include additional items if found necessary. The judges were requested to rate the relevancy of each items on a three point continuum such as most relevant, relevant and least relevant with scores of 3,2 and 1 respectively.

Out of the 50 judges, 36 responded. These 36 responses were finally considered for the study. The relevancy of the items to be included as the dimensions of the organizational efficiency was decided based on their Relevancy Index (RI), which was found out by using the formula explained in the previous section.

Application of RI as the criterion for selection of the dimensions was similar to that in the case of selection of variables of economic performance. Here the relevancy index range from 74.53 to 87.00. The average of the minimum and maximum was taken as the cutting point. This exercise yield eleven dimensions. Dimensions selected and included and their Relevancy Index are given in Appendix – IV.

3.6.2. Operationalization and Measurement of variables

3.6.2.1. Measurement of Organizational efficiency

Numerous studies in the industrial sector have shown that behaviour of employees is governed by their perception of the organizational environment. However, there is dearth of research in this area on developmental organizations.

Jhamtani and Singh (1989) studied perceptual variation of individuals on organizational environment dimension of the development department of Delhi Administration. In this study, this procedure was adopted with slight modification.

Clustering was employed on the entire sample for comparing the members of high, medium and low perceptions of the existing organizational efficiency and also understand the contribution made by the various organizational efficiency dimensions to the high vs medium, medium vs low and low vs high perception clusters.

Clustering and discriminant function analysis were applied to locate the dimensions that need to be manipulated to improve upon the organization efficiency of the State Department of Agriculture.

3.6.2.2. System of scoring

All the eleven dimensions identified were measured individually. Each item was scored on a continuum ranging from 3 to 5 with least score representing poor situation with respect to the dimension and highest score represent the best situation. The item scores ranged from 1 to 5 for each statement and from 4 to 55 for each dimension of the organizational efficiency. For case of comparison, these scores were converted out of 100.

Extension personnel of the organization were clustered into high, medium and low perception groups by calculating means ± SD on the converted score. For this purpose the entire sample of 90 respondents were classified on the basis of the eleven organizational dimensions. Then the means and standard deviations were calculated. The mean value obtained was 70.53 and the SD 4.84. Then grouping was done based on mean ± SD values. Thus three clusters or groups of individuals was arrived at scoring high, medium and low organizational efficiency perception. For the purpose of locating the importance of the eleven organizational dimensions with regard to their power to discriminate amongst the three clusters of personnel with those perceiving the organizational efficiency as high, medium and low, Fisher's discriminant function analysis was applied.

3.6.2.3. Discriminant Function Analysis (DFA)

The DFA was employed to the data on eleven organizational efficiency dimensions taking the three clusters as described in previous para viz., high, medium and low.

The average score on each dimension of the organizational efficiency for the three clusters viz., high, medium and low was worked out to identify the dimensions which were perceived differently by the three clusters.

Further, the three clusters of extension personnel perceiving the efficiency as good, medium and poor (i.e. high, medium and low) were compared and the dimensions causing the differences amongst their perception was observed.

3.6.2.4.Independent variables

The operationalisation and measurement of the selected 11 dimensions of the organizational efficiency are given below.

3.6.2.4.1. Job autonomy

Job autonomy was operationalised as the degree to which the job gives the worker freedom, independence and direction in scheduling work and determining how the work has to be carried out.

This dimension was quantified by adopting the scale developed by Hackman and Lawler (1971.) The scale consisted of two positive (3and4) and two negative (1and2) statements representing different dimensions of their job autonomy. The respondents were asked to indicate their response which was given on a four point continuum namely 'very true', 'somewhat true', 'little true' and 'not at all true' with weightage of 4,3,2 and 1 for positive statements and the reverse for negative statements. Job autonomy score of a respondent was calculated by adding the weightage of all the statements in the scale. The score ranged from 4 to 16. The maximum score would reveal the greater perception of job autonomy by the respondent.

3.6.2.4.2. Job satisfaction

It refers to the degree to which the extension personnel were satisfied or dissatisfied with different aspect of their jobs. This was measured using a scale developed by Sridhar (1977). The responses of the subjects were collected over three point rating scale, namely, 'Very much satisfied'. 'Satisfied' and 'Dissatisfied' with weightage of 3,2 and 1 respectively. There are 11 items in the instrument. Thus the minimum and maximum scores for each respondent were 11 and 33 respectively. The maximum score would reveal the greater job satisfaction by the respondent.

3.6.2.4.3. Job involvement

Job involvement was operationalized as the extent to which the extension personnel identified himself/herself with his/her job in the department.

The job involvement of respondent was measured by the job involvement scale developed by Lodahl and Kejner (1965) and used by Sunderaswamy (1987), with slight modification.

The scale consisted of 14 statements. Against each statement a three point continuum was provided viz., Strongly agree, Agree and Disagree with the score 3,2 and 1 respectively. The scoring system was reversed for the negative statements. Total score for each respondent was the sum of scores obtained for all items. The sum of scores for all items formed the score of job involvement of the respondent. The score ranged from 14 to 42. The maximum score would reveal the higher level of job involvement by the respondent.

3.6.2.4.4. Guidance and supervision

This refers to the regular guidance and supervision in technical matters, professional growth and timely advice to the extension personnel from the higher-ups. It was operationalized as the perception of extension personnel about the extent of counseling and advice received from his superior in connection with his job. This was measured by adopting the scale developed by Reddy (1976). The scale consisted of six statements. Against each statements, five point response categories were provided, such as 'very much satisfied', 'satisfied', 'partially satisfied' dissatisfied and very much dissatisfied with the score of 5, 4,3, 2 and 1 respectively. Thus the minimum and maximum scores for each respondent were 6 and 30 respectively. The total score of the respondent was obtained by summing of all the items.

3.6.2.4.5. Facility and resource

This refers to adequate provision of facilities and resources to extension personnel for the efficient functioning of their job activities. It was operationalized as the perception of extension personnel about the extent of availability of men, money, material and method at his disposal which aids in the successful accomplishment of his job in the organizations. It was measured by adopting the scale developed by Sharma (1969). The scale consisted of six statements. The scoring pattern followed was similar to that of guidance and supervision.

3.6.2.4.6. Organizational involvement

It refers to the sense of loyalty and psychological attachment of the individual towards their own organization. As stated by Romzek (1985) organizational involvement represents a continuum of psychological attachment to organizational commitment, to negative effect or organizational alienation. A scale developed by Romzek (1989) to measure organizational involvement was used in the present study. The scale consisted of 11 statements and the response was obtained on a five point continuum ranging from strongly agree to strongly disagree with the score of 5 to 1 respectively. The scoring system was reversed for negative statements. The score ranged from 11 to 55. Total score for each respondent was obtained by summing the score of all the items

3.6.2.4.7.Achievement motivation

Refers to the striving of extension personnel to do good work and attain a sense of efficiency.

It was measured by applying the achievement motivation scale of Desai (1981). The scale consisted of incomplete sentences each having three choices and the respondents have to choose answers they felt

appropriate. One of the choices indicate high achievement motivation. Extension personnel who responded with proper choice for each of the four statements were given score of 2 and for other choice score of 1. Thus the minimum and maximum scores for each respondent were 4 and 8 respectively. Summing up the scores obtained on the four sentences, the respondent's achievement motivation score was obtained.

3.6.2.4.8. Decision making ability

Refers to the involvements of the extension personnel in generation of ideas, evaluation of options and making choice from among options.

It was measured by using the procedure used by Surendran (2000). It contained five statements. The respondents were asked to respond to the statements in a three point continuum as 'Decision taken independently', 'Considered after consultation with others', 'Not considered' which carried scores 3, 2,1 respectively. The score range from 5 to15. Summation of the scores obtained for the statements in the schedule formed the total score.

3.6.2.4.9. Organizational commitment

Organizational commitment is conceptualized as the extent of dedication devotion or adherence of an individual with a strong belief in accepting his organization.

In this present study the organizational commitment of extension personnel was measured by adopting the scale developed by Manandhar (1987) for measuring job commitment with slight modification. The scale consists of eight statements. The response on these eight statements were collected on a five point continuum as 'strongly agree', 'agree', 'undecided' 'disagree' and 'strongly disagree'. The scoring for positive statements were 5,4,3,2, and 1 respectively and for the negative statements

the same was reversed. Thus the minimum and maximum scores for each respondent were 8 and 40 respectively The organizational commitment score of an individual was worked out by summing the scores of individual items.

3.6.2.4.10. Job perception

Job perception was operationalized as the degree of importance extension personnel attaches to their job duties as prescribed by the Department of Agriculture.

Procedure used by Susilkumar (1984) followed by Kalavathi (1989) was used in this study. The job items were presented to be perceived on a five point continuum. The weightage for the eight items were assigned for different levels of perceptions as below.

Level of perception	**Score**
Very important	5
Important	4
Undecided	3
Less important	2
Not at all important	1

Total job perception score for each respondent was obtained by summing up all the individual scores on the job items.

3.6.2.4.11. Job performance

Job performance was operationalized as the degree of accomplishment by an agricultural extension personnel in the course of

discharge of their duties in terms of job content and various personal and job related factors.

The self rating procedure adopted by Nelson (1992) was followed in this study. It consisted of eleven job items. The response of the extension personnel about the performance was collected on a five point continuum. The weightages assigned for different levels of performance are as follows.

Levels of response	Score
Adequately performed	5
Fairly performed	4
Moderately performed	3
Poorly performed	2
Inadequately performed	1

3.7. CONSENSUS BUILDING WORKSHOP

A consensus-building workshop was conducted for formulating extension strategies. A list of scientists, extension personnel and agricultural experts to be invited as participants was prepared by consulting with experts in the field. Synopsis of the salient findings of the study and draft strategies was sent to 50 identified participants. Thirty-two of them attended the workshop (Appendix XI). The participants were grouped into three and assigned topics for discussion. Group leader was selected for each group. The topic coconut based and homestead based farming system was assigned to the first group. The topic for the second group was rice based and tapioca based farming system and for the third group it was organizational efficiency. At the end, group leaders were

asked to present the results of the discussion. Finally consensus was arrived for the extension strategies.

3.8. TOOLS FOR DATA COLLECTION

3.8.1. Procedure employed in construction of interview schedule/ questionnaire.

The preliminary survey conducted by the researcher gave the first hand information about the basic aspects to be studied. The interview schedule/ questionnaire were prepared in conformity with the objective of the study. Great care was taken to see that questions in the interview schedule/questionnaire were unambiguous, clear, complete and comprehensive. The interview schedule /questionnaire were pre-tested and finalized. The interview schedule/questionnaire is appended in Appendix – VI to VIII.

3.8.2. Method of data collection

The data were collected using the pre –tested interview schedule / questionnaire developed for the study. The interview schedule prepared in English was translated into Malayalam before administering to the respondent farmers. Information for the organizational efficiency was gathered from the extension personnel of the sampling area. SWOT analysis information were collected from the selected stakeholders through mail and in person.

3.9. STATISTICAL TOOLS USED FOR THE STUDY

The data collected from the respondents were scored, tabulated and analysed using suitable statistical methods. The statistical methods used are described below.

3.9.1. Mean

The mean perception score of farmers and extension personnel were worked out to make comparison among the different farming systems, categories of farmers and extension personnel.

.3.9.2. Analysis of variance (ANOVA)

It was used to test the significance of difference among the different categories of respondents in respect of the variables included in the study.

3.9.3. Simple correlation analysis

To study the relationship between each of the independent variables and the dependent variables, simple correlation analysis was employed.

3.9.4. Paired 't' test

It was used to test the significance of difference among the farming systems and NARP zones.

3.9.5. Discriminant Functional Analysis (DFA)

It was used to determine the contribution made to the discrimination by the dimensions on organizational efficiency.

3.10. Hypotheses for the study

Keeping in view the objectives review of literature and conceptual orientation of the study, the following null hypotheses were framed for the present investigation.

1. There will be no significant difference among farming system with respect to the economic performance between reference period I and II.

2. There will be no significant difference among the categories of farmers with respect to the economic performance between reference period I and II.

3. There will be no significant difference among the NARP Zones with respect to the economic performance between reference period I and II.

4. Market related variables have no significant influence on the economic performance of farmers.

5. There will be no significant difference between the perception of Deputy Directors of Agricultural, Assistant Directors of Agriculture, Agricultural officers and Agricultural Assistants with respect to organizational efficiency.

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

The results of the study are presented and discussed under the following broad sub-heads.

4.1. Economic performance

4.1.1.Comparison of major farming systems and the NARP zones with respect to economic performance.

4.1.2. Comparison of major crops and the farming systems with respect to economic performance in the Northern Zone.

4.1.3. Comparison of major crops and the farming systems with respect to economic performance in the Central Zone.

4.1.4. Comparison of major crops and the farming systems with respect to economic performance in the High Range Zone.

4.1.5. Comparison of major crops and the farming systems with respect to economic performance in the Special Zone of Problem Areas.

4.1.6. Comparison of major crops and the farming systems with respect to economic performance in the Southern Zone.

4.1.7. Comparison of economic performance among the categories of farmers and the NARP zones.

4.2. Components of economic performance

4.3. SWOT analysis of Agriculture in Kerala

4.4. SWOT analysis of extension organization in the Kerala State Department of Agriculture.

4.5. Delineation of the dimensions of organizational efficiency of the Kerala State Department of Agriculture.

4.6.Extension strategy.

4.1 ECONOMIC PERFORMANCE

This was measured on the basis of perception of the farmer respondents among the farming systems from the five NARP zones as described in the methodology chapter. The mean score refers to the economic performance score. The economic performance score ranges from 1 to 9. The score range from 6 to 9 indicates high economic performance and 4 to 1 indicates the lowest economic performance. The score five is neutral and it indicates that the economic performance is neither decreased nor increased.

4.1.1. Comparison of the Major Farming Systems and the NARP Zones with Respect to Economic Performance.

Paired 't' test was resorted to compare the economic performance among the four major farming systems and five NARP zones.

It could be observed from Table 2 that all the farming systems were having lowest economic performance during the reference period – II (1996 –2001) than the reference period – I (1990-1995). The highest mean score (4.32) was obtained for the Tapioca Based Farming System (TBFS) followed by the Coconut Based Farming System (CBFS) and the Rice Based Farming System (RBFS). The lowest mean score (4.21) was obtained for the Homestead Based Farming System (HSBFS). It implies that the economic performance of the HSBFS farmers for the reference period- II was very low when compared to other systems. The difference in economic performance of the reference period- II from the reference period -I was high in CBFS (22 per cent). It indicated that the farmers in the CBFS have suffered huge loss than the farmers in the other systems during the reference period- II compared to the reference period- I.

Table. 2 Comparison of the economic performance mean scores among the major farming systems and the NARP zones

Zone	Farming systems											Average		
	CBFS			RBFS			TBFS			HSBFS				
	I	II	't'	I	II	't'	I	II	't'	I	II	't'	I	II
NorthernZone	5.32	4.32	5.15	5.52	4.32	7.27	5.12	3.96	4.41	5.36	4.31	6.14	5.33	4.23
Central Zone	5.31	4.20	5.94	5.28	4.47	4.67	5.36	4.45	6.01	5.47	4.24	6.67	5.36	4.34
High Range Zone	5.41	4.24	7.20	5.28	4.02	7.97	5.16	4.21	6.67	5.23	4.34	4.32	5.27	4.21
Special Zone	5.72	4.14	7.50	5.36	4.16	5.73	5.17	4.43	4.58	5.33	4.12	5.45	5.39	4.21
Southern Zone	5.43	4.31	9.62	5.35	4.16	5.93	5.06	4.57	2.30	5.42	4.06	8.35	5.31	4.30
Average	5.44	4.24		5.36	4.22		5.18	4.32		5.36	4.21			

Significant at 1 %

't' : Critical value obtained by using paired 't' test

I- Reference period 1990-1995 CBFS-Coconut Based Farming System TBFS – Tapioca Based Farming system
II-Reference period – 1996-2001 RBFS – Rice Based Farming System HSBFS- Homestead Based Farming system

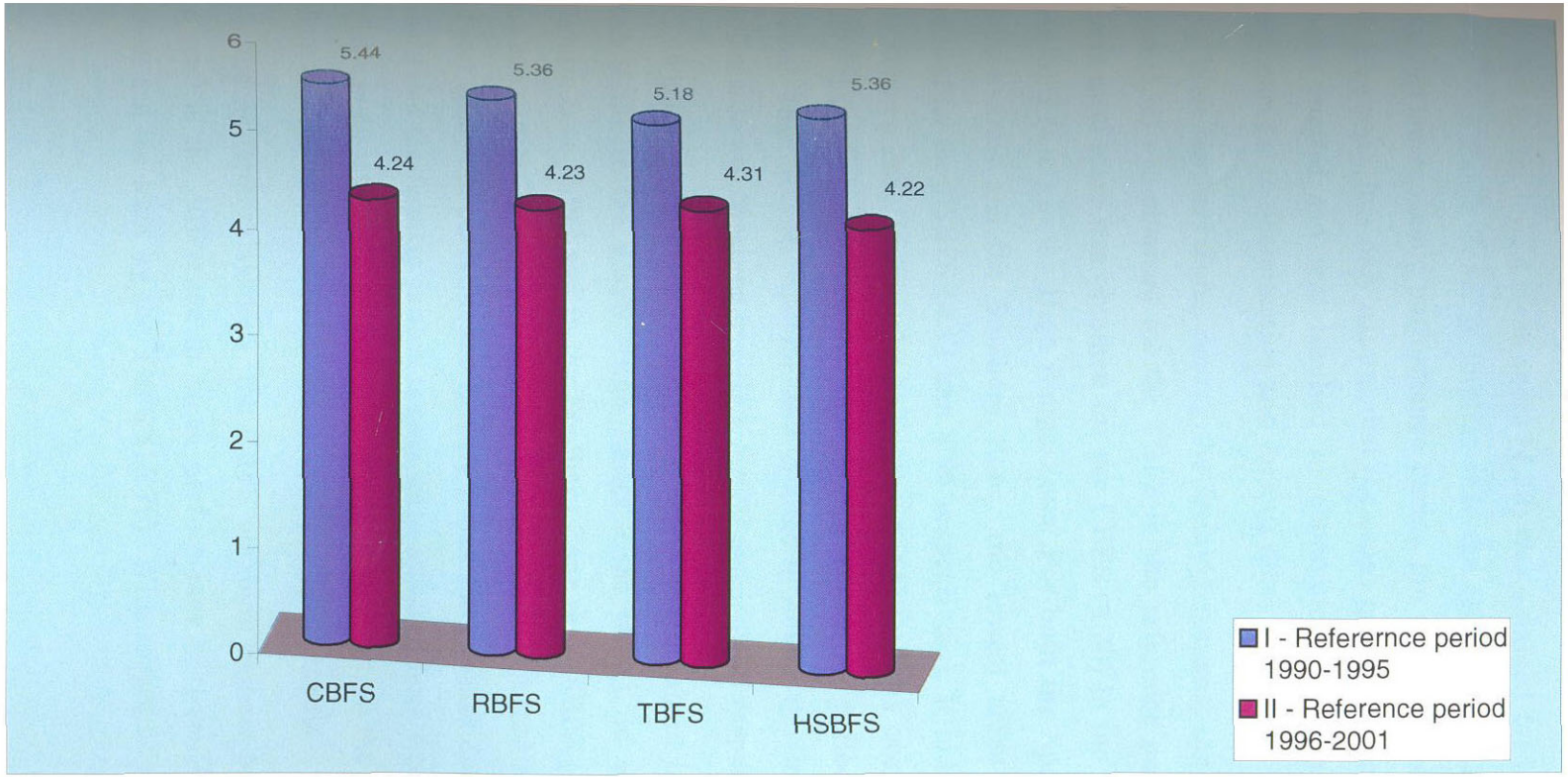


Fig. 4. Economic performance among the farming systems between two reference periods

CBFS – Coconut Based Farming System
RBFS – Rice Based Farming System

TBFS – Tapioca Based Farming System
HSBFS- Homestead Based Farming System

Among the zones, Thrissur district in the Central Zone was having the highest mean score (4.34) for the economic performance in reference period-II and the lowest mean score (4.20) was obtained for Idukki district in the High Range Zone. It implies that the High Range Zone farmers exhibited low economic performance during the reference period -II than the other zones. It is only natural that the crops grown by them are mostly market oriented and that resulted in economic loss because of price fluctuation due to liberalization and various other reasons.

In the Northern Zone, among the farming systems, the lowest mean score (3.96) was obtained for the TBFS in the reference period –II. The lowest mean score was obtained for the CBFS (4.20) in the Central Zone and RBFS (4.02) in the High Range Zone. For both the Special Zone of Problem Areas and the Southern Zone, the lowest mean scores were obtained for the HSBFS (4.12 and 4.06 respectively). It indicated that in the Northern Zone, the low economic performance was observed for the TBFS than the other systems during the reference period- II. In the Central, High Range, Special and Southern Zones the low economic performance was observed in CBFS, RBFS and HSBFS respectively.

Within the CBFS the least mean score was obtained in the Special Zone (4.14). In the RBFS, High Range Zone (4.02), in the TBFS the Northern Zone (3.96) and in the Southern Zone the HSBFS (4.06) showed low mean scores. It implied that the region which affected more in terms of poor economic performance in CBFS was the Special Zone. It is only natural that the farmers in this region were affected both from production fall due to disease and fluctuation in price of coconut. In the Central Zone all the four systems performed better than any other zones.

Among farming systems, the CBFS obtained highest percentage (22 per cent) in the difference in mean performance between two-reference periods and the least by the TBFS (16.79). With regard to zones Special

Zone (21.94 per cent) obtained the highest and the Central Zone (18.95 per cent) obtained the least scores.

It implied that the CBFS suffered loss higher than the other systems in the reference period-II than the reference period-I. Among the zones Special Zone was the most affected region when compared to other zones. The percentage difference of economic performance between the two-reference periods was the lowest in the TBFS. Among the NARP zones the lowest percentage of economic performance was observed in the Central Zone.

The data presented in the Table 2 also revealed that there was significant difference between the two reference periods among the farming systems and the NARP zones. This indicated that there was significant difference in economic performance of farmers during the reference period – II than the reference period –I. During this period the prices of almost all agricultural commodities in Kerala had declined due to the impact of economic reforms. This might be the reason for the significant difference in the economic performance.

The findings on economic performance of farmers with respect to farming system and NARP zones could be summarized as follows.

Among the farming systems, low economic performance was obtained in the HSBFS than the other systems during the period- II (1996-2001) than the period – I (1990-1995). With regard to the NARP zones, the low economic performance was obtained in the High Range Zone than other zones. In the Northern Zone, the lowest economic performance was obtained in the TBFS during the period-II than the period –I. The same results were seen in the farming systems such as the CBFS in the Central Zone, RBFS in the High Range Zone and HSBFS in both the Special and Southern Zones.

Table.3 Comparison of the economic performance mean scores among the farming systems and individual crops in the Northern zone

Crops	CBFS			RBFS			TBFS			HSBFS			Average	
	No. Resp	I	II	No. Resp	I	II	No. Resp.	I	II	No. Resp	I	II	I	II
Paddy	5	5.20	4.84	15	5.26	4.60	9	5.11	5.00	10	5.10	5.10	5.17	4.88
Coconut	15	5.53	4.26	15	5.17	3.86	15	5.46	2.93	15	5.53	3.93	5.42	3.74
Pepper	10	5.5	3.60	10	5.75	4.30	8	5.00	3.25	8	5.43	4.13	5.42	3.82
Banana	11	5.16	5.08	13	5.38	4.85	14	5.14	4.92	9	5.00	5.00	5.19	4.96
Tapioca	5	5.00	5.00	5	5.33	3.00	15	4.80	5.00	2	5.00	5.50	5.03	4.63
Arecanut	12	5.50	3.75	7	6.00	3.71	-	-	-	15	5.40	4.53	5.63	3.99
Rubber	-	-	-	5	4.65	3.00	-	-	-	7	5.30	4.25	4.97	3.67

I- Reference period 1990-1995 CBFS-Coconut Based Farming System TBFS – Tapioca Based Farming system

II-Reference period – 1996-2001 RBFS – Rice Based Farming System HSBFS- Homestead Based Farming system

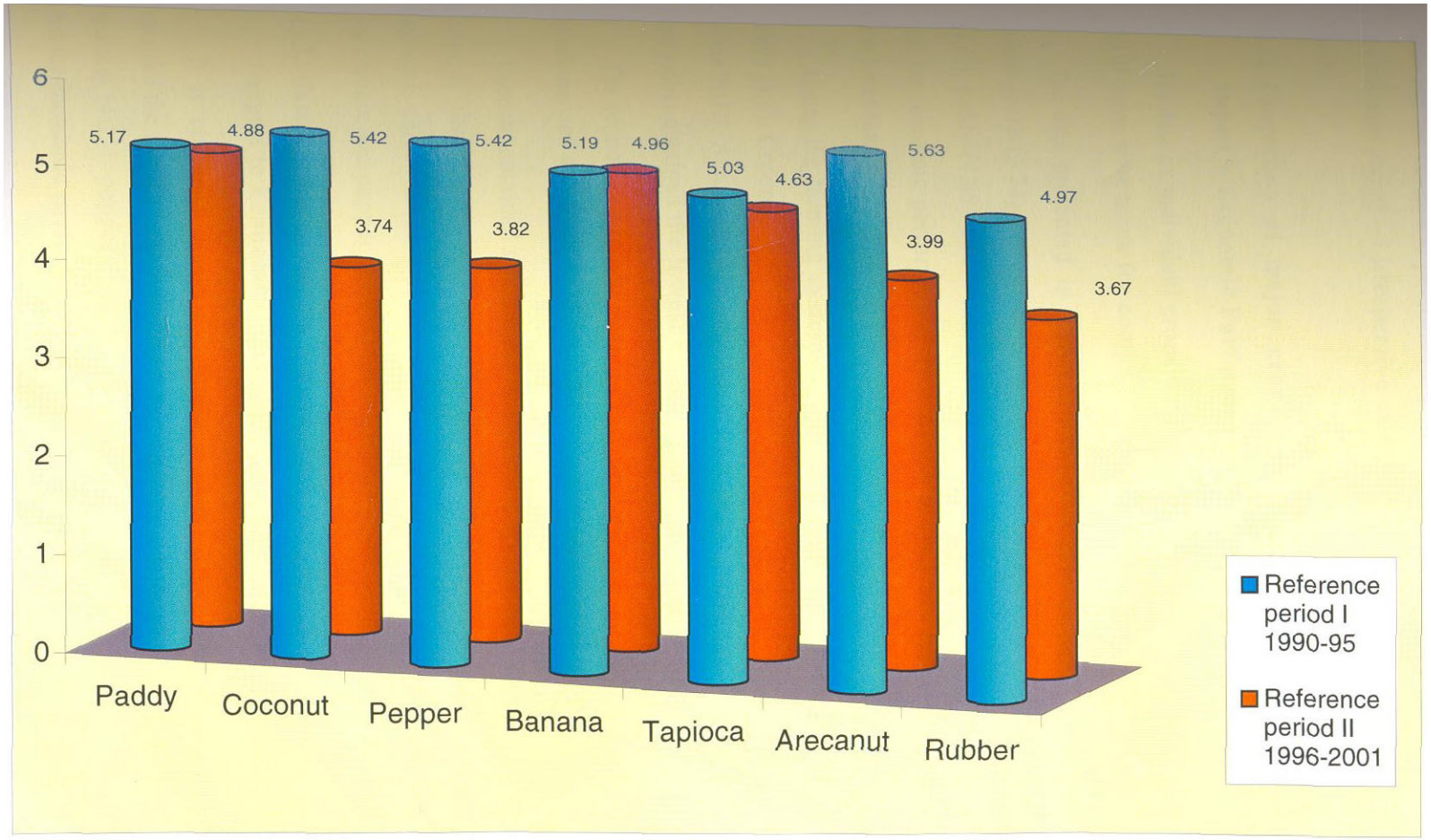


Fig . 5. Economic performance of individual crops in the Northern Zone between two reference periods

The inference that could be drawn from the above findings is that there was low economic performance during the reference period – II than the reference period – I irrespective of the farming systems and the NARP zones.

4.1.2 Comparison of major crops and the Farming Systems with respect to Economic Performance in the Northern Zone.

The data on individual crops under each farming system for different NARP zones were taken for comparison of the economic performance.

The data presented in Table 3 revealed that coconut obtained the lowest score (3.74) followed by pepper (3.82), arecanut (3.99), tapioca (4.63), paddy (4.88) and banana (4.96) in the Northern Zone. It implies that the economic performance of coconut during the reference period II was lower than other crops in this zone.

Among the farming systems, paddy obtained the lowest score in the RBFS (4.6). Coconut (2.93) and pepper (3.25) obtained the lowest scores in the TBFS. Arecanut obtained the lowest mean score (3.71) in the RBFS and rubber obtained the lowest means score (3.00) in the RBFS.

The economic performance of individual crops in the Northern Zone is summarized as follows.

Coconut obtained the lowest economic performance among the major crops in the Northern Zone. Within the farming systems, the lowest economic performance was for paddy, rubber and arecanut in the RBFS. For coconut and pepper it was in the TBFS.

4.1.3. Comparison of major crops and the Farming Systems with respect to Economic Performance in the Central Zone

It is observed from Table 4 that in the Central Zone, coconut obtained the lowest mean score (3.86) among the major crops followed by arecanut (4.13), pepper (4.21), rubber (4.30) and paddy (4.95). It implied that the economic performance was very poor for coconut in this zone. It

Table.4 Comparison of the economic performance mean scores among the farming systems and individual crops in the Central Zone

Crops	CBFS			RBFS			TBFS			HSBFS			Average	
	No. Resp.	I	II	No. Resp.	I	II	No. Resp.	I	II	.No. Resp.	I	II	I	II
Paddy	3	5.00	5.00	15	5.00	5.00	8	5.00	5.13	6	5.33	4.69	5.08	4.95
Coconut	15	5.53	4.06	14	5.5	3.79	15	5.47	3.80	15	5.73	3.80	5.56	3.86
Pepper	5	5.40	4.40	9	5.50	4.56	5	5.60	4.0	9	5.63	3.89	5.53	4.21
Banana	14	5.21	4.78	11	5.27	5.00	9	5.56	5.44	12	4.92	5.09	5.24	5.10
Tapioca	-	-	-	3	3.00	5.33	15	5.27	4.87	4	5.00	5.00	4.42	5.06
Arecanut	6	5.33	4.33	5	5.60	3.80	5	5.60	4.40	12	5.91	4.00	5.61	4.13
Rubber	4	5.21	4.50	5	5.67	3.00	5	5.20	5.20	4	5.50	4.50	5.39	4.30

I- Reference period 1990-1995 CBFS-Coconut Based Farming System TBFS – Tapioca Based Farming system

II-Reference period – 1996-2001 RBFS – Rice Based Farming System HSBFS- Homestead Based Farming system

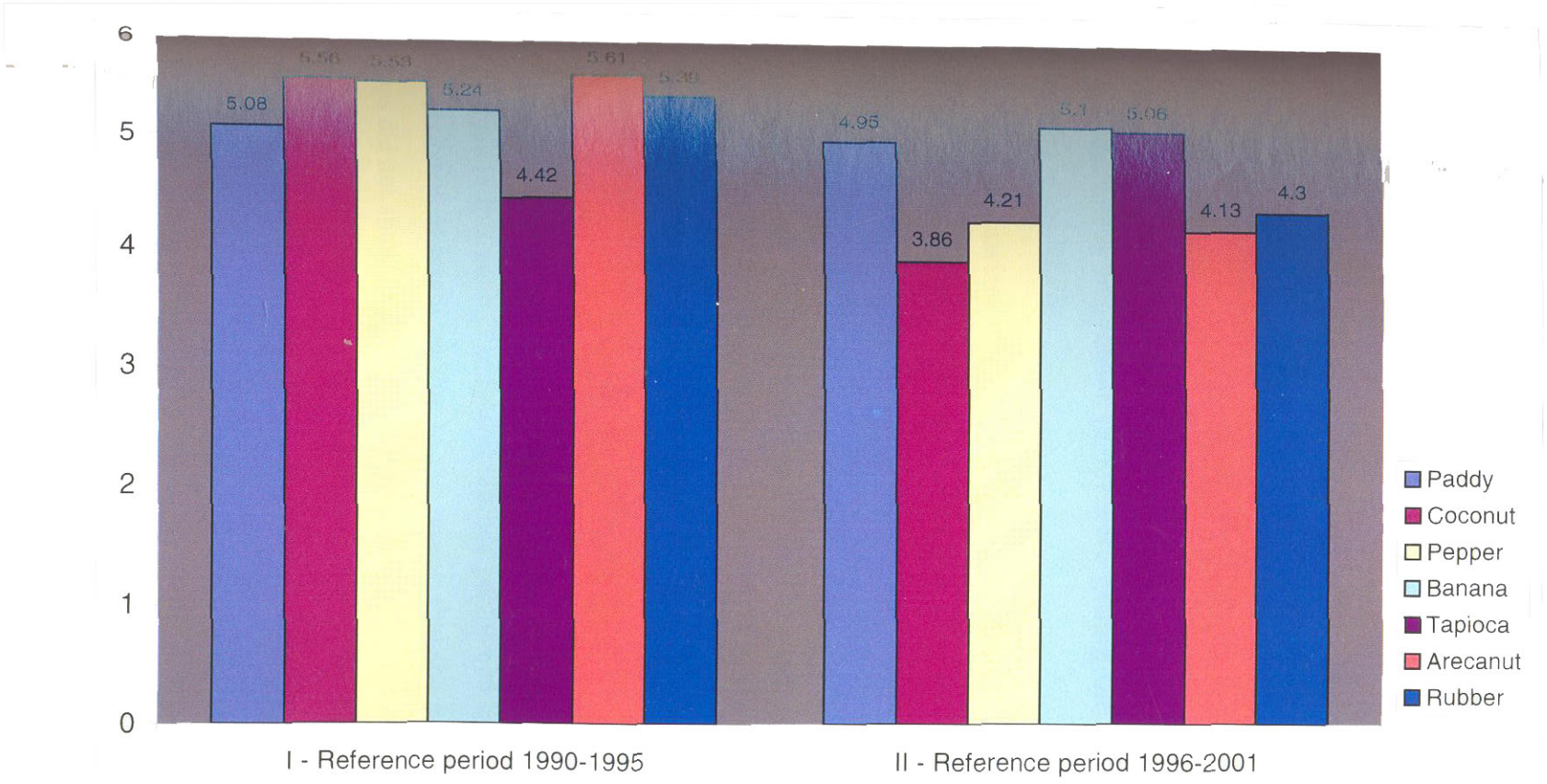


Fig. 6. Economic performance of individual crops in the Central Zone between two reference periods

is interesting to note that the performance of tapioca has improved during the period –II (1996-2001) than the period –I (1990-1995). It might be due to the reason that the area of tapioca is confined to more productive lands. Banana shows almost same level of performance in both the periods.

The economic performance among the farming systems was almost at the same level for paddy except in the HSBFS for both the periods. In the HSBFS, paddy exhibited low economic performance during the period – II than the period –I. Coconut, arecanut and rubber obtained the lowest mean scores in the RBFS. Pepper (3.89) obtained the lowest mean score in the HSBFS. Banana obtained the lowest mean score (4.78) in the CBFS. Arecanut (3.80) and rubber (3.00) were getting the lowest mean scores obtained in the RBFS.

It could be summarized that the economic performance in most of the crops was the lowest in the RBFS. It implies that the RBFS in this zone was having poor economic performance than other systems during the period – II.

4.1.4. Comparison of major crops and the Farming Systems with respect to Economic Performance in the High Range Zone.

The data in Table 5 revealed that coconut obtained the lowest mean score (3.44) during reference period - II followed by coffee (3.52), pepper (3.75), arecanut (4.12), cocoa (4.19) and rubber (4.57). It implied that the economic performance of coconut during the period- II was very poor than the other crops in this zone. Paddy and tapioca performed better than the reference period- I. It might be due to the reason that the yield levels of these crops did not show any decreasing trend and the price was also fairly reasonable. It was revealed during discussions that in the case of tapioca yield has not decreased and the price was also better during the reference period - II.

Table. 5 Comparison of the economic performance mean scores among the farming systems and individual crops in the High Range Zone

Crops	CBFS			RBFS			TBFS			HSBFS			Average	
	No. Res.	I	II	No. Resp	I	II	No. Resp.	I	II	No. Resp.	I	II	I	II
Paddy	6	5.17	4.58	15	5.00	4.89	8	5.00	5.13	6	5.00	6.00	5.04	5.22
Coconut	15	5.47	3.67	13	5.50	3.15	14	5.43	3.43	15	5.60	3.53	5.5	3.44
Pepper	8	5.25	4.25	9	5.38	3.78	7	5.50	3.43	9	5.00	3.56	5.28	3.75
Banana	4	5.50	5.50	7	5.43	4.71	7	4.75	5.29	9	5.67	5.33	5.33	5.20
Tapioca	-	-	-	-	-	-	15	4.73	5.20	6	5.43	5.33	5.08	5.26
Arecanut	-	-	-	-	-	-	4	4.75	4.25	1	5.00	4.00	4.87	4.22
Rubber	14	5.21	4.50	13	5.31	4.45	14	5.43	4.51	13	5.23	4.77	5.29	4.57
Cocoa	5	5.33	4.40	8	5.00	3.50	-	-	-	3	5.33	4.67	5.22	4.19
Coffee	9	4.89	3.50	8	5.60	3.25	-	-	-	8	5.00	3.75	5.16	3.52

I- Reference period 1990-1995 CBFS-Coconut Based Farming System TBFS – Tapioca Based Farming system

II-Reference period – 1996-2001 RBFS – Rice Based Farming System HSBFS- Homestead Based Farming system

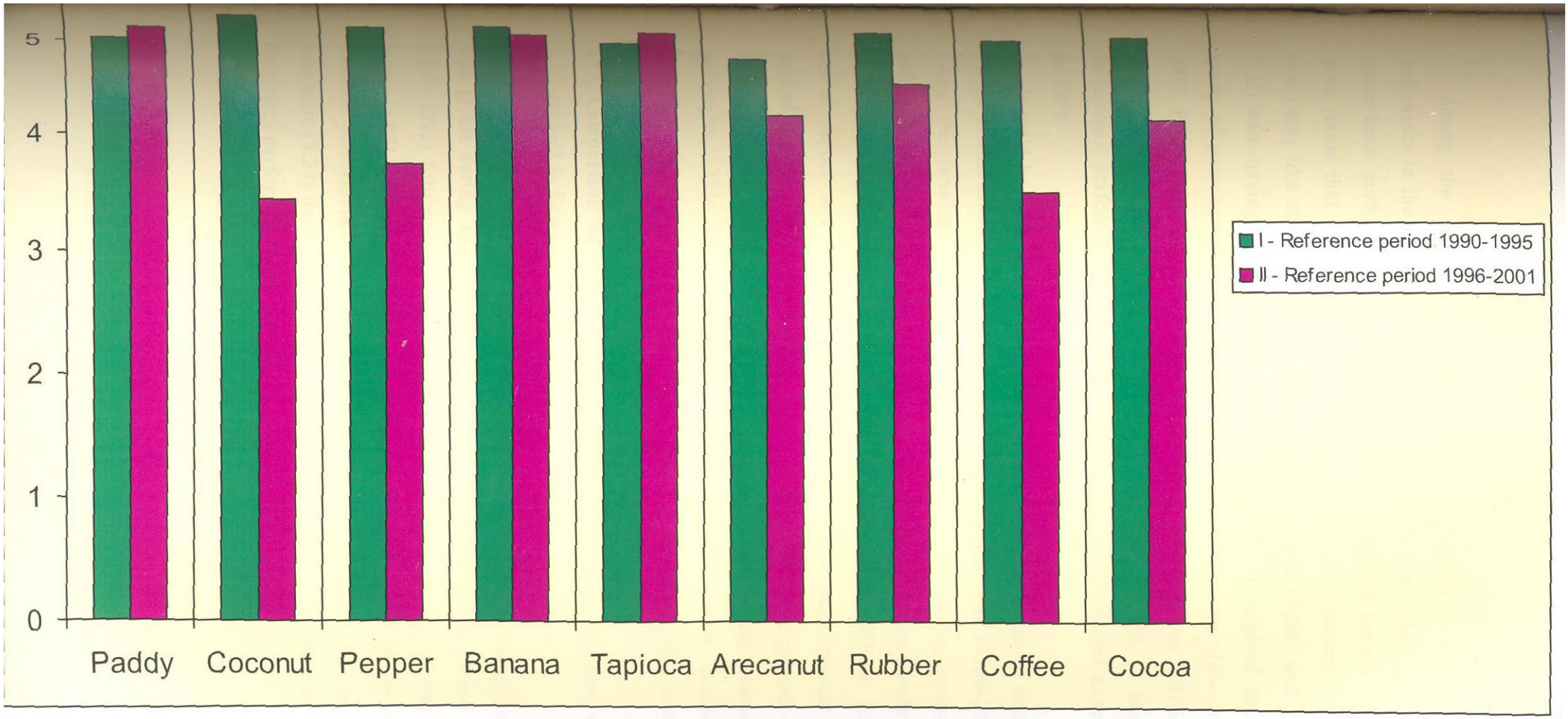


Fig.7. Economic performance of individual crops in the High Range Zone between two reference periods

Among the farming systems, paddy exhibited low economic performance in the period- II than the period- I in the CBFS (4.58). It showed better performance in the HSBFS (6.0) during the period – II, due to the reason that the HSBFS farmers are giving more attention to the crop. Crops like coconut (3.15), rubber (4.45), cocoa (3.50) and coffee (3.25) were having lowest mean scores in RBFS. It implied that the gravity of poor economic performance was comparatively low in the RBFS. Pepper obtained the lowest mean score (3.43) in the TBFS and arecanut obtained the lowest mean score in the HSBFS (4.0). In banana, the economic performance was better in all the farming systems except in the RBFS.

It could be summarized that the economic performance of coconut was the lowest among other crops during the period – II (1996-2001). Among the farming systems, paddy obtained the lowest economic performance in the CBFS. The crops such as coconut, rubber, cocoa and coffee exhibited the lowest economic performance in the RBFS. In the case of pepper and arecanut the lowest economic performance was obtained for the TBFS and HSBFS respectively during the period – II. Majority of the crops in the RBFS obtained the lowest economic performance. This could be the reason for the lowest economic performance of the RBFS in the High Range Zone among the farming systems mentioned elsewhere.

4.1.5. Comparison of major crops and the Farming Systems with respect to Economic Performance in the Special Zone.

It is evident from the Table 6 that coconut obtained the lowest mean score (3.43) during the period – II (1996 –2001) than the period – I (1990– 1995) followed by pepper (3.67) rubber (4.46) paddy (4.68) and banana (4.93). It indicated that coconut was affected much in terms of economic performance than other crops. Tapioca obtained the highest mean score (5.28) during the period – II than the period - I. It also implies that tapioca performed better during period -II than period -I.

Table .6 Comparison of the economic performance mean scores among the farming systems and individual crops in the Special Zone

Crops	CBFS			RBFS			TBFS			HSBFS			Average	
	Resp.No	I	II	Resp.No	I	II	.Resp.No	I	II	Resp.No	1	II	I	II
Paddy	12	5.83	4.75	15	5.33	4.67	5	5.00	3.80	11	5.18	5.50	5.33	4.68
Coconut	15	6.00	3.45	15	5.53	3.47	15	5.60	3.53	15	5.47	3.27	5.65	3.43
Pepper	7	5.43	4.29	9	5.11	3.89	-	-	-	12	4.92	2.83	5.15	3.67
Banana	14	5.46	4.5	13	5.15	5.31	9	5.44	5.00	12	5.50	4.92	5.38	4.93
Tapioca	9	5.22	5.22	9	4.33	5.33	15	5.13	5.47	15	5.23	5.13	5.00	5.28
Rubber	7	5.29	4.43	4	-	-	4	4.75	4.50	-	-	-	5.02	4.46

I- Reference period 1990-1995 CBFS-Coconut Based Farming System TBFS – Tapioca Based Farming system

II-Reference period – 1996-2001 RBFS – Rice Based Farming System HSBFS- Homestead Based Farming system

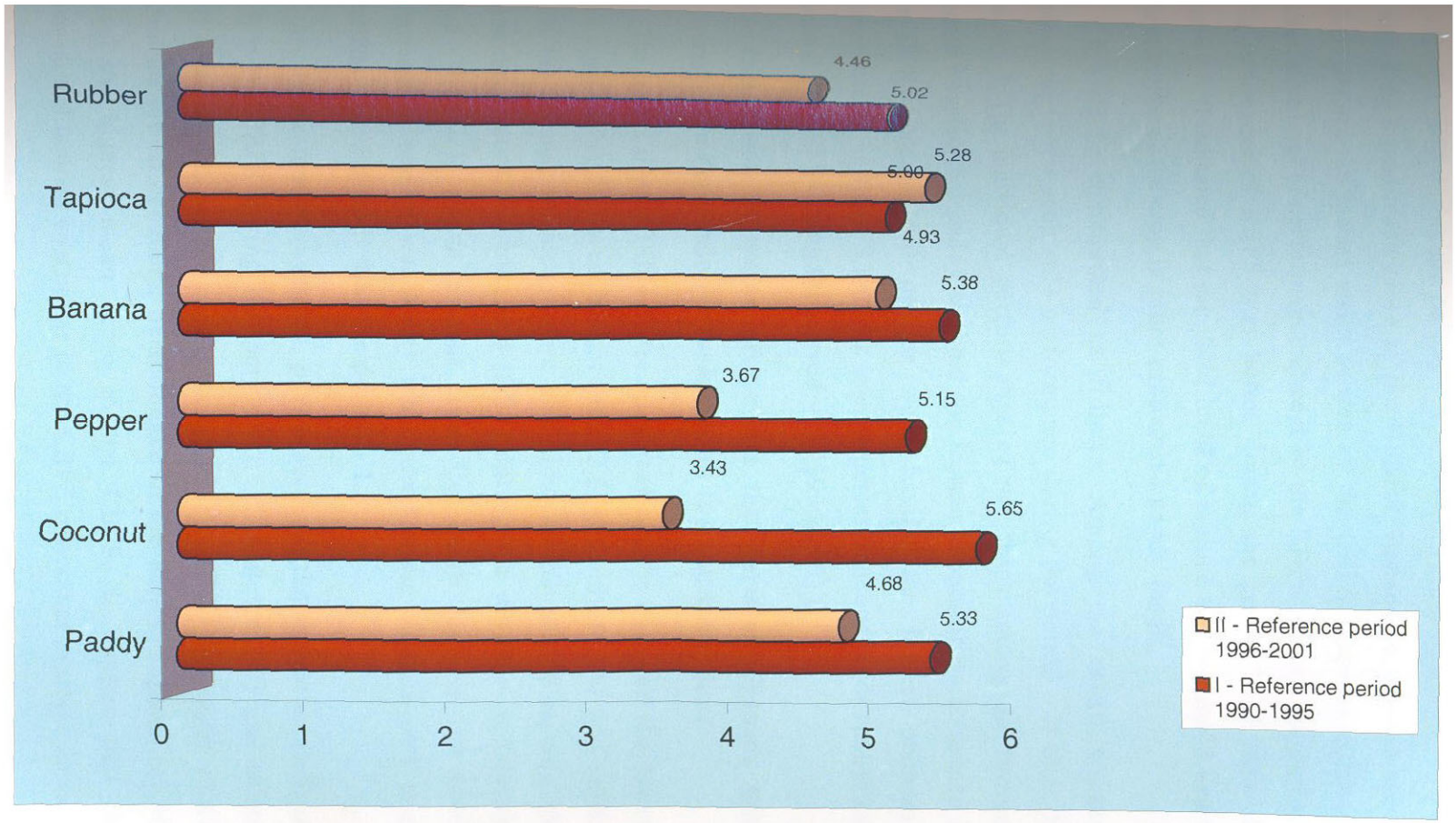


Fig. 8. Economic performance of individual crops in the Special Zone between two reference periods

Among the farming systems, paddy obtained the lowest mean score (3.8) in the TBFS during the period – II. Coconut (3.27) and pepper (2.83) obtained the lowest mean score in the HSBFS. Banana (4.50) and rubber (4.43) obtained the lowest mean scores in the CBFS. Tapioca exhibited almost same level of performance except in the RBFS in both the periods. The performance of RBFS was better during the period – II than the period – I. It indicated that the yield level of tapioca has increased due to the cultivation of the crop in more productive paddy lands.

It could be summarized as follows. Among the crops, coconut obtained the lowest economic performance during the period – II than the period – I. The individual performance of the crops among the farming systems revealed that paddy showed the lowest economic performance in the TBFS. Coconut and pepper were having the lowest economic performance in the HSBFS and the lowest performance was for rubber and banana in the CBFS during the period – II (1996-2001).

4.1.6. Comparison of major crops and the Farming Systems with respect to Economic Performance in the Southern Zone

The results of the Table 7 revealed that pepper obtained the lowest mean score (2.74) followed by coconut (3.67), paddy (4.59) and rubber (4.89). For banana, the mean score was almost same and in tapioca, the highest mean score was obtained (5.30) during the period – II than the period - I (5.02). It is evident from the result that the economic performance of pepper was lower than other crops. Tapioca performed better during the period-II than the period – I.

Among the farming systems, paddy obtained the lowest mean score (4.13) in the CBFS during the period -II. Coconut (3.27) and rubber (4.67) obtained the lowest mean scores in the HSBFS. Pepper (2.67) obtained the lowest economic performance in the RBFS. Tapioca (5.60) obtained the highesf mean score in the CBFS. It implies that the performance of tapioca was better in the CBFS than other systems during

Table.7 Comparison of the economic performance mean scores among the farming systems and individual crops in the Southern Zone

Crops	CBFS			RBFS			TBFS			HSBFS			Average	
	No. Resp.	I	II	No. Resp.	I	II	No. Resp.	I	II	No. Resp.	I	II	I	II
Paddy	8,	5.25	4.13	15	5.13	4.47	9	5.00	4.78	5	5.20	5.80	5.14	4.59
Coconut	15	5.67	3.80	15	5.53	3.53	12	5.50	4.08	15	5.53	3.27	5.55	3.67
Pepper	4	5.50	3.00	3	5.00	2.67	4	4.75	3.50	5	5.40	2.80	5.16	2.74
Banana	15	5.07	5.13	15	5.29	5.00	14	5.00	5.07	14	5.07	5.14	5.10	5.08
Tapioca	5	4.80	5.60	13	5.23	5.23	15	4.73	5.27	15	5.33	5.13	5.02	5.30
Rubber	3	5.67	5.00	3	5.67	5.00	-	-	-	3	5.67	4.67	5.67	4.89

I- Reference period 1990-1995 CBFS-Coconut Based Farming System TBFS – Tapioca Based Farming system

II-Reference period – 1996-2001 RBFS – Rice Based Farming System HSBFS- Homestead Based Farming system

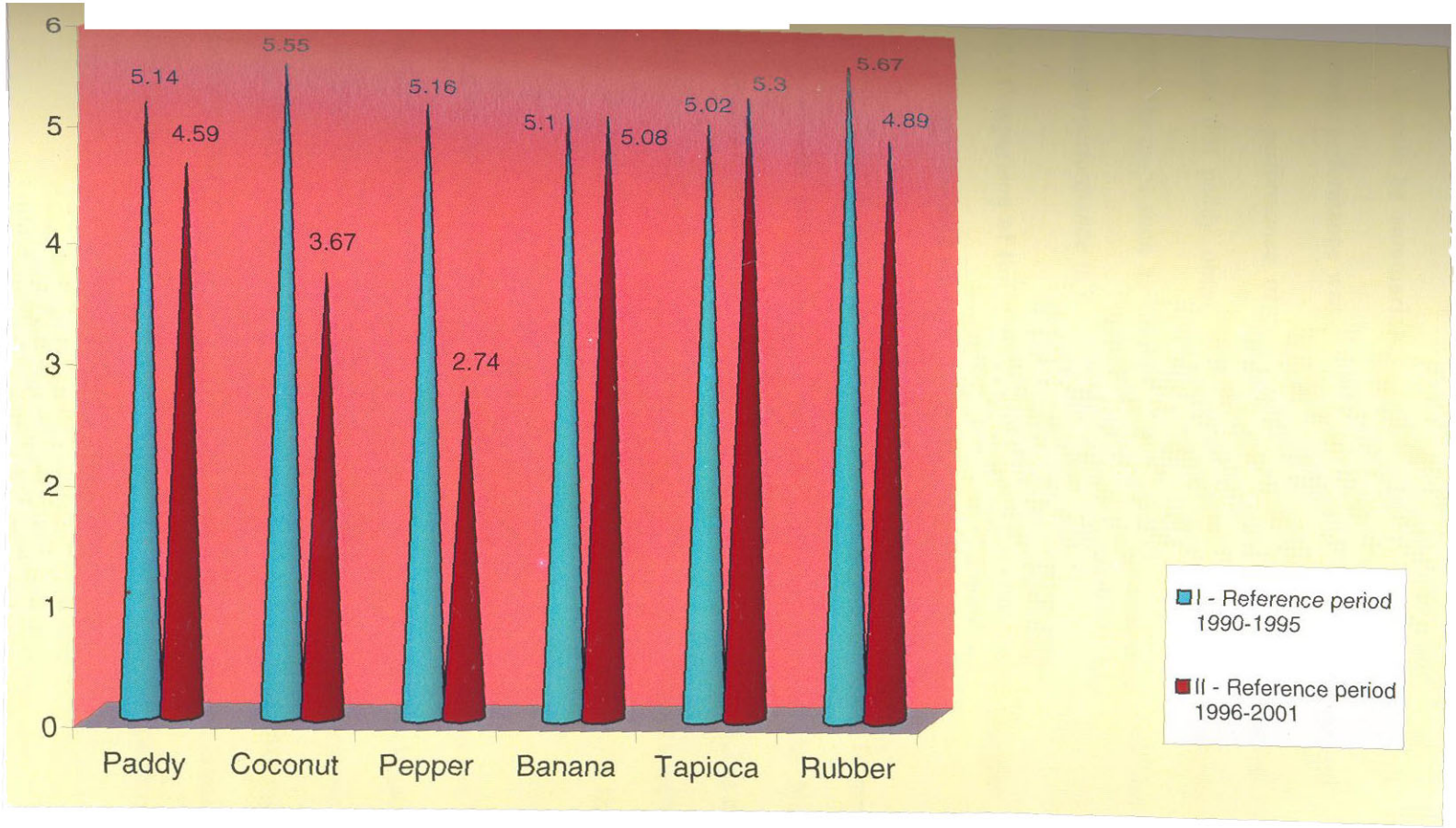


Fig. 9. Economic performance of individual crops in the South Zone between two reference periods

the period – II than the period – I. It might be the reason that tapioca has been cultivated as intercrop in more productive coconut gardens.

It could be summarized as follows. Among the crops the lowest economic performance was obtained for pepper during the period – II. The economic performance of individual crops among the farming systems, revealed that paddy obtained the lowest economic performance in the CBFS. The crops such as coconut, pepper and rubber obtained the lowest economic performance in the HSBFS during the period – II.

4.1.7. Comparison of the Economic Performance among Farmer Categories and the NARP zones

It is observed from the Table 8 that High Range Zone farmers had the lowest mean score (4.10) followed by the farmers in the Northern Zone, and the Special Zone (4.21 each), the Southern Zone (4.28) and the Central Zone (4.33). It implies that the high range zone farmers were most affected in terms of economic performance during the period –II than the period – I.

Among the category of farmers the large farmers obtained the lowest mean score (4.16) during the period – II than the period – I. It indicates that the large farmers had comparatively low economic performance than the other categories. It is due to the reason that the investments made by them are high than the other category and any price fall for the commodity naturally affected them severely. Thus their economic performance

automatically goes down. This was in line with the observation of Krishna and Shivamurthy (1998).

Table. 8.Comparison of the economic performance mean scores among the farmer categories and the NARP zones

Zones	Marginal (Below1 ha)		Small (1to 2 ha)		Large (Above 2 ha)		Average	
	I	II	I	II	I	II	I	II
Northern Zone	5.29	4.31	5.37	4.17	5.32	4.16	5.33	4.21
Central Zone	5.35	4.40	5.39	4.44	5.35	4.16	5.36	4.33
High Range Zone	5.12	4.02	5.34	3.98	5.38	4.29	5.28	4.10
Special Zone	5.45	4.31	5.38	4.18	5.36	4.15	5.40	4.21
Southern Zone	5.31	4.58	5.30	4.19	5.35	4.06	5.20	4.28
Average	5.30	4.32	5.36	4.19	5.35	4.16	5.34	4.22

Within the zones also large farmers were having lowest mean score except in the High Range Zone. Here the lowest mean score was obtained for small farmers (3.98) followed by marginal (4.02) and the large farmers (4.29). It implies that the small farmers are most affected in the High Range Zone than others. It also indicated that farmers of the High Range Zone put sizable effort in farming irrespective of farmer categories.

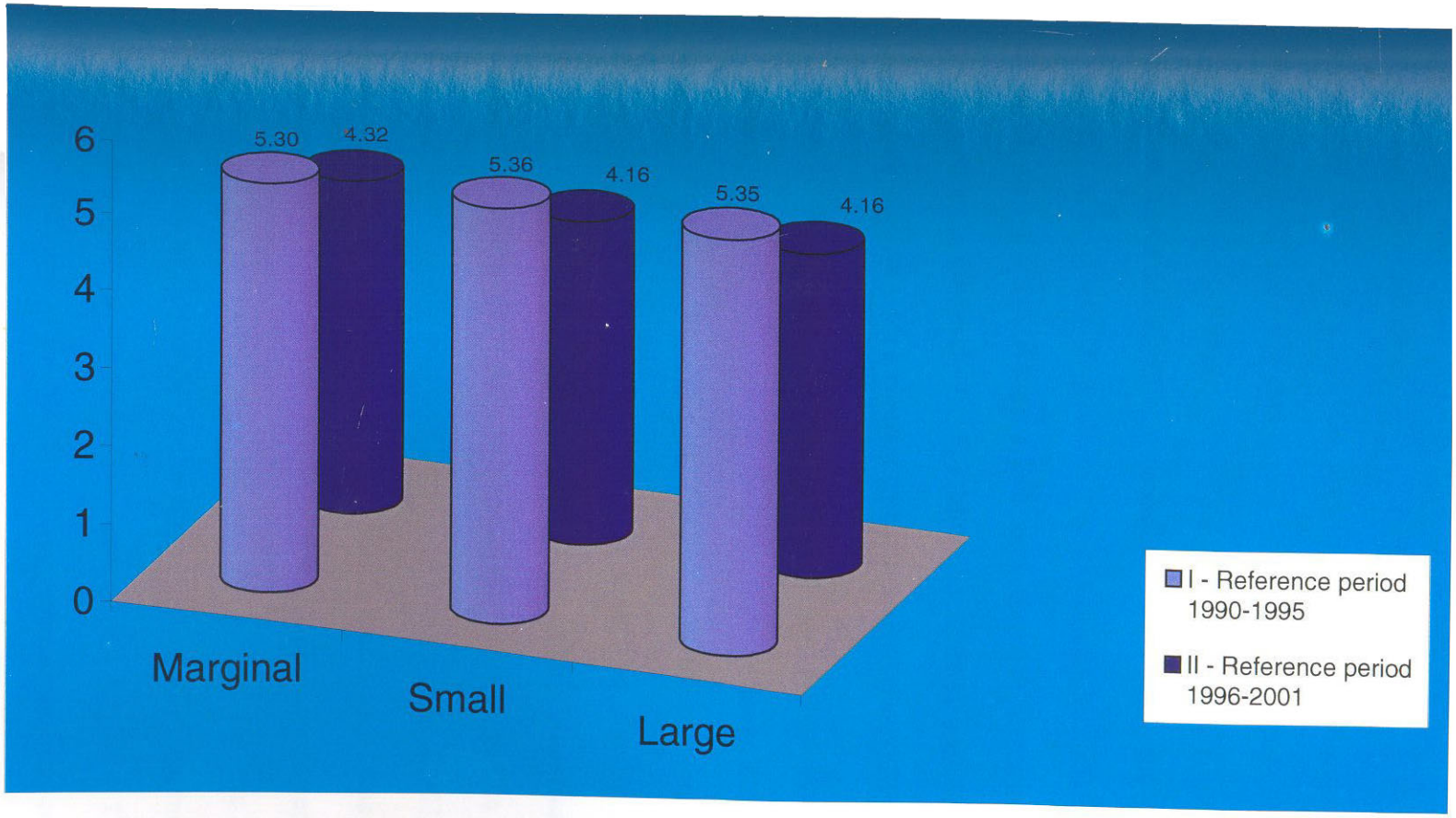


Fig.10. Economic performance of categories of farmer among the NARP Zones between two reference periods

The findings of the economic performance of farmers with respect to farming systems, NARP zones, individual crops and farmer categories could be summarized as follows.

Among the farming systems, the lowest economic performance was obtained in the HSBFS during the period – II (1996 – 2001) than the period – I (1990 – 1995). Similar trend was reflected in the High Range Zone among the NARP zones. In the Northern Zone, among the farming systems the lowest economic performance was obtained in the TBFS. In the Central Zone and High Range CBFS and the RBFS showed low economic performance respectively. For both the Special and Southern Zones, the lowest economic performance was obtained in the HSBFS.

Among individual crops, coconut obtained the lowest economic performance. It was observed from the findings that the mean economic performance of coconut in the State is 3.64. It implied that there was income loss between 26 to 50 per cent. It might be due to price fluctuation, poor management, import of edible oils, liberalization, unexpected disease attack, declined production etc. This was in line with the observations made by Vasudevan (2001) and Nampoothiri (2003). In the case of pepper, the mean economic performance was 3.63. It was also revealed that there was income loss between 26 to 50 per cent in pepper. The liberalized policy measure was one of the causes for the low economic performance of this crop. In the liberalized regime, the import duty of pepper was reduced drastically in view of the Regional Trade Agreement with Sri Lanka. This has facilitated surmounting import of

pepper from that country. This naturally affected the domestic market which led to price fall in pepper. Due to this farmers were reluctant to care the crop. This resulted in declining of production and productivity. The pest and disease problem further worsen the status of the crop. This was in line with the observation made by Peter and Nybe (2002).

Among the farmer categories, the lowest economic performance was for large farmers. The farmers in the High Range Zone had the lowest economic performance among the NARP zones.

In view of the above, the hypothesis that there would be no significant difference, with respect to economic performance between reference period – I and II, among the farming systems, NARP zones and farmer categories was rejected.

4.2.COMPONENTS OF ECONOMIC PERFORMANCE

In this study the independent variables selected are considered as components of economic performance. Eleven components of economic performance of the farmers were identified and selected for the purpose of study based on review of literature, judges rating and relevancy rating. The procedure adopted in this regard was described in the methodology chapter. Analysis of Variance (ANOVA) was resorted to test the data. The results of the components of economic performance are presented in Table 9 to 19.

4.2.1. Innovation Proneness

The results of the Table 9 indicated that no significant difference in the mean scores among the farming systems was noticed with regard to innovation proneness of farmers in the NARP zones.

The Special Zone obtained the highest mean score (13.55) and the lowest mean score obtained in the Central Zone (10.63). Among the farming systems, the highest mean score was obtained in the HSBFS. It might be due to that the HSBFS involved more than one enterprise, which might have prompted the farmers to accept new ideas and seek changes in the farming techniques. The findings of the study indicating high innovation proneness in Special Zone is in line with the results of Surendran (2000).

Table. 9.Comparison of the mean scores on innovation proneness of the farmers among the farming systems and the NARP zones

Zone	CBFS	RBFS	TBFS	HSBFS	Mean	CD
Northern Zone	10.40	12.27	12.60	10.73	11.50	NS
Central Zone	12.60	13.63	13.13	13.80	10.63	NS
High Range Zone	12.73	11.20	11.47	12.73	12.03	NS
Special Zone	13.47	12.08	14.53	14.13	13.55	NS
Southern Zone	14.40	13.27	12.67	11.27	12.90	NS
Mean	12.79	12.12	12.81	12.91	-	-

4.2.2. Economic Motivation

It could be observed from the results presented in Table 10 that there is significant difference in the mean scores among the farming systems in the High Range Zone, with regard to economic motivation. The score 9 and above indicated high level of economic motivation. Among the farming systems, the highest mean score (12.16) was obtained in the CBFS. The lowest mean score was obtained in the TBFS (11.67).

Among the zones, the High Range Zone obtained the highest mean score and the lowest mean score was obtained in the Southern Zone. It indicated that the farmers in the CBFS and the High Range Zone had exhibited high level of economic motivation. Anantharaman (1991) reported that economic motivation significantly contributed to farming efficiency.

Table. 10. Comparison of the mean scores on economic motivation of the farmers among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	12.07	12.00	11.73	12.27	12.02	NS
Central Zone	11.93	12.33	11.40	12.00	11.92	NS
High Range zone	12.67	12.07	11.07	12.73	12.12	1.28
Special Zone	12.60	11.67	12.13	11.73	12.03	NS
Southern Zone	11.53	12.07	12.00	11.87	11.87	NS
Average	12.16	12.01	11.67	12.12	-	-

4.2.3. Sustained profit

The data in the Table 11 revealed that low level of sustained profit was obtained among the farming systems and the NARP zones. There is no significant difference in the mean scores among the farming systems in the NARP zones.

Table. 11.Comparison of the mean scores on sustained profit of farmers among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	5.13	5.40	5.00	5.27	5.20	NS
Central Zone	4.93	5.27	5.47	5.27	5.24	NS
High Range Zone	5.13	5.40	5.80	5.73	5.52	NS
Special Zone	5.80	5.47	4.93	5.87	5.22	NS
Southern Zone	5.69	5.60	5.40	5.13	5.45	NS
Average	5.33	5.43	5.32	5.45	-	-

4.2.4. Productivity

4.2.4.1. Comparison of productivity of paddy among the farming systems and the NARP zones

The data presented in the Table 12 revealed that there is no significant difference in the productivity of paddy among the farming systems in the NARP zones.

Among the farming systems, the highest mean score was obtained in the HSBFS (4.41) and the lowest mean score was obtained in the CBFS (3.71).

Table. 12.Comparison of the mean scores on productivity of paddy among the farming systems and the NARP Zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	3.60	4.20	4.33	4.30	4.12	NS
Central Zone	3.75	4.47	4.13	4.17	4.13	NS
High Range Zone	3.67	4.27	4.25	4.33	4.13	NS
Special Zone	3.92	3.93	3.60	4.64	3.92	NS
Southern Zone	3.63	4.27	3.89	4.60	4.10	NS
Average	3.71	4.15	4.04	4.41		

4.2.4.2. Comparison of the mean score on productivity of coconut among the farming systems and the NARP zones

It is evident from the Table 13 that there is no significant difference in the mean score on productivity of coconut among the farming systems in the NARP zones. It also indicated that in all the zones the productivity was decreased between 26 to 50 per cent. The High Range Zone obtained the lowest mean score (2.48). It implied that the level of decrease in productivity was more in the High Range than the other zones. It might be due to the reason that the High Range farmers are giving less attention to coconut since they are more concerned about the high value crops. The decreasing trend of productivity was observed among the farming systems also.

Table. 13. Comparison of the mean scores on productivity of coconut among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	3.53	2.67	2.53	2.80	2.88	NS
Central Zone	2.87	2.71	2.40	2.80	2.70	NS
High range Zone	2.53	2.50	2.43	2.47	2.48	NS
Special Zone	3.13	2.47	2.46	2.53	2.65	NS
Southern Zone	3.00	2.73	2.92	2.33	2.75	NS
Average	3.01	2.62	2.55	2.59	-	-

4.2.4.3. Comparison of productivity of pepper among the farming systems and NARP zones

The results of the Table 14 revealed that there is no significant difference in the mean productivity score of pepper among the farming systems in the NARP zones. The productivity was decreased in all the NARP zones. The same trend was reflected among the farming systems also.

Table. 14. Comparison of the mean scores on productivity of pepper among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	3.00	2.42	3.00	3.28	2.93	NS
Central Zone	2.33	3.44	3.40	2.78	2.99	NS
High range Zone	2.53	2.63	2.53	2.57	2.58	NS
Special zone	3.29	3.11	0.00	2.55	2.98	NS
Southern zone	1.80	2.67	2.50	2.20	2.29	NS
Average	2.60	2.85	2.87	2.68		

4.2.4.4. Comparison of productivity of banana among the farming systems and the NARP zones

The data presented in the Table 15 indicated that there is no significant difference in the mean productivity score of banana among the farming systems in the NARP zones.

The Table 15 also revealed that the productivity of banana was increased irrespective of the zones and the farming systems. It may be due to the reason that the crop has received better attention from the farmers because of the promising price prevailed in the market for the produce.

Table. 15. Comparison of the mean scores on productivity of banana among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	5.00	4.69	4.64	4.00	4.58	NS
Central Zone	3.73	4.72	3.40	4.25	4.01	NS
High range Zone	4.50	4.43	4.63	4.67	4.56	NS
Special Zone	4.92	4.42	4.56	4.58	4.62	NS
Southern Zone	4.73	4.69	4.29	4.50	4.55	NS
Average	4.58	4.59	4.30	4.40		

4.2.4.5. Comparison of productivity of tapioca among the farming systems and the NARP zones

It is observed from the Table 16 that the productivity of tapioca exhibited better performance among the farming systems and the NARP zones. There is no significant difference among the mean productivity score among the zones. In tapioca the cultivated area is confined to more productive lands. This naturally resulted in higher productivity.

Table. 16. Comparison of the mean scores on productivity of tapioca among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	4.20	5.33	4.13	4.00	4.42	NS
Central Zone	-	4.00	3.60	4.00	4.20	NS
High range Zone	-	5.00	4.67	4.57	4.75	NS
Special Zone	4.44	3.22	4.33	4.57	4.14	NS
Southern Zone	4.80	4.62	4.40	4.07	4.47	NS
Average	4.48	4.43	4.43	4.24	-	-

4.2.4.6. Comparison of productivity of rubber among the farming systems and the NARP zones

The results of the Table 17 revealed that the mean productivity score of rubber has no significant difference among the farming systems in the NARP zones. Among the farming systems the productivity was decreased in the HSBFS and the CBFS.

Table. 17. Comparison of mean scores on productivity of rubber among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	-	-	-	3.00	3.00	NS
Central Zone	3.25	5.33	4.67	4.50	4.44	NS
High range Zone	3.43	3.78	3.92	3.86	3.75	NS
Special Zone	4.86	-	3.95	-	4.31	NS
Southern Zone	4.00	5.00	-	4.33	4.44	NS
Average	3.89	4.90	4.11	3.92		

4.2.5. Diversification of Activity

It is evident from the Table 18 that there is no significant difference among the mean scores on diversification of activities among the farming systems in the NARP zones. Among the zones, the Central Zone obtained the highest mean score (3.75) and among the farming systems the highest mean score was obtained in the CBFS.

Table. 18. Comparison of mean scores on diversification of activity among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern	4.00	3.47	3.47	3.87	3.70	NS
Central	3.87	3.87	3.40	3.87	3.75	NS
High	3.49	3.47	3.67	3.73	3.59	NS
Problem	3.87	3.20	3.87	3.87	3.70	NS
Southern	3.78	3.53	3.73	3.23	3.59	NS
Average	3.72	3.51	3.63	3.71	-	-

Ammour (1994) observed that members of community organizations were particularly influenced in diversification of local production system.

4.2.6. Information backstop

The results of the Table 19 revealed that there is significant difference in the mean scores on information backstop among the farming systems in the Northern Zone and Central Zone. Among zones, High Range and Special Zones obtained highest mean scores (6.50 each) and the lowest in the Southern Zone (5.85). It indicated that farmers of High Range Zone and Special Zones effectively collect information through different media. This might be due to the fact that the farmers in the High Range Zone are interested in plantation and spice sector and the Special Zone farmers are eager to know about rectifying the problems. FAO (1999) recommended that training should be a part of small farmers activities to provide them with necessary information back stop.

Table. 19. Comparison of the mean scores on information backstop among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	5.40	5.00	7.13	6.47	6.00	1.18
Central Zone	5.53	6.20	5.47	6.73	5.78	1.05
High range Zone	6.47	6.47	7.00	6.07	6.50	NS
Special Zone	7.13	6.47	6.00	6.40	6.50	NS
Southern Zone	6.00	6.40	5.80	5.20	5.85	NS
Average	6.11	6.11	6.28	6.17	-	-

4.2.7. Effective Supply of Inputs

The data in the Table 20 revealed that significant difference in the mean scores among the farming systems was noticed in the Central Zone. Among the zones, Special Zone obtained the highest mean score (20.13)

and the lowest score was obtained in the Northern Zone (17.12). It is only natural that the farmers in Special Zone were utilizing more inputs in padasekaram as well as plant protection chemicals for coconut. Peterson (1997) opinioned that farmers need inputs to increase production but access to these is the major problem to the majority of the farming community.

Table. 20 Comparison of the mean scores on effective supply of input among the farming system and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	17.53	16.40	19.33	15.20	17.12	NS
Central Zone	17.27	17.33	19.07	22.13	18.95	2.84
High range zone	19.87	20.53	18.80	19.87	19.27	NS
Special Zone	20.80	20.80	18.13	20.80	20.13	NS
Southern Zone	19.47	18.53	18.67	18.40	18.77	NS
Average	18.99	18.72	18.80	18.89	-	-

4.2.8. Market perception

It could be observed from the data presented in Table 21 that there is significant difference in the mean scores among the farming systems in the High Range and Special Zones.

Among the farming systems, the TBFS obtained the highest mean score (8.29) and the lowest mean score was obtained in the RBFS (7.79).

Among the zones, the Special Zone obtained the highest mean score (8.80) and the Northern Zone obtained the lowest mean score (5.77). This implied that the farmers in the Northern Zone exhibited low level of market perception.

Table. 21 Comparison of the mean scores on market perception among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	7.33	6.40	8.13	7.00	5.77	NS
Central Zone	7.13	7.67	8.00	7.40	7.55	NS
High range zone	8.20	7.53	9.80	8.47	8.50	1.08
Special Zone	10.00	8.73	7.40	9.07	8.80	1.69
Southern Zone	7.80	8.60	8.13	7.73	8.07	NS
Average	8.09	7.79	8.29	7.93	-	-

4.2.9. Market behaviour

Significant difference in the mean scores was noticed in the Northern, Central and the High Range Zones.

The data presented in Table 22 revealed that among the zones, the High Range Zone obtained the highest mean score (12.78) and the lowest mean score was obtained in the Special Zone (11.35).

Among the farming systems, the TBFS obtained the highest mean score (13.60) and the lowest mean score was in the CBFS (11.80) with reference to market behaviour. It was also revealed that low level of

market behaviour was exhibited among the farming systems and the NARP zones. It might be due to the fact that there was no organized marketing system existing in the agricultural sector.

Table. 22 Comparison of the mean scores on market behaviour among the farming systems and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	14.27	11.20	13.53	11.20	12.55	2.49
Central Zone	9.33	11.07	13.87	11.27	11.39	2.90
High range Zone	12.86	13.00	12.87	12.40	12.78	3.05
Special Zone	9.93	11.73	11.40	12.33	11.35	NS
Southern Zone	12.60	13.07	11.33	12.00	12.25	NS
Average	11.80	12.01	13.60	11.84		

4.2.10. Market intelligence

It could be observed from the Table 23 that the highest mean score was obtained in the Central Zone and the least mean score for the Southern Zone. Significant difference was noticed in the Northern and High Range Zones.

The HSBFS farmers obtained the highest mean score (10.11) and the least by the TBFS (9.55). It implied that HSBFS farmers exhibited high level of market intelligence. Since they were engaged in different enterprises related to farming it is natural that they possessed high market intelligence.

Table. 23 Comparison of the mean scores on market intelligence among the farming systems and NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	11.07	9.33	9.53	10.00	9.98	1.30
Central Zone	9.53	10.00	10.47	10.80	10.80	NS
High range Zone	9.27	10.27	9.80	10.60	9.99	NS
Special Zone	9.87	9.60	8.13	10.13	9.43	1.43
Southern Zone	8.87	10.00	9.80	9.00	9.42	NS
Average	9.72	9.84	9.55	10.11	-	-

The present trend could be explained in the light of the results relating to the diversification of activities of the farmers of Central Zone furnished elsewhere. The level of diversification of activities of the farmers, was found to be high. It is only natural that these farmers possessed high level of market intelligence for marketing their commodities from the diversified activities.

4.2.11. Market demand

There was no significant differences in the mean scores among the farming systems in the NARP zones.

The results of the Table 24 revealed that among the zones the Southern Zone obtained the highest mean score (5.45) and the lowest mean score was obtained in the High Range Zone (4.98).

Among the farming systems, the CBFS and the TBFS obtained the highest mean scores (5.24 each) and the lowest mean score was for the RBFS (5.01). It implied that of the CBFS and the TBFS farmers were having perceived the market demand in high level. That means, they cultivate crops according to the market demands.

Table. 24 Comparison of the mean scores on Market demand among farmers between farming system and the NARP zones

Zones	CBFS	RBFS	TBFS	HSBFS	Average	CD
Northern Zone	5.47	4.33	5.33	5.40	5.13	NS
Central Zone	4.93	5.00	5.07	5.53	5.13	NS
High Range Zone	5.27	5.20	4.93	4.50	4.98	NS
Special Zone	5.07	5.13	5.27	5.40	5.22	NS
Southern Zone	5.47	5.40	5.60	5.33	5.45	NS
Average	5.24	5.01	5.24	5.23	-	-

The findings on comparison of components of economic performance among the farming systems and the NARP zones could be epitomized as follows.

The farmers in the Special Zone exhibited high level of innovation proneness than other zones. The high level of economic motivation was observed in the High Range Zone. The level of sustained profit was low irrespective of the farming systems. The productivity of paddy was decreased in the Special Zone and in the CBFS. For coconut, the productivity was decreased irrespective of the farming systems and the NARP zones. The same result was obtained for pepper in all the zones and the farming systems. Banana and tapioca obtained better performance among the farming systems and the NARP zones. Diversification of activities was more among the farming systems and the NARP zones. Among the farming systems and the NARP zones, the farmers have low

level of information backstop. The availability of inputs for farming is more among the farming systems and the NARP zones. High level of market perception was exhibited in the High Range Zone and the CBFS. The level of market behaviour was low among the farming systems and the NARP zones. With respect to market intelligence, the highest scores was obtained in the Central Zone and in the HSBFS. The lowest mean score was obtained in the HSBFS for market demand.

4.2.12 Correlation of the Economic Performance of Farmers with independent variables among the Major Farming Systems

The degree of the linear relationship of the eleven independent variables with economic performance of farmers was found out by calculating the Pearson's product – moment correlation coefficient. The results are presented in Table. 25

The perusal of the data presented in Table.25 indicated the relationship of independent variables with economic performance of farmers. The test for statistical significance for correlation coefficient was made at 0.05 and 0.01 levels of probability.

The variables such as innovation proneness, economic motivation, information backstop, market perception, market behaviour, market intelligence and market demand had significant and positive association with economic performance.

Table .25 Correlation between economic performance and the independent variables.

Sl.No.	Independent variables	Correlation coefficient
1.	Innovation proneness	0.251*
2	Economic motivation	0.212*
3	Sustained profit	0.127
4	Productivity	0.160
5	Effective supply of inputs	0.161
6	Diversification of activities	0.178
7	Information backstop	0.281*
8	Market perception	0.237*
9	Market behaviour	0.215*
10	Market intelligence	0.286*
11	Market demand	0.359**

* significant at 5%

** significant at 1 %

4.2.13 Intercorrelation among the independent variables

The degree of intercorrelation among the independent variables was found out by calculating the Pearson's product-moment correlation coefficients. The results are presented in Tables 26 to 29.

The results of the study indicated that the intercorrelation among the variables viz., productivity and economic motivation, effective supply of inputs and sustained profit, information backstop and innovation proneness, market perception and information backstop, market behaviour and sustained profit, market intelligence with diversification of activities and market behaviour and market demand with innovation proneness, productivity, information backstop and market perception had significant and positive association with each other in the CBFS.

Table. 26 .Inter correlation of the independent variables in the coconut based farming system

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	1.000										
X2	0.178	1.000									
X3	0.039	0.048	1.000								
X4	0.052	0.212*	0.003	1.000							
X5	0.005	0.044	0.280**	0.019	1.000						
X6	-0.104	0.143	0.043	0.033	0.106	1.000					
X7	0.249*	0.090	0.168	0.056	0.197	0.018	1.000				
X8	0.045	-0.181	0.083	0.002	0.178	-0.116	0.278**	1.000			
X9	-0.068	0.021	0.225*	0.026	0.139	-0.035	-0.079	0.001	1.000		
X10	0.048	0.174	0.068	0.052	0.177	0.269**	0.069	0.028	0.208*	1.000	
X11	0.203*	0.062	0.012	0.359**	0.47	0.135	0.316**	0.252**	0.163	0.126	1.000

** Significant at 1 % * Significant at 5 %

X1 Innovation proneness
X2 Economic motivation
X3 Sustained profit
X4 Effective supply of inputs
X5 Diversification of activities
X6 Productivity
X7 Information backstop
X8 Market perception
X9 Market behaviour
X10 Market intelligence
X11 Market demand

Table. 27. Inter correlation of the independent variables in the rice based farming system

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	1.000										
X2	0.069	1.000									
X3	0.187	-0.189	1.000								
X4	0.251**	0.011	0.050	1.000							
X5	0.036	-0.163	0.164	0.161	1.000						
X6	0.064	0.111	-0.358**	0.031	-0.246*	1.000					
X7	0.289**	0.247*	0.205*	0.251*	0.205*	-0.096	1.000				
X8	-0.012	0.077	0.061	0.237*	0.091	0.053	0.017	1.000			
X9	-0.058	0.025	0.326**	0.215*	0.092	-0.258**	0.251**	0.193	1.000		
X10	-0.058	0.052	0.008	0.001	0.185	-0.025	0.035	0.124	0.161	1.000	
X11	-0.129	0.216*	-0.058	0.101	0.184	0.099	0.130	0.077	0.024	0.236*	1.000

** Significant at 1 % * Significant at 5 %

X1 Innovation proneness
X2 Economic motivation
X3 Sustained profit
X4 Effective supply of inputs
X5 Diversification of activities
X6 Productivity
X7 Information backstop
X8 Market perception
X9 Market behaviour
X10 Market intelligence
X11 Market demand

Table. 28. Inter correlation of the independent variables in the tapioca based farming system

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	1.000										
X2	0.069	1.000									
X3	0.102	-0.055	1.000								
X4	0.060	0.158	0.127	1.000							
X5	0.045	0.125	0.209*	0.148	1.000						
X6	0.119	0.188	-0.084	0.028	0.136	1.000					
X7	-0.045	0.059	0.340**	0.281**	0.197	0.083	1.000				
X8	-0.086	-0.014	0.286**	0.095	0.137	0.050	0.216*	1.000			
X9	0.043	-0.084	0.072	0.190	0.292**	0.121	0.020	0.139	1.000		
X10	-0.088	0.177	0.772**	0.286**	0.100	0.193	0.180	0.312**	0.264**	1.000	
X11	0.223*	0.041	0.060	0.033	0.182	0.118	0.119	-0.151	0.194	0.067	1.000

** Significant at 1 % * Significant at 5 %

X1 Innovation proneness
X2 Economic motivation
X3 Sustained profit
X4 Effective supply of inputs
X5 Diversification of activities
X6 Productivity
X7 Information backstop
X8 Market perception
X9 Market behaviour
X10 Market intelligence
X11 Market demand

Table. 29. Inter correlation of the independent variables in the homestead based farming system

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	1.000										
X2	0.227*	1.000									
X3	0.087	0.042	1.000								
X4	0.123	0.048	0.019	1.000							
X5	-0.201*	0.111	0.038	0.054	1.000						
X6	0.165	0.043	-0.188	0.178	0.087	1.000					
X7	-0.171	-0.026	0.154	0.113	-0.018	0.150	1.000				
X8	-0.332**	0.047	0.002	0.173	0.330**	0.034	0.108	1.000			
X9	-0.178	-0.158	-0.075	0.108	0.388**	0.084	0.117	0.210*	1.000		
X10	-0.327**	-0.062	-0.197	0.131	0.297**	0.006	0.329**	0.237*	0.312**	1.000	
X11	0.019	0.059	0.091	0.012	0.065	0.047	-0.008	0.088	-0.307**	0.220*	1.000

** Significant at 1 % * Significant at 5 %

X1 Innovation proneness
X2 Economic motivation
X3 Sustained profit
X4 Effective supply of inputs
X5 Diversification of activities
X6 Productivity
X7 Information backstop
X8 Market perception
X9 Market behaviour
X10 Market intelligence
X11 Market demand

In the RBFS, information backstop had significant and positive association with components viz., innovation proneness, economic motivation, sustained profit, productivity and effective supply of inputs.

In the TBFS, market intelligence had significant and positive association with components viz., sustained profit, productivity, market perception and market behaviour.

In the HSBFS, market intelligence had significant and negative association with innovation proneness and positive association with effective supply of input, information backstop and market perception.

4.3. SWOT ANALYSIS OF AGRICULTURE IN KERALA

The procedure adopted for identifying the SWOT of agriculture in Kerala is described in the methodology chapter.

4.3.1. Strengths of Agriculture in Kerala

The results of the Table 30 indicated that first rank was obtained for plant diversity. Diversified physiography and progressive and highly literate farmers were placed in next two positions. The elements of strengths such as rich and fertile soil, abundant water resources, impressive animal wealth and varied type of climatic conditions obtained the lowest ranks.

Table. 30. Strengths of Agriculture in Kerala

Sl. No	Strengths	Mean Value	Rank
1	Plant diversity	8.5	I
2	Diversified Physiography	8.2	II
3	Progressive and highly literate farmers	8.0	III
4	Rich natural resources and bio diversity	7.8	IV
5	Dominance of export oriented crops	7.8	IV
6	Bright sunshine with high intensity of solar energy	7.5	V
7	Experts and experience in growing spices and condiments	7.5	V
8	Large population mostly in rural areas especially women	7.2	VI
9	Largest coastline-facilitated for water transport good scope for marine cultivation	7.0	VII
10	Good medicinal plant wealth	7.0	VII
11	Rich and fertile soil	6.8	VIII
12	Abundant water resources	6.8	VIII
13	Impressive animal wealth	6.5	IX
14	Varied type of climatic conditions	6.2	X

4.3.2. Weaknesses of Agriculture in Kerala

It is observed from Table 31 that among the weaknesses of agriculture in Kerala, the top rank was obtained for fragmented and uneconomic holdings. It was followed by low value addition process, highly fluctuating and unrewarding price regime, preponderance of small

and marginal farmers, post harvest losses etc. The elements of weaknesses such as low recognition and appreciation of the sector and very low consumption of fertilizer and nutrients were ranked lowest.

Table 31 Weaknesses of Agriculture in Kerala

Sl. No.	Weaknesses	Mean Value	Rank
1	Fragmented and uneconomic holdings	9.2	I
2	Low value addition process	9.0	II
3	Highly fluctuating and un rewarding price regime	8.8	III
4	Post harvest losses	8.5	IV
5	Preponderance of small and marginal farmers	8.5	IV
6	Lack of infrastructure facilities	8.2	V
7	High wage rate and low labour productivity	8.2	V
8	Lack of organized marketing	8.0	VI
9	Absentee land owners	7.8	VII
10	Lack of incentives to promote agriculture	7.2	VII
11	Low productivity and high cost of production	7.2	VIII
12	Low recognition and appreciation of the sector	7.0	IX
13	Very low consumption of fertilized and nutrients	6.2	X

4.3.3 Opportunities of agriculture in Kerala

The data presented in Table 32 revealed that untapped export potential in sectors such as value addition, food supplements etc. obtained the first rank. The other major opportunities are in the decreasing order as popularize and make use of brand name for agricultural commodities, diversification of activities, human resource development, use of information and communication technology. Exploit the acceptance of Indian foods internationally obtained the lowest rank.

Table .32 Opportunities of agriculture in Kerala

Sl. No	Opportunities	Mean Value	Rank
1	Untapped export potential in sectors such as Value addition, food supplements, spices, fruits and Vegetables, handicrafts, fisheries, forest produce, food processing, Beverages	9.0	I
2	Popularize and make use of brand name for Agricultural commodities	8.5	II
3	Diversification of activities	8.5	II
4	Human resource development	8.2	III
5	Use of information and communication technology	8.0	IV
6	Utilization of new and under utilized crops	7.8	V
7	Promotion of organic farming	7.8	VI
8	Networking among research-extension system	7.5	VII
9	Promotion of marketing based on consumer preference	6.5	VIII
10	Protected cultivation	5.0	IX
11	Exploit the acceptance of Indian foods internationally	4.5	X

4.3.4. Threats of Agriculture in Kerala

It is evident from the Table 33 that among threats of agriculture in Kerala, deforestation has obtained the top rank. It was followed by rapid soil erosion, slow adoption of quality culture, globalization of Indian agriculture and WTO etc. The threats such as bio-diversity degradation and natural calamity showed the lowest two ranks.

Table 33 Threats of agriculture in Kerala

Sl. No.	Threats	Mean Value	Rank
1	Deforestation	9.2	I
2	Rapid Soil erosion	9.0	II
3	Slow adoption of quality culture	8.8	III
4	Globalization of Indian agriculture and WTO	8.5	IV
5	Pest and diseases problem	8.0	V
6	Sanitary and phyto- sanitary measures	8.0	V
7	Growth of cheap imports	7.5	VI
8	Genetically modified crops	7.2	VII
9	Indiscriminate use of pesticides	6.2	VIII
10	Bio-diversity degradation	6.0	IX
11	Natural Calamity	5.5	X

The findings of the SWOT analysis of agriculture in Kerala could be summarized as follows.

The major strengths of agriculture in Kerala are plant diversity, diversified physiography and progressive and highly literate farmers. The major weaknesses identified were fragmented and uneconomic holdings, low value addition process and highly fluctuating and unrewarding price regime. The opportunities such as untapped export potential, diversification of activities and human resource development were identified as top ranking elements. The major threats identified were deforestation, rapid soil erosion, slow adoption of quality culture and globalization of Indian agriculture and WTO.

4.4. SWOT ANALYSIS OF EXTENSION ORGANIZATION IN THE STATE DEPARTMENT OF AGRICULTURE.

The procedure adopted in the case of SWOT of agriculture in Kerala, was used for SWOT analysis of extension organization in the State Department of agriculture also. It is described in the methodology chapter.

4.4.1. Strengths of Extension Organization in the State Department of Agriculture

It is evident from the Table 34 that among the strengths of extension organization in the State Department of Agriculture, first rank was obtained for grass root level extension functionary offices. The lowest rank was obtained for professionalism among extension personnel. The other strengths identified were reasonably well-structured organizational set up, human resource, reasonably good laboratory and infrastructure facilities for testing seed, fertilizer, and soil, padasekhara samithies etc.

Table 34 Strengths of extension organizations in the State Department of Agriculture.

Sl. No.	Strengths	Mean Value	Rank
1.	Grass root level extension functionary offices spread over the state	9.5	I
2	Reasonably well structured organizational set up	8.5	II
3.	Human resource	8.2	III
4.	Reasonably good laboratory and infrastructure facilities for testing seed, fertilizer, soil etc.	8.0	IV
5.	Padasekhara samithies, Farmers Groups etc.	7.8	V
6.	Training centers	7.5	VI
7.	Corruption free work culture	7.5	VI
8	Risk bearing capacity of extension personnel during contingency.	7.0	VII
9	Ability to Co-operate and co-ordinate with line Departments	6.8	VIII
10.	Continued financial support by the state and central government	6.5	IX
11.	Professionalism among extension personnel	6.2	X

4.4.2. Weaknesses of Extension Organizations in the State Department of Agriculture.

A perusal of the data presented in Table 35 revealed that dual administrative control has obtained first rank among the weaknesses. Lack of recognition and appreciation had obtained the lowest rank. The other major weaknesses identified were insufficient infrastructure

facilities, paucity of funds to invest in high-tech programmes, poor conveyance facilities etc.

Table. 35. Weaknesses of extension organization in the State Department of Agriculture.

Sl. No.	Weaknesses	Mean Value	Rank
1	Dual administrative control	8.8	I
2	Insufficient infrastructure facilities	8.5	II
3	Poor conveyance facilities	8.2	III
4	No continuity of development schemes	8.0	IV
5	Paucity of funds to invest in high-tech programs	8.0	V
6	Lack of commitment and accountability	7.8	V
7	Lack of desire among extension personnel to acquire latest knowledge in agriculture	7.8	V
8	Lack of IT knowledge among technical officers and related infrastructure facilities in offices.	7.5	VI
9	Lack of HRD Mechanism	7.2	VII
10	No proper Mechanism for monitoring and evaluating of assistance given to farmers	7.0	VIII
11	Lack of norms for transfer and posting	6.8	IX
12	Lack of recognition and appreciation	6.5	X

4.4.3. Opportunities of Extension Organizations in the State Department of Agriculture

Among the opportunities of extension organizations in the State Department of Agriculture, the highest rank was obtained for market oriented extension with emphasis on export and import as per the Table36.

It was followed by strengthening information communication technology, gearing up to face the challenges raised by globalization by shifting the thrust towards high-tech agriculture, exploit the potential of watershed based development system, consultancy services etc. The lowest rank was obtained for extraction of human resource potential.

Table.36. Opportunities of extension organization in the State Department of Agriculture

Sl. No	Opportunities	Mean Value	Rank
1	Market oriented extension with emphasis on export and import	9.0	I
2	Strengthening Information Communication Technology	8.8	II
3	Gearing up to face the challenges raised by globalization by shifting the thrust towards high-tech agriculture	8.5	III
4	Exploit the potential of watershed based development system	8.2	IV
5	Consultancy services	8.0	V
6	Promotion of Organic farming practices	7.8	VI
7	Strengthening bio-diversity conservation activities	7.5	VII
8	Make-use of Geographical Information System (GIS) facilities for crop modeling	7.0	VIII
9	Extraction of human resource potential	6.8	IX

4.4.4. Threats of Extension Organization in the State Department of Agriculture

It is evident from the Table 37 that first rank was obtained for conversion of arable land to non-agricultural purpose among the threats. The lowest rank was obtained for growth of intermediaries in marketing.

The other threats were globalization necessitated changes in the concept of conventional agriculture, absentee landowners, increasing trend of negligence of the sector and lack of commitment among extension personnel etc.

Table .37 Threats of extension organization in the State Department of Agriculture

Sl.No.	Threats	Mean value	Rank
1	Conversion of arable land to non-agricultural purpose	8.6	I
2	Globalization necessitated changes in the concept of conventional agriculture	8.5	II
3	Absentee land owners	8.2	III
4	Increasing trend of negligence of the sector	8.0	IV
5	Lack of commitment among extension personnel	7.8	V
6	Lack of attraction among youth towards agriculture	7.5	VI
7	Privatizations of extension services	7.0	VII
8	Growth of intermediaries in marketing	6.5	VIII

The findings of the SWOT analysis of extension organizations in the State Department of Agriculture could be summarized as follows.

The major strengths of the extension organization are grass root level extension functionary offices, reasonably well structured organizational set up, human resource, reasonably good laboratory and infrastructure facilities for testing seed, fertilizer, and soil etc. The weaknesses identified were dual administrative control, insufficient infrastructure facilities, paucity of funds to invest in high-tech programs, poor conveyance facilities and lack of recognition and appreciation.

Market oriented extension with emphasis on export and import, strengthening information communication technology, gearing up to face

the challenges raised by globalization by shifting the thrust towards high-tech agriculture, exploit the potential of watershed based development system and consultancy services were identified as major opportunities. The major threats identified were conversion of arable land to non-agricultural purpose, globalizations necessitated changes in the concept of conventional agriculture and absentee land owners.

4.5. Delineation of the Dimensions of Organizational Efficiency in the State Department of Agriculture

Analysis of Variance was resorted to test the data on the dimensions of organizational efficiency of the State Department of Agriculture.

4.5.1.1. Job autonomy

The data presented in Table 38 revealed that no significant difference was noted among the zones. The Central Zone obtained the highest mean score (11.86) with reference to job autonomy and the least score was for the Special Zone (9.83). The score above 10 indicates high level of job autonomy.

Table. 38 Comparison of the mean scores on job autonomy among the categories of extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	10.67	8.67	12.0	12.22	11.64
Central Zone	12.33	12.67	11.0	11.44	11.86
High Range Zone	13.67	11.33	8.33	11.33	11.17
Special Zone	9.33	8.33	10.33	11.33	9.83
Southern Zone	13.33	8.0	11.67	11.67	11.17
Average	11.87	9.80	10.67	11.60	CD-N.S

Among the categories of extension personnel, the Deputy Directors of Agriculture (DDA) obtained the highest mean score (11.87) followed by

the Agricultural Assistants (AA), the Agricultural Officers (AO) and the Assistant Directors of Agriculture (ADA). It indicated that the Deputy Directors of Agriculture possessed high level of job autonomy than the other categories.

4.5.1.2. *Comparison of job satisfaction among the categories of extension personnel and the NARP zones*

Significant difference was noticed in the mean scores among the zones. It is observed from the Table 39 that the High Range Zone obtained the highest mean score (21.95) and the lowest was for the Northern Zone (19.84). The mean score of 22 and above indicates greater job satisfaction level. It is evident from the table that the job satisfaction level of extension personnel among the zones was below average. Low level of job satisfaction was obtained among the categories of extension personnel also.

Table. 39 Comparison of the mean scores on job satisfaction among the categories of extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	21.00	18.67	19.0	20.67	19.84
Central Zone	17.67	21.0	21.33	20.78	20.20
High Range Zone	24.67	23.33	18.00	21.78	21.95
Special Zone	19.67	23.0	16.67	20.22	19.89
Southern Zone	20.00	21.67	19.0	23.67	21.09
Average	20.60	21.53	18.80	21.42	C.D= 2.53

4.5.1.3. *Comparison of job involvement among the categories of the extension personnel and the NARP zones*

Significant difference in the mean scores was noticed among the zones. The score 28 and above indicates higher level of job involvement. It is evident from the Table 40 that the Southern Zone obtained the highest mean score (35.00) and the lowest score was in the Central Zone (25.25). It indicated that the extension personnel in the Southern Zone exhibited higher level of job involvement. The data presented in the table also revealed that higher level of job involvement was exhibited among the categories of extension personnel.

Table. 40 Comparison of the mean scores on job involvement among the categories of the extension personnel and the NARP zones

Zone	DD	ADA	AO	AA	Average
Northern Zone	30.00	30.67	28.33	27.00	29.00
Central Zone	33.00	27.00	25.00	26.00	25.25
High Range Zone	32.00	27.00	29.00	24.00	28.00
Special Zone	33.00	31.00	27.00	31.00	30.50
Southern Zone	37.00	37.00	34.00	32.00	35.00
Average	33.00	30.53	28.67	28.00	C.D =2.94

4.5.1.4. *Comparison of guidance and supervision among the categories of the extension personnel and the NARP zones*

The results in Table 41 indicated that the difference in mean scores observed among the zones was statistically significant. The Southern Zone obtained the highest mean score (22.13) and the lowest mean score was obtained in the Northern Zone (18.69). The score 18 and above indicated high level of guidance and supervision. From the table it was observed

that among the zones the extension personnel belonging to the Southern Zone had high level of guidance and supervision.

Among the categories of extension personnel, the highest score was obtained by the Agricultural Assistants (23.49). It implied that the Agricultural Assistants were getting high level of guidance and supervision than the other categories of extension personnel.

Table. 41 Comparison of the mean scores on guidance and supervision among the categories of the extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	19.33	18.00	17.00	20.44	18.69
Central Zone	18.33	19.00	17.70	20.40	18.86
High Range Zone	21.00	18.70	21.00	23.70	21.10
Special Zone	17.30	19.00	19.30	23.70	19.82
Southern Zone	18.30	23.30	21.70	25.20	22.13
Average	18.85	17.80	19.34	23.49	C.D -3.50

4.5.1.5. Comparison of facility and resources among the categories of the extension personnel and the NARP zones

Significant difference in the mean scores was noticed among the zones. The Southern Zone obtained the highest mean score (15.69) with reference to facility and resource in the organization as evident from the Table 42. The lowest score was obtained in the Northern Zone (12.25). The mean score 18 and below indicated low level of facility and resource. It was revealed from the table that the extension personnel belonging to the Northern Zone had low level of facility and resource among the NARP zones.

The Table 42 also revealed that among the categories of extension personnel, the Agricultural Officers had obtained the highest mean score (16.27). The lowest mean score was obtained for the Assistant Directors of Agriculture (11.73).

Table. 42 Comparison of the mean scores on facility and resources among the categories of the extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	12.33	9.00	12.33	15.33	12.25
Central Zone	12.00	12.67	16.00	14.67	13.84
High Range Zone	16.67	9.33	16.00	14.78	14.20
Special Zone	12.33	12.33	18.00	18.11	15.19
Southern Zone	11.33	15.33	19.00	17.11	15.69
Average	12.93	11.73	16.27	16.00	C.D=3.18

4.5.1.6. Comparison of organizational involvement of the categories of the extension personnel among the NARP zones

It is observed from the Table 43 that significant difference in the mean scores was noticed among the zones. The High Range Zone obtained the highest mean score (35.56) and the least by the Special Zone (32.78). The score 33 and above indicated high level of organizational involvement. It implied that the extension personnel belonging to the High Range Zone had obtained high level of organizational involvement among the NARP zones.

Among the categories of extension personnel the Assistant Directors of Agriculture obtained the highest mean score (34.93). The Agricultural Officers (33.73) had obtained the lowest mean score.

Table. 43 Comparison of the mean scores on organizational involvement of the categories of the extension personnel in the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	36.33	37.33	29.00	34.33	34.25
Central Zone	36.00	34.00	33.67	36.22	34.97
High Range Zone	35.33	36.00	36.33	34.56	35.56
Special Zone	35.00	31.33	34.00	30.78	32.78
Southern Zone	31.67	36.00	35.67	35.00	34.59
Average	34.87	34.93	33.73	34.20	C.D -3.15

4.5.1.7. Comparison of achievement motivation among the categories of the extension personnel and the NARP zones

The results of the data furnished in Table 44 revealed that no significant difference was noticed in the mean scores among the zones. The Central Zone obtained the least mean score (5.81) and the highest score was for Special Zone (6.45).

Table. 44 Comparison of the mean scores on achievement motivation among the categories of the extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	6.33	7.33	6.00	5.67	6.33
Central Zone	6.33	6.00	5.00	5.89	5.81
High Range Zone	5.33	7.33	5.67	5.78	6.01
Special Zone	6.33	6.00	6.67	6.78	6.45
Southern Zone	6.33	4.67	7.0	6.00	6.00
Average	6.13	6.27	6.07	6.02	C.D -NS

Among the categories of the extension personnel the Assistant Directors of Agriculture obtained the highest mean score (6.27). The lowest mean score was obtained for Agricultural Assistants (6.02).

4.5.1.8. Comparison of decision-making ability among the categories of the extension personnel and the NARP zones

The data presented in the Table 45 indicated that no significant difference was observed among the zones. The Central Zone obtained the highest mean score (11.47) and the lowest mean score was in the Southern Zone (10.29).

Among the categories of extension personnel, the Assistant Directors of Agriculture obtained the highest mean score (11.54). The Agricultural Assistants (10.04) had obtained the lowest mean score.

Table. 45 Comparison of the mean scores on decision making ability among the categories of extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	10.60	12.00	10.33	10.22	10.78
Central Zone	11.20	12.00	11.70	11.00	11.47
High Range Zone	10.60	11.30	10.40	10.00	10.58
Special Zone	10.80	11.70	12.30	8.22	10.75
Southern Zone	10.67	10.70	9.00	10.80	10.29
Average	10.77	11.54	10.74	10.04	C.D - NS

4.5.1.9. Comparison of organizational commitment among the categories of the extension personnel and the NARP zones

No significant difference was noticed in the mean scores among the zones. The data presented in Table 46 revealed that among the categories

of extension personnel, the Assistant Directors of Agriculture obtained the highest mean score (30.58). The Agricultural Assistants obtained the lowest mean score (28.84). The mean score 24 and above indicated high level of organisational commitment. It implied that the Assistant Directors of Agriculture had high level of organisational commitment. It is natural that the Assistant Directors of Agriculture had more responsibility in carrying out and supervising the development activities.

Table. 46 Comparison of the mean scores on organizational commitment among the categories of the extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	28.67	32.00	28.33	29.78	29.70
Central Zone	31.70	28.30	28.30	29.80	29.51
High Range Zone	30.30	32.30	30.30	29.30	30.55
Special Zone	31.70	30.00	30.00	27.00	29.68
Southern Zone	28.30	30.30	31.00	28.30	29.48
Average	30.13	30.58	29.59	28.84	C.D -NS

4.5.1.10. Comparison of job perception among the categories of the extension personnel and the NARP zones

It is evident from the Table 47 that no significant difference was noticed in the mean scores among the zones. The extension personnel in the Southern Zone obtained the highest mean score (37.00) for job perception. Among the zones, the Special Zone (33.83) had obtained the least mean score.

Table. 47 Comparison of the mean scores on job perception among the categories of the extension personnel and the NARP zones

Zone	DD	ADA	AO	AA	Average
Northern Zone	34.67	35.00	36.33	36.22	35.56
Central Zone	32.67	37.00	35.33	34.22	34.81
High Range Zone	36.00	34.67	36.67	35.89	35.81
Special Zone	34.33	34.00	33.00	34.00	33.83
Southern Zone	37.00	38.00	36.67	36.33	37.00
Average	34.93	35.73	35.60	35.33	C.D - NS

4.5.1.11. Comparison of job performance among the categories of the extension personnel and the NARP zones

The data presented in the Table 48 revealed that significant difference was noticed among the zones. The highest level of job performance was obtained in the Southern Zone (44.70). The Central Zone had (41.73) obtained the lowest level of job performance. The mean score 33 and above indicated high level of job performance. The results of the table implied that the extension personnel belonging to the Southern Zone had obtained the highest level of job performance.

Among the categories of extension personnel, the highest mean score was obtained for the Assistant Directors of Agriculture (45.00). The lowest mean score was obtained for the Deputy Directors of Agriculture (41.47).

Table. 48 Comparison of the mean scores on job performance among the categories of the extension personnel and the NARP zones

Zone	DDA	ADA	AO	AA	Average
Northern Zone	39.00	46.33	42.33	43.22	42.80
Central Zone	41.00	41.00	40.39	44.50	41.73
High Range Zone	41.00	42.33	41.39	42.78	41.88
Special Zone	41.67	46.67	41.67	42.00	43.00
Southern Zone	44.33	48.67	42.11	43.69	44.70
Average	41.47	45.00	41.58	42.25	C.D =3.83

The findings could be summarized that significant difference in the mean scores of extension personnel was observed for job satisfaction, job involvement, guidance and supervision, facility and resources, organizational involvement and job performance among the zones. Among the categories of extension personnel, the Assistant Directors of Agriculture obtained the highest mean score for all the eleven dimensions except job autonomy and job involvement.

4.5.2. Relative Importance of the Dimensions of Organizational Efficiency

The performance of the entire sample of respondents were classified to three clusters viz., low, medium and high based on the average performance. The mean and standard deviation were calculated. Then clustering was done based on mean ± SD values as described in the methodology chapter. The scores obtained to each cluster are given in Table 49.

The results of the Table 49 revealed that for the high efficiency cluster, job perception obtained highest mean score (91.71) followed by guidance and supervision (89.79) and job performance (85.50). In the medium cluster also job perception ranked first (88.31) followed by achievement motivation (78.59) and job performance. In the low efficiency cluster job perception (76.72) ranked first position followed by job performance and organizational commitment (71.40).

Table.49 Mean scores of the high, medium and low organizational efficiency clusters on the eleven dimensions

Sl.No.	Dimensions	High	Medium	Low
1.	Job autonomy	78.36	69.62	56.47
2.	Job satisfaction	75.43	62.46	52.60
3.	Job involvement	75.71	68.70	65.93
4.	Guidance& Supervision	89.79	69.25	57.13
5.	Facility & Resource	65.36	47.62	38.53
6.	Organizational involvement	72.86	69.11	65.73
7.	Achievement motivation	75.93	78.59	68.93
8.	Decision making ability	76.43	69.85	67.27
9.	Organizational commitment	75.93	73.46	71.4
10.	Job perception	91.71	88.31	84.8
11.	Job performance	85.50	76.72	74.27
12.	Overall average	78.47	70.33	63.91

It could be observed that irrespective of the clustering, job perception obtained highest mean score in this organization. It is obvious that the extension personnel perceived high importance to job duties.

It was observed that irrespective of the clustering, facility and resource obtained the lowest mean score amongst the organisational efficiency dimensions. In the high efficiency cluster organisational involvement and job satisfaction had obtained the lowest mean scores. For medium efficiency cluster, it was job satisfaction and job involvement which fetched the lowest mean scores and for the low efficiency cluster it was job satisfaction and job autonomy which obtained the lowest mean scores.

From the perception of extension personnel, facility and resource aspect of organization was low. It seems that the organization has done little to ensure facility and resource. It is also one of the reasons for low job satisfaction among the clusters.

It was interesting to note that the low and medium cluster had scored least on guidance and supervision than the high cluster. It is obvious that there was no proper guidance to them for the work in which they are involved and probably this was the reason for the low score on all the dimensions.

The low cluster scored least on decision making ability than the other two clusters. It was found during discussion that there was no effort made to involve all the members in decision-making and often decisions were made at the top and the juniors simply used to comply. This may also be the reason for poor job autonomy of low efficiency cluster.

4.5.3. Percentage Contribution of the Organizational Efficiency Dimensions towards Discrimination amongst the three levels viz., High, Medium and Low perceiving Clusters

Discriminant Function Analysis was resorted to find out the percentage contribution of the organizational efficiency dimensions towards discrimination amongst the three groups.

It was observed from the Table 50 that comparing the cluster of high versus medium and taking into consideration at least 10 per cent contribution made to differences of the two, the dimension facility and resource was quite significant, contributing 16.96 per cent of their difference. Similarly other dimensions in their order of contribution were achievement motivation (15.92) decision making ability (15.18) and job autonomy (12.30).

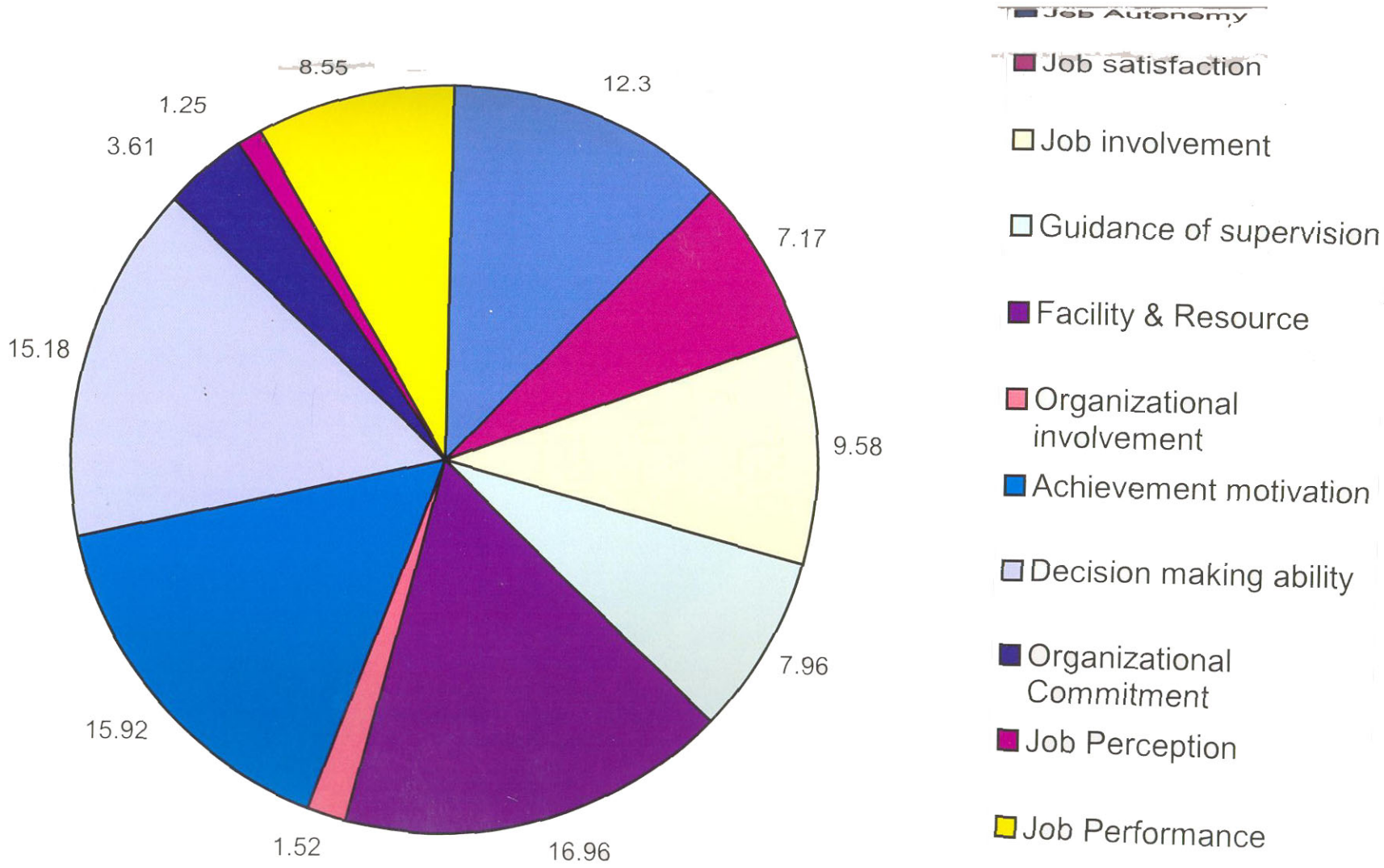


Fig.11.Percentage contribution of the organizational efficiency dimensions towards discrimination among high vs medium cluster

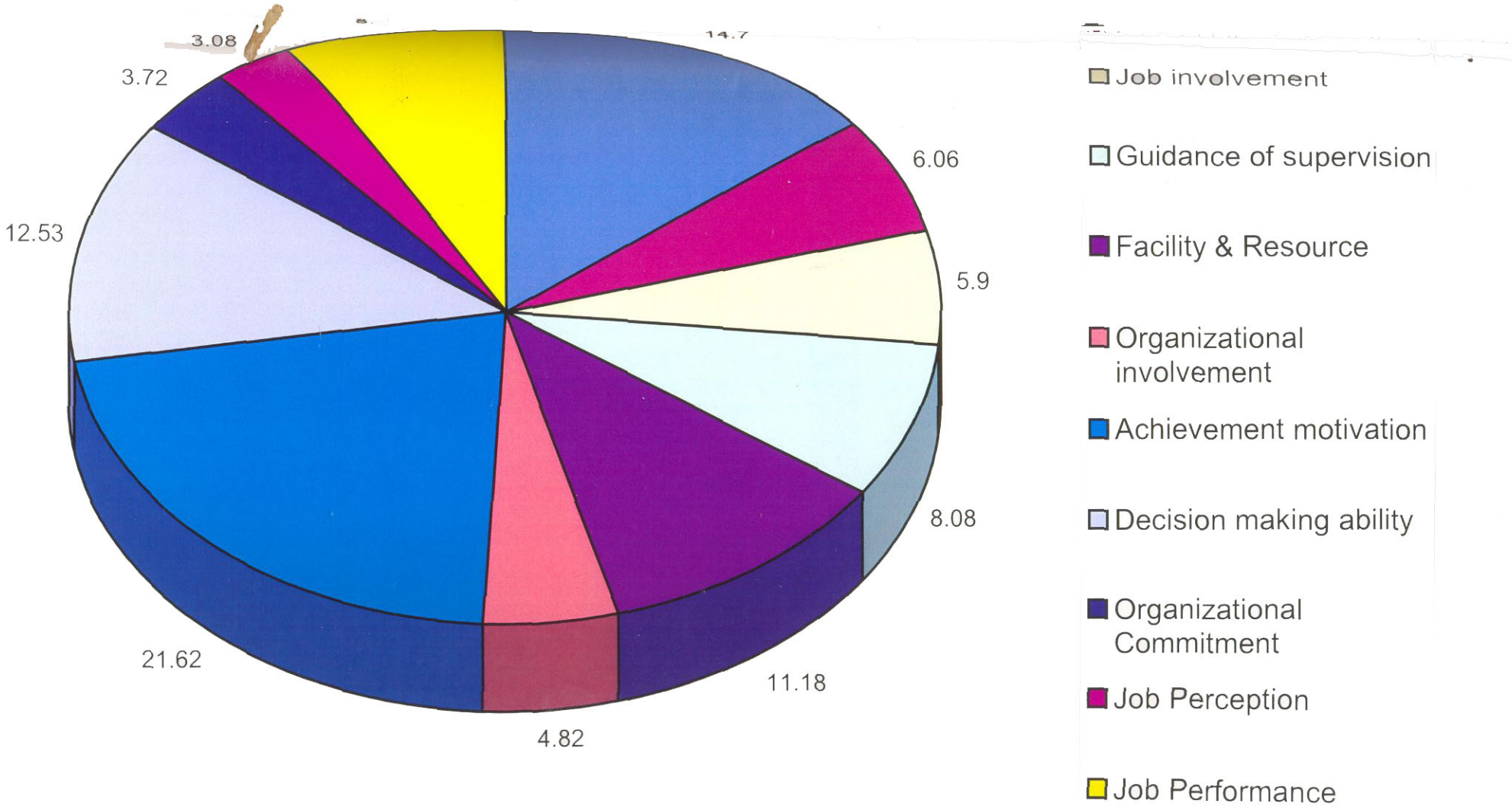


Fig. 12. Percentage contribution of the organizational efficiency dimensions towards discrimination among medium vs low cluster

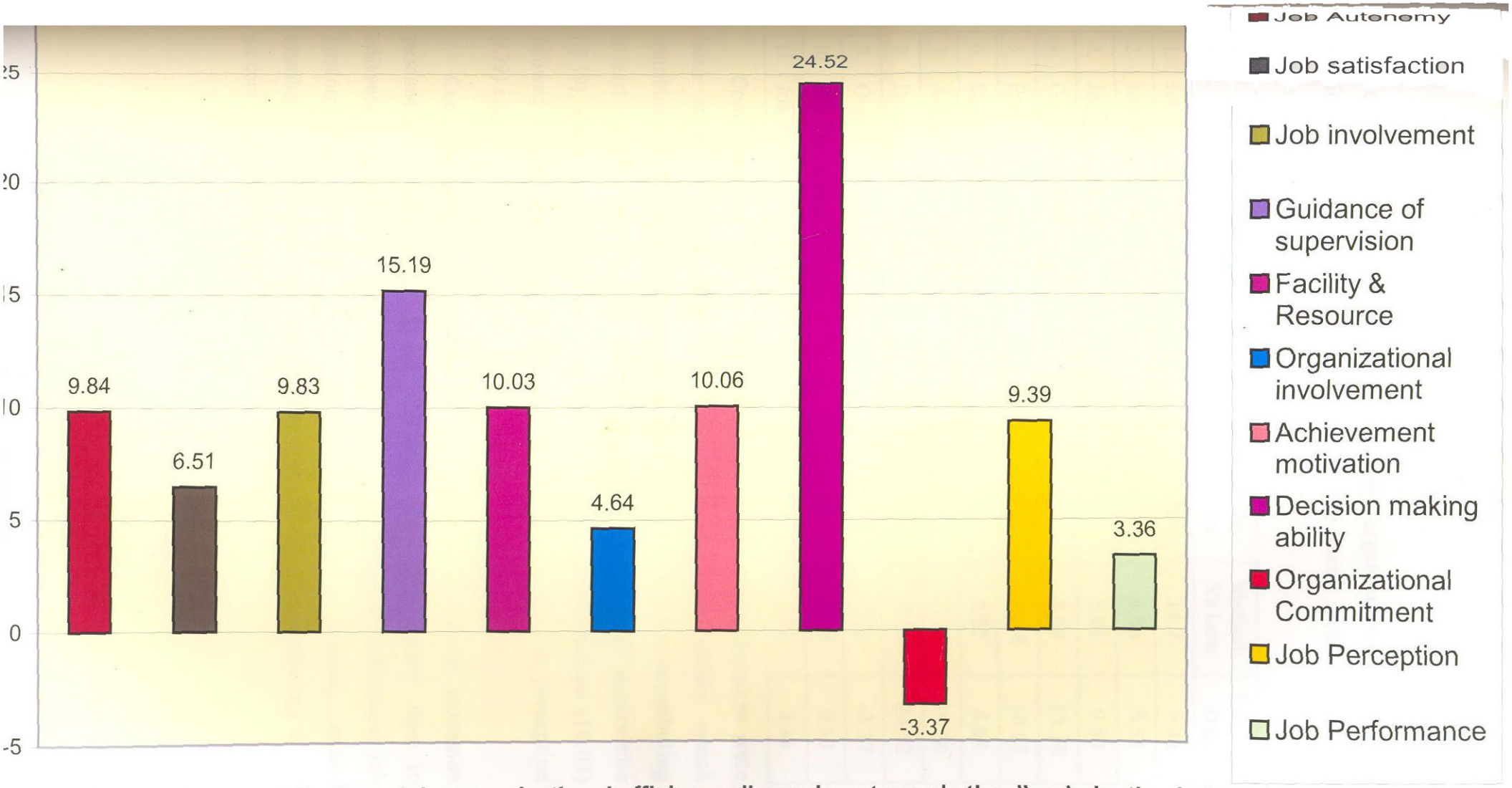


Fig. 13. Percentage contribution of the organizational efficiency dimensions towards the discrimination between the low vs high perceiving clusters

Table.50 Percentage contribution of the organizational efficiency dimensions towards discrimination amongst the three levels viz., high, medium and low perceiving clusters.

Sl. No.	Dimensions	High vs Medium	Medium Vs Low	Low Vs High
1.	Job Autonomy	12.30	14.7	9.84
2.	Job satisfaction	7.17	6.06	6.51
3.	Job involvement	9.58	5.90	9.83
4.	Guidance of supervision	7.96	8.08	15.19
5.	Facility & Resource	16.96	11.18	10.03
6.	Organizational involvement	1.52	4.82	4.64
7.	Achievement motivation	15.92	21.62	10.06
8.	Decision making ability	15.18	12.53	24.52
9.	Organizational Commitment	3.61	3.72	-3.37
10.	Job Perception	1.25	3.08	9.39
11.	Job Performance	8.55	8.30	3.36

Comparing the high vs low perception cluster, the differences were found mainly due to the dimension decision-making ability which contribute 24.52 per cent to the difference. Other dimensions contributing at least 10 per cent to the differences were guidance and supervision (15.19), achievement motivation (10.06) and facility and resource (10.03) followed by job autonomy (9.84) job involvement (9.83) job perception (9.39) etc.

Comparison of medium and low perception cluster of extension personnel, showed that causes of their differences were due to achievement motivation contributing 21.62 per cent to the difference, job autonomy contributing 14.71 per cent, decision making ability contributing 12.53 per cent and 'facility and resources' contributing 11.18 per cent to the differences.

It is obvious from the foregoing that the dimension decision making ability was perceived better among high perception cluster as compared to low perception cluster. This indicated that the members who themselves had concern to do things in a better way by taking correct decision perceived the overall organizational efficiency comparatively better than those who lacked this interest. This implies that decision making ability is an important dimension of organizational efficiency.

To improve upon the individuals perception of organizational efficiency, it is essential to involve the employees especially those involved in carrying out the task in the decision making process. The notion of managing to get the work done or target orientation should be avoided and instead quality work should be encouraged through proper reward system.

The findings on organizational efficiency dimensions could be summarized as follows.

Analysis of Variance and Discriminant Function Analysis were resorted to test the eleven dimensions of organizational efficiency. Significant difference in the mean score was noticed in dimensions viz., job satisfaction, job involvement, guidance and supervision, facility and resource, organizational involvement and job performance.

The extension personnel in the Central Zone obtained the highest mean score for job autonomy and decision making ability. For job satisfaction, organizational involvement and organizational commitment the highest mean score was in the High Range Zone. For job involvement, guidance and supervision, facility and resource the highest mean score was in the Southern Zone. The highest mean score for achievement motivation was obtained in the Special Zone and for decision making ability the Central Zone obtained the highest mean score.

Among the extension personnel, the Deputy Directors of Agriculture obtained the highest mean score for job autonomy and job involvement. The Assistant Directors of Agriculture obtained the highest mean score for job satisfaction, achievement motivation, decision-making ability, organizational commitment, job perception and job performance. The highest mean score for guidance and supervision, facility and resource and organizational involvement was obtained by the Agricultural Assistants.

Comparing the high vs low perceiving cluster by means of Discriminant Function Analysis, it was revealed that decision making ability is the major dimension contributing the highest percentage to the difference. Other dimension contributing at least 10 per cent to the differences were guidance and supervision, achievement motivation and facility and resource. In the case of high vs medium cluster it was found that the dimensions viz., facility and resource, achievement motivation and decision making ability were the major contributing dimensions. Comparison of medium and low perception cluster of extension personnel, showed that courses of their differences were mainly due to achievement motivation, job autonomy and decision making ability. In all the three clusters the dimension of decision making ability was found to be contributing much to the difference. This indicated the importance of the dimension in organizational efficiency.

4.6. EXTENSION STRATEGIES.

The economic performance of all the four major farming systems was low during the period 1996-2001 when compared to 1990-1995 (Table 2). This trend was reflected in all the NARP zones also.

In the Northern Zone low economic performance was observed in the farming systems such as coconut based farming system, rice based farming system, homestead based farming system and tapioca based farming system in the decreasing order. In the Central Zone it was in the order of RBFS, TBFS, HSBFS and CBFS, in the High range HSBFS, CBFS, TBFS

and RBFS, in the Special Zone TBFS, RBFS, CBFS and HSBFS and in the Southern Zone TBFS, CBFS, RBFS and HSBFS.

Among the individual crops, the lowest economic performance was noticed in coconut irrespective of NARP zones (Tables 3 to 7). The performance of tapioca and banana were either higher or at the same level during 1996-2001 than 1990-1995.

All the farmer categories viz., marginal, small and large farmers had also indicated low economic performance during 1996-2001 than 1990-1995 (Table 8).

The result in respect of the economic performance, SWOT analyses of agriculture in Kerala as well as extension organization in the State Department of Agriculture and organizational efficiency of the extension personnel were consolidated and were subjected for discussion in a consensus-building workshop. The probable causes and draft strategy were discussed. Finally these were ranked on priority basis.

Based on this consensus-building workshop, strategies were formulated. These strategies are presented here as follows.

4.6.1.Coconut Based Farming System

4.6.1.1. Major causes for the low economic performance in the coconut based farming system

The main causes for the low economic performance were illustrated in the Table 51. The results of the table indicated that lack of proper management obtained the first rank and the lowest rank was for pest and disease complex.

Table 51. Major causes for low economic performance prioritized in the coconut based farming system

Sl. No.	Causes	Rank
1.	Lack of proper management	I
2.	Lack of irrigation system	II
3.	Price fluctuation	III
4.	Lack of organized marketing system	IV
5.	Non-availability of sufficient quality planting materials	V
6.	High wage rate	VI
7.	High cost of cultivation	VII
8.	Labour insufficiency	VIII
9.	Lack of value addition	IX
10	Pest and disease complex	X

4.6.1.2. Strategies for the coconut based farming system

Among the strategies, comprehensive coconut development program was ranked the first position and the lowest rank was for crop cafeteria (Table 52).

Table 52. Strategies prioritized in the coconut based farming system

Sl.No.	Strategies	Rank
1	Comprehensive coconut development program	I
2	Productivity and quality	II
3	Labour bank at panchayat level	III
4	Fully autonomous market network system	IV
5.	Need based research on value addition	V
6.	All incentives should be product linked and routed through bank	VI
7.	Promote industries for value addition	VII
8.	Suitable policy measures	VIII
9.	Pest and disease surveillance system	IX
10.	Crop cafeteria.	X

4.6.1.3. Major strategies

i. Coconut Producers Society (CPS)

Coconut Producers Societies (CPS) have to be organized in the state in line with the Rubber Producers Societies (RPS) of the Rubber Board for promoting coconut development activities such as increasing production, post harvest handling, value addition etc. These societies have to be promoted by the Coconut Development Board formed at the village panchayat level. All extension activities have to be carried out through

this organization. Micro Credit System (MCS) can be implemented through these organizations.

ii. Introduction of the concept and practice of 'Crop Cafeteria'

It includes promotion of multiple cropping system, production cum processing units etc. The ultimate aim is employment and income generation by the optimum utilization of the coconut cultivated lands. With a view to harvest the solar energy vertically, multi tier system of intercrops have to be introduced in the coconut plantations.

iii. Pest and disease surveillance system.

Proper pest and disease surveillance system has to be established. Regular pest monitoring, survey and surveillance is necessary to enhance the preparedness of farmers to meet the pest / disease threats to the crop's in the coconut based farming system.

iv. Replanting and rejuvenation

In Kerala most of the coconut palms are old and senile. So there is a need for replanting. It has to be promoted on a phased manner in a systematic way. Rejuvenation and under planting with quality planting materials have also to be carried out systematically.

v. Production of quality planting materials.

The capacity of the existing Departmental coconut nurseries has to be enhanced. The procurement of quality nuts has to be strengthened. Proper monitoring and timely distribution of seedlings should be ensured.

Production of seedlings have to be promoted in farmer's fields itself under the supervision of the extension functionaries.

Strict norms have to be enforced for the production of planting materials by the private nurseries.

vi. Increasing farm level income

This is possible through the efficient utilization of coconut products at the farm/ community levels, and to strengthen the infrastructure facilities for domestic and export marketing. Farm level processing and value addition can be the viable strategy to enhance the on farm income.

vii. Integrated farming

Profitable utilization of inter spaces both during pre-bearing and post- bearing phases in coconut gardens is to be promoted.

viii. Organic farming

Organic farming is considered as a welcome approach for maintenance of soil health and there by increasing production.

ix. Product diversification

Product diversification and by-product utilization need encouragement and promotion.

x. Product promotion

Tender coconut water has medicinal properties. Coconut oil reduces the risk of cancer, heart disease and diabetics. The wood and shell based handicraft units support more than 50000 people. The hidden beauty in coconut wood shell and mid-rib while carving artistic designs would be value added attractants and money-spinners. By promoting this particular area itself, the socio economic status of a sizeable sections of rural poor will be improved.

xi. Awareness campaign

Campaigns for the promotion of the use of coconut, coconut oil and the value added products have to be organized as done in the case of Egg by the National Egg Promotion Council. This responsibility has to be shouldered jointly by the State Department of Agriculture and the Coconut Development Board.

xii. Training

Training on coconut management practices, harvesting (using machine), plant protection measure etc. have to be conducted for the unemployed young men and women.

xii. Labour bank

Labour bank has to be constituted at Panchayat level.

xiv. Organization of small scale processing units

Promotion of small scale processing units for value addition with financial support from Nationalized Banks on soft loan basis has to be attempted by the Coconut Development Board. Escort service scheme and the Technology Incubator scheme have to be implemented as envisaged by the Government of India.

xv. Product diversification and value addition

This needs to be effectively implemented by the Coconut Producers Societies. The Central Plantation Crops Research Institute (CPCRI) has evolved technically feasible and economically viable technologies for production of value added coconut products such as Snow Ball Tender Nut and coconut chips. Currently, more than 70 coconut-based products are commercialized and nearly 50 products have entered into the international market. There is growing demand for coconut products in dietary foods, functional foods, nutraceuticals, pharmaceuticals, cosmetics, bio-fuel, bio-lubricants and as virgin coconut oil against viral, fungal and bacterial diseases. Byproducts like coir-based composites, coir pith have wider uses in soil erosion control, soil moisture conservation. Coconut wood as a substitute for forest timber can be promoted. All possible value additions can be explored as niche market products.

xvi. Crop Geometry

Short stature palms should be evolved to facilitate easy harvesting and plant protection measures.

Climbing equipment which can be easily handled has to be fabricated.

xvii. Policy matters

Revision of applied import tariff for edible oils, especially Palmolein and Coconut oil is required. The applied tariff for Palmolein was enhanced from 65 per cent to 75 per cent recently. Since the bound rate for edible oils is fixed at 300 per cent, it is very reasonable to enhance the applied tariff for Palmolein to at least 150 per cent which can herald the increased demand for coconut oil in the domestic market in the country.

Planting of coconut seedlings in converted paddy land should be strictly prohibited by proper legislation.

Majority of present agricultural land owners in Kerala are not at all interested in farming due to various reasons. At the same time the agricultural labourers are unable to cultivate due to the illegality of land leasing. The government should either provide land to the landless agricultural labourers or revise the existing land use laws to allow leasing or renting or contract farming.

xviii. Micro irrigation

Micro irrigation ensures 30 to 70 per cent savings in water, 25 to100 per cent increase in yield and 15 to 30 per cent reduction in operating and crop production costs. It economizes energy usage around 50 per cent by reducing pumping hours. The Coconut Development Board in collaboration with NABARD shall promote micro irrigation by promising supervised credit.

4.6.2. Rice Based Farming System

4.6.2.1. Major causes for the low economic performance in the rice based farming system

The main causes for the low economic performance of the rice based farming system are presented in the Table 53. It was revealed from the table that small land holdings was getting the first rank and the non availability of organic manure was ranked the lowest.

Table. 53. Major Causes for low economic performance prioritized in the rice based farming system

Sl. No.	Causes	Rank
1.	Small land holdings	I
2.	Negligence of the system	II
3.	High wage rate and low labour productivity	III
4.	Non-availability of timely labour	IV
5.	Lack of acceptance of new technology	V
6	Reluctance in farming	VI
7	Non availability of inputs in time	VII
8	Lack of irrigation facilities	VIII
9	Inadequate power supply	IX
10	Non availability of organic manures	X

4.6.2.2. Strategies for the rice based farming system

The strategies presented in the Table 54 indicated that identification of most suitable varieties for each agro climatic regions obtained the first rank and the lowest rank was for promotion of integrated pest and nutrient management and organic farming.

Table. 54. Strategies prioritized in the rice based farming system

Sl. No.	Strategies	Rank
1.	Identification of most suitable varieties for each agroclimatic regions	I
2.	Use of hybrid rice technology to local farming situation	II
3.	Water management	III
4.	Use of biotechnology	IV
5.	Production improvement program	V
6.	Identify high potential areas and prohibit irreversible conversion of land by legislation.	VI
7	Special package for Kuttanad	VII
8	Strengthening group farming activities	VIII
9	Training both extension functionaries and farmers in scientific management practices.	IX
10	Promotion of integrated pest and nutrient management and organic farming.	X

4.6.2.3. Major strategies

i. Identification of most suitable varieties for each agro-climatic regions.

During the 8th plan period Kerala Agricultural University released nine new paddy varieties. In 2002 they released seven varieties. But none of these varieties were accepted by farmers more than varieties like Annapoorna, Thriveni, Jyothi etc. which were released decades back. This warrants the evolution of need based, region specific, farmer choice varieties by the University.

ii. *Use of hybrid rice technology to local farming situation.*

In 2002-03 the area under high yielding varieties was 2.51 lakh ha. That means 81 per cent of the paddy area was covered under such variety. Even then the productivity is only 2162 kg/ha. The average productivity in China is 6436 kg/ha. It is due to wide spread adoption of hybrid rice technology. The possibility of application of hybrid rice technology can also be explored here in local farming situations.

iii. Use of biotechnology

In the context of a holistic agricultural development, the role of biotechnology is going to be of vital importance. It offers uncommon opportunities for improvements in genetic potential of plants. In paddy, biotic and abiotic stresses are production-inhibiting factors. So varieties suitable to overcome these factors should be evolved by making use of the latest developments in biotechnology.

iii. Water management

Agriculture is a profligate user of water. It takes twice as much water to produce rice than any other cereal crop. More than five tonnes of water is needed to grow one kilogram of rice.

Ensure season wise planning for irrigation. Water users groups must be organized for the maintenance of irrigation and drainage channels and for the rational use of water by all farmers.

iv. Seed multiplication

Good quality seeds preferred by the farmers preferred seeds should be produced and distributed. A separate agency should be established for production and distribution of seeds based on demand.

v. Package for Kuttanad and other problem areas

Extension of area of cultivation, supply of free electricity, provision of pumping subsidy and additional income generating activities should form the special package for rice production in these areas to be implemented by the Government of Kerala.

vi. Value addition and product diversification

Research and development activities exploring the possibilities of product diversification and value addition should be undertaken by Kerala Agricultural University.

vii. Paddy procurement agency

Farmer's societies should be formed for procurement of paddy at a reasonable price. The existing procurement agencies should be strengthened and proper monitoring mechanism for its functioning should be established.

viii. Effective extension activities

All development programs under the Kerala State Department of Agriculture should be implemented intensively to ensure that the paddy crop receives top priority. The farmers must be enabled to adopt cultivation practices in a systematic manner such as correct spacing, optimum number of plants per hill, integrated nutrient management and integrated pest management practices.

ix. Involvement of youth organizations

Training should be given to unemployed youth in appropriate farm mechanization. Existing agro service centers have to be equipped to serve as Custom – cum – Hire Service Centers for the farm machinery.

x. Identify untapped potential area.

Untapped potential areas like varieties with medicinal value, scented varieties etc. should be identified and suitable schemes have to be formulated. Research on evolving short duration scented variety should be undertaken.

xi. Organized marketing

Identify new market avenues for organic paddy especially pokkali rice, scented varieties, value added products and promotion of branded commodities.

xii. Development of upland rice

Suitable schemes should be formulated for the promotion of upland rice.

xiii. Easy credit

Credit facilities should be given in time and based on requirement at reasonable interest rate.

xiv. Strengthen group farming activity

Revitalize the existing group farming samithies. They should be entrusted with not only cultivation but also procurement, processing, value addition and marketing.

4.6.3.Tapioca Based Farming System

4.6.3.1. Major causes for low economic performance in the tapioca based farming system

It is evident from the Table 55 that the conversion of land to more remunerative horticultural crops was ranked first among the causes for the low economic performance in the tapioca based farming system. The lowest rank was obtained for pest and disease problem.

Table.55. Major causes for low economic performance prioritized in the tapioca based farming system

Sl. No.	Causes	Rank
1.	Conversion of land to more remunerative horticultural crops	I
2.	Lack of suitable land for tapioca cultivation	II
3.	Non availability of quality planting materials	III
4.	Lack of industrial and marketing support	IV
5.	Lack of processing and value addition	V
6.	Inadequate extension support	VI
7.	Presence of toxic substances	VII
8.	Pest and disease problem	VIII

4.6.3.2.Strategies prioritized for the tapioca based farming system

The strategies presented in the Table 56 indicated that the first rank was obtained for enhancing productivity and the lowest rank was for the practical application of tissue culture technology.

Table. 56. Strategies prioritized in the tapioca based farming system

Sl. No.	Strategies	Rank
1.	Enhancing productivity	I
2.	Multiplication and distribution of quality planting materials	II
3.	Diversification and value addition	III
4.	Exploitation of cassava as an industrial crop	IV
5.	Evolving suitable early maturing varieties which has industrial application	V
6.	Practical application of tissue culture technology	VI

4.6.3.3. Major strategies

i. Nursery for field multiplication of planting material

Disease free stems have to be collected after the harvest of the crop and good quality planting materials should be made available to the farmers in adequate quantity and in time.

ii. Good Agricultural Practices (GAP)

Short duration high yielding varieties, correct spacing, proper management, practices, balanced supply of inputs etc. should be popularized in tapioca cultivation.

iii. Diversification and value addition.

Cassava starch has got high viscosity which enables its use as a binding material in pellet fish feeds. Use of granulated cassava starch as a solidifying agent in plant tissue culture media, biodegradable plastic etc. should be promoted. This will be helpful in augmenting domestic demand.

iv. Promotion of intercrops

Short duration legumes like bunchy variety of ground nut and vegetable cowpea are found to be ideal inter crops of tapioca. Multiple cropping systems have been developed for low land and upland. Amorphophallus is an ideal inter crop for coconut garden besides banana. For single crop paddy fields, rice followed by short duration tapioca is profitable. These practices should be propagated among the cultivators by the Department of Agriculture.

v. Field sanitation

Compulsory roguing of infected plants and destroying them are found to be effective in reducing the disease incidence and its further spread. Efforts are to be taken to mark the infected tapioca plants in farmer's fields with black/yellow paint to eliminate such plants from being used for subsequent propagation.

Importance of using healthy, virus free planting materials against cassava mosaic disease has to be stressed and the healthy nursery program is recommended in disease prone area.

vi. Tissue culture technology

Tissue culture protocols are available for all tuber crops as well as for disease elimination. This should be popularized.

vii. Post harvest utilization

Important post harvest technology in cassava include the production of alcohol, cassava starch based biodegradable plastic, cold water soluble

starch from cassava, extraction of starchy flour, cassava as animal feed, cassava starch factory waste as poultry feed etc. These should be promoted by the Central Tuber Crops Institute, Kerala Agricultural University and the State Department of Agriculture.

viii. Research

Evolving short duration, low HCN cassava varieties with good qualities and with high yield for consumption purpose, evolving high yielding, high starchy varieties for industrial areas should be the priorities in genetic research in cassava.

Developing low cost diverse technologies for producing value added products should be emphasized.

4.6.4. Homestead Based Farming System

4. 6. 4.1. Major causes for low economic performance in the homestead based farming system

The major causes presented in the Table 57 revealed that the first rank was obtained for wrong choice of crops and the lowest rank was for lack of recognition of homestead as a production unit.

Table. 57. Major causes for low economic performance prioritized in the homestead based farming system

Sl. No.	Causes	Rank
1.	Wrong choice of crops	I
2.	Over crowding of crops	II
3.	Lack of individual attention to crops	III
4.	Lack of balanced nutrient supply	IV
5.	Lack of recognition of homestead as a production unit	V

4.6.4.2. Strategies prioritized in the homestead based farming system

It is evident from the Table 58 that the first rank was obtained for adoption of integrated resource based farming system with due people's participation among the strategies and the lowest rank was for the promotion of organic farming.

Table. 58. Strategies prioritized in the homestead based farming system

Sl.No.	Strategies	Rank
1.	Adoption of integrated resource based farming system with due people's participation	I
2.	Product diversification and value addition and agro processing	II
3.	Production and distribution of high quality planting materials.	III
4.	Effective extension techniques	IV
5.	Promotion of organic farming.	V

4.6.4.3. Major strategies

i. Adoption of integrated resource based farming system with due peoples participation

Integrating inter/mixed/multiple/multi storied cropping / milch animals/ poultry/fish etc. depending upon the farmer's choice and conditions should be attempted.

ii. Effective extension methodologies

For selection of crops, cultivation practices, cropping intensity, balanced nutrient supply, integrated pest and disease management etc. effective participatory extension methodologies have to be adopted.

ii. Promotion of organic farming

Proper organic residue management will provide adequate nutrients. This provides sustainable income throughout the year, generates employment for the farm families and improves soil health due to addition of all bio masses produced in the farm. This will also reduce the cost of production. Hence organic farming has to be nurtured in the homestead based farming system.

iii. Formation of Self Help Groups (SHG)

By organizing of Self Help Groups, activities like product diversification, value addition, production and distribution of quality planting materials, promotion of village level marketing, quality awareness etc. could be facilitated.

iv. Promotion of horticultural crops

Diversification to horticultural crops has been found to be good, as these crops not only give more profit, generate additional employment for rural masses, conserve natural resources but are also adapted to a wide range of climate and produce higher biomass than field crops per unit area. The post harvest management of horticultural crops has been given more emphasis in the tenth plan strategy. This will help in product diversification and value addition which yield additional income to farm families. This provision in the Tenth Five Year Plan should be capitalized by the Government of Kerala for the benefit of the predominant homestead farmers in the State.

4.6.5.Organizational Efficiency

4.6.5.1. Causes for low organizational efficiency in the extension organization

It is evident from the data furnished in Table 59 that lack of commitment and accountability was ranked first among the causes for the low organizational efficiency of the extension personnel in the State Department of Agriculture. The lowest rank was obtained for self oriented rather than client oriented attitude of extension personnel.

Table.59. Causes prioritized for low organizational efficiency in the extension organization

Sl. No.	Causes	Rank
1.	Lack of commitment and accountability	I
2.	Lack of guidance and supervision	II
3.	Lack of decision making ability	III
4.	Procedural delays	IV
5.	Lack of achievement motivation	V
6.	Paucity of funds	VI
7.	Lack of facility and resources	VII
8.	Absence of team spirit	VIII
9.	Self-oriented rather than client oriented attitude of extension personnel	IX

4.6.5.2. Strategies for Organizational efficiency

The strategies presented in the Table 60 indicated that the first rank was obtained for better management / administrative system and the

lowest rank for delegation of powers and create good working environment.

Table. 60. Strategies prioritized for Organizational efficiency

Sl.No.	Strategies	Rank
1.	Better management / administrative system	I
2.	Reorientation of extension services	II
3.	Client orientation	III
4.	Orientation / in service training	IV
5.	Avoidance of superfluous political interference	V
6.	Delegation of powers and create good working environment	VI

4.6.5.3. Major strategies

i. Better Management / Administrative system.

The technical division under the Department of Agriculture should be revamped and integrated planning should be adopted. It is suggested that manuals, job charts etc. have to be drawn up on the basis of well thought out norms and prescriptions.

ii. The extension services need a thorough reorientation with interactive support from the government in the following areas.

a. Staffing and training

b. Co-ordination between Panchayat and Line Departments etc.

c. Monitoring and evaluation.

iii. Client orientation

The syllabi of agricultural courses in Kerala Agricultural University have to be thoroughly revised to fit in with the changing agricultural scenario and to facilitate client orientation in the Agricultural Extension Organization of the Government of Kerala.

iv. Revamping the extension system

The Directorate of Extension of the Kerala Agricultural University and the Kerala State Department of Agriculture shall have due co-ordination for the conduct of orientation / in service training programs to refresh the officials of the Department. Separate funds have to be earmarked by the Department for orientation training and conduct of regular follow up trainings.

v. Delegation of powers

Specific delegation of powers, providing ample amenities and incentives to be thought of jointly by the Department and the Kerala Agricultural University. Promotion policies, transfer policies etc. have to be pre-determined and made transparent and accountable.

vi. Establishment of Centers for Advance Studies (CAS)

This type of centers should be formed to undertake advanced teaching, research and extension activities in sunrise fields of agricultural technology.

vii. Agricultural human resource development

A comprehensive project has to be formulated to enable agricultural human resource development to modernize the agricultural education and extension system in the State. This includes training scientists in various disciplines at international levels. Linkages with the advanced research teams elsewhere in the world has to be fostered to improve the quality of Agricultural Research and Extension.

4.6.6. General Strategies

4.6.6.1. Extension strategies

i. Holistic extension service

A holistic rural extension, which integrates farms and non-farm enterprises, would bring about the much-desired phase of growth in the agricultural sector and rural development. It will be the roadmap to rural transformation in the new World Trade Order.

Special emphasis should be given to eco-friendly technologies, integrated farming system, precision farming technologies, value-addition at farm level, micro credit system, collective marketing and development of basic infra-structure on a co-operative basis.

The extension system should be re-oriented to meet the needs of 'information hungry' farmers, especially the educated women and youth engaged in farming. IT application in agriculture have to be broad based and propagated among the farmers.

Setting up of 'rural knowledge banks' with a network of computers in various clusters of villages form the foundation of a meaningful holistic rural extension system. This will pay way for generation of more jobs and more income in the rural areas.

The Gandhian Philosophy of ''production by the masses'' should be intended to ''processing by the masses using industrial hygiene'' to use in sustainable agrarian prosperity. 'Institutional pluralism' to provide services to farmers in the Government, NGO and private sectors has to be advocated and regulated appropriately.

ii. Dual agricultural extension system.

"Blanket extension approach" to all situations irrespective of the location and categories of farmers will not be an appropriate, successful, and sustainable one in the long run. Experience shows that it is not only

technologies which have to be relevant to fit into the agro-climatic and socio-economic conditions of the farmers but also the extension approaches and methodologies. The ideal extension system which takes care of sustainable agriculture, global competitiveness, integrated land use pattern, subsistence farmers, broad based agricultural development and privatization of extension services. In addition, it should have the special features like participatory, bottom-up, interactive, self-sustainable, and accessible to different clientele and accomplishing goal in food front.

iii. Target oriented extension approach

In Kerala, majority of the holdings belongs to marginal farmers (94 per cent) i.e. below one hectare. Among them below 0.5 ha contribute 90 per cent and the rest four per cent is between 0.5 to 1 ha. The average size of holding in this case is 0.15 ha. So each farmer may not be able to arrange all agricultural activities by himself. There needs to be some co-ordinated group activity by bringing together 100 to 200 farmers as one group. All the innovations in this sector like new promising crops, technology etc. should be brought in by these groups together.

Agricultural development programs should be based on size of holding and not crop oriented i.e. a farmer's holdings / group of farmer holding should be taken as a unit and programs for the holistic development of the unit should be chalked out in a phased manner covering all the marginal farmer groups in the first phase. They should be provided with sufficient financial assistance as subsidy to the extent of 50 per cent.

It is better to give attention to less number of farmers with more area than more number of farmers with lesser area. In Kerala, 98 per cent of the holdings are below two hectare. Of this only eight per cent of the holdings are covering thirty six per cent of the cultivated area. The holding size ranges between 0.5 to 2 hectare. It is more economic to concentrate on this section of farmers by adopting suitable crop improvement programs.

It is also inevitable to promote the large chunk of the farmers having holding size below 0.5 hectare. This constitute thirty nine per cent of the total cultivated area and ninety per cent of the holdings in Kerala. Special package needs to be formulated for this major section of farmers. It is by organizing the farmers on the SHG model and promote farming activities in following ways.

Self Help Group is to be formed based on holding size. Farmers having cultivated area up to twenty-five cents are grouped under one category. Those having the area between 26 to 50 cents and 51 cents to 1.25 acres should be categorized in separate groups. It is better to form groups involving 10 to 20 farmer members in each category.

iv. Market – led extension

A well established market center should be developed in each Panchayat with farmers co-operation. In these markets, farmers and traders can directly involve in the process of buying and selling and the farmer should get a premium price for his product.

Cropping systems can be developed through buy back arrangement with processing units / exporters.

The scope of high income crops like vanilla, safedmusali, medicinal plants etc. should be studied in depth for cultivation and marketing.

v. Extension centers

This can be taken up by enterprising young professionals with the help of good training infrastructure and Information Communication Technology (ICT) network. This should aim at filling all the gaps found in the present system. This should be promoted jointly by the village panchayat and the Department of Agriculture. These centers should cater to the urgent needs of the farmers and provide necessary infrastructure facilities for improving the farming situation.

Farmers welfare activity should be started and propagated through these center in each Krishibhavan (KB) by providing scholarships to the wards of best farmers selected in the KB (at least 10 in each KB at a total cost of Rs. 50,000/-).

Insurance cover should be provided to all cultivated crops and allied activities. These centers can provide timely information in this regard to the farmers.

vi. Meeting WTO challenges

Necessary steps needs to be taken for meeting the standards of Sanitary and Phyto Sanitary Measures (SPM) on agricultural commodities. This should be undertaken by proper awareness and quality improvement campaign among farmers.

Pest monitoring can help in improving the export of fresh fruit to countries like USA.

Standardising the techniques and educating the growers about the special post harvest treatments such as Vapour Heat Treatment (VHT) of fruit for disinfections for exporting to countries like Japan, EU and USA.

Standardisation of protocols for pest surveillance and adherence of uniform package of practices need to be hastened for improving the exports.

vi. Emphasis on organic farming

There is a need to promote organic farming in the production of different horticultural commodities with the objectives of promoting exports and improving returns. There is an urgent need to develop technologies for organic farming and create awareness on the benefits it provides. This calls for standardization of technologies for producing vermi-compost, biofertilizers, mycorhizae and bio pesticides for different crops. There is also need to develop guidelines for this purpose and

designate agency/agencies for accreditation of such produce for meeting international requirements.

Currently, organic spices share is 1 to 1.5 per cent of the global spice market. It is forecast that by 2006, there would be a five-fold increase in organic spice market all over the world.

India, especially Kerala with intrinsic quality of spices grown in wide agro ecological regions and low per capita consumption of fertilizers and pesticides can be easily exploit the organic sector.

4.7 EMPIRICAL MODEL OF THE STUDY

The empirical model of the study showing the observed relationship between the dependent variable, economic performance and independent variables is presented in Fig. 15.

Results of the correlation analysis revealed that economic performance influenced innovation proneness, economic motivation, market perception market behaviour, market intelligence and market demand.

The percentage contribution of the organisational efficiency dimensions towards discrimination between the low and high clusters is also seen. It reveals that the dimensions viz., achievement motivation, decision making ability, facility and resources and guidance and supervision were contributing more than 10 per cent to the difference of low and high cluster.

Table. 61 . Extension strategies in the context of changing agricultural situation in Kerala

Farming system	Causes	Strategies	Solutions
Coconut based farming system	Lack of proper management Lack of irrigation system Price fluctuation Lack of organized marketing Non-availability of sufficient quality planting materials High wage rate High Cost of cultivation Labour insufficiency Lack of Value addition Pest and Disease complex	Comprehensive coconut development program Productivity and quality Labour bank Fully autonomous market network system Increasing Farm level income Need based research on value addition Policy measures Pest and Disease surveillance system	Coconut producers society community based organization crop cafeteria Replanting and reservation production of quality planting materials Micro irrigation Integrated farming Organic farming Product diversification product promotion Awareness campaign, training Organized small scale processing units
Rice based Farming system	Small land holdings Negligence of the system High wage rate low labour productivity Non availability of timely labour Lack of acceptance about new technology Non-availability of inputs in time Lack of irrigation facilities	Identification of most suitable varieties for each agroclimatic region Use of hybrid rice technology Water management Use of biotechnology Production improvement program Identify high potential areas and prohibit irreversible conversion of	Group farming, quality seeds production, cultivation in absentee land

	Inadequate power supply Non-availability of organic manure	land by legislation. Special package for Kuttanad Training both extension functionaries and farmers in scientific management practices Promotion of integrated pest and nutrient management and organic farming.	Possibility of increasing number of crops
Tapioca based farming system	Conversion of land to more remunerative horticultural crops Non-availability of quality planting materials Lack of industrial and marketing support Lack of processing and value addition In adequate extension support Pest and disease problem	Enhancing productivity Multiplication and distribution of quality planting materials. Diversification and value addition Exploitation of Cassava as an industrial crop Evolving suitable early maturing varieties which has industrial application	
Homestead based farming System	Wrong choice of crops Over crowding of crops Lack of individual attention to crops Lack of balanced nutrient supply Lack of recognition of homestead as a production unit	Adoption of integrated resource based Farming system with due people's participation Product diversification and value addition Production and distribution of high quality planting materials Effective extension techniques Promotion of organic farming	

Organizational efficiency	**Lack of commitment and accountability** Lack of guidance and supervision Lack of decision making ability Procedural delays Lack of achievement motivation Paucity of funds Lack of facility and resources Absence of team spirit Self-oriented than client oriented	**Better management/administrative system** Re-orientation of extension services Client orientation Orientation Orientation/In service training Delegation of powers, create good working environment	

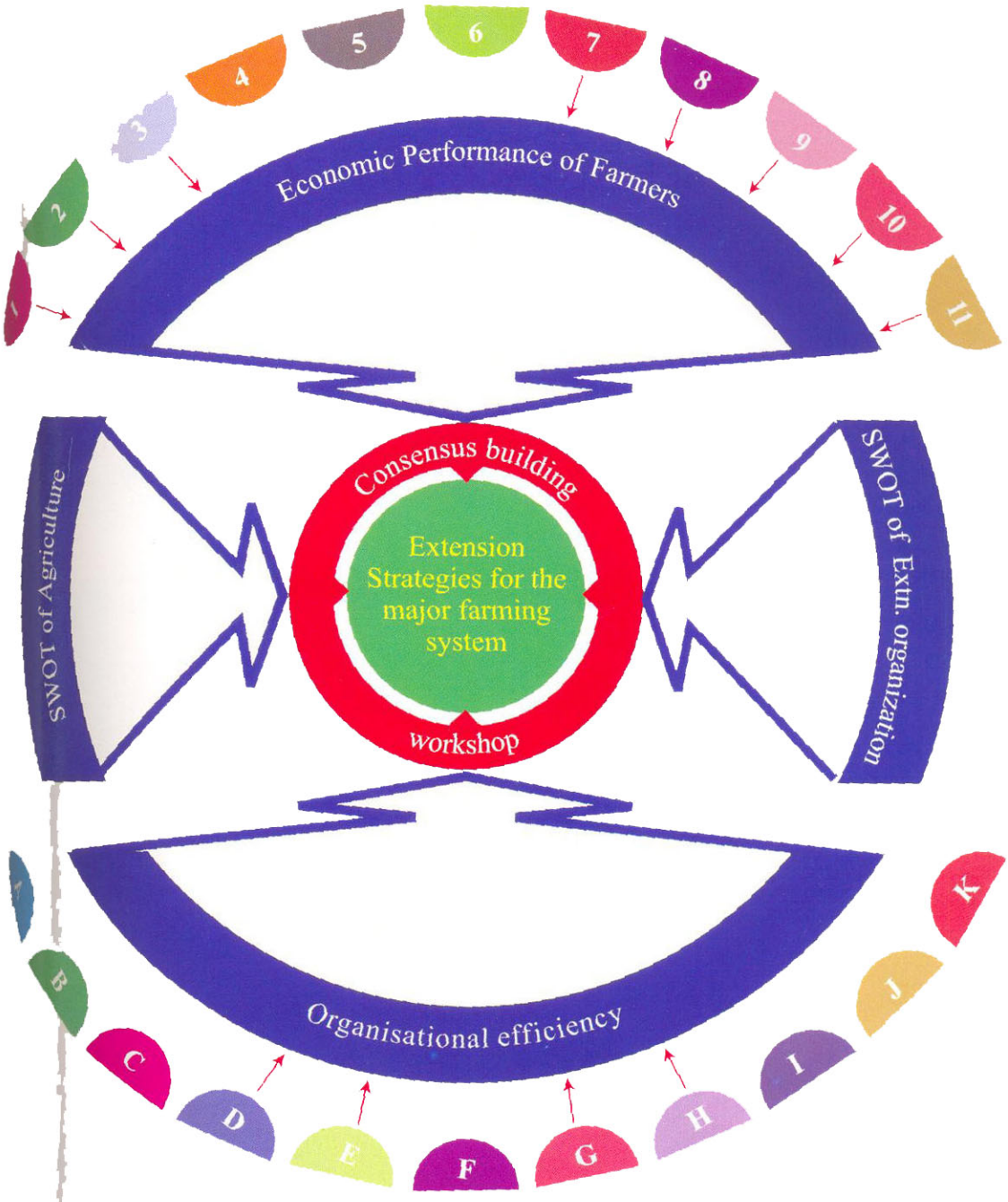


Fig.14.EMPIRICAL MODEL OF THE STUDY

Index

A. Job autonomy
B. Job Satisfaction
C. Job involvement.
D. Achievement motivation
E. Decision making ability
F. Organisational involvement
G. Facility and Resources
H. Guidance and Supervision
I. Organisational commitment
J. Job perception
K. Job performance

1. Innovation proneness
2. Sustained profit
3. Economic motivation
4. Diversification of activities
5. Effective supply of inputs
6. Productivity
7. Information backstop
8. Market perception
9. Market behaviour
10. Market intellegence
11. Market demand

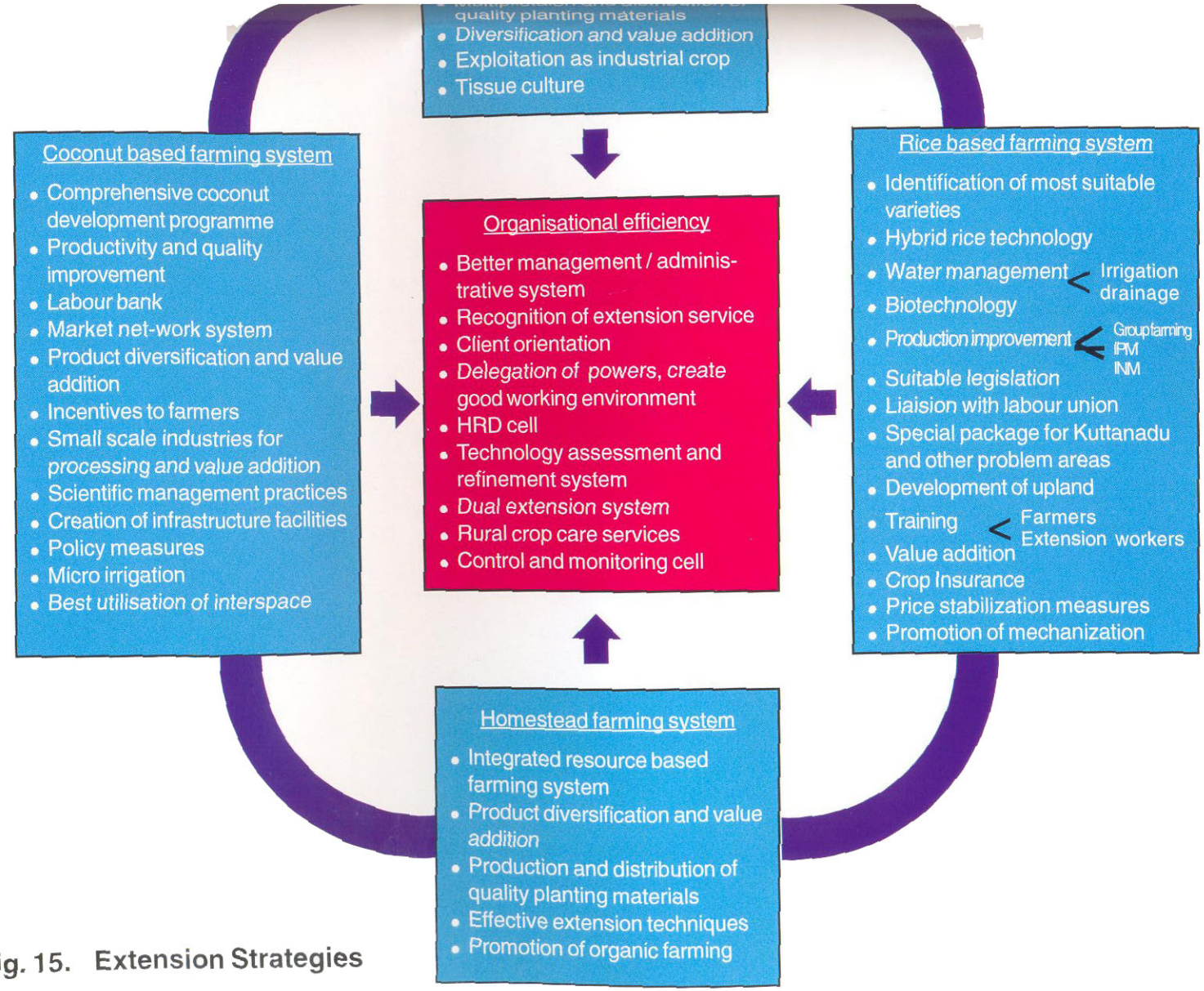


Fig. 15. Extension Strategies

SUMMARY

5. SUMMARY

Kerala agriculture is marked by the existence of a series of agricultural micro-environments suited to different kinds of mixed farming and by a large proportion of perennial crops in total agricultural output. In this era of trade liberalization in farm products, as a result of the implementation of the Agreement on Agriculture (AoA) of the World Trade Organization from 1995 onwards, Kerala's agricultural products have experienced a price crash of unprecedented proportions. The brunt of this crisis has been borne by cultivators belonging to the small and marginal farmer category who constitute a major segment of the rural workforce. Though various reports, studies and commissions have analyzed this problem, no scientific studies at micro level have so far been taken up to systematically analyze the problem and suggest solutions for the same. Moreover, an agro-climatic region wise farming system-based study would provide more realistic and meaningful information, which will help the planners, administrators and other development personnel for chalking out future program in this direction. Considering these, the present study was taken up with the following objectives.

1. To assess the impact and implication of the economic reforms in agriculture on of the economic performance of farmers.
2. To analyze the SWOT of agriculture in Kerala.
3. To identify and analyze the SWOT of extension organization in the State Department of Agriculture, Kerala.
4. To delineate the dimensions of organizational efficiency in the State Department of Agriculture, Kerala.
5. To develop an extension strategy in the context of the changing agricultural situation in Kerala.

For assessing economic performance, farmers were selected from all the five NARP regions of the state namely, the Northern, Central, High Range Zone, Special Zone and the Southern Zone. Sixty farmers were selected from each zone based on the major farming systems (fifteen each to represent each farming system namely coconut based, rice based, tapioca based and homestead based) as respondents. Cantrill's self –anchoring striving scale was used for the purpose. Data were collected during 2003.

For SWOT analysis, the Delphi Method – elicitation of SWOT of agriculture in Kerala as well as extension organizations in the State Department of Agriculture through three rounds of data collection – was used. The respondents included scientists, extension personnel, experts and farmers. Sixty respondents were selected for the purpose. These data were collected during 2004.

For delineation of dimensions of organizational efficiency 90 extension personnel were identified from the sampling area. They included 15 each of Deputy Director of Agriculture, Assistant Director of Agriculture, Agricultural Officers and 45 Agricultural Assistants.

Data regarding the economic performance, SWOT, and organizational efficiency were collected from the farmers, stakeholders and extension personnel using a pre-tested structured questionnaire in Malayalam and English.

The statistical tools used were namely Mean, ANOVA, Simple Correlation, Paired 't' test and Discriminant Function Analysis.

The salient findings of the study are summarized as follows.

5.1. IMPACT AND IMPLICATION OF THE ECONOMIC REFORMS IN AGRICULTURE ON THE ECONOMIC PERFORMANCE OF FARMERS.

5.1.1.Economic Performance among the Major Farming Systems and the NARP zones.

Economic performance of farmers among major farming systems were low during the reference period II than the reference period I. The low performance resulted in the decreasing order as tapioca based farming system, coconut based farming system, rice based farming system and the homestead based farming system. Among the NARP zones low economic performance during the same period were in the order of Central Zone, Southern Zone, Northern Zone, Special Zone and the High Range Zone.

In the Northern Zone, the low economic performance among the farming systems was in the decreasing order as coconut based farming system, rice based farming system, homestead based farming system and tapioca based farming system. The low economic performance in the Central Zone was in the order of rice based farming system, tapioca based farming system, homestead based farming system and the coconut based farming system. For High Range Zone, the low economic performance was in the order of homestead based farming system, coconut based farming system, tapioca based farming system and the rice based farming system. The low economic performance in the Special Zone was in the order of tapioca based farming system, rice based farming system, coconut based farming system and the homestead based farming system. For the Southern Zone, the low economic performance was in the order of tapioca based system farming system, coconut based farming system, rice based farming system and the homestead based farming system.

5.1.2.Economic Performance of Individual Crops among the Farming Systems and the NARP zones.

In the Northern Zone, coconut has obtained the lowest economic performance than the other crops. It was followed by arecanut, tapioca, paddy, and banana.

In this region, in the coconut based farming system, low economic performance among major crops were in the order of pepper, areca-nut, coconut etc. In the rice based farming system, paddy obtained the least economic performance. For the tapioca based farming system and the homestead based farming system there is no striking difference in the economic performance of crops. Banana and tapioca exhibited same level of economic performance in both the reference periods.

In the Central Zone, the low economic performance among crops were in the order viz., coconut, arecanut, pepper, rubber and paddy. Among individual crops paddy obtained low economic performance in homestead based farming system. For coconut, the lowest economic performance was in the rice based farming system. For pepper, it was in the homestead based farming system. Banana has recorded better performance in the homestead based farming system during the reference period-II than the reference period-I.

In the High Range, the lowest economic performance was obtained by coconut. This was followed by coffee, pepper, arecanut, cocoa and rubber. Paddy and tapioca recorded better performance during the reference period II than the reference period I. In the coconut based farming system the lowest economic performance was obtained for paddy. For coconut and rubber the lowest economic performance was obtained in the rice based farming system during the period – II. In the tapioca based farming system, the lowest economic performance was obtained for pepper

and in the homestead based farming system, arecanut obtained the lowest economic performance.

In the Special Zone, low economic performance was seen in coconut among major crops. The performance of tapioca was better during the reference period II than the reference period I. The economic performance of paddy was the lowest in tapioca based farming system when compared to other systems. For coconut and pepper the lowest economic performance was obtained in the homestead based farming system, for banana and rubber lowest economic performance was in the coconut based farming system. The performance of tapioca was almost at the same level in all the farming systems.

In the Southern Zone, the performance of pepper was the lowest among major crops. Among farming systems, the performance of banana was almost at the same level in all farming systems and for paddy the lowest economic performance was observed in the coconut based farming system. For coconut and rubber the lowest economic performance was in the homestead based farming system and for pepper lowest economic performance was obtained in the tapioca based farming system. The performance of tapioca was better during the period II than the period I and was high in coconut based farming system when compared to other systems.

5.1.3. Economic Performance among the Categories of Farmers and the NARP zones

With respect to the various categories of farmers low economic performance was seen in all the five NARP zones. The performance of farmers in the High Range Zone was the least when compared to others. Among the categories, the economic performance of large farmers were the least in all the zones except in High Range Zone. Here the economic performance of small farmers were least when compared to other categories.

5.2. COMPONENTS OF ECONOMIC PERFORMANCE.

The farmers in homestead farming system possessed high innovation proneness when compared to other systems. Among the zones the high innovation proneness was seen in the Special Zone. Farmers in the coconut based farming system were having higher level of economic motivation than the other systems. Sustained profit was high in the homestead based farming system. Among the farming systems, the lowest productivity in crops like paddy, pepper and rubber was observed in the coconut based farming system, coconut and banana in the tapioca based farming system and tapioca in the homestead based farming system. In diversification of activities farmers in the coconut based farming system were having higher level than others. Information backstop was high in the tapioca based farming system. With regard to effective supply of inputs there was no significant difference among the farming systems. Farmers in the tapioca based farming system had higher level of market perception, market behaviour and market demand. Market intelligence was high in the homestead based farming system.

5.3. RELATIONSHIP OF ECONOMIC PERFORMANCE WITH INDEPENDENT VARIABLES.

Among the farming systems, the variables such as innovation proneness, economic motivation, information backstop, market perception, market behaviour, market intelligence and market demand had significant and positive association with economic performance.

5.4 INTER CORRELATION OF THE INDEPENDENT VARIABLES AMONG THE MAJOR FARMING SYSTEMS.

In the coconut based farming system, information backstop had significant relationship with market perception, market demand and innovation proneness. The components such as market demand with effective supply of input and market perception; market intelligence with

diversification of activities and market behaviour had significant relationship.

In the rice based farming system, information backstop had significant relationship with innovation proneness, economic motivation, sustained profit, effective supply of inputs and market behaviour.

In the tapioca based farming system, sustained profit with effective supply of inputs, information backstop, market perception and market intelligence had significant relationship.

In the homestead based farming system, innovation proneness had significant relationship with economic motivation, effective supply of inputs and market perception. Market intelligence had significant relationship with effective supply of inputs, information backstop, market perception, market behaviour and innovation proneness.

5.5. SWOT ANALYSIS OF AGRICULTURE IN KERALA.

Plant diversity, diversified physiography, progressive and highly literate farmers, rich natural resource and biodiversity were found to be the top ranking elements of strengths. Fragmented and uneconomic holdings, low value addition process, highly fluctuating and unrewarding price regime, predominant labour problem, preponderance of small and marginal farmers, post harvest losses, lack of infrastructure facilities, high wage rate and low labour productivity, lack of organized marketing were the elements of weaknesses ranked high by the respondents. Untapped export potential in sectors such as value addition, food supplements, popularize and make use of brand name for agricultural commodities, diversification of activities, human resource development, use of information and communication technology, utilization of local resources, technology upgradation, utilization of new and under utilized crops and promotion of organic farming were the top ranking elements of opportunities. The elements of threats ranked high by the respondents

were deforestation, rapid soil erosion, slow adoption of quality culture, globalization of Indians agriculture and WTO, farming risk in the form of pest and diseases, sanitary and phytosanitary measures, IPR regime etc.

5.6. SWOT OF EXTENSION ORGANIZATIONS IN THE STATE DEPARTMENT OF AGRICULTURE.

The high ranking strengths were grass root level extension functionary offices, reasonably well structured organizational set up, human resource, reasonably good laboratory and infrastructure facilities for testing seed, fertilizer, soil etc, Padasekhara samithies, farmers groups and training centers. Dual administrative control lack of HRD mechanism, insufficient infrastructure facilities, no continuity of development schemes were the top ranking elements of weaknesses. The opportunities ranked high were market oriented extension with emphasis on export and import, strengthening information communication technology, gearing up to face the challenge raised by globalization by shifting the thrust towards high-tech agriculture, exploit potential of watershed based development system and consultancy service. Conversion of arable land to non-agricultural purpose lack of commitment among extension personnel, globalization necessitated changes in the concept of conventional agriculture, restrictive funds from governments, absentee land owners and rising pest and disease problem were found to be the high ranking elements of threats of extension organizations in the state department of agriculture.

5.7 ORGANIZATIONAL EFFICIENCY OF STATE DEPARTMENT OF AGRICULTURE

The high efficiency cluster included 15 per cent of the respondents. Sixty eight per cent of respondents were in medium cluster and the low efficiency cluster was only 17 per cent.

Job perception, guidance and supervision and job performance were found to be high in the high efficiency cluster. In the medium cluster job

perception, achievement motivation and job performance were ranked in the first three positions. Job perception, job performance and organizational commitment were having first three ranks in the low efficiency cluster.

6. CONSENSUS BUILDING WORKSHOP

The results of economic performance of farmers, SWOT analysis of agriculture in Kerala as well as extension organizations in the state department of agriculture and organizational efficiency were discussed in the consensus building workshop. The causes for the problems and draft strategies were discussed among participant groups. Finally, consensus was arrived on the strategies for the farming systems and extension organizations in the state department of agriculture.

7. EXTENSION STRATEGIES

7.1. Coconut Based Farming System

The causes for low economic performance viz., lack of proper management, lack of irrigation system, price fluctuation, lack of organized marketing system, non-availability of sufficient quality planting materials were ranked top in the consensus building workshop.

Comprehensive coconut development programme, productivity and quality, labour bank at panchayat level, fully autonomous market system, need based research on value addition were the strategies ranked high among the participants of the consensus building workshop.

7.2. Rice Based Farming System

Small land holdings, negligence of the sector, high wage rate, non-availability of timely labour, non availability of inputs, lack of irrigation were the causes ranked high by the participants.

The strategies viz., identification of most suitable varieties for each agroclimatic regions, use of hybrid rice technology, water management,

use of biotechnology were placed in top position in the consensus building workshop.

7.3.Tapioca Based Farming System

The causes ranked in high position in the consensus-building workshop were, conversion of land to more remunerative horticultural crops, lack of suitable land for tapioca cultivation, non availability of quality planting materials, lack of industrial and marketing support etc.

Enhancing productivity, multiplication and distribution of quality planting materials, diversification and value addition, exploitation of cassava as an industrial crop were the top ranking strategies in the tapioca based farming system.

7.4. Homestead Based Farming System

Wrong choice of crops, over crowding of crops, lack of individual attention to crops, lack of balanced nutrient supply, lack of recognition of homestead as a production unit were top ranking among the causes.

The strategies adoption of integrated resource based farming system with due peoples participation, products diversification and value addition and agro processing, production and distribution of high quality planting materials, effective extension techniques, promotion of organic farming were ranking in the decreasing order of importance by the participants.

7.5.ORGANIZATIONAL EFFICIENCY

The causes for low organizational efficiency, lack of commitment and accountability, lack of guidance and supervision, lack of decision making ability, procedural delay, lack of achievement motivation, paucity of funds and lack of facility and resource were ranking high by the participants.

Better management system, reorientation of extension services, client orientation, in service training, avoidance of superfluous political

interference and delegation of powers were the top ranking strategies for organisation efficiency.

7.6. SUGGESTED LINES OF FUTURE RESEARCH

1. Research studies on economic performance of other farming systems viz., rubber based, plantation based farming system need to be initiated in the immediate future

2. Case studies have to be undertaken for the implication of liberalization on export-oriented crops especially spices and cashew.

3. Co-ordinated research projects involving a team of scientists with specialization in post harvest handling, processing and value addition need to be initiated.

4. Many myths prevalent in crop production in Kerala such as labour shortage, low labour efficiency and resistant to farm mechanization and the like have to be subjected to rigorous scientific valuation.

7.7. IMPLICATIONS OF THE STUDY

1. This study has convincingly demonstrated the effect of economic reforms in agriculture on the economic performance of farmers. Simultaneously, the existence of myriad and interrelated problems has also come to lime light. Efforts to boost the growth of agriculture sector must be based on farming system basis and their field level manifestations.

2. The methodology followed in the study for the identification of SWOT of agriculture in Kerala as well as extension organizations in the state department of agriculture, namely, the Delphi analysis has opened up new vistas in understanding of problems and for prediction based on consensus.

3. The results of economic performance, diversity of SWOT identified, their relative importance and their impact on crop yields in the five NARP regions and major farming systems also substantiate the need

for region specific, farming system based research and extension education program.

4. The findings on organization efficiency requires an effective extension mechanism in the State Department of Agriculture.

5. The consensus building workshop conducted in this study has paved way for the future researchers to follow the methodology for getting consensus in related issues.

6. The strategy proposed in the study also imply multifaceted considerations at the policy making level. This include conversion of paddy land, allocation of funds, labour bank, incentives to farmers, fully autonomous market system, post harvest loss, value addition and processing, insurance, remunerative prices for agricultural commodities have all policy implications for the concerned.

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APPENDICES

Appendix - I
Area, production and productivity of principal crops

Sl.No	Crops	Area (Ha)		Production (MT)		Productivity (kg/ha)	
		2001-02	2002-03	2001-02	2002-03	2001-02	2002-03
1	Rice	322368	310521	703504	688859	2182	2218
2	Pepper	203956	201037	58240	59744	286	297
3	Ginger	10706	10365	40181	39886	3753	3848
4	Turmeric	3558	3388	7895	7598	2219	2243
5	Cardamom	41336	44237	8380	6480	203	146
6	Arecanut	93193	92589	87681	92039	909	994
7	Banana	50871	51805	375903	379884	7389	7333
8	Cashewnut	89718	86623	65867	63287	734	731
9	Tapioca	111189	110297	2455880	2504391	22087	22706
10	Coconut	905718	905482	5479	5338	6049	5895
11	Coffee	84795	84139	66690	64425	786	766
12	Tea	36899	36821	66090	65800	1791	1787
13	Rubber	475039	476047	580350	594917	1222	1250

Source: Directorate of Economic and Statistics.
Economic Review 2004.

Appendix -II

KERALA AGRICULTURAL UNIVERSITY

Dr.R. Prakash,
Associate Professor.

Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvuananthapuram.695522
Phone. (O) 2384625
(R) 2468664

Dated:

Dear Sir/Madam

Sri. N.G. Balachandranath, Ph.D.Scholar of this department has taken up a research study on **"Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala"** under my guidance.

For studying the economic performance of the farmers and organizational efficiency of extension organization he has identified some of the variables based on the review of literature and discussion with experts. These are listed here along with their operational definition.

Considering your vast experience, I request you to offer your valuable rating about the relevancy of each variables for inclusion by putting a tick mark in the appropriate column. Kindly add any other variable, if considered appropriate, to the list with necessary comments. I would be thankful, if you can send the same to the student through the self addressed stamped envelope enclosed, at the earliest.

With regards,

Yours sincerely,

(Dr.R.Prakash)

Objective:

To assess the impact and implication of the economic reforms in agriculture on the economic performance of farmers.

Dependent variable:

Economic performance: For the study it is referred as the net income obtained from the crop enterprise to the farmer during the particular period.

Following are the independent variables. Please tick mark appropriate relevance category. Any addition, modification and deletion are welcome.

(MR – Most Relevant; R- Relevant ; LR – Least Relevant).

Sl. No	Particulars	MR	R	LR
1	**Economic motivation** It refers to the relative value placed by the farmers on economic ends.			
2	**Team spirit** Refers to the extent to which joint action behaviour is exhibited by group members through co-ordinated efforts to achieve common goals.			
3	**Sustained profit** It refers to the extent to which activities in the farm provides continued profit and monetary benefits to the farmer.			
4	**Productivity** It refers to the output from unit area cultivated.			
5	**Employment generation** Refers to the extent to which the activities of the farm can generate additional employment opportunity.			
6	**Innovative proneness** Innovative proneness refers to the keenness of the respondent in accepting new ideas and seeking changes in farming techniques and to introduce such changes into their farming operations when practical and feasible.			

7	**Risk orientation** Refers to the degree to which the farmer is oriented towards encountering risk and uncertainty in adopting new ideas in farming.			
8	**Entrepreneurial behaviour** Refers to the ability of the farmer to exploit opportunity and initiate activities to increase income from farming.			
9	**Knowledge in farming** It refers to the quantum of scientific information possessed by the farmer on crop production.			
10	**Scientific orientation** Refers to the degree to which the farmer is oriented to the use of scientific methods of decision making in farming.			
11	**Experience in farming** It refers to the total number of years the respondent has been engaged in farming.			
12	**Annual income** Refers to the total earnings of all the members of the family of the respondent for one year.			
13	**Farm size** Refers to the extent of area possessed by the respondent.			
14	**Credit orientation** Refers to the orientation to avail credit by respondent.			
15	**Effective supply of inputs**. It refers to the availability of critical production inputs like seeds, fertilizer, pesticides, irrigation water and credit in correct time and sufficient quantity.			
16	Diversification of activities Refers to the extent to which crop production activities are diversified to generate additional income.			

17	**Information backstop** It refers to the availability of facilities and opportunities to the member for updating of information regarding scientific cultivation of crops.			
18	**Co- operation from other departments** Refers to the timely assistance rendered by other development department for effective farming.			
19	**Risk compensation** It refers to the extent of assistance which are likely to receive for crop failure due to natural calamities, pest and disease attack and failure of new technology.			
20	**Incentives** Refers to the subsidies and assistance provided by Government and sponsoring agencies to motivate farmers.			
21	**Satisfaction** It refers to the degree to which the farmer achieve happiness with respect to farming operations.			
22	**Market demand** It refers to the capacity of the farmer to position the cultivation according to the market demand of the produce.			
23	**Market perception** Market perception referred to the capacity or tendency of an individual farmer to identify the market trend to sell the harvested produce for greater returns.			
24	**Marketing behaviour** It referred to the capacity or tendency of an individual farmer to identify the market trend to sell the produce for greater returns.			

25	**Market intelligence** Market intelligence was operationalised as the capacity of the respondent to seasoning, get alert, well informed and knowledgeable and independently performing the marketing of his farm produces.			
Name and address.				
Phone number: (O) (R)				

Objective:

To delineate the dimensions of efficiency of extension organization in Kerala.

Dependent variable:

Organizational efficiency:

It is defined as the capability of the organization in performing the tasks in the right and just manner to achieve the objective of the organization.

Following are the independent variables. Please tick mark the appropriate relevance category. Any addition, deletion and modification are welcome.

(MR – Most Relevant ; R – Relevant; LR – Least Relevant).

Sl. No	Particulars	MR	R	LR
1	**Job satisfaction** It is operationally defined as the result of various attitudes that the worker holds towards his job, towards related factors and towards life in general.			
2	**Job experience** It refers to number of completed years of services as extension personnel in the state department of agriculture.			
3	**Job performance** An individuals performance on the job is a joint function of his/ her individual personal characteristics and his/ her motivation to do a good job.			
4	**Job attraction** Job attraction refers to the extent of liking for the job as a whole.			

5	**Job involvement** It is defined as the degree to which a person is identified psychologically with his work or the importance of work in his total self-image.			
6	**Life satisfaction** Life satisfaction refers to feeling about life in general.			
7	**Educational status** It refers to the educational qualification acquired by the respondent.			
8	**Rural- Urban background** Rural- Urban background was operationalised to subsume aspects such as father's occupation, native place, place of education, interest in working in rural areas and cultivable land owned.			
9	**Attitude towards profession** It refers to the positive or negative affect of the extension personnel towards his profession.			
10	**Attitude towards farmers** Attitude towards farmers is operationalised as the positive or negative affect of the extension personnel towards farmers.			
11	**Self confidence** It refers to the feeling of an individual about his ability, initiative and zeal to achieve his goal or aim.			
12	**Self concept** Self-concept defined as a global evaluation made about one's own personality.			

13	**Achievement motivation** It refers to the value associated with an individual which drives him to excel in his activities and there by attaining a sense of professional accomplishment.			
14	**Job perception** It is the degree to which the employees perceive their performance with regard to the major goals and activities.			
15	**Training received** It is acquisition of knowledge and skills by the extension personnel which is characterised by pre-service and inservice training.			
16	**Job autonomy** It was operationalised as the degree to which the job gives the worker freedom, independence and direction in scheduling work and determining how the work has to be carried out.			
17	**Perceived work load** It was operationalised as the feeling of the officer towards his works assigned in the organisation within a specific time.			
18	**Technical competency** It refers to the extent to which the respondent possess knowledge on the various aspects of scientific agriculture.			
19	**Organizational commitment** Organizational commitment is an attitude that reflects an individuals identification with and attachment to the organization.			

20	**Organisational involvement** It refers to the sense of loyalty and psycological attachment of the individual towards his own organisation.			
21	**Guidance and Supervision** This refers to the regular guidance and supervision in technical matters, professional growth and timely advice to the extension personnel from the higher ups.			
22	**Facility and resources** This refers to adequate provision of facilities and resources to extension personnel for the efficient funcutioning of his job activities.			
23	**Variety of Job** The degree to which the job requires a variety of different activities so that the employee can use a number of different skill and talent.			
24	**Communication behaviour** Communication behaviour is operationalised as the summation of information input, processing, output and feed back.			
25	**Significance of job** The degree to which the job has a substantial impact on the lives or work of other people.			
26	**Initiative** It is defined as the capacity of person to come forward as his own to take up some activity.			

27	**Decision making ability** It is defined as the degree to which a incumbent justifies the selection of most effective means from among the available alternatives on the basis of scientific criteria for achieving maximum economic profit / organisational efficiency.			
28	**Risk taking ability** Risk taking ability is defined as the degree to which a person is oriented towards risk and uncertainty and have courage to face the problems encountered with organisation.			
29	**Interpersonal trust** It is defined as a reflection as to how a member of the organisation views other member in terms of faith and confidence.			
30	**Interpersonal communication** It is defined as the communication skill of member which helps the member to express their ideas in the organisation and in turn to know the ideas of other members.			
Name and address:				

Appendix-III

Selected independent variables of economic performance

Sl.no	Independent variables	Relevancy index
1	Innovation proneness	84.00
2	Economic motivation	87.65
3	Sustained profit	90.00
4	Productivity	90.00
5	Effective supply of inputs	88.67
6	Diversification of activities	84.00
7	Information backstop	82.61
8	Market perception	80.33
9	Market behaviour	86.61
10	Market intelligence	82.33
11	Market demand	80.66

Appendix-IV

Selected independent variables of organizational efficiency

Sl. no	Independent variables	Relevancy Index
1	Job autonomy	86.67
2	Job satisfaction	82040
3	Job involvement	83.00
4	Guidance and Supervision	81.00
5	Facility and Resources	81.30
6	Organizational involvement	82.03
7	Achievement motivation	81.00
8	Decision making ability	87.00
9	Organizational commitment	82.33
10	Job perception	86.67
11	Job performance	84.25

APPENDIX - V

No.CA-69-2003/DA.

Directorate of Agriculture,
Thiruvananthapuram, dt. 12.11.2003.

From

K.R. Jyothilal, IAS
Director of Agriculture.

To

The Principal Agricultural Officer,
Thiruvananthapuram/Alappuzha/Idukki/Trissur/Kozhikkode.

Sir,

Sub: Sri. N.G. Balachandranath, Ph.D. scholar – KAU – assistance for Conducting survey – reg.
Ref: Lr.dt. 28.10.2003 from Dr. R. Prakash, Associate Professor, Dept. of Agriculture Extension, College of Agrl. Vellayani, Tvm.

Sri. N.G. Balachandranath, Assistant Director of Agriculture is presently doing Ph.D. in the Department of Agricultural Extension at College of Agriculture, Vellayani. The topic of his research programme is "Extension strategies for major farming systems in the context of changing agricultural situation in Kerala".

He would like to undertake field level survey in the districts of Trivandrum Alappuzha, Idukki, Trissur, Kozhikkode among farmers and extension personnel.

You are requested to take necessary action to render all possible assistance to enable him conduct the survey in a fruitful manner.

Yours faithfully,

Director of Agriculture.

Copy to: Dr. R. Prakash, Associate Professor, College of Agriculture, Vellayani, for information.

Appendix -VI

KERALA AGRICULTURAL UNIVERSITY
DEPARMENT OF AGRICULTURAL EXTENSION
COLLEGE OF AGRICULTURE, VELLAYANI.

Extension strategies for the major farming systems in the context of changing agricultural situation in Kerala.

Interview schedule
(for farmers)
Part - A

Agril: block : District :
Krishibhavan : Development block :
Name of farmer : Panchayat :
Address :

1.**Age** :

2.**Educational qualification** :

3.**Cultivated area** :

Particulars	Area in acres			
	Owned	Leased out	Leased in	Total
Unirrigated				
Well irrigated				
Canal irrigated				
Total				

4.**Area under major crops** : (in acres)

Name of crops	Rainfed	Irrigated	Total

5.**Economic performance** :

Here is the picture of a ladder. Each step of the ladder re presents the economic performance of the crops in your farm. You have to place the intensity of economic performance of each crop separately in the appropriate steps of the given ladder and write the respective number in the box provided based on the following questions.

9	>75 %
8	51 – 75
7	
6	25 – 50
5	up to 25
4	neutral
3	less than 25
2	26 to 50
1	51 – 75
	>75

A. In the ladder where do you feel the economic performance of the crop stands during post mid nineties (1990- 1995)

Crops										
Response step number										

B. In the ladder where would you feel the economic performance of the crops stands during the pre- mid nineties (1996 – 2001).

Crops										
Response step number										

6.**Innovation proneness**

Indicate one statement out of the three that is most liked (ML) by you and another statement of the same that is least liked (LL) by you.

A. 1. I try to keep myself update with information on new farm practices but does nor mean that I try all new methods	.ML	L L
2. I feel restless till I try at a new farm practices I have heard about.		
3 .They talk of many new farm practices these days but who known whether new one are better than old ones.		

B. 1. From time to time I heard of several new farm practices and I have tried out most of them in the last year.	ML .	L L
2. I usually wait to see what result my neighbour obtain before I try out the new practices		

3. Somehow I believe that the traditional ways of farming are the best.		

C. 1. I am cautious about trying new practices.	.ML	L L
2. After all our forefathers were wise in their farming practices and I do not see any reason for changing those old methods		
3. Often new practices are not successful, however if they are promising , I would surely like to adopt them.		

7.**Economic motivation**

Please indicate your extent of agreement towards the following statements.

(SA- Strongly agree; A – Agree; UD – Undecided ; DA – Disagree; SDA – Strongly disagree).

Sl. No	Statements	SA	A	UD	DA	SDA
1	A farmer should work for better yield and economic return					
2	A farmer should try any new farming idea which may resulting in maximum income.					
3	A farmer should grow cash crops to increase monetary profit in comparison to growing of food crops for home consumption.					

8.**Sustained profit**

Please answer the following questions by putting tick mark in the appropriate column.

Sl. No	Statements	Yes	No
1	Do you agree that your income from farming has improved substantially for the last five years.		
2	Do you make continuous profit from 1990 – 1995 period.		
3	Do you think globalization can promote sustainable profit.		
4	Do you agree globalization has assured increased income continuously.		

9.**Productivity**

Please indicate whether the level of productivity of crops for the last five years have increased. YES / NO

If so give details.

Sl. No.	Crops	Increase / decrease (%)			
		<25	26 -50	51-75	>75

10.**Effective supply of inputs**

Please indicate the extent of availability of inputs for crop production.

(A – always: ST – sometimes: N –never ; CQ – correct quantity; CT – correct time)

Sl. No.	Inputs	A		SM		N	
		CQ	CT	CQ	CT	CQ	CT
1	Seeds						
2	Fertilizers and manures						
3	Plant protection						
4	Irrigation water						
5	Credit						

11.**Diversification of activities**

Please answer the following questions by putting tick mark in the appropriate column

Sl. No	Statements	Yes	No
1	Do you believe in diversification of activities by growing intercrops, multiple cropping, dairy, poultry will help to overcome the present situation.		
2	Do you think it increases profit.		

12.**Information backstop**

1.Do you have an opportunity to undergo training.	Always	Some times	Never
2. Do you get written communication regarding technical aspects.			
3. Do you have access to collect information online.			
4. Do you have library facilities for data collection.			

13.**Market perception**

Please indicate your response to the following questions.

1. Do you think a farmer will be able to sell the produce if he increases the production .	Yes	No

2. Do you think that the produce of the crop cultivated according to recommended practices will fetch good prices compared to those raised under traditional practices?	Low price	Same price	High price

3. How difficult it will be to dispose the crop produce cultivated if resulted in surplus?		Very diffi cult	Difficult	Easy	Very easy
4.When do you prefer to sell majority of the produce	Soon after the harvest	When the price is attractive	When in need of cash	Pre Harvest contract	

14.**Marketing behaviour**

Please indicate your choice for the following marketing behaviour activities.

1. Mode of transport

Head load	Bicycle	Bullock cart	Moped	City bus	Tempo van	Lorry	Train

2. Place of sale

In the village itself	Nearby town	Distance town

3.Mode of sale

Local merchant	Retailers in the nearby town	Commission agents in nearby town	Contractors	Whole sale merchants

4.Terms and condition for sale

Auction	Credit sales	On contract	Immediate payment

5.Distance of market (in KM)

Up to 5	5-10	10-15	15-20	20-25	>25

15.**Market intelligence**

Please indicate your choice for the following questions.

1. Do you have the capacity of reasoning the market trends ?

More capable	Somewhat capable	Not capable

2.Do you get alert at the time of harvest to market the produce profitably ?

More alert	Somewhat alert	Not alert

3.Do you get information about latest market trends?

Frequently get	Occasionally get	Don't get

4.Do you have knowledge about produce marketing?

Adequate knowledge	Somewhat knowledge	No knowledge

5.Do you independently perform the marketing?

Always	Sometimes	Never

16.**Market demand**

Please indicate your choice for the following statements.

1.	One should grow those crops which has more demand in the market.	Yes	No
2.	One should get better price for the produce which has more demand in the market.		
3.	It is not necessary to cultivate crops according to the market demand.		

signature

APPENDIX - VII

പ്രേക്ഷിതൻ

എൻ.ജി. ബാലചന്ദ്രനാഥ് (കൃഷി അസിസ്റ്റന്റ് ഡയറക്ടർ)
ഗവേഷണ വിദ്യാർത്ഥി,
കാർഷിക വിജ്ഞാന വിഭാഗം, കാർഷിക കോളേജ്,
വെള്ളായണി, തിരുവനന്തപുരം - 695 522

സ്വീകർത്താവ്

പ്രിൻസിപ്പൽ കൃഷി ആഫീസർ,
കോഴിക്കോട്/തൃശൂർ/ഇടുക്കി/ആലപ്പുഴ/തിരുവനന്തപുരം

സർ,

വിഷയം :- ഗവേഷണത്തിന്റെ ഭാഗമായി സർവ്വേ നടത്തുന്നതു സംബന്ധിച്ച്

സൂചന :- നം: CA-69/2003/DA തീ.തി. 12/11/2003 കൃഷി ഡയറക്ടറുടെ കത്ത്

ഉപരി സൂചന പ്രകാരം ഞാൻ ..... തിയതി മുതൽ ..... തിയതി വരെ കോഴിക്കോട്/തൃശൂർ/ഇടുക്കി/ആലപ്പുഴ/തിരുവനന്തപുരം ജില്ലയിൽ സർവ്വേ നടത്താൻ നിശ്ചയിച്ചിരിക്കുന്നു. ..... തീയതി രാവിലെ 10 മണിക്ക് അങ്ങയുടെ ആഫീസിൽ എത്തിച്ചേരും.

ജില്ലയിലെ നാല് പഞ്ചായത്തുകളിലാണ് സർവ്വേ ഉദ്ദേശിക്കുന്നത്. Rice based, Coconut based, Tapioca based and Homestead farming systems അടിസ്ഥാനമാക്കി പ്രമുഖ കർഷകരുമായിട്ടാണ് അഭിമുഖം നടത്തേണ്ടത്. ഓരോ farming system-വും ഓരോ പഞ്ചായത്ത് ആയാൽ നന്ന്. 1990-ാം ആണ്ടു മുതൽ മുഴുവൻ സമയ കർഷകരെ വേണം തെരഞ്ഞെടുക്കാൻ. ഓരോ പഞ്ചായത്തിൽ നിന്നും നാമമാത്ര, ചെറുകിട, വൻകിട വിഭാഗങ്ങളിായി അഞ്ചുവീതം കർഷകരെ ആവശ്യമുണ്ട്. (മൊത്തം ഒരു പഞ്ചായത്തിൽ 15 കർഷകർ). പ്രസ്തുത നാല് കൃഷിഭവനുകളിൽ നിന്നും അൻപതിൽ കുറയാത്ത പ്രമുഖ കർഷകരുടെ ലിസ്റ്റും (പേര്, മേൽവിലാസം, കൃഷി) കിട്ടുകയാണെങ്കിൽ വളരെ ഉപകാരമായിരിക്കും.

ഈ അവസരത്തിൽ അങ്ങയുടെ നിസ്സീമമായ സഹകരണം ഉണ്ടാകുമെന്ന് പ്രതീക്ഷിക്കുന്നു.

വെള്ളായണി,
18-11-2003

എന്ന്
വിശ്വസ്തതയോടെ,

Sd/-

ഉള്ളടക്കം:- കൃഷി ഡയറക്ടറുടെ കത്തിന്റെ പകർപ്പ്

(എൻ.ജി. ബാലചന്ദ്രനാഥ്)

കേരള കാർഷിക സർവ്വകലാശാല
കാർഷിക വിജ്ഞാന വിഭാഗം
കാർഷിക കോളേജ്, വെള്ളായണി

കേരളത്തിലെ മാറിയ കാർഷിക സാഹചര്യത്തിൽ പ്രധാന ഫാമിംങ് സിസ്റ്റങ്ങളെ മുൻ നിർത്തി അനുവർത്തിക്കേണ്ടുന്ന വിജ്ഞാന വ്യാപന തന്ത്രങ്ങൾ

കർഷകർക്കുവേണ്ടിയുള്ള നേർമുഖ പത്രിക

ഭാഗം എ

ബ്ലോക്ക് ജില്ല

കൃഷിഭവൻ പഞ്ചായത്ത്

കർഷകന്റെ പേര്

മേൽവിലാസം

1. **വയസ്സ്**
2. **വിദ്യാഭ്യാസ യോഗ്യത**
3. **കൃഷിചെയ്യുന്ന സ്ഥലം (ഏക്കറിൽ)**

വിവരണം	വിസ്തീർണ്ണം			
	സ്വന്തം	പാട്ടം	പാട്ടത്തിന് കൊടുത്തത്	മൊത്തം
ജലസേചനം നടത്തുന്നത്				
ജലസേചനമില്ലാത്തത്				

4. **കാർഷിക വിളകളുടെ വിശദവിവരം (ഏക്കറിൽ)**

കാർഷികവിള	ജലസേചനം ഇല്ലാത്തത്	ജലസേചനം നടത്തുന്നത്	മൊത്തം

5. **സാമ്പത്തിക പ്രവർത്തനോന്മുഖത**

1990-95; 96-2001 കാലയളവിൽ നിങ്ങൾ കൃഷിചെയ്തിട്ടുള്ള കാർഷിക വിളകളിൽ ഓരോന്നിനും ഉണ്ടായിട്ടുള്ള സാമ്പത്തിക മെച്ചം അല്ലെങ്കിൽ നഷ്ടം എത്രയെന്നു പറയാമോ?

9	>75%
8	51-75
7	26-50
6	<25
5	Neutral
4	<25
3	26-50
2	51-75
1	>75%

മുകളിൽ കൊടുത്തിരിക്കുന്നത് ഒരു ഏണിയുടെ ചിത്രമാണ്. 1 മുതൽ 9 വരെ പടികളാണ് രേഖപ്പെടുത്തിയിട്ടുള്ളത്. ഇവ ഓരോന്നിനും ആനുപാതികമായി തൊട്ടടുത്ത ചിത്രത്തിൽ മൂല്യം രേഖപ്പെടുത്തിയിട്ടുണ്ട്. താഴെപ്പറയുന്ന ചോദ്യങ്ങൾക്ക് അനുസൃതമായി ഉത്തരം ബന്ധപ്പെട്ട സ്ഥാനത്ത് രേഖപ്പെടുത്തണം.

1. 1996–2001 കാലയളവിൽ നിങ്ങൾ കൃഷിചെയ്തിട്ടുള്ള വിളകൾ ഓരോന്നിനും പ്രത്യേകം പ്രത്യേകമായി ഉണ്ടായിട്ടുള്ള സാമ്പത്തിക മെച്ചം അല്ലെങ്കിൽ നഷ്ടം മുകളിലത്തെ ചിത്രത്തിലെ ഏത് പടികളിലാണ് വരുന്നതെന്ന് തിട്ടപ്പെടുത്തി താഴെ കാണുന്ന കള്ളികളിൽ രേഖപ്പെടുത്തേണ്ടതാണ്.

വിളകൾ	നെല്ല്	തെങ്ങ്	റബ്ബർ	കുരുമുളക്	മറ്റുള്ളവ
നമ്പർ					

2. ഇതേ രീതിയിൽ 1990–95 കാലയളവിലെ കാര്യങ്ങൾ പ്രത്യേകം സൂചിപ്പിക്കേണ്ടതാണ്.

വിളകൾ	നെല്ല്	തെങ്ങ്	റബ്ബർ	കുരുമുളക്	മറ്റുള്ളവ
നമ്പർ					

6. നവസാങ്കേതികത്വ പ്രവണത

(A)

1. കാർഷികമായി ബന്ധപ്പെട്ട ഏറ്റവും നൂതനമായ വിവരങ്ങൾ ഞാൻ ശേഖരിയ്ക്കുന്നുണ്ടെങ്കിലും അതെല്ലാം അതേപടി പ്രാവർത്തികമാക്കുന്നുണ്ടെന്ന് വിശ്വസിക്കേണ്ടതില്ല.
2. നൂതനമായ ഒരു കാർഷിക രീതി മനസ്സിലാക്കിക്കഴിഞ്ഞാൽ അത് നടപ്പാക്കുന്നതുവരെ എനിക്ക് സ്വസ്ഥതയുണ്ടാവില്ല.
3. ഇപ്പോൾ പലരും നൂതന കാർഷിക രീതികളെക്കുറിച്ച് പറയുന്നുണ്ടെങ്കിലും, അവയെല്ലാം പാരമ്പര്യ രീതികളെക്കാൾ മെച്ചമാണെന്ന് വിശ്വസിക്കാനാവില്ല.

(B)

1. കാലാകാലങ്ങളിൽ പല നൂതന കാർഷിക രീതികളെക്കുറിച്ച് എനിക്ക് മനസ്സിലാക്കാൻ കഴിഞ്ഞിട്ടുണ്ട്. അതിൽ പലതും ഞാൻ കഴിഞ്ഞ വർഷം നടപ്പാക്കുകയും ചെയ്തു.
2. ഞാൻ പുതിയൊരു കൃഷിരീതി അവലംബിക്കുന്നത് എന്റെ അയൽക്കാരൻ അത് പരീക്ഷിച്ച് വിജയം കണ്ടതിനുശേഷമാണ്.
3. എന്തൊക്കെ ആയാലും പാരമ്പര്യ കൃഷിരീതികളാണ് എന്റെ അഭിപ്രായത്തിൽ മെച്ചം.

(C)

1. വളരെ കരുതലോടെയാണ് ഞാൻ പുതിയ കാർഷികരീതികൾ അവലംബിക്കുന്നത്.
2. നമ്മുടെ പൂർവ്വികരുടെ കൃഷിരീതികളെല്ലാം മഹത്തരമാണ്, അവ മാറ്റണമെന്നതിന് ഒരു കാരണവും എനിക്ക് കണ്ടെത്താനാവുന്നില്ല.
3. പുതിയ കൃഷിരീതികൾ ചിലപ്പോൾ വിജയകരമല്ലെങ്കിലും അവ വിശ്വസിയ്ക്കത്തക്കതാണെങ്കിൽ, തീർച്ചയായും ഞാൻ പ്രാവർത്തികമാക്കും.

7. സാമ്പത്തിക പ്രേരണ

താഴെ പറയുന്ന പ്രസ്താവനകളോട് ശരിയായ അഭിപ്രായം രേഖപ്പെടുത്തുക

		വളരെ യോജിക്കുന്നു	യോജിക്കുന്നു	നിശ്ചയമില്ല	വിയോജിക്കുന്നു	വളരെ യധികം വിയോജിക്കുന്നു
1.	ഒരു കർഷകൻ ഉയർന്ന ഉല്പാദനവും, വരുമാനവും മുൻനിറുത്തി പണിയെടുക്കണം.					
2.	ഒരു കർഷകൻ കൂടുതൽ വരുമാനം നൽകാൻ ഉതകുന്ന കൃഷിരീതികൾ അവലംബിയ്ക്കേണ്ടതാണ്.					
3.	വീട്ടാവശ്യത്തിനുള്ള ഭക്ഷ്യവിളകൾ കൃഷി ചെയ്യുന്നതിനേക്കാൾ നാണ്യവിളകളായാൽ കൂടുതൽ വരുമാനമുറപ്പിക്കാം.					

8. വരുമാന സ്ഥിരത

താഴെ പറയുന്ന കാര്യങ്ങൾക്ക് ശരിയാ ഉത്തരം നൽകുക

		ഉണ്ട്	ഇല്ല
1.	കഴിഞ്ഞ അഞ്ചുവർഷത്തിൽ താങ്കളുടെ കാർഷിക വരുമാനം സ്ഥിരമായി വർദ്ധിച്ചിട്ടുണ്ടോ?		
2.	1990–95 കാലയളവിൽ സ്ഥിരമായി വരുമാന വർദ്ധനവ് രേഖപ്പെടുത്തിയിട്ടുണ്ടോ?		
3.	ആഗോളവൽക്കരണം സ്ഥിരമായ വരുമാനത്തിന് സഹായകരമാകുമെന്ന് കരുതുന്നുണ്ടോ?		
4.	ആഗോളവൽക്കരണം നിമിത്തം തുടർച്ചയായി കൂടുതൽ വരുമാനം ലഭിക്കുമെന്ന് വിശ്വസിക്കുന്നുണ്ടോ?		

9. ഉല്പാദനക്ഷമത

കഴിഞ്ഞ അഞ്ചു വർഷത്തിൽ താങ്കളുടെ കൃഷിയിടത്തിലെ കാർഷികവിളകളുടെ ഉല്പാദന ക്ഷമതയിൽ ഉണ്ടായിട്ടുള്ള ഏറ്റക്കുറച്ചിൽ എത്രയെന്ന് വ്യക്തമാക്കാമോ?

കാർഷിക വിളകൾ	ഉല്പാദനക്ഷമത				
	മാറ്റമില്ല	<25	26–50	51–75	>75
		വർദ്ധന കുറവ്	വ കു	വ കു	വ കു
		(A1) (B1)	(A2) (B2)	(A3) (B3)	(A4) (B4)

10. ഉല്പാദനോപാധികളുടെ ലഭ്യത

കൃഷിക്ക് ആവശ്യമായ ഉല്പാദനോപാധികൾ കൃത്യമായ അളവിലും, സമയത്തും കിട്ടിയിരുന്നോ എന്ന് വ്യക്തമാക്കാമോ? ബന്ധപ്പെട്ട കോളങ്ങളിൽ (✓) മാർക്ക് ചെയ്യേണ്ടതാണ്.

ഉല്പാദനോപാധികൾ	A എല്ലായ്പ്പോഴും കൃത്യമായ		S വല്ലപ്പോഴും കൃത്യമായ		N ഒരിയ്ക്കലും ഇല്ല കൃത്യമായ	
	അളവിൽ CQ	സമയത്ത് C7	അളവിൽ CQ	സമയത്ത് C7	അളവിൽ CQ	സമയത്ത് C7
വിത്ത്,						
വളം,						
കീടനാശിനി						
ജലസേചനം						
വായ്പ						

11. കാർഷികേതര സംരംഭങ്ങൾ

താഴെപ്പറയുന്ന ചോദ്യങ്ങൾക്ക് നിർദ്ദിഷ്ട കോളത്തിൽ മറുപടി രേഖപ്പെടുത്തുക.

1.	ഇന്നത്തെ കാർഷിക പ്രതിസന്ധി തരണം ചെയ്യാൻ ഇടവിളകൃഷി, ബഹുവിളകൃഷി മറ്റ് കാർഷികേതര സംരംഭങ്ങളായ പശുവളർത്തൽ, കോഴി വളർത്തൽ എന്നിവ പ്രോത്സാഹിപ്പിക്കുന്നതുകൊണ്ട് കഴിയുമെന്ന് തോന്നുന്നുണ്ടോ?	ഉണ്ട്	ഇല്ല
2.	ഇവയെല്ലാം വരുമാന വർദ്ധനവിന് സഹായകരമാകുമെന്ന് കരുതുന്നുണ്ടോ?		

12. വിവരശേഖരണക്ഷമത

താഴെപ്പറയുന്ന കാര്യങ്ങൾക്ക് യുക്തമായ മറുപടി (✓) മാർക്ക്ചെയ്ത് ബന്ധപ്പെട്ട കോളങ്ങളിൽ രേഖപ്പെടുത്തുക.

1. പരിശീലന പരിപാടികളിൽ പങ്കെടുക്കാനുള്ള സാഹചര്യം ലഭ്യമായിട്ടുണ്ടോ?	എല്ലായ് പ്പോഴും	വല്ല പ്പോഴും	ഒരിയ്ക്കലും ഇല്ല
2. സാങ്കേതിക വിവരങ്ങളെക്കുറിച്ച് ലഘുലേഖകൾ കിട്ടാറുണ്ടോ?			
3. കമ്പ്യൂട്ടർ അധിഷ്ഠിതമായി വിവരങ്ങൾ ശേഖരിക്കാറുണ്ടോ?			
4. ലൈബ്രറി സൗകര്യങ്ങൾ ലഭ്യമാക്കാറുണ്ടോ?			

13. വിപണി അവബോധം

താഴെപ്പറയുന്ന കാര്യങ്ങൾക്ക് യുക്തമായ ഉത്തരം ബന്ധപ്പെട്ട കോളങ്ങളിൽ (✓) മാർക്ക് ചെയ്ത് രേഖപ്പെടുത്തുക.

1. കർഷകൻ തന്റെ കാർഷികവിളകളുടെ ഉല്പാദനം കൂട്ടുകയാണെങ്കിൽ അവ എളുപ്പത്തിൽ വിറ്റഴിക്കാൻ സാധിക്കുമെന്ന് കരുതുന്നുണ്ടോ?

ഉണ്ട്		ഇല്ല	

2. ശാസ്ത്രീയ രീതിയിൽ ഉല്പാദിപ്പിക്കുന്ന കാർഷിക ഉൽപ്പന്നങ്ങൾക്ക് പാരമ്പര്യ കൃഷിരീതിയിൽ ലഭിക്കുന്നവയേക്കാൾ എന്തുവില കിട്ടുമെന്നാണ് കരുതുന്നത്.

കുറഞ്ഞവില		ഒരേവില		കൂടിയവില	

3. അധിക ഉല്പാദനം ഉണ്ടായാൽ അവ വിറ്റഴിക്കാൻ നിലവിലുള്ള വിപണി സാഹചര്യമെന്തെന്ന് പറയാമോ.

വളരെ പ്രയാസം		പ്രയാസം		എളുപ്പം		വളരെ എളുപ്പം	

4. താങ്കൾ/കർഷകൻ എപ്പോഴാണ് ഭൂരിഭാഗം ഉല്പന്നങ്ങളും വിറ്റഴിക്കാൻ തയ്യാറാകുന്നത്.

വിളവെടുപ്പ് കഴിഞ്ഞ ഉടൻ		കൂടുതൽ വിലകിട്ടുന്ന അവസരത്തിൽ		പണത്തിന് ബുദ്ധിമുട്ട് വരുമ്പോൾ		വിളവെടുപ്പിന് മുമ്പ് കോൺട്രാക്റ്റ് അടിസ്ഥാനത്തിൽ	

14. വിപണി പ്രവർത്തനസ്വഭാവം

വിപണിയിൽ ഉല്പന്നങ്ങൾ എത്തിക്കുന്നതുമായി ബന്ധപ്പെട്ട കാര്യങ്ങളിൽ യുക്തമെന്നു തോന്നുന്നത് (✓) മാർക്ക് ചെയ്യുക..

1. **ഉല്പന്നങ്ങൾ എത്തിക്കുന്ന രീതി**

തലച്ചുമട്	സൈക്കിൾ	കാളവണ്ടി	സ്കൂട്ടർ	ബസ്സ്	വാൻ	ലോറി	ട്രെയിൻ

2. **വിൽക്കുന്ന സ്ഥലം**

ഗ്രാമത്തിൽ തന്നെ	അടുത്ത ടൗൺ	ദൂരെയുള്ള ടൗൺ

3. **ആർക്കാണ് വിൽക്കുന്നത്**

പ്രാദേശിക കച്ചവടക്കാർ	ടൗണിലെ ചെറുകിട കച്ചവടക്കാർ	കമ്മീഷൻ ഏജന്റ്	കോൺട്രാക്ടർ	മൊത്ത വ്യാപാരികൾ

4. **വിൽക്കുന്നരീതി**

ലേലം	കടത്തിന്	കോൺട്രാക്റ്റ്	ഉടൻപണം കിട്ടുന്ന രീതി

5. **വിപണിയിലേക്കുള്ള ദൂരം**

5 കി.മീ ഉള്ളിൽ	5-10 കി.മീ.	10-15 കി.മീ.	15-25 കി.മീ.	25 കി.മീ. മുകളിൽ

15. ബുദ്ധിപരമായ വിപണനം

താഴെപ്പറയുന്ന കാര്യങ്ങൾക്ക് യുക്തമായ ഉത്തരം കണ്ടെത്തി (✓) മാർക്ക് ചെയ്യുക.

1. വിപണിയിലെ ചലനങ്ങൾ കാലേക്കൂട്ടി അപഗ്രഥിക്കാൻ കർഷകനുള്ള/താങ്കൾക്കുള്ള കഴിവ് എത്രത്തോളമെന്ന് പറയാമോ?

വളരെക്കൂടുതൽ	കുറച്ചൊക്കെ	ഒട്ടും ഇല്ല

2. വിളവെടുപ്പ് സമയത്ത് വിപണിയിൽ മുന്തിയ വില കിട്ടണമെന്ന ചിന്താഗതിയുണ്ടോ?

വളരെക്കൂടുതൽ	കുറച്ചൊക്കെ	ഒട്ടും ഇല്ല

3. വിപണിയിലെ ഏറ്റവും പുതിയ വിലനിലവാരത്തെക്കുറിച്ച് വിവരങ്ങൾ ലഭിക്കാറുണ്ടോ?

എല്ലായ്പ്പോഴും	വല്ലപ്പോഴും	ഒരിയ്ക്കലും ഇല്ല

4. ഉല്പന്നങ്ങൾ വിറ്റഴിക്കുന്നതു സംബന്ധിച്ച് വിവരങ്ങൾ ശേഖരിക്കാറുണ്ടോ?

പൂർണ്ണമായും	കുറച്ചൊക്കെ	ഒട്ടും ഇല്ല

5. സ്വന്തമായിട്ടാണോ വിപണനത്തിലേർപ്പെടുന്നത്?

എല്ലായ്പ്പോഴും	വല്ലപ്പോഴും	ഒരിയ്ക്കലും ഇല്ല

16. വിപണിയിലെ ആവശ്യകത

താഴെപ്പറയുന്ന കാര്യങ്ങൾക്ക് യുക്തമായ ഉത്തരം നൽകുക.

1.	കർഷകൻ വിപണിയിൽ കൂടുതൽ ഡിമാന്റുള്ള ഉല്പന്നങ്ങൾ മനസ്സിലാക്കി അവ കൃഷി ചെയ്യേണ്ടതാണ്.	ഉണ്ട്	ഇല്ല
2.	വിപണിയിൽ ഡിമാന്റുള്ള ഉല്പന്നങ്ങൾക്ക് കൂടുതൽ വില കിട്ടാൻ സാദ്ധ്യതയുണ്ട്		
3.	വിപണിയിലെ ഡിമാന്റ് അനുസരിച്ച് കൃഷിചെയ്യുന്നത് അഭികാമ്യമല്ല.		

Appendix -VIII

KERALA AGRICULTURAL UNIVERSITY
DEPARMENT OF AGRICULTURAL EXTENSION
COLLEGE OF AGRICULTURE, VELLAYANI

Extension strategies for the major farming systems in the context of changing agricultural situation in Kerala.

PART –B

Interview schedule
(Extension personnel)

Objective :-To Delineate the dimensions of efficiency of extension organization in the state department of agriculture.

Name : Address :-

Krishibhavan :

Panchayat:

Block:

District :

1. **Age:**
2. **Educational qualification:**
   (a) Basic :
   (b) Additional (including IT related)

3. **Total experience** :

4. **Training received.**

Department		National level		International	
No	Duration	No	Duration	No	Duration

5.**Job autonomy**

Please indicate your response by putting a tick mark in the appropriate column against each statement. (VT – Very true; SWT- Somewhat true; LT – Little true; NAT – Not at all true).

Sl no	Statements	VT	SWT	LT	NAT
1	I have a lot of say over what happens on my job				
2	I have enough authority to do my best				
3	My job allows me to make a lot of decision on my own				
4	I have enough freedom on to how to do my work				

6Job satisfaction

Please indicate your response by putting a tick mark in the appropriate column against each statement.(VMS – very much satisfied; S- satisfied; DS – dissatisfied).

Sl. no	Statements	VMS	S	DS
1	How much satisfied you are - With the flexibility given by superiors to do your job well.			
2	With the working facilities that you have to do your job well			
3	With the opportunities provided in your job to utilize your personal abilities.			
4	With the work you are doing as extension personnel			
5	With the recognition gives to your work by			

	the people of your area.			
6	What is the span of your satisfaction with relationship among internal and external public?			
7	What is the range of your satisfaction with technical guidance and support of higher ups to perform your job?			
8	With the policies and practices of the department in relation to your work			
9	With the job authority delegated to you in order to do your job.			
10	When you considered the expectations you had when you took up this.			
11	With the relation you have with your superior in your work.			

7.**Job involvement**

Please indicate your response by putting a tick mark in the appropriate column against each statement.(SA- Strongly agree; A- agree; DA – disagree).

Sl. no	Statements	SA	A	DA
1	I shall stay overtime to finish a job even if I am not paid for it.			
2	We shall measure a person pretty well by how good a job he/she does.			
3	The major satisfaction in my life comes from my job.			
4	For me morning at work really go off quickly.			
5	I usually go for work a little early to get the things ready.			

6.	The important things that happens to me involve my work..			
7	Sometimes I keep myself awake at night, thinking ahead to the next day's work.			
8	I am really a perfectionist about my work.			
9	I felt distressed when I fail at something connected with my work.			
10	I have other activities more important than my work.			
11	Quite often, I felt the staying at home instead of going for work.			
12	To me, my work is only a small part of my life.			
13	I avoid taking extra duties and responsibilities in my work.			
14	Most thing in life are more important than work.			

8. Guidance and supervision

Keeping you and your organization in mind Guidance and supervision prevailing in your organization are listed below. Please tick mark against each statement to indicate your degree of satisfaction. (VMS – very much satisfied; PS- Partially satisfied; DS – Dissatisfied; VMDS- Very much dissatisfied).

Sl.no	Statements	VMS	S	PS	DS	VMDS
1	Technical matters					
2	Professional competancy					
3	Job responsibility					
4	Field work					
5	Regular and timely advice					
6	Office work					

9. **Facility and resources**

Keeping you and your organization in mind facilities and resources prevailing in your organization are listed below. Please tick mark against each statement to indicate your degree of satisfaction. (VMS – very much satisfied; PS- Partially satisfied; DS – Dissatisfied; VMDS- Very much dissatisfied).

Sl. no	Statements	VMS	S	PS	DS	VMDS
1	Field supplies					
2	Repair and maintenance					
3	Transportation					
4	Office supplies					
5	Storage facilities					
6	Providing demonstration equipments					

10. **Organizational involvement**

Please indicate the extent to which you agree the following statement by putting tick mark in the appropriate column.(SD- Strongly disagree; D – Disagree; MF – Mixed feeling ; A – Agree ; SA – Strongly agree).

Sl. no	Statements	SD	D	MF	A	SA
1	Have you considered seeking employment elsewhere since you accepted employment in the department of agriculture.					
2	If I could being working over again in the same occupation as I am in now, I would choose this department.					

3	I feel a strong sense of loyalty towards this department.					
4	I feel a sense of pride in working for the department.					
5	If another department offered me more money for the same kind of work, I would accept.					
6	On occasion I have been angered by attempt made by this department to influence my attitude and beliefs.					
7	My closer friends have very favourable attitude towards the department for which I work.					
8	There is feeling here that employees would develop a personal commitment to this department.					
9	In this department people don't care whether employees a re committed to this department.					
10	In this department people don't care whether employees are committed k to the department.					
11	If I had my life top live over again, I would still choose to work for this department.					

11. **Achievement motivation**

Please respond to the following sentences by choosing the appropriate answers

(tick mark).

(a) In whatever work I undertake

1. I like to make advance plan
2. I like to do my best
3. I don't assume full responsibility for it.

(b) I am always keen

1. to maintain the social status
2. to remove social evils
3. to develop my qualification

(a) I feel happy when

1. I tell others of my personal experience
2. I am assigned a difficult job
3. I am required to advice others

(b) I like to venture something which

1. others can hardly do
2. will make one wealthy
3. others required as a quality of leadership.

12. **Decision making ability**

How extent you are subject to the following with respect to decision making ability. Please indicate your response by putting tick mark in the appropriate column.

(NC – Not considered; CACO = Considered after consultation with others; DTI – Decision taken independently).

Sl. no	Items	NC	CACO	DTI
1	To attend training			
2	To try new practices			
3	To meet people's representatives before implementing schemes			
4	To start a new program			
5	To change the style of office functioning			

13. **Organizational commitment**

Please indicate your degree of agreement or disagreement using a tick mark against each statement in the appropriate column.

(SA- Strongly agree; A – Agree; UD – Undecided; DA – Disagree ; SDA – Strongly disagree).

Sl. no	Statements	SA	A	UD	DA	SDA
1	Working in the organization as an extension personnel is very much prestigious.					
2	It is better to be an extension worker to serve the rural people.					
3	An honest worker hardly gets satisfaction from this organization					
4	If one should gets a similar remuneration in some other organization , it will be better for him to join.					
5	An extension worker gets a lot of freedom in this organization.					
6	An extension worker should not care much for his job responsibilities.					
7	An extension worker should be dedicated to his work.					
8	An extension worker should be happy with his job in comparison to other equivalent.					

14. **Job perception**

Kindly go through these and check your response by putting a tick k mark in the appropriate column to indicate how you are perceiving (how much importance you attach to) the items of job duties.

(VI – very important; I – important; UD – undecided; LI – little important; NAI – not at all important).

Sl. no	Items of job duties	VI	I	UD	LI	NAI
1	Preparing location specific schemes.					
2	Implementation of schemes prepared.					
3	Correspondence of official matters.					
4	Periodic checking of schemes implemented.					
5	Arranging meeting on agricultural development programs in villages.					
6	Involving the farmers in the planning and implementation of agricultural program.					
7	Planning optimum use of available land, water and solar energy.					
8	Promoting mass media participation in agricultural development.					

15. **Job performance**

Kindly go through these and check your response by putting a tick k mark in the appropriate column to indicate how you are perceiving the performance of the items of job duties.

(AP – adequately performed; FP – fairly performed; MP- moderately performed; PP – poorly performed; IAP – inadequately performed).

Sl. no	Items Job duties	AP	FP	MP	PP	IAP
1.	Preparing calendar of operations for the year.					
2	Organizing and implementing group management operations.					
3	Encouraging the efforts of farmers producing maximum output from unit area.					
4	Promoting infrastructure development facilities.					
5	Promoting organic farming					
6	Arranging quality control campaigns.					
7	Conducting / attending agroclimatic to solve the problems of farmers regarding crop cultivation.					
8	Promoting co-operative marketing among farmers.					
9	Conducting seminar, demonstration, minikit trials for the benefit of farmers.					
10	Giving special attention in the case of minor crops like tuber crops, vegetables, flowering plants.					
11	Conducting farmers group discussions to convince them about new technology.					

Signature

Appendix - IX

KERALA AGRICULTURAL UNIVERSITY

Dr.R. Prakash,
Associate Professor.

Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvuananthapuram.695522
Phone. (O) 2384625
(R) 2468664

Dated:

Dear Sir/Madam

Sri.N.G. Balachandranath, Ph.D.Scholar of this department has taken up a research study on " Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala" under my guidance.

SWOT analysis of agriculture in Kerala is one among the objectives of the study.

Considering your vast experience, I request you to indicate the SWOT of agriculture in Kerala based on the major farming systems (namely, Rice based, Coconut based, Tapioca based and Homestead based).I would be thankful, if you can send the same to the student through the self addressed stamped envelope enclosed, at the earliest.

With regards,
Yours sincerely,

(Dr.R.Prakash)

Appendix - X

KERALA AGRICULTURAL UNIVERSITY

Dr.R. Prakash,
Associate Professor.

Department of AgriculturalExtension,
College of Agriculture, Vellayani,
Thiruvuananthapuram.695522
Phone. (O) 2384625
(R) 2468664

Dated:

Dear Sir/Madam

Sri. N.G. Balachandranath, Ph.D.Scholar of this department has taken up a research study on " Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala" under my guidance.

SWOT analysis of extension organization in the State Department of Agriculture is one among the objectives of the study.

Considering your vast experience, I request you to indicate the SWOT of extension organization in the State Department of Agriculture. I would be thankful, if you can send the same to the student through the self addressed stamped envelope enclosed, at the earliest.

With regards,
Yours sincerely,

(Dr.R.Prakash)

Appendix - XI

KERALA AGRICULTURAL UNIVERSITY

Dr.R. Prakash,
Associate Professor.

Department of Agricultural Extension,
College of Agriculture, Vellayani,
Thiruvuananthapuram.695522
Phone. (O) 2384625
(R) 2468664

Dated:

Dear Sir/Madam

Sri.N.G. Balachandranath, Ph.D.Scholar of this department has taken up a research study on " Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala" under my guidance.

As part of this it is proposed to conduct a consensus building workshop for formulating suitable strategies in the context of changing agricultural situation. The salient findings and draft strategies are enclosed herewith for your kind perusal. The one day workshop will be scheduled on 21- 07 – 2004 at 10.30 AM in the Seminar Hall of the Department of Agricultural Extension. Considering your vast experience, I kindly request you to participate in the workshop and contribute your valuable suggestion.

Yours sincerely,

(Dr. R . Prakash)

Consensus building workshop

(Ph.D project of Sri.N.G.Balachandranath (2001-21-09))

Chairman: Dr.R.Prakash, Associate Professor.

Title of the project: Extension strategies for the major farming systems in the context of the changing agricultural situation in Kerala.

Objective of the study

Formulating strategies for the major farming systems in Kerala by undertaking micro - level studies on the impact and implications of the economic reforms,

SWOT analysis of agriculture in Kerala as well as State Department of Agriculture and delineate the dimensions of efficiency of extension organizations in the state department of agriculture.

Brief description

From the five NARP zones one district each was identified. From these districts four panchayats each representing the four major farming systems were selected. The respondents for the study are farmers for economic performance, stakeholders for SWOT analysis and extension personnel for the organizational efficiency. The economic performance was assessed in two different periods namely period-I (1996—2001) and period – II (1990-1995).

Findings / Trends / Problems

Low economic performance was observed during the reference period –I than II in among farming systems , zones, crops and categories of farmers. The trends in low economic performance among farming systems namely, coconut based farming system (4.25), rice based farming system(4.23), tapioca based farming system (4.33) and homestead based farming system (4.22).Among zones it was in the order of northern (4.23), central (4.35), high range(4.20),problem zone(4.21) and southern(4.30). Among crops the lowest performance was recorded in coconut ie. 3.63. The trend was just reverse in the case of tapioca (5.11) and banana (5.06). Among farmers category, it was in the order of large farmer (4.16), small farmer(4.19) and marginal farmer (4.32).

Lack of infrastructure facilities, post harvest loss, highly fluctuating and unrewarding price regime, low value addition, lack of irrigation facilities etc. New pest and diseases, globalization and WTO, soil erosion , deforestation, slow adoption of quality culture, poor infrastructure support etc. Unaware of well defined objectives consistent with the mission and goals, poor conveyance facilities, system of selecting farmer beneficiaries, lack of IT knowledge among technical staff, no proper mechanism for monitoring miss utilization of assistance given to farmers, insufficient infrastructure facilities, recognition and appreciation etc. Globalization necessitated changes in the concept of conventional agriculture, restrictive funding from government, privatization of extension services, agricultural graduates reluctant to work in rural areas, high wage rates and low labour productivity etc.

It was observed that only 15.5 per cent of extension personnel perceived as high with regard to organizational efficiency of the state department of agriculture followed by medium 68.1 per cent and low 16.4 per cent. The results on comparison between groups revealed that facility and resources obtained the maximum percentage contribution(16.96 per cent) made to difference of the group between high and medium. For high and low group it was decision making ability(24.52 per cent) This indicate that facility and resources as well as decision making ability are considered as important dimensions of organizational efficiency.

Salient findings

All the four major farming systems exhibited low economic performance during 1996 –2001 than the period 1990 – 1995. The mean economic performance score obtained for coconut based farming system was 5.44 to 4.25, rice based farming system 5.36 to 4.23 , tapioca based farming system 5.18 to 4.33 and homestead based farming system 5.36 to 4.22.

Among zones it was 5.34 to 4.23 for northern, 5.28 to 4.20 for high range, 5.36 to 4.35 central, 5.40 to 4.21 problem zone and 5.32 to 4.30 for southern zone.

The economic performance score obtained by large farmer was 5.35 to 4.16, small farmer 5.36 to 4.19 and marginal farmer 5.30 to 4.32.

Among major crops the low economic performance was noticed in coconut during 1996 – 2001 than the period 1990 – 1995. The mean performance score is 3.63 and 5.54 respectively. The performance was either better or at the same level in the case of tapioca (4.91 to 5.11) and banana (5.24 to 5.06).

Coconut based farming system

Trend / Problem

In coconut based farming system the performance of coconut was low when compared to major crops(5.64 to 3.85). The performance of paddy (5.29 to 4.71) and banana (5.28to 4.50) were almost at the same level.

Causes ?

Price fluctuation due to liberalization policy , pest and disease complex , production loss, reduced area of cultivation , lack of management practices, labour insufficiency , old and senile palms , lack of quality planting materials , high wage rate and low labour productivity, high cost of cultivation , small holding size (0.2ha) , predominant rainfed farming, lack of organized marketing, insufficiency in agro – based industries.

Strategies.

Review of policy measures related to liberalization. The first step in this regard is to increase the import tariff fixed for edible oils especially palmolein. As per WTO norms it was fixed as 300 per cent . The prevailing tariff for refined palmolein is 75 per cent. This has to be increased at least by 150 per cent.

Proper pest and surveillance system for monitoring pest and disease problem.

Establish crop cafeteria , small coconut estate. It includes multiple cropping system, production cum processing units. The ultimate aim is employment and income generation.

Formation of community based organization. Implementation of micro credit system through this organization will help the farmers to meet the urgent necessity. Extension activities should be concentrated on this community based organization.

Systematic replanting , rejuvenation , under planting with quality planting materials. In India 45 per cent of the palms are old and senile. In the major

coconut growing stale of Kerala in addition to the old and senile trees, the root wilt disease palms also need replanting. Encourage farmers to produce quality seedlings in their field itself by proper supervision of the extension functionaries.

Establish labour employment counseling and training center .Unemployed youth will be given training on harvesting, plant protection measures etc.

Research on crop geometry. How to reduce the height of the palm ? If the height is within six feet, it facilitate easy harvesting, PP application etc. by family labour itself. It will further reduce cost of cultivation and increase income.

Organized marketing for diversified and value added products. Promotion of product diversification and value addition.

Adopt integrated farming system . Integrating inter/ mixed/multiple cropping, milch animals /poultry/fish etc. Provide irrigation facilities. Promotion of organic recycling.

Rice based farming system

The performance of coconut was the least among major crops(5.45 to 3.56). There was no significant difference in the performance of paddy (5.14 to 4.73).

In rice based farming system the major problems were declining area of paddy field, shortage of labour, high labour cost and low labour productivity, high cost of cultivation, insufficient supply of inputs, non availability of inputs at correct time, lack of balanced application of fertilizer, conversion of land for other purpose, lack of infrastructure facility and low productivity compared to neighbouring state.

Causes ?

Negligence of the system, uneconomic, reluctance in farming, lack of acceptance about new technology, lack of group action, no timely application of fertilizer, lack of support and incentives, lack of credit facilities, lack of marketing support.

Strategy

Strengthening group farming activities, farm loan at low interest rate, marketing facilities, proper market intervention, crop insurance , identification of most suitable varieties for each agro climatic region, use of hybrid rice technology to local farming situations, use of bio technology, water management, production

improvement program, special package for Kuttanad, development of upland, identify high potential areas and prohibit irreversible conversion of such lands by legislation., scheme for price incentives, higher MSP and subsidy, exploitation of scented varieties, product diversification and value addition, proper irrigation and drainage system, promotion of mechanization.

Tapioca based farming system

Trends

The performance of tapioca was better (4.91 to 5.11) during 1996 – 2001 than the period 1990 –1995.

Causes ?

Adoptability to wide variation. Productivity and production increase, better price, provide food security.

Strategy

Evolving suitable early maturing varieties. Multiplication and distribution of quality planting materials. Enhance shelf life of tubers. Enhance productivity. Diversification and value addition. Exploit cassava as an industrial crop, plastic crop , medium in tissue culture.

Homestead based farming system

Trends

In the homestead based farming system coconut(5.57to3.56) and pepper (5.28to3.44) recorded low economic performance when compared to other crops. Paddy and banana have performed almost at the same level.

Causes ?

Over crowding of crops, wrong choice of crops, lack of individual attention among crops, lack of balanced nutrient supply. Paddy and banana would normally get better attention in homesteads than other crops.

Strategy

Adoption of integrated farming system – INM, IPM. Selection of correct choice of crops, HYV, quality planting materials , planting density.

Promotion of organic farming. Product diversification and value addition.

SWOT

The results of the SWOT analysis of agriculture in Kerala revealed the major problems as namely fragmented and uneconomic holdings, lack of infrastructure facilities , absentee land owners, crisis in plantation sector, high wage rate and low labour productivity, acute shortage of labour, low productivity of crops, highly fluctuating and unrewarding price regime, insufficient input supply including irrigation and electricity, low recognition and appreciation of the sector, absence of full time farmers, low value addition process, absence of effective extension work, weak market support, post harvest losses, poor exploitation of information and communication technology and lack of efficient transportation and storage facilities.

Causes ?

No proper land use policy, reluctance in farming activities, lack of budgetary support, no proper plan for meeting contingency, lack of support and incentive to farmers, lack of investment and trade unionism.

Strategy

Proper R and D policy initiatives – improving efficiency in inputs, enhancing genetic production, harnessing complementarities of enterprises.

Promotion of mixed farming , agro forestry and livestock.

End to end technology mission approach to undertake agricultural intensification, diversification and value addition in and integrated manner.

Farm graduates / extension personnel should be equipped for global competitiveness.

Agricultural technology park to assess economic viability of new technology.

Adopt a scientific and practical land use policy – by considering most suitable crops for different regions, minimum price, environmental aspects and attitude of agricultural labour force.

Set up employment exchange for labourers.

The result of the SWOT analysis of the extension organizations in the state department of agriculture reveals the major problems as namely dual control, insufficient infrastructure, poor conveyance facility, office oriented extension, no continuality of schemes, no recognition and appreciation, lack of awareness about well defined objectives, no proper HRD mechanism, no proper mechanism for monitoring and evaluation of assistance given to farmers and paucity of funds for high tech program.

Causes ?

Dictate and accept attitude , lack of commitment and accountability, administrative lacuna, lack of supervision and monitoring, procedural delays, communication gap, vested interest, absence of team spirit, unhealthy political interference, self oriented rather than client oriented performance.

Strategy

Establish strong and compulsory HRD mechanism.

Technology assessment and refinement system for small production and green revolution production system.

Dual extension system for resource poor farmers and resourceful farmers. Meeting needs –Farmer's first rather than transfer of information. Encouraging interactive approach among the farmers. Provide counseling and grievances center for extension personnel.

Organizational efficiency

Only 15.5 per cent of the extension personnel comes under high perception group of organizational efficiency. Facility and resource dimension was perceived low among eleven dimensions. The percentage contribution of facility and resources, decision making ability were higher in differentiating high vs medium and high vs low perception groups.

Causes ?

Lack of commitment, accountability, trust, job satisfaction of extension personnel. Self oriented than client oriented, reluctance to take risk, take for granted attitude from both ends, superfluous political interference, lack of conveyance facility and working environment.

Strategy

Overall improvement in professional responsibility and accountability for effective and efficient working of extension system. It is by meeting needs – farmers first rather than transfer of information, need to become 'Insiders' developing a new relationship with their clients and thus becoming more like facilitators rather than just working as outside visiting experts. Considering farmers interests as the moving force for action – more concern with people first than with TOT. Cost effectiveness of extension workers should be measured meaningfully in terms of the impact on agricultural production rather than number of meeting and seminar.

Ensure co-ordination among various departments. Control and monitoring cell both for scheme review and establishment affairs of extension personnel.

KERALA AGRICULTURAL UNIVERSITY

DEPARTMENT OF AGRICULTURAL EXTENSION

CONSENSUS BUILDING WORKSHOP
(Part of Ph.D programme)
N.G. Balachandranath (2001 – 21 – 09)

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EXTENSION STRATEGIES FOR THE MAJOR FARMING SYSTEMS IN THE CONTEXT OF THE CHANGING AGRICULTURAL SITUATION IN KERALA

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ABSTRACT OF THE THESIS

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ABSTRACT

The study was aimed to analyse the impact and implication of economic reforms in agriculture on the economic performance of farmers, SWOT analysis of agriculture in Kerala as well as extension organization in the State Department of Agriculture and delineation of the dimensions of organizational efficiency in the State Department of Agriculture. Consensus building workshop was conducted on the basis of collected data and extension strategy was formulated for the changing agricultural situation in Kerala. A sample of 300 farmers was selected at random from 20 panchayats (five each for coconut, rice, tapioca and homestead based farming system) from the five NARP zones of the state. Besides 60 stakeholders and 90 extension personnel were selected as respondents for the study. The components of economic performance and dimensions of organizational efficiency formed the variables of the study. The data were gathered by the use of interview schedule and questionnaire from the respondents. Statistical techniques such as correlation, ANOVA, Paired 't' test and Discriminant Function Analysis were used to analyse the data.

The variables namely, economic motivation and market demand were exhibited significant association with economic performance in the coconut based farming system. Innovation proneness, information backstop, market perception, market behavior were exhibited significant association with economic performance in the rice based farming system. In the tapioca based farming system variables namely, information backstop and market intelligence were having significant association with economic performance.

The high organizational efficiency cluster consisted of only 15 per cent of the extension personnel. The dimensions namely, job perception, guidance and supervision, job performance and achievement motivation were perceived high among the extension personnel. The dimensions such

as facility and resource, job satisfaction, job involvement and job autonomy were perceived low among the extension personnel.

The dimensions, job satisfaction with job autonomy, guidance and supervision and facility and resources; facility and resources with guidance and supervision; organizational commitment with organizational involvement and job perception; job performance with organizational commitment were having significant relationship with each other.

To asses the economic performance of farmers, Cantrill's 'self-anchoring striving scale' was adopted. Data from the farmers were collected using pre-tested structured interview schedule.

For identification of SWOT, Delphi technique – the methodology for elicitation of expert opinion – was used. SWOT from the stakeholders were collected using separate schedules.

The economic performance of farmers among farming system were low during the reference period-II (1996-2001) than the references period –I (1990-1995). It was in the decreasing order as tapioca based, coconut based, rice based and homestead based farming system.

In Northern Zone, comparatively low economic performance was observed in the tapioca based farming system. In the Central Zone, low economic performance was obtained in the coconut based farming system. In the High Range Zone, low economic performance was observed in the rice based farming system and in the Special Zone and Southern Zone low economic performance was obtained in the homestead based farming system.

Among performance of individual crop, the low economic performance was observed in coconut when compared to other crops in the Northern Zone. Among the farming systems, paddy exhibited low economic performance in rice based farming system in the Northern Zone. The economic performance of coconut and pepper was low in the

tapioca based farming system. Arecanut showed low economic performance in the rice based farming system. The performance of banana and tapioca were having almost at same level in both the reference period irrespective of the farming system.

In the Central Zone, coconut exhibited low economic performance than other crops. Among the farming systems, coconut and rubber were having low economic performance in the rice based farming system. The economic performance of pepper was low in the homestead based farming system. For banana, low economic performance was obtained in the coconut based farming system. Tapioca obtained low economic performance in the tapioca based farming system.

Coconut obtained low economic performance in the High Range Zone during reference period-II when compared to other crops. Among the farming systems, the performance of paddy was low in the coconut based farming system. The economic performance of coconut, banana, rubber, cocoa and coffee was low in the rice based farming system. Pepper obtained low economic performance in the tapioca based farming system.

In the Special Zone, coconut had low economic performance during the reference period – II than the reference period-I than other crops. In the coconut based farming system the low economic performance was obtained for paddy. Coconut and pepper had low economic performance in the homestead based farming system. For banana and rubber low economic performance was obtained in the coconut based farming system.

The economic performance of pepper was low during the reference period – II than the reference period – I when compared to the other crops in the Southern Zone. Paddy obtained low economic performance in the coconut based farming system, coconut and rubber obtained low economic performance in the homestead based farming system and pepper obtained low economic performance in the tapioca based farming system.

The economic performance of farmers in the High Range Zone was low when compared to other zones during the reference period-II than the reference period-I. The large farmers were having comparatively low economic performance than small and the marginal farmers. In the High Range Zone comparatively low economic performance was obtained for the small farmers than the other two categories.

Plant diversity, diversified physiography, progressive and highly literate farmers, rich natural resource and bio-diversity were ranked high among the strengths of agriculture in Kerala. The weaknesses ranked high were fragmented and uneconomic holdings, low value addition process, highly fluctuating and unrewarding price regime, predominant labour problem, post harvest loss, lack of infrastructure facilities etc. The opportunities such as untapped export potential, popularize and make use of brand name, diversification of activities, human resource development, use of information technology were having the top positions. Rapid soil erosions, deforestation, slow adoption of quality culture, globalization of Indian agriculture and WTO were ranked high among the threats.

Grass root level extension functionary offices, reasonably well structured organizational set up, human resource, reasonably good laboratory and infrastructure facilities for testing seed, fertilizer, soil etc. were ranked high among the strengths of extension organization in the State Department of Agriculture. The weaknesses such as dual administrative control, lack of human resource development mechanism, insufficient infrastructure facilities, paucity of funds to invest in high-tech programs, poor conveyance facilities were having high ranks. Market oriented extension with emphasis on export and import, strengthening information communication technology, gearing up to face the challenges raised by globalization were having top ranks among the opportunities. The threats such as conversation of arable land to non-agricultural purpose, lack of commitment among extension personnel, globalization

necessitated changes in the concept of conventional agriculture, restrictive funds from the government, absentee land owners were having top ranks.

Based on the results consensus was arrived on the strategies for the farming systems and extension organization in the State Department of Agriculture.