IMPACT OF NARP ON AGRICULTURAL DEVELOPMENT IN THE SOUTHERN AGRO-CLIMATIC ZONE OF KERALA

By

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THESIS

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Dedicated to

My loving father, whom I lost on the way...

Declaration

I hereby declare that the Thesis entitled " Impact of NARP on Agricultural Development in the Southern Agro-climatic zone of Kerala" is a bonafide record of research work done by me during the course of research and the thesis has not previously formed the basis for the award to me any degree, diploma, associateship or other similar title of any other University or Society.

Vellayani
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Certificate

Certified that this Thesis entitled " Impact of NARP on Agricultural Development in the Southern Agro-climatic zone of Kerala" is a record of work done independently by Smt. Ashaletha. S., under my guidance and supervision and that it has not previously formed basis for any degree, fellowship or associateship to her.

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List of abbreviations used

ICAR - Indian Council of Agricultural Research

NARP - National Agricultural Research Project

KAU - Kerala Agricultural University

SDA - State Department of Agriculture

NATP - National Agricultural Technology Project

RARS - Regional Agricultural Research Stations

IBRD - International Bank For Reconstruction and Development

SAU - State Agricultural University

IDA - Inter national Development Agency

INTRODUCTION

1.Introduction

In India, during post-independence period tremendous progress was achieved in agricultural production with massive application of science and technology. Food grain production has increased three times during the period 1950-51 to 1993-94. Earlier it was as a result of increase in both areas under plough and irrigation potential. Later the progress was attained mainly through increase in productivity as a result of green revolution. Suitable technologies have been generated with the help of improved infrastructure and manpower. Thus our country has shifted from a state of "begging bowl to breadbasket".

On the other hand demand for food is increasing rapidly along with population rise. By May 2000 AD, the population has become one billion. The demand for food was predicted to be about 215 billion tonnes. According to International Food Policy Research Institute (IFPRI)-Indian Agricultural Research Institute (IARI) projections, the demand for cereals alone will be 293.4 million tonnes in 2020. As a result, agricultural development relies more and more on scientific and technological advances in agriculture that necessitates the development

of a strong and dynamic National Agricultural Research System. The Country's agricultural research system has been undergoing changes from time to time geared to meet the present needs as well as the challenges in future.

After independence the agriculture system in India has made rapid strides both in concept and implementation towards becoming an effective system. Under the present set up the Indian Council of Agricultural Research (ICAR) at the national level mainly aids, promotes and co-ordinates research and education activities in the country. It also undertakes research through it's own institutions. But in these national institutes research is undertaken mainly on issues of national importance. The responsibility of conducting research on state level problems rests with State Agricultural Universities (SAUs). These SAUs have a statewide mandate for education, research and extension and did not have a strong base for agricultural research at regional level. The fund received from ICAR and state governments was inadequate. The major efforts of SAUs were concentrated at their main campuses because infra-structural facilities were not fully developed at regional stations to take up research activities at regional level on location specific needs.

In 1979, with World Bank assistance, ICAR launched an innovative research programme known as National Agricultural Research Project (NARP) to strengthen the research capabilities of SAUs. This project was aimed at assisting the SAUs in conducting location specific, need based and production-oriented research on the basis of identified agro- climatic zones.

The main objective of NARP is to improve the regional research capabilities of SAUs permanently. This strengthening was considered to be an important means of finding solutions to the location-specific problems of different agro-climatic regions in the service area. For this purpose research effort was promoted in respect of (1) food grains (cereals and millets, pulses and oil seeds particularly grown under rainfed conditions) (2) farming systems involving crop-livestock and crop-fish production systems (3) agronomic practices (4) soil and water conservation techniques and (5) land use patterns for more efficient use of natural resources and ecological potential.

Under NARP, the country has been classified into 135 agro-climatic zones (Ghosh, 1991). In each zone a Regional Agricultural Research Station (RARS) was established / strengthened. Adequate infra structure facilities were provided/ improved at these stations. Scientific manpower was also strengthened. Hence these research stations became

full-fledged in terms of manpower and physical facilities. The responsibility of conducting location-specific and need-based research on problems related to the crops and commodities of a particular region rests with the regional stations.

The project was funded by ICAR from its plan allocation and was supported by the International Bank for Re-construction and Development (IBRD) to the extent of fifty per cent of the expenditure. ICAR has sanctioned many sub- projects under NARP during the first phase. NARP has been Implemented with an International Development Agency (IDA) credit of $27m, which is fifty per cent of the total estimated cost of $54m. Normally the projects funded with IDA support are appraised, sanctioned and monitored by IDA. However in respect of NARP, the IDA has made a departure and has delegated the responsibility to the ICAR itself. Evaluations are done on a routine basis by the visiting teams of ICAR and World Bank.

In Kerala Agricultural University (KAU), NARP was launched in May 1980. Taking the composite view of the physiography, soils, climate, sea water incursion, irrigation facilities and land use pattern, Kerala state was divided into five agro- climatic regions i.e.,(1)Northern region (2) Central region(3) Southern region (4)High ranges and (5)Region with problem areas including *Onattukara, Kuttanadu* and *Pokkali* areas.

According to the guideline given under NARP by the Director of Research, KAU, research projects were formulated and implemented based on the identified problems of different farming situations.

Need for the study

Different types of responses are obtained from researchers and farmers about the impact of the research project during and after the implementation. For example, a report on the success of a demonstration trial conducted by NARP scientists in *Kuttanad* of *Allappuzha* district, which appeared as very much surprising and hopeful, is as follows;

An extension cum demonstration of integrated pest management in rice in *Kuttanad* of *Alappuzha* district of Kerala was carried out during 1995-1996. Twenty-five farmers were selected and grouped into five and the season long training was carried out on the last working day of each week. Exercises carried out during the training period were (1) agro-eco-system analysis (AESA), (2) crop compensation exercise, (3) effect of insecticides on bio-diversity and (4) varietal reaction in pest and defender incidence.

Considering the effect of insecticide on bio- diversity alone, the result is like this-"In the unsprayed and sprayed plots somewhat the same trend was recorded. In the unsprayed plots the defenders were high upto seventh week and thereafter the pest population started increasing during the 8th, 9th, and 10th week. The maximum population of pest was noted at the 10th week and there after pest population decreased and the defenders increased. In the sprayed plots, pest population started increasing from 6th week onwards and reached the peak on the 9th week and gradually decreased during the 10th and 11th week. Again it started building up (three sprayings were given at the 3rd, 5th and 9th weeks after sowing) The sprayed and unsprayed plots gave the same yield (4.9t to 5t / ha) with an additional expenditure of Rs. 1200 / ha for the "sprayed plots".

In nutshell, the scientists behind the project claim that if the defenders and the pests are allowed to live and multiply in the rice fields, the biological balance will be maintained and will do no harm to the farmer, affecting the crop yield. In other words the wastage of effort and money by the farmers can be saved to a greater extent.

On the other hand, during a field visit made by the researcher as a part of a training programme in a Krishibhavan in *Thiruvananthapuram* district, few progressive farmers of the locality were interviewed. The

farmers were innovative and possessed good knowledge. But they were very much worried about the research approach and complained that the research system is not understanding the felt needs of farmers and is not analysing the field situation properly before selection of research problem and release of technology. They quoted an example to substantiate their argument, which was like this;

During the third crop season, farmers of the locality have the practice of cultivating cowpea in the summer rice fallows. Usually they cultivate a local variety, which gives poor yield, which they also admitted. During one summer season the Krishibhavan officials distributed seeds of a new cowpea variety, which was recommended for cultivating in the summer rice fallows for better yield compared to the local variety. The progressive farmers of the locality cultivated the crop followed proper cultivation practices and the crop showed luxurious growth also. But the crop did not yield grains. The farmers were shocked by the incident and almost all lost the credibility in the Krishibhavan officials. When the Krishibhavan officials were asked about the incident, they also agreed to what was told by the farmers. They believe that the seeds might have been that of a fodder variety of cowpea. The farmers ate, whoever may be the culprit, the bitter fruits of the harvest.

Hence it was understood that the perception and response about the research project by farmers, extension personnel and researchers will be different in many aspects. Research efforts were found to be scarce in analyzing the impact of NARP, which was implemented for providing proper attention to the location specific needs of the farmers.

In this study an attempt is made to assess the impact of NARP on the agricultural development of the southern agro- climatic region of the state.

The specific **objectives** of the study are;

- To analyze the trends in area, production and productivity of major crops in the region

- To study the extent of awareness about NARP, level of knowledge and adoption of the improved varieties and recommended practices by the farmers

- To study the perception of extension personnel about the impact of NARP on farmers

- To study the perception of extension personnel and farmers about the extension components of NARP

- To study the perception of scientists about the implementation of the research concept of NARP

- To study the perception of scientists and extension personnel about the linkage existing among researchers, extension personnel, input agencies and farmers

- To study the perception of scientists, extension personnel and farmers about the constraints experienced during the implementation of NARP

Scope of the study

By launching NARP in India, ICAR has added a new dimension to agricultural research. The results of this impact study will throw light to facts on the extent of achievement of the objectives of NARP. The perception of scientists, extension personnel as well as the end users will be analyzed in detail. The study will reveal the level of awareness of farmers about the programme, their knowledge about the improved practices, extent of adoption, which would indicate the efficacy of the project. The strategy developed based on the results would be of much help in the effective implementation of National Agricultural Technology Project (NATP) so as to suit the needs of the farmers as well as to

motivate the functionaries involved in the implementation of the programme. 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 programmes /projects.

Limitations of the study

The present research formed a part of the Doctorate programme of the author and hence all the limitations of time, finance and resources were there. Those limitations restricted the selection of study area and sample size. The study was conducted in the southern zone. The generalisability of the results may be low. Since the study is based upon the expressed opinion of the respondents, it may not be free from personal bias and prejudice. In spite of all the limitations, every effort was made by the researcher to carry out the study as systematic and sincere as possible.

Organization and presentation of the thesis

This thesis is presented in five chapters. The **first** chapter is devoted to brief introduction containing the importance, objectives, scope and limitations of the investigation. The **second** chapter deals with

the theoretical orientation of the thesis. The definition of concepts and review of literature are presented in this chapter.

Chapter **three** deals with the methodology of the thesis. In this chapter the location of the study, sampling procedure, variables selected for the study and their measurement, development of questionnaire, details of data collection and statistical methods used for analysis are given. Findings are given in chapter **four** and the results are discussed. A summery and conclusion of the thesis is presented in chapter **five**. References and appendices are given at the end.

THEORETICAL ORIENTATION

2. Theoretical Orientation

In this chapter an attempt is made to give a proper orientation to the study by linking the research findings available in the area of the study with the proposed research problem. It provides an understanding of the concepts used in the study. It also helps in understanding the present position of research works done in the area. But it has been observed that very few research studies have been undertaken in this study area. However an earnest effort is made to review the available literature having direct or indirect bearing on this study. This chapter is presented under the following heads;

1. Trends in area, production and productivity of major crops.
2. Concept of Agricultural development
3. NARP
4. Awareness about NARP
5. Knowledge about improved varieties and practices
6. Adoption of improved varieties and practices
7. Relationship of profile characteristics of farmers with their perception about the extension activities under NARP.

8. Perception about extension activities under NARP
9. Perception of scientists about the implementation of NARP.
10. Perceived linkage problems under NARP.
11. Perception about the impact of NARP.
12. Perception of constraints in the implementation of NARP.

2.1. Trends in area, production and productivity of major crops.

Crop sector accounts for the largest share of the State's agricultural income while livestock and fisheries sectors are also emerging as important areas supplementing the rural income and employment. As a natural corollary in development support and resource allocation crop sector has gained prime significance. The earlier sectorial strategy in the Five Year plans attributed significance to both vertical and horizontal growth of agriculture but the 6th plan onwards the focus is on vertical growth, augmenting the productivity of both food crops and commercial crops through infra structure development and better management.

Babu *et al.*(1993) studied the trends in area, production and productivity of major crops in Kerala. His report is as follows;

2.1.1 Paddy: The paddy acreage in the State was increasing steadily till 1969- 70 and then remained stagnant till 1975-76. It has been

declining continuously since then. Paddy production continued to increase rapidly till 1971- 72 and stagnated during the second half of seventies and declined during eighties. Productivity continued to grow through out the study period except during the stagnation experienced during the early seventies and mid-sixties.

2.1.2 Banana : The area, production and productivity of *nendran* and other plantains combined, was analyzed and found that the area and production of banana were fluctuating widely. On the other hand productivity showed stagnation till 1975-76 and deceleration afterwards.

2.1.3 Tapioca : Tapioca acreage was increasing till 1975-76 and then its reverse trend. Tapioca production also increased steadily to reach the peak during 1971-72 and declined till 1977-78. Thereafter an increasing trend was noted till 1985-86.

2.1.4 Coconut: " The tree of heaven" plays a pivotal role in the State's economy. Coconut area was reported to show an increase steadily till 1973-74 and declined thereafter. An upward trend in coconut acreage could be observed from 1981 onwards till 1985-86. Production also followed a more or less similar trend. Coconut productivity on the other hand, has been declining continuously and the productivity level of the late 50s was reported to be not achieved again.

Report of the task force on Field Crops (1997-2002) says that rice production has touched an all time low of 9.53 lakh tonnes against the Eighth Five Year Plan target of 14 lakh tonnes. The report says that production targets for crops like rice, pulses and tapioca were as a matter of compulsion kept at reduced levels and the performance was still worse with the production base eroding year after year. As per the committee report, coconut is the only crop in the State which has shown a spectacular recovery from its trend exceeding the physical targets in Sixth, Seventh and Eighth Five Year Plans. For crops like banana, the targets and achievement were at high variance.

A critical review of the current trends in area, production and productivity of major crops in the zone with all its strengths and weaknesses is necessary to get a comparison of the pre and post implementation periods of NARP. Hence an attempt is made in this study to analyze the trends in area, production and productivity of major crops like rice, coconut, banana, sesamum and tapioca for a period of 1960-98. A comparison of the trends during 1960 -80 with that during 1980-98 will give a picture of the change (if any) in the acreage, production and productivity which can be attributed to the NARP to a greater extent as NARP was implemented during 1979-80.

2.2. Concept of agricultural development

2.2.1 Development

Development implies gradual and sequential phases of change. Rogers and Shoemaker (1970) defined development as a type of social change in which new ideas are introduced into the social system in order to produce higher per-capita income and levels of living through modern production methods and improved social organizations.

World development report (1991) defined economic development as a sustainable increase in living standards that encompasses material consumption education, health and environmental protection. Development in broader sense is understood to include other important and related attributes as well, notably more equality of opportunity and political freedom and liberties. The overall goal of development is, therefore, to increase the economic, political and civil rights of all people across gender, ethnic groups, races, religions and countries.

2.2.2 Agricultural development

Shankariah and Reithmuller (1977) reported agricultural development as an outcome of developing people's ability to set up goals, make decisions and carry out their plans through;

- Transformation of subsistence agriculture to commercial agriculture
- Increase in commercial activities
- Increase division of labour in agriculture.
- Transformation of occupational structure and
- Modernization of benefits and values

Agricultural development can be considered as development that occurs in the sphere of agriculture. It can be referred to as the considerable increase in the productivity of crops resulting from modern technology, which in turn will shape meticulously the socio-economic conditions of farmers.

In the context of NARP, agricultural development can be defined as improvement in the regional research capability of SAUs and thereby enhancing the productivity of crops cultivated by farmers leading to their socio-economic improvement.

2.3 National Agricultural Research Project (NARP)

The NARP has been launched by ICAR on 1st 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 IBRD to the extent of 50per cent of the expenditure. The genesis of the project could be traced to the fact that SAUs, which have a state-wise mandate for education, research and extension education, did not possess a strong base for agricultural research at regional level. They were also constrained by shortage of funds to intensify their efforts in this direction. The research programme also has been developed by and large in an adhoc manner based on isolated projects. The research efforts of the Universities often were not well- focussed on local research needs. In many cases, available resources in terms of research scientists and physical facilities were not optimally utilized. Existing schemes for supporting research were concentrated on the development of main campuses, not the regional research needs. This was proposed to be remedied through the implementation of NARP. Thus the aim of NARP was (a) rationalization of university research programme and research organization and (b) strengthening capacity of the agricultural universities to undertake research on location specific problems in all parts of the state.

Assistance to the SAUs under NARP was given for;

- Strengthening on going research
- Pursuing new applied research aimed at alleviating or removing constraints on the production of commodities and
- Establishing new research stations to serve the research needs of agro-climatic zones. For this purpose three types of sub-projects were identified

2.3.1 Administrative sub-project:

To strengthen the office of the Director of Research, through provision of additional scientific and supporting staff, office equipment, transport etc., for effective implementation and coordination of research programmes.

2.3.2 Regional research sub-project:

To establish and strengthen regional research station in each selected agro-ecological zone and for enhancing the capabilities of the SAU to conduct locations specific research aimed at solving the problem of the zone. Scientific and supporting staff, laboratory, office, farm structure, residential houses, equipment, furniture, farm development

and transport, operation cost are major components where support is provided under NARP funding.

2.3.3 Basic research sub-project:

To initiate, strengthen and accelerate basic research crucial for the long-term development of agriculture in the state. The support is provided for staff, equipment and operating cost for basic research sub-project.

2.3.4 Training sub-project

In addition, two training sub –projects have also been approved under NARP, one in the National Academy of Agricultural Research & Management (NAARM) and other at the Indian Agricultural Research Institute (IARI), New Delhi. The two training sub-projects provided training facilities to the scientists working at the SAUs.

2.3.5 NARP – programmes:

2.3.5.1 Phase-I

The phase-I of the NARP financed by IDA of the World Bank was started in July 1979. In phase-I the intensification of research efforts was aimed mainly at food grains (cereals and millets), pulses and

oilseeds grown under rainfed conditions. It was also aimed to boost production of the crops grown under rainfed conditions, developing cropping patterns and mixed farming system and production of commercial crops namely sugarcane, potato, tobacco and cotton. Bridging the research gaps in the field of agriculture and improving the research-extension linkages for effective transfer of technology to the farmers' field was also covered. Phase –I of NARP was completed in March 1986.

With the establishment of zonal research stations during Phase-1 the research focus was gradually shifting form main campus of the University to the zonal research station. To realize the full impact, the need on continuation and re-orientation of NARP operations to tackle many of the newer problems was felt. During the operation of the phase–1 the following issues came to light:

- Large segment of the farmers are still not aware of the role of research in agriculture

- Very often, researchers located at the regional research centres have little say in formulating their research programme.

- Inadequate facility and location of research stations prohibit work on varying problems encountered in the service area of research station.

- Inadequate attention to diversification of crops provided little alternative to the farmers but to traditional crops and systems.

- The technology developed at the research centres are not effectively tested for their suitability under farmers managerial and resources situation.

2.3.1.2 Phase –II

In phase-II,the following activities were identified:

- Completion of un-finished phase-I sub-projects.

- Strengthening the new areas of research such as irrigated farming, animal drawn farming implements, agro-forestry, horticulture and animal nutrition. It was felt that field-testing and refinement of research results need emphasis.

Research sub-projects being financed during phase –II were of three kinds:

- Supplemental sub-projects at zonal research station already established in the Phase-I

- New sub-projects in un-covered agro-ecological zones

- Special research sub-projects.

The priority areas of research in phase-II of NARP were focused at some new areas like

- Irrigated farming

- Agricultural Implements

- Horticulture and commercial field crops

- Agro-forestry

- Animal Nutrition

- Special research sub-projects to find solutions in certain priority problems that were not yet identified. Phase II of NARP was completed in 1992.

2.4. Awareness about NARP

2.4.1 Awareness

According to Dictionary of Behavioural Sciences, awareness is being conscious of something, perceiving or taking account of some event, occasion, experience or object. Lionberger (1960) defined awareness as the first knowledge about a new idea, product or practice. At the awareness stage a person has only general awareness about it. The success of any development programme lies in the support given by masses. Hence to gain support, prime step is to make the people aware of the programme, its activities, aims etc. Awareness is the first step towards adoption.

2.4.1.1 Awareness of farmers about NARP

Reddy (1984) reported that awareness about NARP functions is generated among farmers by means of personal visits, training programmes, field visits etc. Balu (1980) found that three fourth of the participants (71.67per cent) and nearly half of the non- participants (40per cent) belong to the medium awareness category about the functioning of Integrated Dryland Agricultural Development Programme. Haraprasad (1982) found that the beneficiaries have significantly higher awareness about Small Farmers Development Agency (SFDA) activities.

Ponnappan (1982) found that fish farmers had significantly higher awareness about facilities of Fish Farmers Development Programme than others.

Krishnankutty and Nair (1988) revealed that maximum awareness about Integrated Rural Development Programme (IRDP) was among marginal farmers. Awareness about the benefits of the programme was very low among most of the beneficiaries even after 10 years of implementation of the programme.

Sajeevchandran (1989) found that there was significant difference in the level of awareness among beneficiaries and non-beneficiaries about pepper development programmes. Ganesan and Muthiah (1991) reported that there existed significant differences among officials, leaders and farmers beneficiaries of Madhurai District of Tamil Nadu regarding the awareness level of agricultural development schemes.

Kumar and Dhawan (1992) reported that majority of the farmers in the Kandy areas of Punjab were having high level of awareness about the land development programmes implemented there. While studying the extent of awareness of the beneficiaries of Jawahar Rozgar Yojana, Sureshkumar and Venkataramaiah (1992) found that only those who were benefited by the programme were aware of the programme in detail.

Others had comparatively little awareness about the programme and that again was regarding the wage rate paid and the implementing agency only. Lakshmi and Manoharan (1993) also revealed the same result while studying the level of awareness of farmers about the Dryland Agricultural Technology. Jnanadevan (1993) reported that majority of the beneficiaries of Coconut Development Programmes possessed higher level of awareness about the programmes.

Kalivaradhan *et al* (1996) reported that awareness of women beneficiaries about IRDP was significantly low in Pondichery. Manjunath *et al* (1996) found that though enough dry farming technologies have been evolved, farmers are not fully aware of it in Mysore. Pushpa and Seetharaman (1998) indicated that majority of the Training for Youth for Self Employment programme beneficiaries (78.38 per cent) possessed medium level of awareness followed by high-level awareness category i.e., 13.51 per cent.

The above findings reveal that the awareness level of clients about development programmes vary in different contexts due to different reasons. Hence, an attempt was made to analyze the level of awareness of the beneficiaries of NARP in this study.

2.5 Knowledge level of farmers about improved varieties and practices

2.5.1 Knowledge

Websters New International Dictionary defined knowledge as familiarity gained by actual experience, practical skill and technical acquaintance. Webster has also defined it as "acquaintance with facts, state of being aware of something or of processing information, hence scope of information."

- Oxford English Dictionary defined knowledge in various ways but the most relevant definitions to this study are the following

- Acquaintance with a branch of learning, a language or the life, theoretical or practical understanding of an art, science, industry etc.

- Intellectual acquaintances with perception of facts or truths, clear and certain mental apprehensions, the fact, state or condition of understanding.

In scientific terms, knowledge is the totality of facts gained by human labour, experience and experiments; as well as fiction or

mythological or artistical production learned irrationally through the use of mental and spiritual powers.

Fuller and Waldron (1989) opined that knowledge generation in agricultural sector developed along three main lines. Research information has largely informed the policy sector of agricultural development institutions and agencies of Government. Scientific advance has been adopted and further developed by agri-business and industry, while the research and development in farming methods, storage, marketing and management techniques has been passed on to the farmers through various types of technical service and extension services.

Pandey and Sharma (1990) defined knowledge as familiarity gained by mental experience, practical skill and acquaintance or intellectual experiences with truths or merely acquaintance with facts. Thus knowledge is generally used synonym to acquaintance, familiarity, fact or simply to know. Proper knowledge of a farmer is the indication of effective transfer of information. Knowledge about an information is a pre-requisite for its adoption.

2.5.2 Effect of development programmes on knowledge of farmers

A brief review of effect of development programmes on knowledge about improved scientific practices are presented below;

Samad (1979) found that in areas where pepper and coconut package programme were implemented knowledge of farmers about improved scientific practices were more compared to other areas. NARP status report (1989) revealed that the rice farmers of Kerala have good knowledge about the benefits of balanced nutrition but had low adoption. Binoo (1991) says that majority (67per cent) of commercial vegetable growers had medium level of knowledge about improved vegetable cultivation practices in Thrissur district of Kerala.

According to Reddy and Iqbal (1993) the level of knowledge of majority of beneficiaries was high while that of majority of the non-beneficiaries was low regarding Watershed Development programme. Jnanadevan (1993) revealed that majority of the beneficiaries of the Coconut Development Programme possessed higher level of knowledge about the programme.

Manjunath *et al* (1996) reported that though enough dry farming technologies have been evolved farmers are not fully aware about it in Mysore. Waghmare *et al* (1998) observed that 19.33 per cent of the

beneficiaries of Horticultural Development Programme (fruits and vegetable growers) were found to be in the low knowledge category. Sixty per cent were located in medium knowledge category and one fifth of the respondents possessed adequate knowledge about the programme.

2.6 Adoption of improved varieties and practices

2.6.1 Adoption behaviour of farmers

Chattopadhyay (1963) defined adoption as the stage in the process where decision analyzing is complete regarding the use of a practice and action with regard to such a practice commences. Rogers and Shoemaker (1970) defined adoption as a decision to make full use of an innovation. It can be considered as an overt behaviour, which is intended to accomplish some objectives, which in turn would satisfy or at least reduce some needs of the individual.

Leagans (1985) stated that adoption behaviour tends to be specific to particular innovation, individuals and environment. But there are some characteristics in general such as

- It is an adoption behaviour and as such idiosyncratic. Individually circumstances may vary so adoption behaviour also

- Effect of communication, what, why and how of the technical idea, is a component.

- Traditional socio-economic factors generally influence the adoption of agricultural innovation.

- Socio-psychological factors significantly involve in adoption of an innovation.

Thus at the basic level of conceptualization, adoption of an innovation is a type of action or behaviour.

According to Sulaiman (1989) perception about the attribute of an innovation and their appropriateness as judged by the farmers is crucial in deciding their adoption behaviour.

Sharma *et al* (1989) pointed out that the adopted village under Lab to Land Programme had higher adoption as well as yield level because of improved technology transfer. The NARP status report of KAU (1989) revealed that the adoption pattern of fertilizer use by the rice farmers in Kerala exhibited much variation in the different stages of crop growth. It was also pointed out that rice farmer of Kerala is well aware of the benefits of balanced nutrition, but the adoption level was low.

Gaikwad and Ingle (1992) revealed that 85 per cent of the beneficiaries had high adoption level. Adoption level of improved seed, use of fertilizer, use of insecticide, inter cropping, use of irrigation system etc. was high in high adopters.

Nataraju *et al* (1996) reported that there existed a wide gap between research system (technology generation) and farmers system (technology utilization) under NARP.

2.6.2 Extent of adoption of improved practices

According to Adhiguru and Perumal (1984) percent adoption for variety and seed rate followed by fertilizer application and seed treatment was low. i.e., those technologies with vinal impact will motivate farmers where as in the case of technologies with intangible effect, however lower may be it cost, will not attract farmers. In such cases, farmers need to be educated. Yield gap has been reduced considerably in the post implementation period of Integrated Programme for Rural Development (IPRD).

Pandey and Pandey (1984) reported that small farmers were better adopters of chemical fertilizer compared to marginal farmers.

Saxena *et al* (1990) showed that 17.6 per cent of farmers adopted recommended practices in full, while 49.6 per cent adopted partially and 32 per cent followed minimum level on their fields.

Singh and Singh (1991) reported that marginal farmers were good adopters of dryland farming technology in the district of Mirzapur ,Uthar Pradesh.

Janadevan (1993) reported that level of adoption of recommended practices of coconut was low among the beneficiaries of Coconut Development Programme, when compared with that of non-beneficiaries. Geethakutty (1993) observed that there was a variation between the NARP zones based on the composite fertilizer use behaviour of farmers. The central zone had the highest percentage of farmers under good level of composite fertilizer use behaviour index (60 per cent) followed by the High Range Zone (53.33 per cent).

Farooqui *et al* (1993) reported that the extend of adoption of water management practices by majority of farmers were low. Geethakutty (1993) observed that there was a variation between the NARP zones based on the composite fertilizer use behaviour of farmers. The central zone had the highest percentage of farmers under good level of

composite fertilizer use behaviour index (60 per cent) followed by the High Range Zone (53.33 per cent).

Jayalekshmi and Alagesan (1998) revealed that except fertilizer application and plant protection, farmers did not apply any other technologies recommended for sesamum in *Cauvery Mettur* project area. Adoption level was low among big farmers and high in medium farmers.

Sujatha and Annamalai (1998) indicated that adoption behaviour of farmer irrespective of the categories, ie small, medium and marginal, was medium.

Marathy and Reddy (1998) reported that majority of respondents had medium level of adoption (61.6per cent) of paddy production practices followed by low (21.7per cent) and high (16.7per cent).

Sekar and Alagesan (1998) reported that during 1981-91 a spectacular change occurred in the area, production and productivity as against the negative growth during 71-81. The authors attribute this change to the effective Transfer of Technology (TOT) from Krishi Vigyan Kendra , Directorate of Oilseeds and State Directorate of Agriculture. The efforts resulted not only in improvement but also in stabilizing area, production and productivity.

2.6.3 Extent of adoption of improved varieties and practices by pulses and oil seed growers.

Researchers have shown that the adoption of scientific cultivation practices for pulses and oil seeds vary from crop to crop, farmer to farmer and area to area. A review of studies of the adoption of practices from pulses and oil seeds is presented below (Table 1).

2.6.4 Effect of development programmes in adoption pattern

Singh and Singh (1974) reported that National Demonstrations were effective in helping scientifically oriented farmers in adoption. Kaleel (1978) reported that high adopters of improved agricultural practices were more in Intensive Paddy Development Programme implemented areas than in other areas.

Samad (1979) found that extent of adoption of improved scientific practices was more in coconut package programme areas, than in other areas. He also observed that programme participation and attitude had a significant influence on adoption behaviour of farmers.

Sivaramakrishnan (1981) observed that there was significant difference in the extent of adoption of individual practices within different crops viz., paddy, tapioca, coconut and rubber.

Sanoria and Sharma (1983) found that majority of the beneficiaries of agricultural development programmes were at medium level of adoption. Sudha (1987) found that the extent of adoption of transferred technologies was more among tribal participant farmers of Lab to Land programme than others.

Anantharaman *et al* (1992) based on a study conducted in *Vellanad* block of Thiruvananthapuram district revealed that out of sixteen practices, high technological gap exists in practices such as liming, seed treatment, water management, pest and disease control and potassium application.

Table 1. Research studies showing extent of adoption of different practices of pulses and oil seeds.

Sl.No.	Name of researchers	Year	Extent of adoption	Crop
1.	Balasubramahnian	1985	High yielding variety (HYV)– 76.75per cent Seedrate –76.71per cent Rhizobium treatment – 46.88per cent Plant protection measures – 58.9per cent	Pulses
2.	Bhaskaran and Praveena.	1982	Use of improved seeds was the only recommended practice adopted by majority of the respondents (2/3rd)	Castor
3.	Nagabhushanam and Basha	1981	HYV –0per cent Fertilizer application –0 per cent Plant protection – 15.78 Hand weeding – 100per cent	Ground nut.
4.	Satapathy	1981	Majority adopted–HYV Rhyzobium Culture –0per cent Chemical Fertilizer –17per cent Plant protection measures – 16per cent	Pulses
5.	Sen & Das	1986	HYV -100per cent Seedrate –majority Organic manure-10-19percent Chemical fertilizer-82.84percent	Rapeseed Mustard Groundnut
6.	Thyagarajan.	1981	HYV -100per cent Seed rate - 61per cent Rhizobium culture–70percent	Pulses
7	Anithakumari	1989	Full adoption of HYV – 25.33per cent Partial adoption - 45.33per cent Plant protection - 4per cent Full adoption - 16per cent Partial adoption - 52per cent Plant protection measures- 29.33per cent	Sesamum ,, ,, Cowpea ,, ,,

2.7 Relationship of the profile characteristics of farmers with their awareness, knowledge and adoption.

Various studies were conducted on the nature of the relationship existing among the socio-economic characteristics of farmers and their awareness about development programmes, knowledge about improved practices and extent of adoption of recommended practices, which revealed different kinds of relationships. An attempt was made to review those works to give an orientation to the study intended to be carried out to analyse the pattern of relation of selected twelve variables of the farmers with their awareness, knowledge and adoption. The following is a culmination of this effort.

2.7.1 Education.

Formal education expands one's ability to use modern communication media. Beal and Sibley (1967) have pointed out that the individual's ability to read and write and the amount of formal education he possesses will affect the manner in which he gathers data and relate himself to the environment.

2.7.1.1 Relationship with awareness

Table 2. Relationship of education of farmers with their awareness about the programme

No	Name.	Year.	Kind of relationship.
1.	Balu.	1980	Positive and significant
2.	Mani.	1980	,,
3.	Nandakumar.	1980	,,
4.	Sarkar and Reddy.	1980	,,
5.	Naik.	1981	,,
6.	Haraprasad.	1982	,,
7.	Vijaya.	1982	,,
8.	Cheriyan.	1984	,,
9.	Sumana and Reddy.	1998	Significant.
10.	Ponnan.	1982	,,
11.	Selvakumar.	1988	,,
12.	Theodore.	1988	,,
13.	Kunchu.	1990	,,
14.	Nandakumar.	1980	Negative and significant.

2.7.1.2 Relationship with knowledge.

Table 3. Relationship of education of farmers with their knowledge about recommended practices.

No.	Name of Author.	Year	Kind of relationship.
1.	Bhaskaran and Mahajan.	1968	Positive and significant.
2.	Supe and Salode	1975	,,
3.	Kaleel.	1978	,,
4.	Sethy *et al*	1984	Significant.
5.	Sinha and Ray.	1985	Positive and significant.
6.	Anithakumari.	1989	,,

2.7.1.3 Relationship with adoption.

Table 4. Relationship of education of farmers with their extent of adoption of recommended practices

Sl.No	Name of Author.	Year	Kind of relationship
1.	Kaleel	1978	Positive and significant.
2.	Rajendran	1978	,,
3.	Kamarudeen	1981	,,
4.	Haraprasad.	1982	,,
5.	Vijayakumar.	1983	,,

6.	Prasannan.	1987	Positive and significant.
7.	Anithakumari.	1989	,,
8.	Khan *et al*	1997	,,
9.	Sujatha and Annamalai.	1998	,,
10.	Ogunfidifimi	1981	,,
11.	Olown *et al*	1988	,,
12.	Thimmappa	1981	,,
13.	Sainath	1982	,,
14.	Sreekumar.	1983.	Positive and significant .
15.	Reddy	1987	Positive
16.	Pandurangaiah	1987	,,
17.	Reddy and Reddy	1988	,,
18.	Veeraraghavareddy	1988	Negative
19.	Sivanarayana and Reddy.	1994	Negative and non-significant.
20.	Rani and Singh.	1999	Positive

2.7.2 Farm size

Different authors have reported different types of influence of farm size on the level of awareness , knowledge and adoption level of farmers.

2.7.2.1 Relationship of farm size with awareness of farmers about the programme.

Table 5. Relationship of farm size with awareness of farmers about the programme

No	Author	Year	Kind of relationship
1.	Balu	1980	Positive and significant.
2.	Mani	1980	,,
3.	Haraprasad.	1982	,,
4.	Cheriyan.	1984	,,
5.	Kunchu	1990	,,

2.7.2.2 Relationship of farm size with knowledge

Table 6. Relationship of farmsize with the knowledge level of farmers about the recommended practices

No	Author	Year	Kind of relationship
1.	Sarkar and Reddy	1980	Positive and significant.
2.	Haraprasad.	1982	,,
3.	Jayaraman	1988	,,
4.	Singh and Singh	1991	,,

2.7.2.3 Relationship with the extent of adoption

Table 7. Relationship of farm size with the extent of adoption of recommended practice.

No	Author	Year	Kind of relationship
1.	Kaleel	1978	Positive and significant
2.	Pillai	1978	,,
3.	Rajendran	1978	,,
4.	Prakash	1980	,,
5.	Vijayakumar.	1983	,,
6.	Prasannan.	1987	,,
7.	Bavalatty& Sundaraswami.	1990	,,
8.	Singh and Singh	1991	,,
9.	Rani and Singh	1999	,,
10.	Ahmed *et al.*	1999	Significant

2.7.3 Economic motivation

Economic motivation might be regarded as an indication of the degree of willingness for investment of available potential resources in adopting farm innovations.

2.7.3.1 Relationship with awareness

Table 8. Relationship of economic motivation with awareness of farmers about the programme

No.	Name of Author	Year	Relationship
1.	Nandakumar	1980	Significant
2.	Mani	1980	,,
3	Aristotle	1981	,,
4.	Sajeevchandran	1989	,,

2.7.3.2 Relationship with knowledge

Table 9. Relationship of economic motivation with knowledge of farmers about recommended practices.

No	Name of Author	Year	Relationship.
1.	Jayakrishnan	1984	Positive and significant
2.	Somasundaram	1976	Positive and significant

2.7.3.3 Relationship with adoption.

Table 10. Relationship of economic motivation with extent of adoption of improved practices by farmers

No	Name of Author	Year	Relationship
1.	Shukla	1980	Positive and significant
2.	Krishnamurthy	1984	,,
3.	Singh and Ray	1985	,,
4.	Prasannan	1987	,,
5.	Balan	1987	,,
6.	Pathak and Samsal	1992	,,
7.	Sujatha and Annamalai	1998	,,
8.	Manivannan	1980	Negative and significant
9.	Gogi and Gogi	1989	,,
10.	Jnanadevan	1993	,,

2.7.4 Training

Training is a vital function to attain, sustain and accelerate the process of development.

Nataraju *et al* (1991) reported that majority of the extension workers of the Tamil Nadu State Department of Agriculture showed positive opinion regarding conduct of training sessions in terms of subject

matter coverages, physical arrangements, participation and involvement of scientists and extension workers in training sessions.

Sumana and Reddy (1998) says that training has no significant association with the level of awareness of the farmers about the different components and recommended practices of Watershed Development Project in *Prakasam* district of Andhra pradesh.

According to Sabharwab *et al* (1999) training imparted either through demonstration or through video film is necessary if permanent changes are planned to bring about.

No studies have been found conducted for studying the association of training with level of knowledge and extent of adoption of improved practices by farmers under NARP. Hence it was decided to study under the present context.

2.7.5 Innovation Proneness.

Sajeevchandran (1989) reported a positive association between the innovativeness and awareness level of farmers; while the relationship between innovation proneness and level of adoption of improved practices by farmers were studied and reported in different patterns by different researchers as follows,

2.7.5.1 Relationship with extent of adoption

Table 11. Relationship of innovation proneness with level of adoption of farmers.

No	Author.	Year.	Kind of relationship.
1.	Ravichandran.	1980	Positive
2.	Khan.	1997	Significant.
3.	Sujatha and Annamalai.	1998	Positive and Significant.

2.7.6 Risk Orientation

Farming operations suffer from some inherent risks. Farmers have to plan production and resource use in an atmosphere of imperfect knowledge. Farmers are different in their capacity to take risks, which may reflect upon their behaviour in total.

2.7.6.1 Relationship of with awareness.

Table 12. Relationship of risk orientation with awareness level of farmers about NARP

No	Author	Year	Kind of relationship
1.	Nandakumar.	1980	Positive and significant.
2.	Aristotle.	1981	,,
3.	Cherian.	1984	Positive significant.
4.	Sajeev chandran.	1989	,,

2.7.6.2 Relationship with knowledge

Table 13. Relationship of risk orientation with knowledge of farmers about recommended practices

No	Author	Year	Kind of relationship
1.	Kamarudeen	1981	Positive and significant.
2.	Jayakrishnan	1984	,,
3.	Krishnamoorthi	1984	,,
4.	Sabhapathy	1987	,,
5.	Ananda rao	1989	,,
6.	Govind	1992	,,
7.	Singh and Singh	1991	,,

2.7.6.3 Relationship with adoption Level.

Table 14. Relationship of risk orientation with extent of adoption of improved practices by farmers

No	Author	Year	Kind of relationship
1.	Nair.	1969	Positive and significant
2.	Singh and Sahay	1970	,,
3.	Anitha Kumari	1989	,,
4.	Juliana *et al.*	1991	,,
5.	Jaleel	1992	,,
6.	Singh and singh	1991	,,
7.	Govind	1992	,,
8.	Jayakrishnan	1984	,,
9.	Nanjayan	1985	,,
10.	Rathina Sabhapathy	1987	,,
11.	Sujatha and Annamalai	1998	,,

2.7.7 Management orientation.

Farmers differ in the degree to which they are oriented towards scientific management. Effective management of farm is essential to

secure maximum continuous profit. Farmers` orientation to management may influence behavioural pattern in turn.

2.7.7.1 Relationship with knowledge

Table 15. Relationship of management orientation with knowledge level of farmers.

No.	Author.	Year.	Kind of relationship
1.	Kamarudeen	1981	Positive and significant
2.	Anantharaman.	1991	,,

2.7.7.2 Relationship with adoption level

Table 16. Relationship of management orientation with adoption level of farmers.

No	Author	Year	Kind of relationship
1.	Bhaskaran.	1979	Significant.
2.	Kamarudeen.	1981	,,
3.	Thimmappa.	1981	,,
4.	Sreekumar.	1985	,,
5.	Syamala.	1988	,,
6.	Saed	1989	,,
7.	Ramachandran.	1992	Positive and significant
8.	Sivanarayanan	1994	Negative.

2.7.8 Level of Aspiration

Sushama (1993) operationally defined level of aspiration as the overall assessment of the respondents in relation to his or her concern for wishes and hopes for the future or for the fear and worries about the future in his /her own reality world. Sumana and Reddy (1998) indicated that level of aspiration has a significant association with the awareness level of farmers about different components and recommended practices of the Watershed Development Programme in Prakasm district of Andra Pradesh.

2.7.9 Attitude towards scientific agriculture

The attitude towards scientific agriculture is the degree of positive affect towards modern method of cultivation practices, a farmer possesses.

2.7.9.1.Relationship of with awareness

Table 17. Relationship of attitude towards scientific agriculture and awareness

No	Author	Year	Kind of relationship
1.	Nandakumar.	1981	Positive and significant.
2.	Kamarudeen.	1981	,,
3.	Jnanadevan.	1993	,,

2.7.9.2. Relationship of with knowledge level

Table 18. Attitude towards scientific agriculture and knowledge level of farmers.

No	Author	Year	Kind of relationship
1.	Manivannan	1980	Positive and significant.
2.	Kamarudeen.	1981	,,
3.	Syamala.	1988	,,
4.	Jnandevan	1993	,,

2.7.9.3 Relationship with adoption level

Table 19. Attitude towards scientific agriculture and adoption behaviour of farmers.

No	Author	Year	Kind of relationship
1.	Aristotle.	1981	Positive and Significant.
2.	Jayapalan	1985	,,
3.	Krishnamoorthy.	1985	,,
4.	Wilson and Chathurvedi	1985	,,
5.	Prasannan.	1987	,,
6.	Reddy and Reddy.	1988	,,
7.	Anithakumari.	1989	,,
8.	Sajeevchandran.	1989	,,
9	Umale *et al*	1991	,,
10.	Ramachandran.	1992	,,
11.	Swaminathan.	1986	,,
12.	Sivanarayana and Reddy.	1994	,,
13.	Jnanadevan.	1993	,,
14.	Sujatha and Annàmalai.	1998	,,

2.7.10 Credit Orientation

Farmers' orientation towards utilization of credit in farming may be influenced by different factors.

2.7.10.1 Relationship with adoption level

Table 20. Relationship of credit orientation with adoption level .

No	Author	Year	Kind of relationship
1.	Suryavanshi *et al*	,,	Positive relation
2.	Perumal and Mariappan	1982	,,
3.	Reddy *et al*	1982	,,
4.	Jaleel	1992	,,
5.	Sangeetha.	1997	Positive and Significant.

2.7.11 Information source utilization pattern

Information source utilization pattern indicates the mode and frequency of use of the different information sources by the farmer in order to gather information on the improvements and innovations in the field of agriculture.

2.7.11.1 Relationship with awareness

Table 21. The relationship between information source utilization and awareness level of farmers

No	Author	Year	Kind of relationship
1.	Mani	1980	Positive and significant.
2.	Nandakumar.	1980	,,
3.	Haraprasad.	1982	,,
4.	Ponnappan	1982	,,
5.	Selvakumar	1988	,,
6	Theodore	1988	,,
7	Kunju	1990	,,
8	Jnanadevan	1993	,,
9	Naik	1981	,,
10	Cheriyan	1984	,,
11.	Sajeevchandran.	1989	,,
12.	Sumana and Reddy.	1998	,,

2.7.11.2 Relationship with knowledge

Table 22. Relationship of information source utilization with knowledge.

No	Author	Year	Kind of relationship
1.	Haraprasad	1982	Positive and significant.
2.	Syamala	1988	,,
3.	Jnanadevan	1993	,,

2.7.11.3 Relationship with adoption level

2.7.11.4 Table 23. Relationship of information source utilization with level of adoption

No	Author	Year	Kind of relationship
1.	Balasubramaniam	1985	Positive and significant
2.	Mishra and Jha	1985	,,
3.	Swaminathan.	1986	,,
4.	Burns	1987	,,
5.	Sankaran.	1987	,,
6.	Jaiswal and Sharma.	1990	,,
7.	Satheesh.	1990	,,
8.	Umale.	1991	,,
9.	Ramachandran	1992	,,
10.	Jnanadevan.	1993	,,
11.	Khan *et al*	1997	,,
12.	Prakash	1980	,,

13.	Viju	1985	,,
14.	Sagar and Pal	1986	,,
15.	Theodore	1988	,,
16.	Athimuthu	1990	,,
17.	Govind.	1992	,,
18.	Sujatha and Annamalai	1998	,,

2.7.12.Extension participation

Extension participation is operationally defined as the degree to which a farmer participates in the extension activities organised in his locality by the development agencies.

2.7.12.1 Relationship with awareness

Table 24.The relationship between extension participation and awareness level of farmers

No	Author	Year	Kind of relationship
1.	Haraprasad	1982	Positive and significant.
2.	Selvakumar	1988	,,
3.	Kunchu	1990	,,
4.	Jnanadevan	1993	,,

2.7.12.2 Relationship with knowledge level

Table 25. Relationship of extension participation with knowledge level of farmers

No	Author	Year	Kind of relationship
1.	Knight and Singh	1975	Positive and significant
2.	Kaleel	1978	,,
3.	Kamarudeen	1981	,,
4.	Haraprasad	1982	,,
5.	Syamala	1988	,,
6.	Jnanadevan	1993	,,
7.	Manivannan	1980	,,
8.	Jayakrishnan	1984	,,
9.	Govind.	1992	,,

2.7.12.3 Relationship with adoption level

Table 26. Relationship of extension participation with level of adoption.

No	Author	Year	Kind of relationship
1.	Anithavijayan	1988	Positive and significant
2.	Krishnamoorthy	1988	,,
3.	Syamala	1988	,,
4.	Jnanadevan	1993	,,
5.	Jayaraman	1988	,,
6.	Govind	1992	,,

2.8 Perception about the extension activities under NARP

2.8.1 Farm trials

Cummings (1981) emphasized on on-farm research to evaluate technology's performance. Crawford and Barclay (1982), suggested that developing and evaluating technology must be done within the context of the farmer's own decision making environment and under the same conditions they face.

Sabarathnam (1987) reported that 71 per cent of scientists was deficient in conduct of on- farm trials.

Balaguru *et al* (1988) reported that observational farm trials conducted on pulses in farmers field was having good impact and favorable response from farmers.

According to Van Den Ban and Hawkins (1990) farm trial is one in which planned recommendations are compared with current farm practices. He also suggested that extension agents and research workers must co-operate with each other because research workers know most about the recommendations and extension agents know the current practices and how the practices will be put into practice on a farm.

Baker (1991) reported that farmer- based experimentation refers to an orientation of on-farm trials design, implementation and analysis procedures to focus on farmers' circumstances.

2.8.2 Demonstrations

According to Van Den Ban and Hawkins (1990) demonstration is an extension method that stimulates farmers to try out innovations themselves, or even may replace a test of the innovation by the farmer. He also says that there are unfortunately very few studies on demonstrations and the factors influencing the effects of it.

Pathak and Sasmal (1992) suggested demonstration as one of the best means for effective transfer of technology in jute. MSEE seminar on Extension Strategies for Watershed Development (1993) recommended demonstrations as effective means for better perception and adoption.

Nanjappa *et al. (1997)* recommended whole farm demonstrations as a better solution to bridge the gulf in the prevailing extension sytem in the country.

Singh and Jha (1998) reported that front line demonstrations conducted on the technology packages of pulses in Banda district of

Uttar Pradesh helped to bridge the gap in technology recommendation and its adoption.

Jayalaksmi (1998) reported that demonstrations and farm trials were two among the different strategies suggested for overcoming production constraints and to increase sesamum yield and thereby the income level of farmers.

2.8.3 Workshops

Radhakrishnan and Ravichandran (1995) reported that monthly zonal workshops act as a primary communication method for the scientists.

2.9 Perception of scientists about the implementation of NARP

2.9.1 Research concept of NARP

Studies conducted on perception of scientists about the research concept of NARP were reviewed which were comparatively very few. Those are given below:

Balaguru and Rajagopalan (1984) through a case study revealed that the concepts of NARP were not well perceived by the scientists. Venkateswarlu and Rajagopalan (1984) reported that many scientists did not know the NARP mandate. Saha (1985) reported that the scientists were not fully aware of the concept of NARP.

Sabarathnam (1987) reported that perception of scientists was upto 18 per cent only towards technology development systems. Sudha (1987) found out that all the scientists working at Tirupathi RRS were well acquainted with the goals of the research station, as well as their discipline.

Balaguru *et al* (1988) revealed that sources of ideas for experiments for the scientists of Baval Regional Research Station (RRS) of Haryana Agricultural University was mainly from zonal workshops. Status reports ranked second, while for scientists of *Thirupathy* RRS, workshops ranked top as the major source of research ideas and scientists own initiative ranked second.

The above literature says that majority of the scientists were not fully aware of the concept and mandate of NARP.

2.9.2 Infrastructure facility development

Keller (1983) found that sufficient land area was available for the conduct of experiments.

Balaguru and Rajagopalan (1984) reported inadequacy and lack of laboratory equipment for research at RRSs hampered research. Rani (1985) stated that 67 per cent of researchers reported lack of laboratory equipment. Similar findings were observed by Venkateswarlu and Rajagopalan (1984) and Saha (1985).

Sabarathnam (1987) in his study indicated that 53 per cent of the researchers demanded improvement of land for research. He also indicated that 50 per cent of his respondents demanded to improve the laboratory conditions.

Balaguru (1988) reports that in *Bawal* R.R.S of Haryana two third of the total terminated projects were terminated for want of manpower and infra-structure facilities , which indicates the inadequacy of infra-structure facilities present during the first phase of NARP. He also reported that lack of sufficient staff and avoidable procedural delays made it difficult for *Thirupathi* RRS to spend the sanctioned fund.

2.9.3 Multi disciplinary research facilities

Norman and Hays (1980) reported enhanced efficiency in research quality and technology development will be seen when people worked in multidisciplinary research. Similar findings were reported by Crawford and Barclay (1982) and Francis *et al.*(1982)

ICAR (1982) in its NARP manual mentioned that each project may have one or more field experiments and /or laboratory studies. Even in each experiment one or more disciplines are likely to be involved depending on the type of problems and the design of experiment formulated to find the solution of that problem. The objective here is to prepare projects in which scientist from different disciplines can work together to finalize the solution of the problem.

Balaguru and Raman (1985) reported that the scientists had realized the importance of multi-disciplinary approach to the problem of farmers.

Padmaiah (1987) reported that at RARS, *Anakapalle* 90 per cent scientists have projects of inter-disciplinary nature and 10 percent have multi-disciplinary projects.

Reddy (1987) reported that the experiments, which were conducted at RARS, majority was single disciplinary and only 30 per-cent were multi-disciplinary.

Sabarathnam (1987) reported that majority of the projects taken for researches were uni-disciplinary in nature.

APAU (1987) in its guidelines emphasized the need and importance of multidisciplinary research. In the memo no. 6712/Res III(2)91-3 dated 25.2.91 drawn the attention of the Agricultural Economists at the zonal stations to go through the NARP mandate and formulate the programme of work for the year 1991-92 and also interacted to involve themselves in the development of technical programmes of various disciplines, examine economic viability and feasibility of the technologies developed by the scientists as well as socio-economic analysis. Further mentioned that the Agricultural Economists' role was not yet fulfilled and this lacuna was pointed out by several missions.

Balaguru *et al* (1988) revealed that both *Bawal* and *Tirupathi* RRSs followed the multi-disciplinary approach (26% and 36% respectively) while the percentage of uni-disciplinary research experiments was 74

and 68percentages respectively. Among the uni-disciplinary research experiments plant breeding ranked top followed by Agronomy. Economics and Soil Science found to be not sticking on single disciplinary research.

NARP (southern region) report (1995) states that multi-disciplinary cum multi-institutional research programmes will be helpful in avoiding duplication of work and in bringing out early solutions to the problems. The need for streamlining the overall conduct of zonal workshops is stressed. The report also revealed that regular farmer participation programmes are not operating except seminar or field days occasionally organized in local stations. Progressive farmers are interested in export-oriented subsidiary farming occupations and hence technologies for this purpose should be generated more.

The above findings revealed that multi-disciplinary research projects must be taken up because the farm consists of different systems. The scientists were aware of the importance of multi-disciplinary research projects while conducting such experiments.

2.9.4 Intra and Inter-disciplinary research facilities

ICAR (1982) in its manual mentioned that the proposal prepared at regional level should be discussed in discipline-wise meetings at state level mainly on research methodology and approach to be adopted in finding the solution of the station staff.

Sabarathnam (1987) reported in his study that 65 percent of the scientists discussed about the project proposals within the discipline only. He also reported that 75 percent of scientists discussed about the project intra and inter disciplines.

Varadan and Jayakumar (1990) highlighted the fact that inter-disciplinary approach is needed for basic data analysis for the development of plans for large cultivated watersheds.

APAU (1993) in its guide lines (memo no 11018/Res III(2) /89 dated 27.2.89) mentioned that the research programmes should be drafted after mutual consultations and discussions among different scientists working in a particular discipline/ crop/ scheme/ research station and submitted to the Associate Director of research of the zone concerned. The discussions should be on the need, relevance, utility of

the problem, methodology, suitability, statistical design, treatment details, results of the previous seasons etc.

Maharashtra Society of Extension Education (MSEE) seminar report (1993) reveals that an interdisciplinary approach is a must for overall development of the watershed area and hence it should be ensured that SAU, State Department Agriculture, Horticulture department, Forest department, Banks and Input agencies work together.

2.10 Perceived linkage problems under NARP

Linkage has been defined by different authors in different ways;

According to Webster's Third New International Dictionary, linkage means the manner or style of being fitted together or united.

According to Litterer (1973), co-ordination is a process by which linkage is maintained.

Sharma (1982) reported that linkage has an element of co-ordination and linkage means to chain in one way or other and the chain has two functions.

- To keep a check, to control or to limit the movement up to a certain point and
- To facilitate co-ordinate /controlled movement for the fulfillment of some desired purpose.

Kunju (1989) states that linkage is the working relationship between any two subsystems.

Since there are limited number of direct studies, some related studies are also reviewed here.

Regarding the linkage with other organizations, Mosher (1975) expressed that fostering linkage with complementary organization is a strategic task. Taking a genuine interest in the work of other organizations acknowledging the mutual dependence that exists and getting personally acquainted with the administrator of other projects can do it.

Benor and Harrison (1977) suggested that extension must be linked to various research programmes well tuned to the needs of the farmers.

Chanthalkhana (1977) of Thailand emphasized that the research is being conducted to answer the farmers' questions. Therefore research process in agriculture should be extended one more step to include extension.

ICAR (1982) in NARP manual indicated that farmers' days, field trip, farm trials, training and skill demonstrations are good means for establishing linkage with farmers.

Sen (1984) stated that strong inter-organizational linkage is necessary for effective technology development since several organizations are involved in the process.

2.10.1 Linkage between research - extension system

Ambasta (1977) in a study of communication pattern of farm scientists in Bihar found that researchers in general had comparatively higher contact with farmers visiting office, influential farmers and farmers visiting Kisan melas. But traditional farmers were the least contracted categories.

Jaiswal and Arya (1981) found that there was no effective link between the research and extension system.

Surendran (1982) found that there was effective linkage between the Agricultural University and SDA.

Singh (1984) observed that linkage between extension and research systems is weak and of ad-hoc type.

Balaguru and Rajagopal (1984) suggested field visits as important means of research - extension linkage. They suggested that frequent visits are vital for the necessary mutual support of extension and research staff to establish and strengthen formal and informal linkages and this is most essential for successful transfer of any technology to the field.

Venkateswarlu and Rajagopalan (1984) observed that researchers' linkages with extension personnel were through seasonal workshops, T & V system, training programmes, mini- kit trials, on farm trials and adaptive trials.

Bhatnagar *et al* (1986) in his study on management of Agricultural under T&V system in India found that majority of states in India show satisfaction regarding research- extension linkage.

Sabaratnam (1987) reported that linkage between research and extension systems in identification of problems was 9% and 39% of researchers had enough linkage with extension personnel in dissemination of technology.

Venkitaraman (1988) had also the same opinion of Bhatnagar *et al* and stated that after the introduction of T&V system these was a well knit extension – research linkage. Kunju (1992) found that linkage exists between research and extension system during package of practice workshop, research advisory committee and zonal workshops of NARP and T & V system.

2.10.2 Linkage among research - extension - clientele systems

Getahum *et al (1977)* lamented that peasants have not given the opportunity to actively participate both in conceptual identification of agricultural problems and in generation of appropriate technologies to meet their basic needs.

Crawford and Berclay (1982) suggested that developing and evaluating technology must be done within the context of farmers' decision-making environment.

Reddy (1986) found that communicative interactions between extension and client systems take place through field days, exhibitions, cattle fairs, tours, film shows and publications.

Balaguru (1988) reported that the sub-projects under NARP in *Bawal* RRS of Haryana and *Thirupathi* RRS of Andhrapradesh established a variety of mechanisms for strengthening linkage like zonal workshops, training of subject matter specialists and field camps.

Kunju (1989) reported that the extent of linkage of research sub-system was best with extension sub- system followed by extent of linkage with credit sub-system and input –subsystem in descending order.

Pushpa *et al* (1993) reported a satisfactory level of linkage in respect of research, extension and client system as perceived by all the three categories. Jnanadevan (1993) reported lack of proper linkage and co-ordination as a major problem indicated by the extension officers in implementing coconut development programme.

2.11 Perception about impact of NARP

Balaguru and Rajagopalan (1984) reported that the researchers strengthened linkage with extension system through existing linkage mechanisms under NARP.

Maroof and Singh (1981) reports that beneficiaries of Small Farmers' Development Agency programme adopted cropping pattern after implementing the project. Majority adopted HYV. Area under improved seeds and yield also increased. Farmers were not using fertilizer and manure in recommended doze.

Nataraju *et al.* (1991) reported that majority of the extension workers of Tamil Nadu State Department of Agriculture were of the opinion that T&V system improved the extent of adoption and knowledge of level of farmers which resulted in the increased yield and income among farming community.

Roy *et al.* (1992) found that special Jute Development programme provide to be beneficial to both the beneficiary and control group farmers in imparting high and medium level knowledge regarding improved farming practices on Jute and subsequently sharing their attitude towards its use.

Differential levels of impact of T&V system on knowledge , socio-economic status and economic performance of contact and follower farmers and among various categories of farmers were studied by Gowda *et al* (1993). All the three characteristics were found to be high in contact farmers compared to followers. Likewise these were high in the case of big farmers as compared to small farmers & marginal farmers.

Ranade *et al. (1995)* reported that the integrated approach for increased agricultural productivity in dryland areas of vertisols in the field of forestry & horticulture, Animal husbandry was having a definite impact on the overall socio-economic conditions of the farmers of the watershed areas in *Indore.*

2.12 Perceived constraints in the implementation of NARP

Parameswaran (1973) identified lack of knowledge, poor efficiency, unsuitability of soil and lack of conviction among farmers as the important reasons for non-adoption of package programme of cotton.

Viswanathan (1975) in his study found high cost of cultivation as the limiting factor with adoption process.

Pollisco (1976) pleaded for relief of the scientist from administrative and non technical matters. Rao (1981) observed similar findings. Anbalakan (1976) showed that lack of knowledge and conviction among farmers as main reasons for non-adoption of package of practices for high yielding varieties of paddy.

Kaleel (1978) studying the impact of Intensive Paddy Development Programme, reported non-availability of inputs in time as the most important constraints felt by farmers.

Waghmare and Pandit (1982) found lack of knowledge, lack of technical guidance and high cost of chemical fertilizers as the important constraints on adoption of wheat technology by tribal farmers of Madhya Pradesh.

Several authors (Allow and Schwass, 1982; Rogers, 1983 and Sigman and Swanson,1984) have reported several constraints like deficiencies in areas like appropriate technology, linkage, technical training, transportation facilities, teaching aids, teaching and communication equipment, organization, co-ordination and other specific problems which limit the effectiveness of extension in developing countries of Asia and Africa.

Balaguru and Rajagopalan (1984) reported that lack of residential facilities as constraint for generation of farm technology. Similar findings were reported by Saha (1985) and Sawant *et al* (1993).

Rani (1985) reported that researchers were engaged in extra work and multifarious duties than research work as constraints.

Ramanathan *et al* (1987) reported that high cost of cultivation, non-availability of planting material in time and better performance of local varieties under poor management were acting as constraints in the adoption of high yielding cassava varieties.

Syamala (1988) found that lack of follow up, lack of need based training and inappropriate way of conducting field days were the most felt constraints in farmers level demonstrations.

Chaubey and Pandey (1988) reported that important reasons for slow / poor transfer of technologies under Lab to Land programme have been availability of services, materials and unawareness of technologies by farmers.

Jnanadevan (1993) identified constraints in the following order of importance as perceived by farmers;

- ❖ Higher labour charges
- ❖ Non-availability of labourers in time
- ❖ Inadequate and untimely supply of seedlings
- ❖ Non-availability of climbers for Plant protection operations and harvest
- ❖ Lack of and untimely provision of financial assistance and subsidies

He also revealed that in Agricultural Officers' perception, the important constraints were;

- ❖ Lack of proper linkage and co-ordination among different agencies
- ❖ Procedural complexities in sanctioning the financial assistance for farmers under the programme
- ❖ Inadequacy of infrastructure
- ❖ Lack of good rapport between implementing and sanctioning agencies
- ❖ Non-availability of good quality seedlings

A study conducted by Babu *et al* (1993) in the southern NARP zone revealed that the high labour wages in Kerala have made rice production unattractive because rice is the most labour intensive crop in Kerala.

Sawant et al (1993) found that lot of paper work, lot of touring and number of meetings as constraint for scientists.

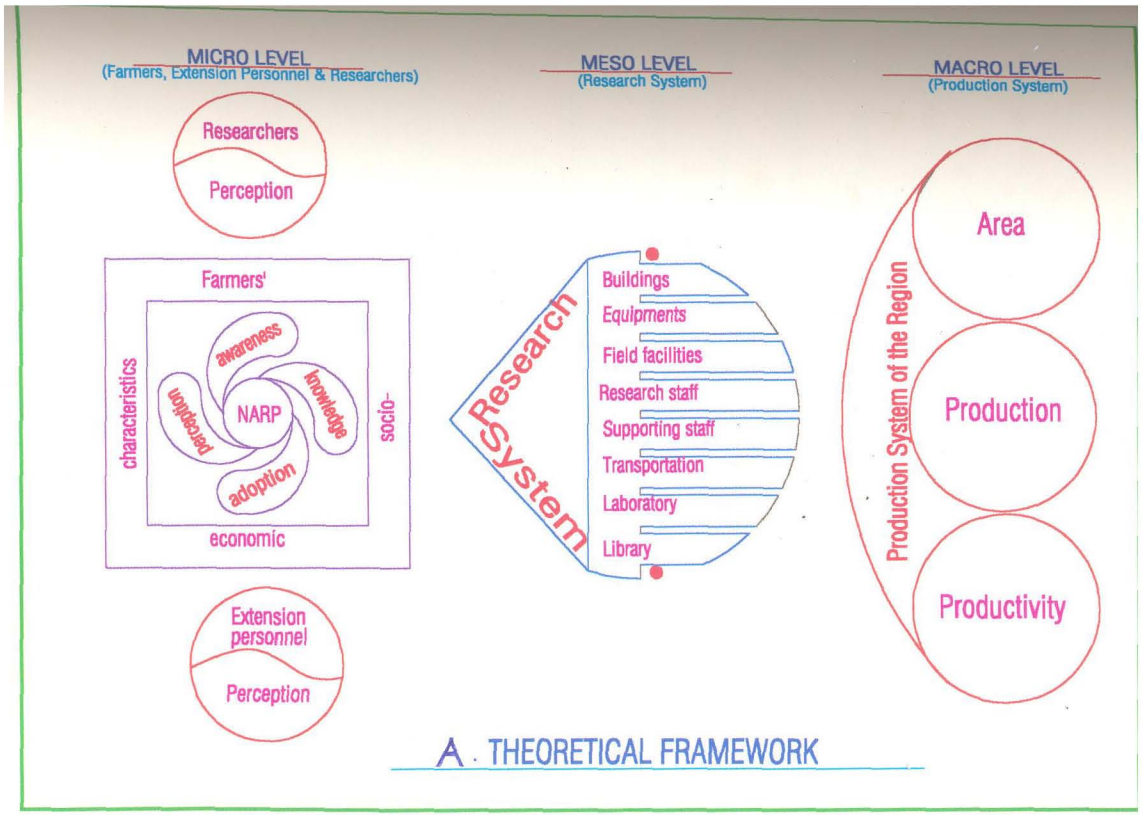
NARP (Southern Region) report(1995)listed out some constraints in achieving NARP objectives as; shortage of funds for training programmes, high cost of technologies, high cost of labour, lack of irrigation facilities, marketing constraints and some other situational problems.

Kareem and Jayaramaiah (1997) revealed that the block development of officers and Village Extension Officers perceived the three most important constraints in implementing IRDP as mis-utilization of assets by beneficiaries, lack of managerial ability by farmers to take care of the assets and lack of transportation facilities for block officials to reach beneficiaries in time.

Hypotheses formulated for testing in the study

1. There would be no awareness among the rice farmers about NARP
2. There would be no knowledge among the rice farmers about the recommended technologies
3. There would be no adoption of the recommended technologies among the rice farmers
4. There would be no awareness among the sesamum farmers about NARP

5. There would be no knowledge among the sesamum farmers about the recommended technologies
6. There would be no adoption of the recommended technologies among the sesamum farmers
7. There would be no significant relationship between the selected characteristics of rice farmers and their awareness level.
8. There would be no significant relationship between the selected characteristics of rice farmers and their knowledge level.
9. There would be no significant relationship between the selected characteristics of rice farmers and their adoption level.
10. There would be no significant relationship between the selected characteristics of sesamum farmers and their awareness level.
11. There would be no significant relationship between the selected characteristics of sesamum farmers and their knowledge level.
12. There would be no significant relationship between the selected characteristics and the adoption level of sesamum farmers.
13. There would be no significant relationship between experience and evaluative perception of scientists about NARP.
14. There would be no significant association between experience and perception of extension personnel about NARP.



A . THEORETICAL FRAMEWORK

METHODOLOGY

3. METHODOLOGY

This chapter deals with the materials and methods employed in the study, which are presented under the following subheads.

3.1 Location of the study.

3.2 Sampling design

3.3 Variables selected for the study and their measurement

3.4 Development of questionnaire

3.5 Statistical analysis

3.1 Location of the study

Kerala is having a wide variety of crops being cultivated in the coastal, plain and hilly tracts. The state is divided into five Agro-climatic regions, based on climate, topography, soil type and cropping pattern, out of which southern region was randomly selected for the study because it was impossible for the researcher to cover the entire state within the stipulated time and limited resources. The southern region comprises five districts namely *Thiruvananthapuram, Kollam, Pathanamthitta,*

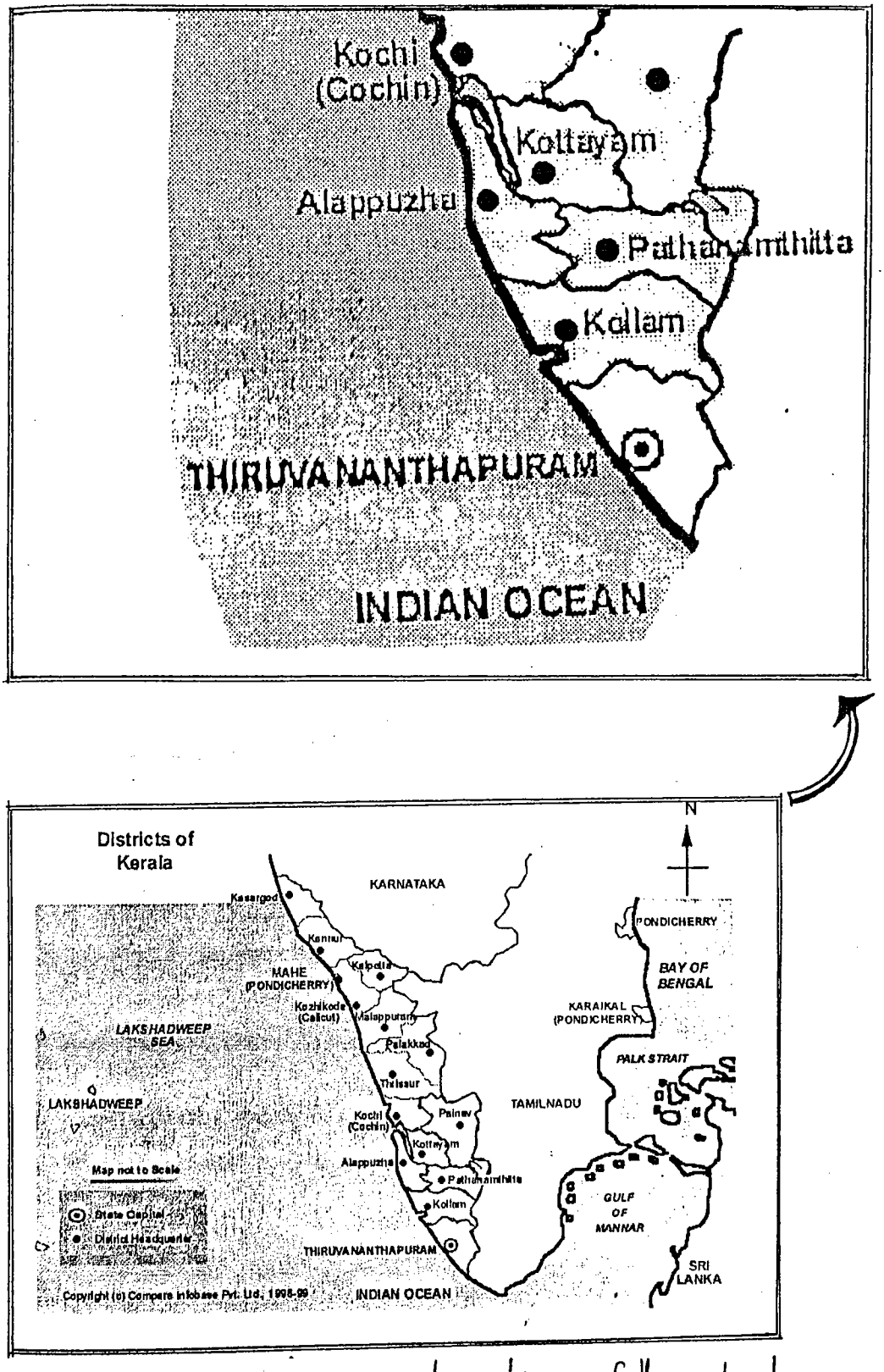


Fig. 1 Map showing location of the study

Alappuzha, and *Kottayam* . The map of the southern region is shown in Fig (1).

In southern region the existing research set up is as follows;

Table 27. Existing research set up.

NAME OF RESEARCH CENTER.	HEAD FUNCTION	VERIFICATION FUNCTION.
RARS, Vellayani (a) zonal station	Teaching campus of the SAU	
CRS, Balaramapuram (c)		Coconut, rice, vegetables.
CSRC, Karamana (c)		Agronomic trials.
FSRS, Kottarakkara (a)	Homestead farming.	

RARS- Regional Agricultural Research Station
CRS - Coconut Research Station
CSRC- Cropping System Research Centre
FSRS- Farming System Research Station

a= established under NARP
c=not supported under NARP

3.2 Sampling design

In this study the awareness of farmers about NARP, their knowledge level and extent of adoption regarding improved varieties and practices are assessed. Besides, their perception about the farm trials and demonstrations under NARP and also the constraints in adoption is studied. Evaluative perception of scientists under NARP about the research concept and specific technology transfer approaches is

quantified. Perception of extension personnel of State Department of Agriculture about NARP is also ascertained. Hence there were three categories of respondents for the study viz, farmers, scientists and extension personnel. The details of sampling procedure for selection of respondents of the study are as follows:

3.2.1 Selection of farmer respondents

Since rice and oil seed crops are the major crops in the zone, the farmer respondents included rice and oil seed growers.

3.2.1.1 Selection of rice farmers

The rice farmers were selected from each of the five districts in proportion to the percentage of area under rice in each district. The details are shown in Table (28)

Table 28. Distribution of farmer respondents in the south zone

Districts	Total Rice Area	Percentage of Area	No of Respondents
Trivandrum	16,986	14.14	14
Kollam	23,252	19.36	19
Pathanamthitta	10,860	9.04	9
Alappuzha	44,132	36.74	37
Kottayam	24,878	20.71	21
		Total	100

For selecting rice farmers from the five districts, the block having maximum area under rice was selected in each district. From each of the five selected blocks, the Krishibhavan with maximum rice area was identified and required number of respondents were selected from the krishibhavan area in proportion to the percentage of area under rice in each of those districts. The rice farmers numbering 100 were selected randomly @ fourteen, nineteen , nine , thirty seven and twenty one from *Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha* and *Kottayam* districts respectively.

3.2.1.2 Selection of sesamum farmers

Fifty sesamum cultivators were selected from the *Bharanikkavu* Krishibhavan area where sesame is cultivated extensively in south zone, under *Mavelikkara* block of *Alappuzha* district, forming the total sample of 150 farmer respondents for the study. Response on awareness about NARP, knowledge and adoption of improved varieties and practices, perception about farm trials, demonstrations and constraints in adoption of improved practices were collected from the 150 farmer respondents.

3.2.2 Selection of scientists

Considering the small size of total population of scientists working in the Southern Zone, whole sample was decided to be selected for the study. Thus all the NARP scientists were contacted and a total of 42 scientists responded on their perception about the implementation of research concept of NARP, augmentation of research facilities under NARP, infra structure facility development, multi-disciplinary research facilities, inter and intra- disciplinary research facilities, linkage problems and constraints in implementing NARP.

3.2.3 Selection of extension personnel

All the officials of the state Department of Agriculture, in the five districts who attend the NARP workshops were selected, since the total population available was less. Thus the Principal Agricultural Officers, Deputy Directors and Assistant Directors were contacted for the purpose of collecting information. Thus data on the perception extension personnel about the impact of NARP on farmers, perception about the different extension components of NARP like on-farm trials, demonstrations, monthly workshops etc, linkage problem experienced and constraints experienced during the implementation of NARP were collected. The details of selection of respondents from all the five districts are given in Table (29).

Table 29. Distribution of sample of extension personnel in the south zone

SL.NO.	NAME OF DISTRICTS.	NUMBER OF RESPONDENTS.
1.	Thiruvananthapuram	14
2.	Kollam	14
3.	Pathanamthitta	10
4.	Alappuzha	11
5.	Kottayam **Total**	13 **62**

3.3 Variables selected for the study and their measurement.

Three categories of respondents were contacted for the purpose of data collection under the present study.

3.3.1 Farmers

Data on the awareness about NARP, knowledge about improved practices, level of adoption of recommended practices, perception about demonstrations and farm trials under NARP and the constraints in adopting improved practices were collected from farmers. More over twenty profile characteristics of farmers which were assumed to have an association with the above variables were also selected based on review of literature and discussion with farmers. They were sent to experts of different State Agricultural Universities for relevancy rating. Based on

relevancy rating, twelve characteristics were selected and included in the final questionnaire (Appendix-I).

3.3.1.1 Awareness about NARP

A teacher - made questionnaire was developed for this purpose. Twenty questions in two-point continuum was developed based on review of literature on NARP and discussion with experts and beneficiaries of NARP. Experts in the Department of Agricultural Extension, College of Agriculture, Vellayani rated the questions for its importance. Based on the rating, ten questions were finally selected and included in the interview schedule (Appendix-I). A score of '1' was given for a favourable answer and if the answer was unfavourable, a score of '0' was given. All such scores were totaled up for getting the individual's awareness score. The score ranged from 0 to 10.

3.3.1.2 Knowledge of improved practices by farmers

It is a body of understood information possessed by a farmer about scientific cultivation of rice/ sesamum. In this study a teacher – made knowledge test was developed including questions pertaining to the improved cultivation practices of rice / sesamum separately (Appendix-I). If the answer to a particular question was correct, a score of 'two' was given and if the answer was incorrect, a score of 'one' was

given. For getting the individual farmer's total knowledge score, total of all the scores obtained by him was calculated. There were 12 questions in the knowledge test for rice farmers and 10 questions for sesamum growers. Thus the total score ranged from 12 to 36 for rice farmers while it ranged from 10 to 30 in the case of sesamum cultivators. Respondents scoring above mean were categorized as high knowledge group and those below mean as low knowledge category.

3.3.1.3. Adoption of improved varieties & practices by farmers

3.3.1.3.1 Adoption of improved varieties & practices by rice farmers

Different researchers have developed and used various methods to measure adoption behaviour.

Wilkening (1952) developed an adoption index, which was the percentage of new practices adopted by a farmer to the number of practices available to him.

Marsh and Coleman (1955) suggested an adoption ratio by taking into consideration area adopted and potential area.

$$\text{Adoption ratio} = 1/N \; \Sigma \; \frac{\text{Area adopted}}{\text{Area potential}} \times 100$$

Where, N = the number of practices.

Dasgupta (1963) developed an adoption quotient by adding a new element viz; time.

Chattopadhyay (1963) developed a comprehensive scale called 'adoption quotient' by taking into consideration the extent of adoption, potentiality, time, applicability, consistency and differential nature of innovation.

Singh and Singh (1974) modified the scale developed by Chattopadyay by taking only the two dimensions, extent and potentiality. According to this, the adoption quotient of each respondent was calculated by using the following formula

$$\text{Adoption Quotient} = \frac{\Sigma e/p}{N} \times 100$$

Where, Σ = The summation

e = extent of adoption of each practice

p = potentiality of adoption of each practices

N = Total number of practices selected

Sankaran(1987), Anithakumari (1989) and Ramachandran (1992) used this procedure in their studies.

In the present study the method developed by Singh and Singh (1974) was used with slight modification. According to this method, scoring was done as follows;

Response	Score
❖ Full adoption	3
❖ Partial adoption	2
❖ Non-adoption	1

In this method, the extent of adoption means the degree to which the respondent has actually adopted the selected practices. When the extent of adoption equals potentiality adoption, adoption is full and when it is nil it is considered as non-adoption.

Potentiality is the maximum degree to which the respondents can extend his adoption, if he so wills, depending on the maximum utilization of the resources he commands or he can command. The extent of adoption of each individual practice was calculated as follows,

Table 30. Measurement of extent of adoption of rice farmers

1. Use of high yielding varieties	Scores
1. NARP recommended variety.	3

2. Any other HYV	2
3. Local variety	1
2. Seed treatment	
1. Proper seed treatment	3
2. Incomplete / improper treatment	2
3. No seed treatment	1
3. Soil testing	
1. Proper soil testing	3
2. Incomplete /improper testing	2
3. No soil testing	1
4. Liming	
1. Proper	3
2. Incomplete	2
3. No liming	1
5. Cropping pattern followed	
1. Crop rotation in scientific way	3
2. Crop rotation in unscientific way	2
3. Monocropping	1
6. Weeding method adopted	
1. Proper chemical weeding	3
2. Improper chemical weeding	2
3. No chemical weeding	1

7. Management of sandy soil

   1. Split dose of NPK and more Organic matter addition 3

   2. Any one of the above 2

   3. No special measures 1

8. Use of mini harvester

   1. Regular 3

   2. Occasionally 2

   3. Never 3

9. Use of chemical fertilizer

   1. Use of chemical fertilizers on the basis of soil test results 3

   2. Use of general package of practices (not based on soil test results) 2

   3. No chemical fertilizer application 1

10. Use of plant protection chemicals

   1. Correct /proper use of plant protection chemicals 3

   2. Incorrect/improper use of plant protection chemicals 2

   3. No application of plant protection chemicals 1

Total scores ranged from 10-30 in the case of rice farmers, indicating the adoption score of individual farmer. The mean score obtained for individual practices were also found out so as to make a comparison of the adoption level of individual practices. The adoption quotient was also worked out so that the proportion of the full adopters, partial adopters and non-adopters could be understood clearly.

3.3.1.3.2 Extent of adoption of improved varieties & practices by sesamum cultivators

In the case of sesamum farmers, the questionnaire carried 10 questions pertaining to the recommended practices of sesamum (Appendix-I). The mean score obtained for individual items indicated the extent of adoption of each practice. Total scores were also worked out so as to get an idea of the extent of adoption of individual farmers. Based on adoption quotient, the respondents were classified into full adopters, partial adopters and non-adopters.

3.3.1.4 Perception of farmers about demonstrations conducted under NARP

For measuring perception of farmers about demonstrations under NARP, a semi-structured measurement device was developed. A total number of 20 statements pertaining to the demonstrations were

developed based on review of literature and discussion with experts. After relevancy rating ten questions were selected for inclusion in the questionnaire (Appendix-1). The statements were rated on a five-point continuum ranging from 'strongly agree' to 'strongly disagree'. The scores assigned for positive statements were as follows;

	Response	Score
❖	Strongly agree	5
❖	Agree	4
❖	Undecided	3
❖	Disagree	2
❖	Strongly disagree	1

For negative statements the scoring procedure was reversed. The perception score for each respondent was obtained by adding his scores corresponding to the respective response pattern. Same procedure was followed for both sesamum and rice farmers.

3.3.1.5 Perception of farmers about farm trials conducted under NARP

The same procedure used for measurement of perception about demonstration was used here also. The device had ten statements that were rated on a five-point continuum with a score ranging from 1 to 5. The scores assigned for positive statements were as follows;

	Response	Score
❖	Strongly agree	5
❖	Agree	4
❖	Undecided	3
❖	Disagree	2
❖	Strongly disagree	1

For negative statements the scoring procedure was reversed. The perception score for each respondent was obtained by adding his scores corresponding to the respective response pattern. Same procedure was followed for both sesamum and rice farmers. Thus the total score for the individual ranged from 10 to 50.

3.3.1.6 Perception of farmers about constraints in adoption of improved varieties and practices

In the light of a detailed review of the available literature and also based on a thorough discussion with subject matter specialists as well as farmers, 15 constraints which makes it difficult for farmers to adopt improved varieties and practices recommended by NARP were identified. These problems were rated by farmers based on the degree of importance they attach to each of the constraints, on a three-point continuum (Appendix-I). The scoring procedure was as follows;

Response	score
❖ most important	3
❖ important	2
❖ less important	1

The constraint Perception Index was worked out based on a cumulative index. The frequency of responses under each category was multiplied with the corresponding weightage and added to get a cumulative index and the ratio between cumulative index and frequency of responses for each constraint was worked out. Based on this ratio, each of the constraint was ranked. The scoring procedure was same for both sesamum and rice farmers.

3.3.1.7 Measurement of profile characteristics of farmers

A list of profile characteristics which may have relationship with awareness, knowledge and adoption of farmers was prepared after literature search and discussion with experts, which was ranked for importance by extension experts of different Agricultural Universities. Finally the following 12 characteristics were selected based on the experts' rating.

3.3.1.7.1 Education

Refers to the extent of informal or formal learning experience possessed by the farmer respondent. The different educational levels will be scored as per the procedure followed in the socio-economic status scale of Trivedi (1963). The scoring procedure was as follows:

Level of education.	Scores
1. Illiterate	0
2. Can read only.	1
3. Can read and write.	2

4. Primary school	3
5. Middle school	4
6. High school	5
7. College & above	6

3.3.1.7.2 Farm size

Refers to the size of the operational holding of the respondents measured in hectares.

3.3.1.7.3 Economic motivation

Refers to the relative value placed by the farmers on economic ends. This was measured with the help of the economic motivation scale developed by Moulik (1965). The scale consists of three sets of statements, each having three sentences with weightages 3, 2 and 1. Each farmer was asked to choose a sentence, which described him most accurately, and another that described him least accurately from each group of statements. After obtaining the respondents most –least choices for each of the three sets of statements the scoring was done by summing up the ratios of weightages of the most-like sentences to least–like sentences.

3.3.1.7.4 Training undergone

Refers to the number and nature of training obtained by the respondent farmer on the concerned crop (rice/sesamum).

3.3.1.7.5 Innovation proneness

Innovation proneness refers to the behaviour pattern of the farmers who have interest in and desire to seek changes in farming techniques and to introduce changes into their farming operations when practical and feasible.

The self-rating scale developed by Moulik (1965) measured innovation proneness. The scale consists of three sets of statements. The respondents were asked to choose the one amongst the three sets of statements which most accurately portrayed (most like) them and another which describe him least accurately from each set. The respondent's 'most liked' and 'least-liked' choices for each set were obtained. The three statements in each set were given the weightage of 3, 2 and 1 denoting high, medium and low degree of innovation proneness.

The ratio of weightage of the most liked statement to the least-liked statement in each set was worked out. Then the ratio for three sets of statement was summed up which give the respondents self-rating score for innovation proneness.

3.3.1.7.6 Risk orientation

Risk orientation was quantified with the help of a risk preference scale developed by Supe (1969). The scale consists of six statements, of which two are negative. The response was collected on a five-point continuum ranging from 'strongly agree' to 'strongly disagree'. The scores assigned for positive statements were as follows;

	Response	**Score**
❖	Strongly agree	5
❖	Agree	4
❖	Undecided	3
❖	Disagree	2
❖	Strongly disagree	1

For negative statements the scoring procedure was reversed. The total score obtained by a respondent indicates his score for risk orientation.

3.3.1.7.7 Management orientation

The management orientation scale developed by Samantha (1977) was used for this study. It consists of 18 statements, six statements each for planning, production and marketing orientation. In each group, positive and negative statements were mixed, retaining at the same time a more or less psychological order of statements. In the case of a positive statement scoring was like this;

	Response	Score
❖	Agree	1
❖	Disagree	0

For a negative statement the scoring was reversed. The sum of the scores obtained by a respondent was taken as his score for management orientation.

3.3.1.7.8 Level of aspiration

It is defined as the overall life goals in his reality world that a farmer is striving for. Procedure used by Saradamony (1983) was adopted for the study with slight modification. Six statements, showing the future wishes of farmers were given for rating on a two-point continuum.

The scoring was as given below;

Response	Score
❖ True	2
❖ False	1

The total score obtained for all the six statements by an individual indicates his score for level of aspiration.

3.3.7.1.9 Attitude towards scientific agriculture

Scale developed by Alex (1994) was used for measuring farmers' attitude towards scientific Agriculture. It consists of 14 statements rated on a five–point continuum ranging from 'strongly agree' to 'strongly disagree'.

The scores assigned for positive statements were as follows;

Response	Score
❖ Strongly agree	5
❖ Agree	4
❖ Undecided	3
❖ Disagree	2
❖ Strongly disagree	1

For negative statements the scoring procedure was reversed. The score of all the 14 statements was summated to get the attitude score of each individual. The possible attitude score of an individual ranges from 14 to 70.

3.3.1.7.10 Credit orientation

It refers to the favourable and positive attitude of the respondents towards obtaining credit from institutions and other sources. For the purpose of measuring credit orientation, the scale adopted by Beal & Sibley (1967) was used after modifying it to suit the conditions. The scale includes five statements rated on a three –point continuum, thus the total score ranging from 5 to 15. The pattern of scoring was as shown below;

Response	Score
❖ Highly favourable answer	3
❖ Favourable answer	2
❖ Unfavourable answer	1

3.3.1.7.11 Information source utilization

Scale developed by Sajeevchandran (1989) was adopted for the study consisting of 24 sources of information which are classified under

impersonal source, formal personal source, informal personal source, commercial source and other channels of communication.

Each respondent was asked to indicate how often he got information on agricultural technology from each of the listed five types of sources. Responses were collected and scores were given as follows;

	Response	**score**
❖	Regularly	2
❖	Sometimes	1
❖	Never	0

Response scores were summed across each item to form the index of use of information sources. Total scores of three grouping were added together to get the total score that obtained for information source utilization for the respondent.

3.3.1.7.12 Extension participation

It refers to the degree of participation of the farmer in various extension activities organised by development agencies. This was measured by the procedure suggested by Bhaskaran (1978) with slight modification.

The respondent's participation in each of the activities was recorded on a three- point continuum and the scores given were;

Response	Score
❖ Regularly	2
❖ Sometimes	1
❖ Never	0

Summing up the scores obtained by the farmer in all the activities, the participant's extension participation score was obtained.

3.3.2 The evaluative perception of scientists

Evaluative perception of scientists was quantified regarding the following items;

3.3.2.1 Research concept of NARP

3.3.2.2 Infra –structure development under NARP

3.3.2.3 Augmentation of research capabilities under NARP

3.3.2.4 Multi-disciplinary research facilities

3.3.2.5 Inter- disciplinary research facilities

3.3.2.6 Perception about linkage problems experienced under NARP

3.3.2.7 Perception about constraints in implementing NARP

Since no standardized scales were available for the measurement of the above aspects and it was quite impossible to develop standardized scales for measuring each item, semi-standardized scales were developed for the purpose.

A total number of 50 statements were developed pertaining to research concept, infra-structure, research capabilities, multi-disciplinary and inter-disciplinary research facilities under NARP based on thorough discussion with scientists, experts of Department of Agricultural Extension, college of Agriculture, *Vellayani* and also based on review of available literature. The subject matter specialists in Agricultural Extension rated the statements for their relevancy. Based on the relevancy rating, 30 statements were selected comprising of six statements under research concept of NARP, five under infra-structure development, six under augmentation of research facilities, six under multi-disciplinary facilities and seven under inter- disciplinary facilities (Appendix-II). The statements were rated by the respondents on a five point continuum, scoring of which was done as shown below,

	Response	Score
❖	Strongly Agree	5
❖	Agree	4
❖	Undecided	3
❖	Disagree	2
❖	Strongly disagree	1

For negative statements, the scoring was reversed.

3.3.2.6 Perception of scientists about linkage problems experienced under NARP

Under linkage problems experienced, 15 problems were listed out and given for relevancy rating. Based on the rating 10 problems were selected for inclusion in the questionnaire (Appendix- II). The items were rated by the respondents on a three-point continuum, the scoring of which was done as;

	Response	Score
❖	Most important	3
❖	Important	2
❖	Least important	1

Thus the total score for an individual ranges from 30 to 10.

3.3.2.7 Perception of scientists about constraints in implementing NARP

Based on review of literature and discussion with scientists, 22 constraints were listed out and were given for relevancy rating by experts in Agricultural Extension. After relevancy rating 15 constraints were selected and included in the questionnaire (Appendix-II). The scientists rated the constraints for the degree of importance attached to each of them on a three point continuum as shown below;

	Response	**Score**
❖	Most Important	3
❖	Important	2
❖	Least important	1

The constraints were ranked based on a cumulative index. The frequency of responses under each category was multiplied with the corresponding weightage and added to get a cumulative index and the ratio between cumulative index and frequency of responses under each constraint was worked out. Based on this ratio each of the constraint was ranked.

3.3.3 The evaluative perception of extension personnel

3.3.3.1 Impact of NARP on farmers

3.3.3.2 NARP workshops

3.3.3.3 Demonstrations

3.3.3.4 Farm trials

3.3.3.5 Linkage among scientists, extension personnel, farmers and input dealers and

3.3.3.6 Constraints in implementation of NARP

Since no standardized scales were available for measurement of the above aspects and it was extremely difficult to develop separate standardized scales for measuring each item, semi-standardized measurement devices were developed for the purpose.

A total number of 60 statements were developed for measuring the perception of extension personnel about the impact of NARP, demonstrations, NARP workshops, farm trials and linkage. This was done on the basis of thorough discussion with extension personnel and subject matter specialists and also on the review of literature. The statements were rated for their relevancy by experts in Agricultural

Extension in the college of Agriculture, *Vellayani, Thiruvananthapuram.* Based on the relevancy rating, a total of 46 statements were identified comprising of ten statements under impact of NARP, ten under NARP workshops, eight under farm trials, eight under demonstrations and ten under linkage. The statements were given for rating to the respondents on a five- point continuum as given below.

	Response	**Score**
❖	Strong agree	5
❖	Agree	4
❖	Undecided	3
❖	Disagree	2
❖	Strongly Agree	1

For negative statements, the scoring was reversed (Appendix-III).

3.3.3.6 Constraints in implementation of NARP

After a thorough discussion with extension personnel and also based on a detailed review of literature, a list of 16 constraints was prepared. Based on the relevancy rating by experts in Agricultural Extension, 15 constraints were identified and finally included in the questionnaire. The

extension personnel rated the constraints on a 3- point continuum and the scoring was as follows:

	Response	Score
❖	Most important	3
❖	Important	2
❖	Least important	1

The constraints were ranked based on a cumulative index. The frequency of responses under each category was multiplied with the corresponding weightage and added to get a cumulative index and the ratio between cumulative index and frequency of responses under each constraint was worked out. Each of the constraints was ranked based on this ratio.

3.3.4 Trend Analysis of major crops

The trend analysis was done using the method of three yearly moving averages. Based on the secondary data on area, production and productivity, trend line was projected.

3.4 Development of Questionnaire

Separate questionnaires were prepared for scientists and extension personnel. For farmer respondents an interview schedule was prepared in Malayalam. For rice farmers and sesamum cultivators separate schedules were prepared. Before the final administration, questionnaires were pre-tested.

3.4.1 Pre-testing of the questionnaire

According to Oppenheim (1966) it is preferable to have the judgements made by people who are similar to those to whom the developed scale shall be applicable. The questionnaire for this study was pre-tested based on the ratings of farmers from non-sample area. Based on the result of correlation analysis, it was found that 'age' was having no significance as far as the level of awareness, knowledge and adoption was concerned, which was originally included along with the profile characteristics of farmers. Hence that variable was discarded from the schedule for the main study. Besides this other necessary modifications were also made in the questionnaires.

3.4.2 Data Collection

Questionnaires for scientists and extension personnel were distributed in person along with stamped and self-addressed envelope to send the filled up questionnaires. This also gave a chance to directly interact with the respondents and gather some information in an informal way. From the farmers the responses were collected through interviewing them directly. The data collection was done during 1997.

3.5 Statistical Analysis.

3.5.1 Trend analysis

Trend is the tendency of a series to change gradually over a long period of time. It is the amount of production that could be obtained at any time if the physical equipment were utilized at economic capacity. Trend is the line around which cycle fluctuates.

3.5.1.2 Method of Moving Averages

The trends in area, production and productivity of major crops grown in the south zone was analysed in the present study by applying the method of moving averages. This method may be considered as an artificially constructed time series in which each periodic figure is replaced by the mean of the value of that period and those of a number of preceding and succeeding periods. This method has the great merit of flexibility, involves taking the average of a definite number of terms in a time series in succession, each time dropping one value at the beginning and taking a new value from the remaining entries of the series.

When this method is employed for fitting the curve, it is necessary to decide the period of moving average such as 3-yearly moving average or 5-

yearly moving average. The period of moving average must coincide with the period of cycle so that cyclical variations may be eliminated. If the period of moving average and the period of cycle may differ, the moving average will depict cycles that are not present in the data. The procedure of computing moving average is illustrated below:

For 3-yearly moving average:

$\frac{1+2+3}{3}$; $\frac{2+3+4}{3}$; $\frac{3+4+5}{3}$; $\frac{4+5+6}{3}$ and so on

3.5.2 Percentage

Percentage of scores obtained for respondents for each individual statement was worked out. Percentage was worked out as follows,

$$Pi = n/N \times 100$$

Pi – Percentage of score obtained for the i^{th} item.

n _ Frequency of responses obtained for i^{th} item.

N _ Maximum possible number of frequencies under i^{th} item.

The percentage score values of each individual statement was worked out. Based on the percentage score value, a clear idea about the difference in perception, the respondents were having about the different components of a main item was obtained.

3.5.3 Mean

Mean values of the scores obtained for each individual statement, which represent a different dimension of the main item, was worked out in order to analyze comparative significance of each statement in the opinion of the respondents. Mean values were worked out for total scores of items. This facilitated the comparison of the different items with respect to degree of importance attached to them by the respondents.

3.5.4 Correlation

To study the relationship between the profile characteristics of farmers and their level of awareness about NARP, knowledge about improved practices and adoption of recommended practices, correlation was worked out. The correlation between experience of extension personnel as well as scientists with their perceptions about NARP was also worked out.

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

In this chapter, the results of the study are presented in the following sequence.

4.1 Trends in area, production and productivity of major crops grown in the southern Agro-climatic zone of Kerala

4.2 Awareness of farmers about NARP

4.3 Knowledge of farmers about improved varieties and practices

4.4 Extent of adoption of improved varieties and practices recommended by NARP

4.5 Perception of farmers about farm trials under NARP

4.6 Perception of farmers about demonstrations under NARP

4.7 Constraints in adoption of improved varieties

4.8 Relationship of selected profile characteristics of farmers with their awareness, knowledge and adoption

4.9 Evaluative perception of scientists

4.9.1 Research concept of NARP

4.9.2 Infra –structure development

4.9.3 Augmentation of research capabilities

4.9.4 Multi-disciplinary research facilities

4.9.5 Inter-disciplinary research facilities

4.9.6 Linkage problems experienced by scientists

4.9.7 Constraints experienced by scientists during the implementation of NARP

4.10 Perception of extension personnel

4.10.1 Impact of NARP on farmers

4.10.2 Linkage between research , extension, farmers and input systems

4.10.3 NARP workshops

4.10.4 Farm trials

4.10.5 Demonstrations

4.10.6 Constraints experienced by extension personnel during the implementation of NARP

4.11 Correlation of experience with perception about NARP

4.11.1 Correlation of experience of scientists with their perception about NARP

4.11.2 Correlation of experience of extension personnel with their perception about NARP

4.12 Strategy for augmentation

4.1 Trends in area, production and productivity of major crops grown in the southern Agro-climatic zone of Kerala

The trend in area, production and productivity of major crops grown in the southern zone ie., rice, banana, tapioca, sesamum and coconut were worked out using the method of three-year moving

averages. The analysis was done for period from 1960-1997. The results are presented below;

4.1.1 Rice

4.1.1.1 Trend in area of rice

Area under rice cultivation was found to increase till 1970-71. Then the area showed stagnation till 1978. After that a declining trend was observed till 1980 and again a stagnation was visible during early eighties. Since then a gradual decline is noticed in the paddy area till the end of study period.

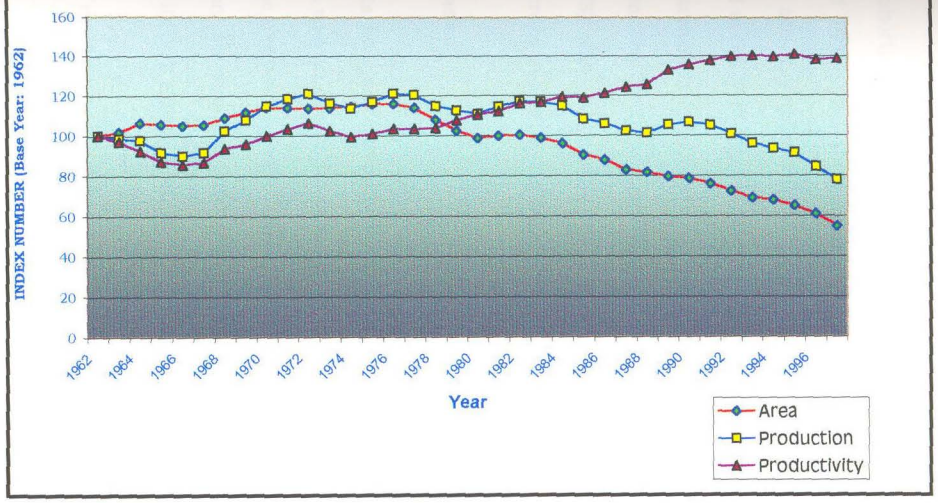
4.1.1.2 Trend in production of rice

A decline was observed in production till 1968 and an increasing trend is observed till 1974, followed by a sudden fall in production. Since then, short ups and downs can be seen in the production trend of paddy, altogether showing a downward trend. After 1990, the trend shows again a clear downward trend.

4.1.1.3 Trend in rice productivity

The trend in productivity was similar to that of production till early seventies. But after that a stagnant period is observed during late

Fig. 2 **Trends in Area, Production and Productivity of Rice in the South Zone using 3 year moving averages**



seventies. Since then a gradual increase is visible in the productivity of rice in the zone till the end of study period (Fig 2).

In short, the productivity, even though showed some ups and downs till 1980, was showing an increasing trend irrespective of the decline in area and production. This improvement in productivity can be attributed to NARP to a great extent. The decrease in production, in spite of the increase in productivity, can be due to the serious decline in paddy area. The result is in conformity with the result obtained by Babu *et al* (1993), who studied the trend in area, production and productivity of major crops in Kerala during 1960-1986.

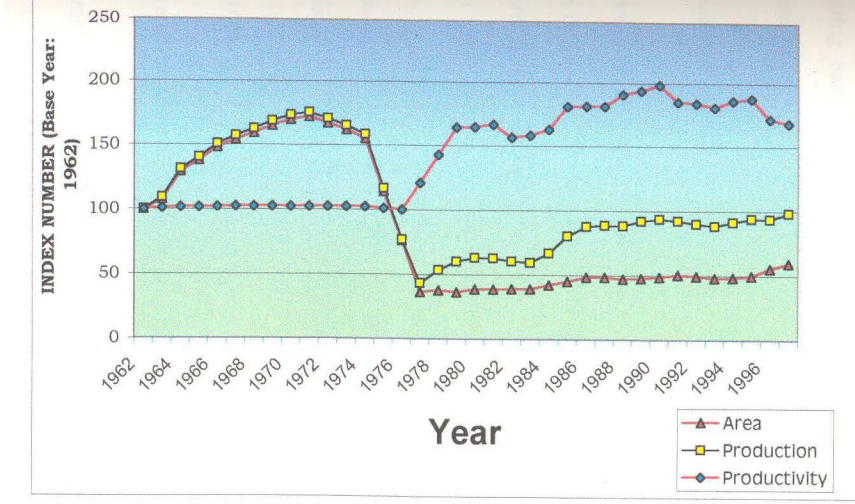
4.1.2 Banana

Data was not available for banana alone, data on banana other plantains was clubbed. Hence a break is given at the end of 1976, after which, the trend are shown for banana alone. During 1966- 75, area and production showed an increasing trend followed by a decline. But productivity was almost stagnant.

4.1.2.1 Trend in area of banana

During eighties the area under banana showed a slow increase followed by stagnation till mid nineties and after that indication of a slight improvement is shown. But the overall picture is not at all good.

Fig. 3 Trends in Area, Production and Productivity of Banana in the south zone using 3 year moving averages



4.1.2.2 Trend in production of banana

Trend line of banana production is showing an increasing tendency till mid-eighties. Since then a stagnation is found and a slow decline during early nineties. Again by the end of nineties a slow improvement gives hope.

4.1.2.3 Trend in productivity of banana

Even though the productivity increased during late seventies, wide fluctuation is visible in banana productivity after that. After mid-nineties a significant decline is there in productivity (Fig 3). The decline in production can be due to the variations occurred in area under cultivation. The lack of availability of suckers of varieties with export potential in large scale for commercial growers might have also lead to the condition.

4.1.3 Tapioca

4.1.3.1 Trend in area of tapioca

A small improvement in area under tapioca cultivation is visible till 1970, followed by a stagnant period till 1976-77. Again the trend line, till the end of study period, expresses a steady declining trend.

4.1.3.2 Trend in production of tapioca

Tapioca production showed an increase till the middle of seventies and then a sudden fall is there, after which no improvement was there during eighties. A small improvement is visible only after 1994-95, which is also very feeble.

4.1.3.3 Trend in productivity of tapioca

An increasing trend was visible till 1972-74, followed by an obvious decline till 1978-80. Again an improvement is observed at a very slow pace till the middle of eighties, followed by a stagnant period of 1985 onwards till 1992-94. Since then an increasing trend is visible in productivity of tapioca (Fig 4). The trend in tapioca productivity in the zone is better when compared to that in the state. This improvement might have been due to the combined effort of Agricultural University and the Central Tuber Crops Research Institute (CTCRI), which is situated in the zone.

4.1.4 Sesamum

4.1.4.1 Trend in area of sesamum

Area under sesamum cultivation did not show much increase till the middle of seventies. Then a substantial improvement is observed, but

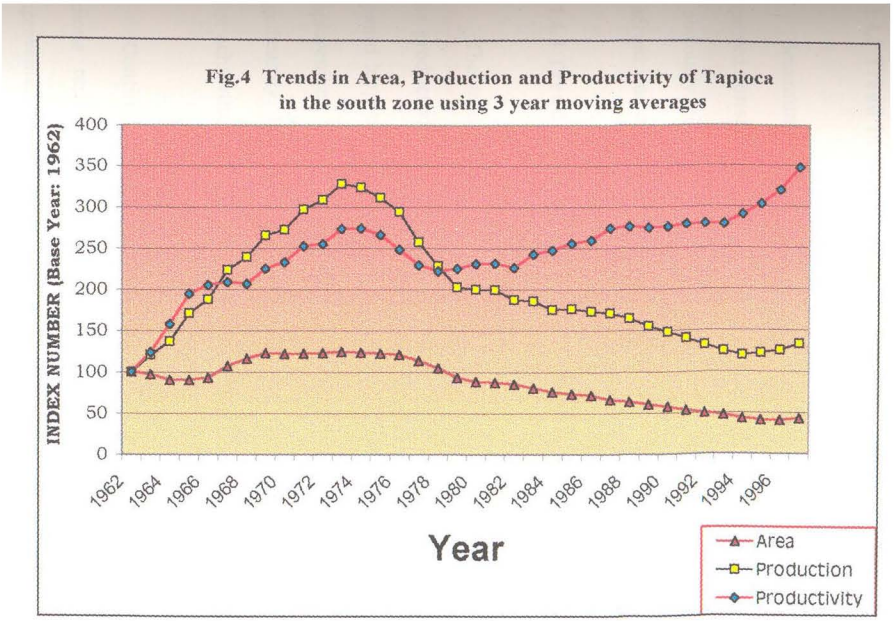


Fig.4 Trends in Area, Production and Productivity of Tapioca in the south zone using 3 year moving averages
INDEX NUMBER (Base Year: 1962)
400
350
300
250
200
150
100
50
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
Year
Area
Production
Productivity

after 1976-78, the area under sesame is declining continuously till the end of the study period.

4.1.4.2 Trend in production of sesamum

Sesamum production, after stagnation during sixties, has improved considerably during early seventies. Afterwards a deceleration is obviously visible in late seventies and early eighties. That decline observed was continuing at a steady pace when study came to an end.

4.1.4.3 Trend in productivity of sesamum

The trend in productivity of sesamum shows wider fluctuations. The productivity, which was stagnant during 1960-1966, showed an upward leap till 1970. Again the trend was decelerating followed by an improvement in late seventies. Afterwards, the productivity decreased significantly. Even though improvements were attempted, productivity, after achieving a little improvement, started declining again in1995-96.

Continuous decline in productivity can be mainly due to the serious reduction in area under cultivation. In proportion to the improvement in productivity during nineties, which may be attributed to the spread of HYVs released under NARP, a small increase was noticed in production also. Even then the area was steadily declining causing a deceleration in production again (Fig 5).

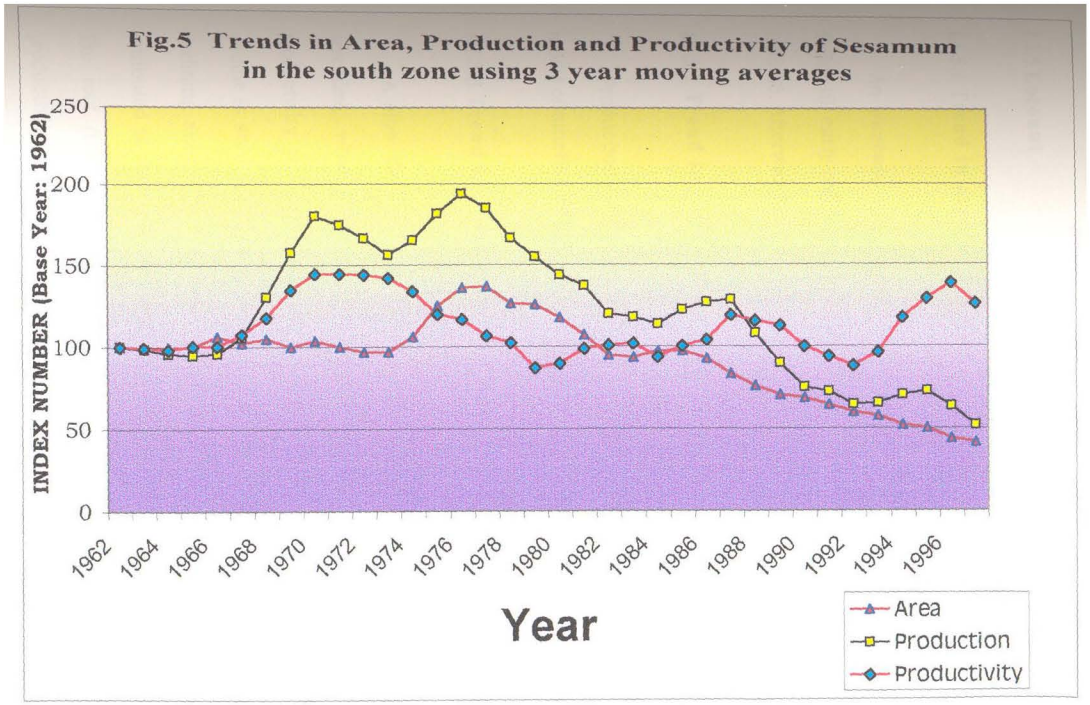


Fig.5 Trends in Area, Production and Productivity of Sesamum in the south zone using 3 year moving averages
INDEX NUMBER (Base Year: 1962)
250
200
150
100
50
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
Year
Area
Production
Productivity

4.1.5 Coconut

4.1.5.1 Trend in area of coconut

An increase in area was visible during 1960-1972 and then a decline till early eighties. Then the trend line was showing stagnation till 1985-86. Afterwards an improvement is observed in coconut area.

4.1.5.2 Trend in production of coconut

Production of coconut also showed a similar trend. But after the middle of nineties, it shows the symptoms of slight decline.

4.1.5.3 Trend in productivity of coconut

A slow decline was found in the productivity of coconut during seventies, which further improved during eighties. An increase in productivity is visible till middle of nineties, but after that a slight decline is shown in the productivity trend. Even though the area is not declining substantially, the production shows a decline, which can be attributed to the low productivity. The incidence of calamitous diseases like *root (wilt)* and *mandary* might have caused the reduction in productivity, that lead to reduction in total production (Fig 6).

After the implementation of NARP, the productivity of rice has shown improvement. But it is not reflected in total rice production as the

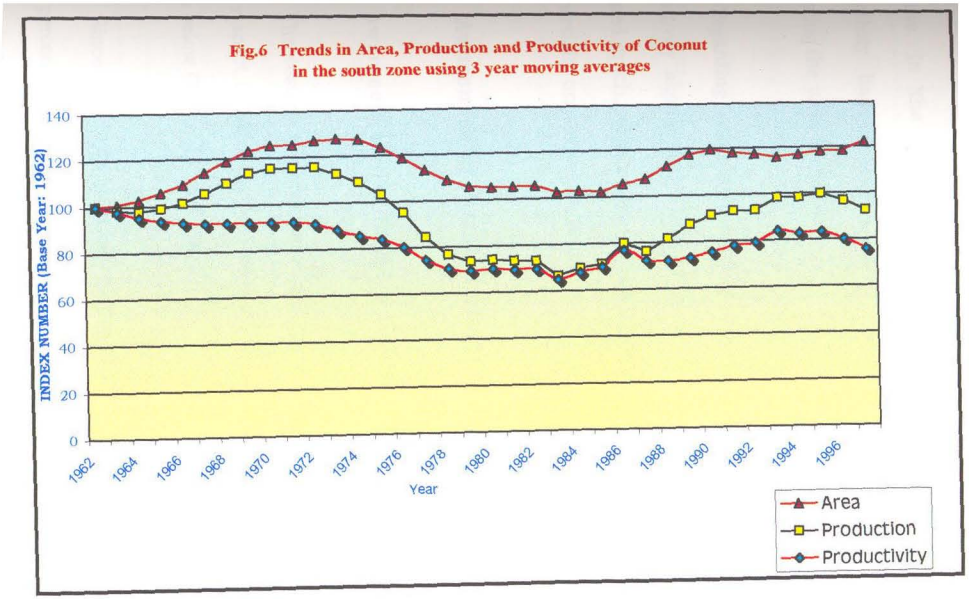


Fig.6 Trends in Area, Production and Productivity of Coconut
in the south zone using 3 year moving averages
INDEX NUMBER (Base Year: 1962)
140
120
100
80
60
40
20
0
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
Year
Area
Production
Productivity

rice area is reducing substantially, which can be remedied only through enforcing the Land Utilization Act effectively, preventing conversion of paddy lands and taking efforts for making rice cultivation more attractive. In the case of crops like tapioca and sesamum, the productivity has increased. But production constraints are more preventing the yield increase.

Regarding coconut, incidence of pest and disease affected the productivity significantly. In the case of banana productivity has not improved much, which can be due to the poor attention received by the commercially important varieties.

4.2 Awareness of farmers about NARP

4.2.1 Awareness of rice farmers about NARP

The results of frequency and percentage analysis of rice farmers with respect to their scores obtained for awareness about the NARP are given below (Table 31 and Fig 7).

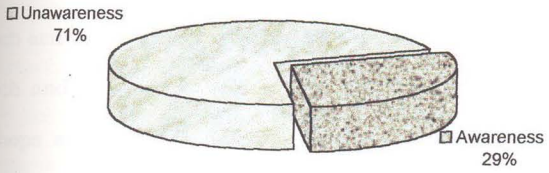
Since the total number of respondents were 100, the frequency and percentage values were same. Out of the 10 statements rated for measuring the level of awareness of farmers about NARP, the percentage of respondents who were aware of NARP were low in all the ten items.

Table 31. Extent of awareness of the rice farmers about NARP

N = 100

Sl. No	Statements	Yes	No
		No & %	No & %
1)	Have you heard about NARP ?	34	66
	If yes,		
2)	Which is the NARP station in your region?	41	59
3)	Is NARP in existence now?	4	96
4)	In which crop the NARP research station in your area is conducting research?	42	58
5)	Have you heard about the demonstrations conducted under NARP?	31	69
6)	Have you heard about farm trials under NARP?	29	71
7)	Have you heard about the monthly workshops under NARP?	17	83
8)	Do you know that your location specific agricultural problems can be solved through NARP?	33	67
9)	Do you know that technologies particularly suitable to your locations are developed in the NARP station of your region?	20	80
10)	Are you aware of the regular multi-disciplinary team field visits under NARP?	35	65
	Average	**28.6**	**71.4**

Fig.7 Extent of awareness of rice farmers about NARP



Hence the hypothesis that the awareness of rice farmers about NARP would be poor is accepted.

The maximum number of positive responses was 41 and the minimum four with an average awareness score of 28.6. Hence it is clear that more than 70 percentage of the respondents were unaware of the term, NARP even after 15 years of implementation of the programme. The least extent of awareness was noticed with respect to the existence of NARP i.e., whether NARP is continuing or not. Those who gave positive responses were also aware of the NARP station and its activities, not as NARP station but as a centre of Agricultural University and its research activities. The concept of NARP, its location - specific nature of research and the front line activities like demonstrations, farm trials, workshops etc were not known to majority. This might be because during the initial stages of implementation of NARP, the significance attributed to creation of awareness among farmers and their participation in research might have been very limited. After the initiation of project, the components of NARP were implemented with a regular nature and about the concept of NARP, beneficiaries remained unawareness.

4.2.2 Awareness of sesamum farmers about NARP

The results of frequency and percentage analysis of sesamum farmers with respect to their scores obtained for awareness about the NARP are given below (Table 32 and Fig 8).

Out of the ten statements rated, the awareness score for six statements were less than average indicating that majority of the respondents was in the low awareness category (54 per cent). Hence the hypothesis that the awareness of sesamum farmers about NARP would be poor is accepted.

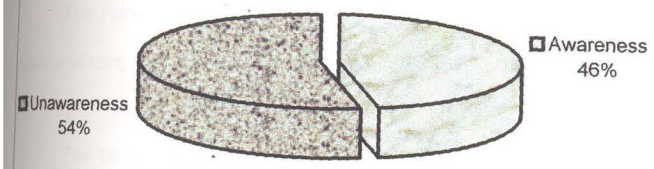
Respondents were having maximum awareness regarding farm trials (78 per cent). The minimum awareness was in the case of conduct of monthly workshops under NARP and awareness about the fact that the specific agricultural problems in the farmer's locality can be solved through NARP. Seventy-six percentages of the respondents expressed poor awareness regarding the existence of NARP. Regarding farm trials, the farmers had fairly high level of awareness. This may be because distribution of the sesamum cultivators are confined to the *Alappuzha* district in which the, Regional Research Station *Kayamkulam* is located. Hence for any technical guidance, farmers will approach the research station. Likewise the verification trials of technologies generated in RRS, *Kayamkulam* are being done in the surrounding areas. So that farmers

Table 32. Extent of awareness of the sesamum farmers about NARP

N = 50

Sl. No	Statements	Yes		No	
		No	%	No	%
a)	Have you heard about NARP ?	15	30	35	70
	If yes,				
b)	Which is the NARP station in your region?	28	56	22	44
c)	Is NARP in existence now?	38	76	12	24
d)	In which crop the NARP research station in your area is conducting research?	30	60	20	40
e)	Have you heard about the demonstrations conducted under NARP?	17	34	33	66
f)	Have you heard about farm trials under NARP?	39	78	11	22
g)	Have you heard about the monthly workshops under NARP?	13	26	37	74
h)	Do you know that your location specific agricultural problems can be solved through NARP?	13	26	37	74
i)	Do you know that technologies particularly suitable to your locations are developed in the NARP station of your region?	22	44	28	56
j)	Are you aware of the regular multi-disciplinary team field visits under NARP?	17	34	33	66
	Average		**46.4**		**53.6**

Fig.8 Extent of awareness of sesamum farmers about NARP



in the area are aware of farm trials of the research station while most of them were not aware of the other activities like workshop, demonstrations etc.

4.3 Knowledge of farmers about the improved varieties and practices

4.3.1 Extent of knowledge of rice farmers about the recommended practices of rice

The results of frequency and percentage analysis of the knowledge scores of rice farmers are furnished in Table 33 and Fig 9 .

The percentage of respondents in the low knowledge category was low (30 per cent). Majority of the farmers possessed higher knowledge (70 per cent) about the recommended practices and varieties. Hence the hypothesis that the knowledge of rice farmers about improved practices would be poor is rejected.

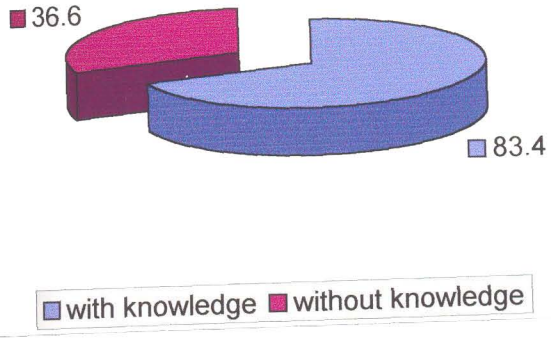
Among the 12 improved practices recommended, the level of knowledge of farmers were found very low in the case of only one practice, i.e. control of blast disease. This shows that even though the awareness level about the programme was very low, their knowledge about improved varieties and practices were high. The respondents

Table 33. Extent of knowledge of rice farmers about improved practices

N = 100

Sl. No	Statements	Incorrect	Correct
		F & %	F & %
1	A high yielding variety of paddy recommended for your area ?	19	81
2	What is a spacing for a short duration variety of paddy in virippu season?	25	75
3	Name a paddy variety suitable for areas like Kollam and Pathanamthitta with high elevation and water scarcity.	39	61
4	Why chemicals are applied on seeds before sowing ?	20	80
5	Why lime is applied in rice field ? a) To reduce the soil alkalinity b) To reduce soil acidity c) To improve the water holding capacity of soil d) To destroy pathogens in soil	14	86
6	For controlling blast disease and stem rot of rice, what measure is to be adopted? a) More phosphatic fertilizer application b) Apply Carbofuran and nematicide along with the fungicide, c) Any other measures d) The above two measures together will be adopted	67	33
7	What is the mode of application of ammonium sulphate/ urea in field? a) Full quantity as basal dose b) Full quantity as basal dressing c) Split application will be done	16	84
8	What measure is to be adopted against BPH infestation? a) Cultivate BPH resistant varieties b) Spray chemicals c) Any other measures	36	64
9	What is Sevin ? a) Fungicide b) Pesticide c) Weedicide d) Fertilizer	45	55
10	The chemical applied against the attack of stem borer? a) Sevin b) Ekalux c) BHC d) DDT	33	67
11	What is your opinion about cutting of leaf tips of paddy seedlings before planting? a) It promotes better growth b) It has no influence on crop performance c) It is harmful	25	75
12	What is the quantity of soil to be taken for soil sampling? a) 200 gms b) 1 Kg c) 1/2 kg d) 2 Kg	27	73

Fig.9 Extent of knowledge of rice farmers about recommended practices



without having proper knowledge about the programme enjoyed the benefits of the programme. ie, whatever technologies are recommended are known to the farmers, which may not be always catered to their specific needs. As they do not know that under NARP, the main thrust is on location specific needs of farmers and research is conducted towards that end, the farmers may not communicate the location specific needs and their participation in the technology development remain very low. This will ultimately lead to severe decline in the rate of adoption of technologies.

4.3.2 Extent of knowledge of sesamum farmers about the recommended practices of sesamum

The results of frequency and percentage analysis of the knowledge scores of sesamum farmers are furnished in Table 34 and Fig 10. Majority (66.6 per cent) of the sesamum farmers were having good knowledge about improved practices in sesamum and hence the hypothesis that the knowledge of sesamum farmers about improved practices would be poor is rejected.

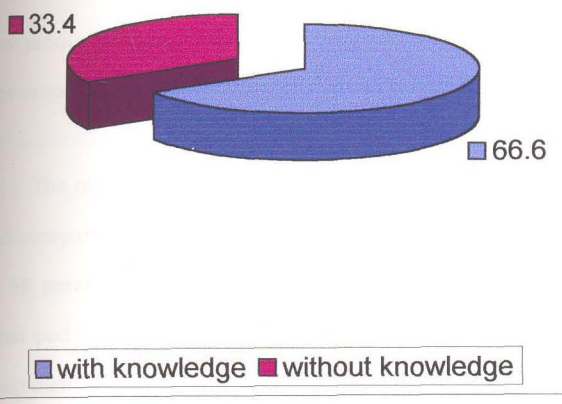
The item about which maximum number of people possessed correct knowledge was regarding 'Thilak' as a good recommend variety of sesamum. The least extent of knowledge was expressed regarding the name, dose and time of application of fertilizers for sesamum ie, only 36

Table 34. Extent of knowledge of sesamum farmers about improved practices

N = 50

Sl. No	Statements	Correct		Incorrect	
		No	%	No	%
1)	Name a high yielding variety of sesamum	36	72	14	28
2)	What is the seed rate for cultivating sesamum in one cent of land?	36	72	14	28
3)	What is the quantity of organic matter to be applied for cultivating sesamum in one cent?	31	62	19	38
4)	Name the fertilizer to be applied for supplying nitrogen to sesamum?	37	74	13	26
5)	Which is the phosphatic fertilizer to be applied for sesamum?	40	80	10	20
6)	What is the quantity of fertilizers to be applied for sesamum crop?	18	36	32	64
	Fertilizer Quantity Time of application N P K				
7)	What is Thilak?	42	84	8	16
8)	Name the pesticide applied against pod borer of sesamum?	29	58	21	42
9)	What is the major disease affecting sesamum?	35	70	15	30
10)	Is it possible to control the little leaf disease of sesamum by spraying chemicals?	29	58	21	42

Fig.10 Extent of knowledge of sesamum farmers about recommended practices



percentage were having correct knowledge. At the same time 80 percentage of farmers knew the name of fertilizer, which is to be applied for sesamum crop to supply phosphorous. Likewise three fourth of the respondents knew which nitrogenous fertilizer to be applied. This is very much significant as it indicates the partial knowledge possessed by farmers. They possessed the basic knowledge, but the details of application were not known to them. ie, time, dosage and quantity were not correctly known to them. That leads to another shocking conclusion that people might be applying the correct fertilizer but not at proper time and in correct dose, which is a serious mistake and that itself can lead to low production and sometimes even crop failure. The crop yield will not be proportionate to the cost and effort taken by farmers.

The quantum of knowledge possessed by sesamum farmers was found comparatively low regarding plant protection measures. Because only 58 percentage of farmers knew the correct pesticide to be used against pod borer of sesamum. The finding was similar in the case of management of phillody disease of sesamum. In all other aspects like seed rate, quantity of organic matter to be applied etc, more than 70 percentage of respondents possessed correct knowledge. This shows that the recommendations, which are easy to understand and remember, were found to be known to majority. Specific details like dosage, mode and exact time of application were comparatively unknown to farmers.

4.4 Extent of adoption of recommended varieties and practices by farmers

4.4.1Extent of adoption of recommended varieties and practices by the rice farmers

Frequency and percentage analysis of the respondents based on the scores obtained for adoption was carried out and was categorized into three categories as presented in the(Table 35 and Fig 11).

Extent of adoption was measured by analyzing the ratings of farmers on the ten recommended practices for rice. Out of these, minimum level of adoption was noticed in the case of seed treatment and 'weedicide application'. The farmers are not convinced on the advantage of these two techniques. More over these practices are not unavoidable as far as rice cultivation is concerned in a less progressive way.

'Partial adoption' was more in the case of inorganic fertilizer application and management of sandy soil. In the case of fertilizer application, all the farmers adopted the practices, but to the majority (66 per cent), adoption was partial. In managing sandy soil also, majority (70per cent) had adopted the recommendations partially. This shows that farmers are aware of the practices, but adoption is not complete due to partial awareness, or due to some other production constraints.

Table 35. Frequency and percentage of non-adopters, partial adopters and full adopters of recommended practices of rice

N = 100

Sl.No	Recommended practice	Non-adoption F &p	Partial adoption F &p	Full adoption F &p
1)	Variety	10	31	59
2)	Seed treatment	60	36	4
3)	Soil testing	20	24	56
4)	Liming	33	41	26
5)	Cropping pattern	12	48	40
6)	Weedicide application	73	25	2
7)	Management of sandy soil	17	79	4
8)	Mini harvester	51	28	21
9)	Inorganic fertilizer	-	66	34
10)	Plant Protection	-	57	43
	Average	**27.6**	**43.5**	**28.9**

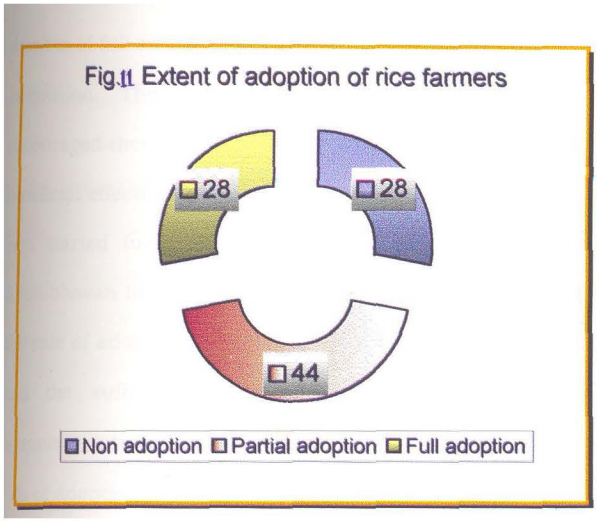


Fig.11 Extent of adoption of rice farmers
28
28
44
Non adoption
Partial adoption
Full adoption

'Full adopters' proportion was more in the case of two practices namely HYV paddy cultivation and proper soil testing (fig 12).

Farmers used to give proper attention for selecting high yielding varieties even in the traditional method of rice cultivation. According to the farmers, the selection of suitable variety is the most important step as far as paddy cultivation is concerned. Hence in selecting HYV, number of full adopters were more, under the present modern method of cultivation. The comparative advantage of HYV cultivated might have encouraged them for adopting new varieties further. Soil testing and its beneficial effects have became more popular after the mobile soil testing labs started functioning. Only a nominal rate is collected through Krishibhavan for carrying out soil testing. It also has a positive effect on the rate of adoption of this technology ie, low cost, easiness in adoption and the sufficient technical guidance for adopting the soil test recommendations provided by Krishibhavan officials explain the high rate of adoption of soil testing.

Table 36 shows the mean scores obtained for the 10 recommended practices according to their rate of adoption. From the table it is clear that maximum adoption was in selecting HYV rice followed by adoption of plant protection and the soil test. The least amount of adoption was observed in the case of weedicide application followed by seed treatment. Among the ten given practices, the adoption score was above mean value

Table 36. Mean adoption scores of rice farmers

N = 100

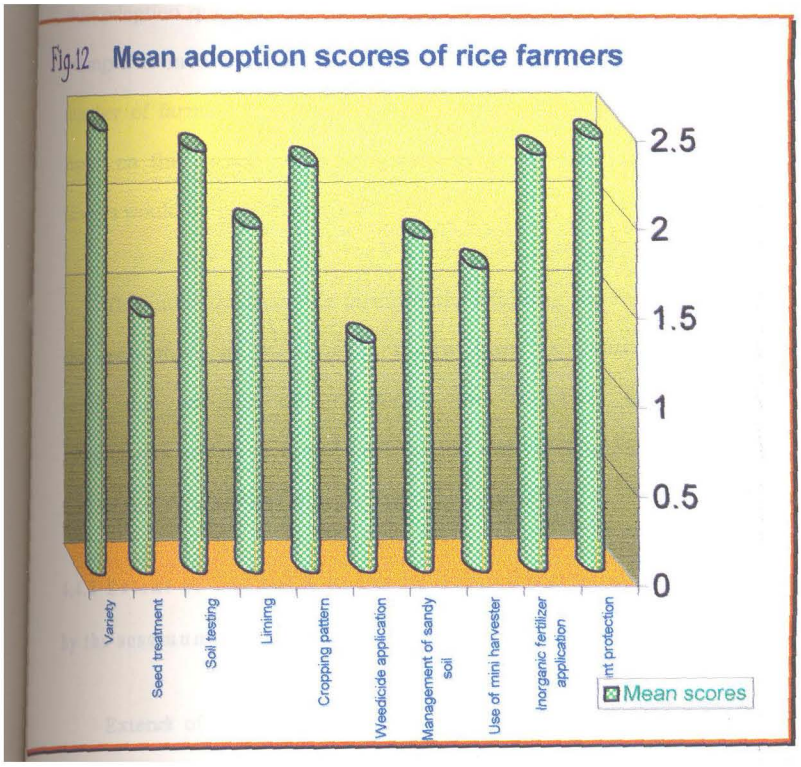
Sl.No	Recommended practice	Mean scores of rice farmers	Ranks
1)	Variety	2.49	I
2)	Seed treatment	1.44	IX
3)	Soil testing	2.36	III
4)	Liming	1.93	VI
5)	Cropping pattern	2.28	VI
6)	Weedicide application	1.29	X
7)	Management of sandy soil	1.87	VII
8)	Mini harvester	1.70	VIII
9)	Inorganic fertilizer	2.34	IV
10)	Plant Protection	2.43	III

Table 37. Distribution of rice farmers according to their adoption quotient

N = 100

Sl.No	Category	Frequency
1)	Low	28
2)	Medium	55
3)	High	17

Fig.12 **Mean adoption scores of rice farmers**



in the case of five practices namely variety, plant protection, soil testing, inorganic fertilizer application and proper cropping pattern.

Table 37 and Fig. 13 gives a picture of the respondents based on their adoption quotient. More than half (55 per cent) of the respondents belonged to medium category, followed low adopters (28 per cent) the number of farmers under high adoption was very low (17 per cent). Based on this result the hypothesis that extent of adoption of rice farmers would be poor is rejected.

This indicates that rice farmers are adopting the recommendations and apply them in their fields, many times as 'reinvention'. This is mostly due to lack of knowledge and technical skill. Extension functionaries are to be more alert in this regard. Transfer of technology is as/or more important than technology generation.

4.4.2 Extent of adoption of recommended varieties and practices by the sesamum cultivators

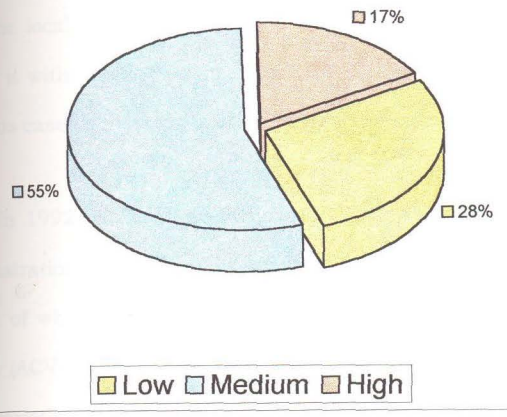
Extent of adoption of recommended varieties and practices of sesamum were quantified based on the ratings of sesamum cultivators on the 10 selected recommended practices of sesamum (Table 38 and Fig 14).

Table 38. Frequency and percentage of non adopters, partial adopters and full adopters of recommended practices of sesamum.

N = 50

Sl.No	Recommendations	F&p	Non-adoption	Partial adoption	Full adoption
1)	Variety	F	8	14	28
		P	16	28	56
2)	Area under high yielding variety	F	10	12	28
		P	20	24	56
3)	Organic fertilizer application	F	5	25	20
		P	10	50	40
4)	Seed rate	F	8	20	22
		P	16	40	44
5)	Inorganic fertilizer application	F	10	32	8
		P	20	64	16
6)	Spacing	F	10	30	10
		P	20	60	20
7)	Weeding operation	F	34	14	2
		P	68	28	4
8)	Control of pod borer	F	6	22	22
		P	12	44	44
9)	Control of little leaf disease	F	24	10	16
		P	48	20	32
10)	Seed preservation	F	16	12	22
		p	32	24	44
Average			**26.2**	**38.2**	**35.6**

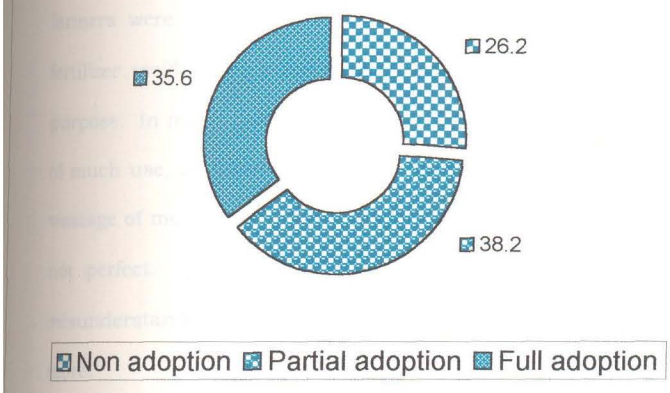
Fig.13 Distribution of rice farmers according to Adoption Quotient



'Full adoption' was found to be maximum in the case of two items; ie, variety and area under high yielding variety. As far as variety is concerned, majority are growing high yielding varieties recommended by NARP like *surya, thilak* etc, but in some pockets they call it by some other local names. The variety could be identified through the plant characteristics. In all the cases, once if the farmer is adopting a HYV sesamum, he will bring all the area under HYV cultivation. This trend was also found very common among sesamum farmers. This indicates that farmers are well convinced about the relative advantage of the HYV over the local varieties. In the case of *'thilak'*, farmers were ready to accept it without any doubt. Farmers of Onattukara referring to some previous cases substantiated this phenomenon as follows;

In 1992, HYV of sesamum was grown in nine selected plots for demonstration. Scientific cultivation practices were also adopted, the details of which were not clearly known to the farmers. It was *surya* variety (ACV-2) which was grown to show its relative advantage over the local varieties. In those demonstrations, the yield obtained was very much encouraging. The farmers were surprised and motivated to adopt the variety. This was the basis for the highly favorable attitude of farmers towards HYV of sesamum. They said that the average yield was around 600 Kg /ha as against the 320-350 Kg/ha of local varieties. But as they continued its cultivation, the yield was not so high, even then all were satisfied with its performance.

Fig.14 Extent of adoption of sesamum farmers

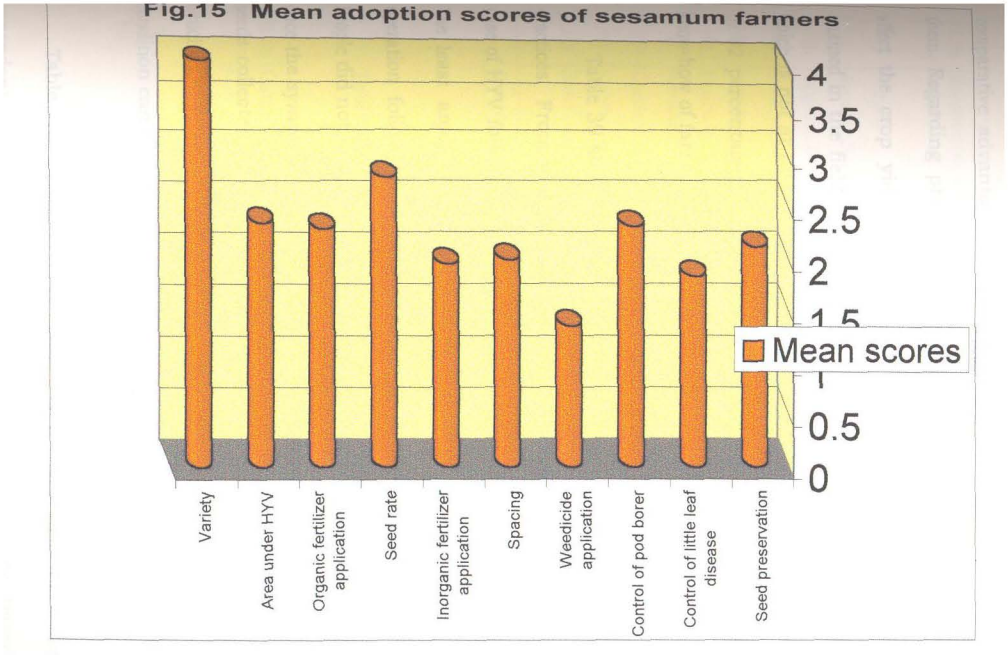


'Full adoption' was fairly high in the case of seed rate, seed preservation and control of pod borer. But in the case of control of pod borer, 'over adoption' was observed with respect to the use of BHC powder. In other aspects adoption was good (Fig 15).

'Partial adoption' was more in the case of inorganic fertilizer application. Here the farmers didn't know the method and dosage. They not at all knew split dose in nitrogen application. In few places, the farmers were found to use no inorganic fertilizers thinking that the fertilizer residues or remaining of the paddy stumps would serve the purpose. In many locations farmers applied fertilizers, but would not be of much use, as the dosage and time was not correct. This will lead to wastage of money and effort. Regarding spacing also, the adoption was not perfect. This might be done due to unawareness or due to a misunderstanding that more number of plants per unit area would yield more.

In the case of organic fertilizer application 'partial adoption' was found maximum. Farmers thought that there is no such specification regarding its quantity as against the case of inorganic fertilizers. Here farmers were applying whatever stuff and quantity were available with them.

Fig.15 Mean adoption scores of sesamum farmers



'Non adoption' was found to be maximum in the case of weeding operation. Even hand weeding was lacking in some cases. The comparative advantage of weedicide application was not convinced to them. Regarding phillody disease, farmers believed that it would not affect the crop yield considerably. Hence the affected plants were retained in the field and some plant protection chemicals were sprayed which is not at all effective. Seed preservation measures were not done by 32 percentage of respondents, which shows the gulf in technical know-how of farmers.

Table 39 shows the mean adoption scores of the 10 recommended practices. From the table, it is evident that adoption is maximum in the case of HYV followed by seed rate and area under high yielding variety. The least amount of adoption was noticed in the case of weeding operation followed by management of phyllody disease of sesamum. People did not know that it is caused by a virus and cannot be controlled once the symptom appears. The infested plants were not destroyed and seeds collected from them were found to be used in the next season, which is very much deleterious. Through proper extension effort, the condition can be improved.

Table 40 gives a clear idea about the adopter categories of respondents. The farmers were classified into three based on the adoption coefficient (Fig. 16). Only 10 percentage of respondents

Table 39. Mean adoption scores of sesamum farmers

N = 50

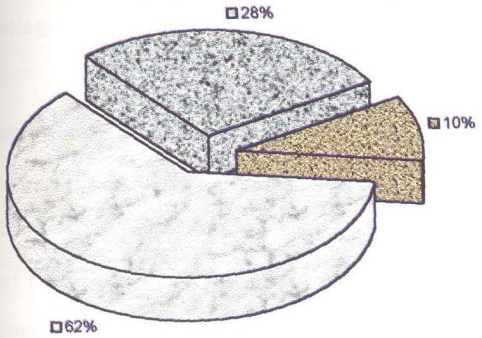
Sl.No	Recommendations	Mean score	Rank
1)	Variety	2.40	I
2)	Area under high yielding variety	2.36	II
3)	Organic fertilizer application	2.30	IV
4)	Seed rate	1.80	IX
5)	Inorganic fertilizer application	1.96	VII
6)	Spacing	2.00	VI
7)	Weeding operation	1.36	X
8)	Control of pod borer	2.32	III
9)	Control of little leaf disease	1.84	VIII
10)	Seed preservation	2.12	V
	Average	**2.306**	

Table 40. Distribution of sesamum farmers according to their adoption quotient

N = 50

Sl.No	Category	Frequency	Percentage
1)	Low	5	10
2)	Medium	31	62
3)	High	14	28

Fig.16 Distribution of sesamum farmers according to Adoption Quotient



belonged to 'low adoption' category while majority (62 per cent) belonged to 'medium adoption' category. Hence the hypothesis that extent of adoption of sesamum farmers would be poor is rejected.

Twenty eight percentage of respondents was 'high adopters' which was comparatively higher than that of the rice farmers. Likewise percentage of low adopters was also very low compared to low adopter category of rice farmers. This shows that among sesamum farmers, rate of technology adoption is comparatively better.

4.5 Perception of farmers about farm trials under NARP

The farmers rated ten statements pertaining to farm trials in a five-point continuum and the mean scores were worked out for all the ten statements in the scale. The average value of all the ten mean scores was worked out.

4.5.1 Perception of rice farmers about farm trials under NARP

From table 41, it can be clearly understood that the score for all the ten items are above mean indicating the favourable opinion, rice farmers were having regarding farm trials. Farmers supported the statement that 'farm trials are essential for transferring new technologies to farmers' (Average score: 4.5). Nobody agreed with the statement that

Table 41. Perception of rice farmers about Farm Trials

N = 100

Sl. No	Statements	SA	A	UD	DA	SDA	AV
1	Farm trials are essential for transfering new technologies to farmers	52	34	14	0	0	4.5
2	Farm trials help to increase the interest of farmers towards modern agricultural practices	19	63	16	2	0	4
3	Farm trials are of no use	0	2	28	46	24	3.9
4	Farm trials satiisfy those farmers who are interested to try new techniques.	20	34	24	16	6	3.5
5	Farm trials lead to economic loss to farmers	5	14	35	10	36	3.58
6	Farm trials help to improve linkage between farmersand scientists	26	48	10	16	0	3.8
7	Lack of proper supervision is a problem while conducting farm trials	0	21	21	17	41	3.78
8	Farm trials are useful for big farms	4	22	14	55	5	3.35
9	Farm trials are essential for testing the suitability ofa new technology in particular location	46	33	14	2	5	4.13
10	Farm trials are conducted for the benefit of scientists	3	29	21	28	19	3.31

'farm trials are of no use. Likewise majority of farmers agreed that farm trials are necessary for testing the suitability of a technology in a particular location. The high degree of favourable opinion might have developed as result of their feeling that the technologies, developed under the controlled conditions of the research station, will mostly fail in the farmer's field, for which farm trials are the only solution in their opinion. Lowest score was obtained for the statement that 'scientists, for their own benefit, conduct farm trials'. This shows the amount of unawareness of farmers about the concept of farm trial itself, which again points out another lacuna of not assuring farmers participation in project implementation.

4.5.2 Perception of sesamum farmers about farm trials under NARP

The mean adoption scores for the nine out of ten statements were above average (Table 42). This showed the highly favourable attitude, farmers were having towards farm trials. The statement that 'farm trials are essential for transferring new technologies to farmers scored maximum (Average score: 4.26), which shows the farmers' knowledge about the purpose of conducting farm trials. The next highest score was obtained for the statement that 'farm trials are necessary for testing the suitability of a technology in a particular location' (Average score: 4.22). Farmers know the significance of farm trials and they welcome such

Table 42. Perception of sesamum farmers about Farm trials

N = 50

Sl. No	Statements		SA	A	UD	DA	SDA	AV
1	Farm trials are essential for transfering new technologies to farmers	No	23	17	10	-	-	4.26
		%	46	34	20	-	-	
2	Farm trials help to increase the interest of farmers towards modern agricultural practices	No	7	30	10	3	-	3.82
		%	14	60	20	6		
3	Farm trials are of no use	No	2	19	22	7	-	3.32
		%	4	38	44	14	-	
4	Farm trials satiisfy those farmers who are interested to try new techniques.	No	10	20	13	4	3	3.6
		%	20	40	26	8	6	
5	Farm trials lead to economic loss to farmers	No	4	7	19	5	15	3.4
		%	8	14	38	10	30	
6	Farm trials help to improve linkage between farmersand scientists	No	13	22	6	8	1	3.76
		%	26	44	12	16	2	
7	Lack of proper supervision is a problem while conducting farm trials	No	1	9	9	7	24	3.88
		%	2	18	18	14	48	
8	Farm trials are useful for big farms	No	2	11	5	31	1	3.36
		%	4	22	10	62	2	
9	Farm trials are essential for testing the suitability ofa new technology in particular location	No	26	14	7	1	2	4.22
		%	52	28	14	2	4	
10	Farm trials are conducted for the benefit of scientists	No	0	21	7	13	9	3
		%	0	42	14	26	18	

attempts. But regarding the conduct of farm trials, they have some misconceptions like, 'farm trials are mostly done for the benefit of scientists'. Some of them believe that only big farmers are benefited by farm trials. These problems can be solved by proper extension effort and farm trials can be made more successful with the active involvement of farmers.

4.6 Perception of farmers about demonstrations

Ten statements pertaining to demonstrations were rated by the farmers to get an idea about the demonstrations conducted under NARP as perceived by farmers.

4.6.1 Perception of rice farmers about demonstrations

As in the case of farm trials opinion regarding demonstrations was highly favourable (Table 43). A greater majority was of the opinion that 'demonstrations are unavoidable for convincing the farmers about the benefits of new technologies and to teach the 'how to do' of a technology' (Average score: 4.5). As another benefit of demonstrations they pointed out that demonstrations help to draw the attention of more farmers towards a technology. To the statement, 'demonstrations lead to economic loss to the farmers', 50 percent agreed. Farmers were complaining that during earlier days, when farm trials or

Table 43. Perception of rice farmers about Demonstrations

N = 100

Sl. No	Statements	SA	A	UD	DA	SDA	AV
		Number and Frequency					
1	Demonstrations are essential to show the method of practical application a new technology.	52	34	14	-	-	4.5
2	Demonstrations help to direct the attention of people towards innovations	19	63	16	2	-	4
3	Demonstrations are mere wastage of money and time.	-	2	28	46	24	3.9
4	Demonstrations are necessary for convincing the fertilizers about the benefits of newtechnology.	20	34	24	16	6	3.5
5	Many technologies found viable in demonstrations, have proven unsuccesfull infarmers field.	5	14	35	10	36	3.58
6	Demonstrations are conducted for the benefit of scientists.	26	48	10	16	-	3.8
7	Demonstrations are conducted under a situation which is entirely different from farmer's field.	-	21	21	17	41	3.78
8	Demonstrations help to solve the anxiety of farmers about the ill effects of newtechnologies.	4	22	14	55	5	3.75
9	Demonstrations lead to economic loss of the farmers.	46	33	14	2	5	4.17
10	Demonstrations help to clear the doubts of farmers about the practical aspects ofthe technology.	3	29	21	28	19	3.25

demonstrations were done in farmers' field, Government used to give incentive or financial support to the farmer, which is not done by KAU now- a- days (Average score: 2.7). A considerable proportion criticized that 'many technologies found viable during demonstrations have proven unsuccessful in farmers' field. This indicates that the technology packages are not developed based on location specific needs and also points to the inadequacy of field tests carried out before releasing a technology. The result is in agreement with the reports of Pathak and Sasmal (1992) and Nanjappa (1997).

4.6.2 Perception of sesamum farmers about demonstrations

As in the case of rice farmers, the mean scores of nine out of ten items were above mean score value (Table 44). Sesamum farmers scored high also on the items that 'demonstrations are unavoidable for convincing the farmers about the benefits of new technologies and to teach the practical application of a technology' (Average score: 4.34). They mean score was high also on the item that 'demonstration help to draw the attention of more farmers towards a technology' (Average score: 4.32). This shows that farmers are aware of the need and purpose of the demonstrations. Singh and Jha (1998) and Jayalekshmi (1998) reported similar results.

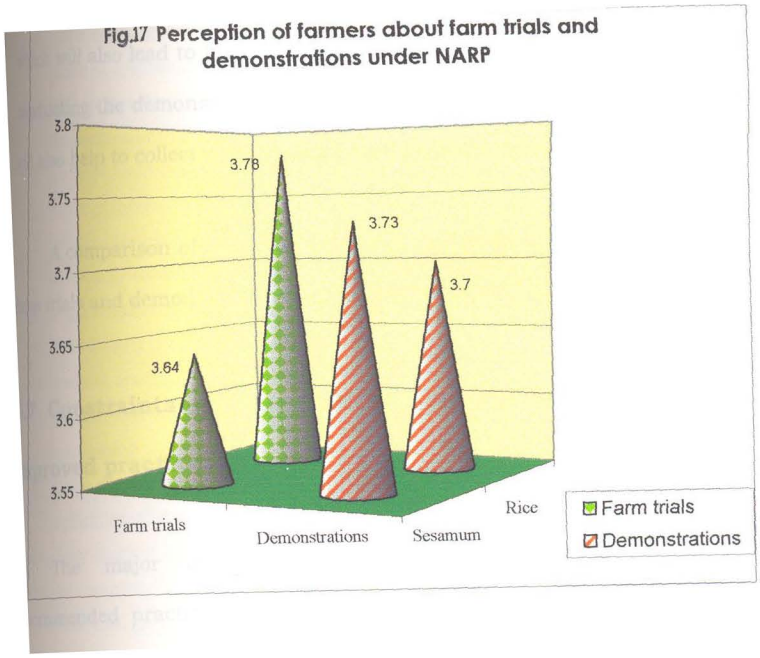
Even then, the farmers were not satisfied with the economic aspect of the demonstrations, which is reflected in the poor response towards the item, 'demonstrations lead to economic loss to the farmers' (Average score: 2.72). The farmers pointed out two reasons behind this ; farmers who are

Table 44. Perception of sesamum farmers about demonstrations

N = 50

Sl. No	Statements		SA	A	UD	DA	SDA	AV
1	Demonstrations are essential to show the method of practical application a new technology.	No	25	19	4	2	-	4.34
		%	50	38	8	4	-	
2	Demonstrations help to direct the attention of people towards innovations	No	28	18	4	0	0	4.32
		%	56	36	8	0	0	
3	Demonstrations are mere wastage of money and time.	No	9	4	3	32	2	3.28
		%	18	8	6	64	4	
4	Demonstrations are necessary for convincing the fertilizers about the benefits of newtechnology.	No	20	28	2	0	0	4.36
		%	40	56	4	0	0	
5	Many technologies found viable in demonstrations, have proven unsuccesfull infarmers field.	No	0	13	12	17	8	3.4
		%	0	26	24	34	16	
6	Demonstrations are conducted for the benefit of scientists.	No	2	10	2	36	0	3.4
		%	4	20	4	72	0	
7	Demonstrations are conducted under a situation which is entirely different from farmer's field.	No	0	13	14	7	16	3.52
		%	0	26	28	14	32	
8	Demonstrations help to solve the anxiety of farmers about the ill effects of newtechnologies.	No	23	13	11	3	0	4.12
		%	46	26	22	6	0	
9	Demonstrations lead to economic loss of the farmers.	No	4	22	15	2	7	2.72
		%	8	44	30	4	14	
10	Demonstrations help to clear the doubts of farmers about the practical aspects of the technology.	No	14	23	8	3	2	3.9
		%	28	46	16	6	4	

Fig.17 Perception of farmers about farm trials and demonstrations under NARP



ready to give land area and other supports for the conduct of demonstrations are not given any monitory incentive which, in their words is, is an injustice. No financial support is provided for the farmers who take up the new variety or practice after the demonstration. In many cases, due to insufficient technical guidance, the trials may fail which will also lead to financial loss to the farmers. In this respect, after conducting the demonstrations, follow up can be made more efficient. It will also help to collect more realistic feed back on the new technology.

A comparison of the mean scores of rice and sesamum farmers on farm trials and demonstrations is pictured in Fig. 17.

4.7 Constraints experienced by farmers in adoption of improved practices.

The major constraints experienced farmers in adopting recommended practices were ranked for their relative importance for both rice and sesamum farmers.

4.7.1 Constraints experienced by rice farmers in adoption of improved practices.

The major constraints experienced rice cultivators in adopting recommended practices are given in table 45, which are ranked on the

Table 45. Constraints experienced by the rice farmers in adopting recommended practices

N = 100

Sl. No	Constraints	Constraint Perception Index (CPI)	Rank
1	Unaware of modern agricultural practices	1.77	XII
2	High costs of inputs	2.74	II
3	Lack of availability of inputs	2.58	III
4	Recommended improved varieties demand larger quantities of in-organic fertilizers.	2.58	III
5	Lack of technical guidance	2.24	VII
6	Lack of interest in trying new methods	1.63	XIV
7	Modern techniques of cultivation are not easily understandable	2.2	VIII
8	High wage rate of labourers	2.88	I
9	Insufficient financial assistance	2.12	X
10	Lack of credibility in technocrats.	1.92	XI
11	Lack of interest to give up traditional methods of cultivation	1.52	XV
12	Lack of proper training in modern agricultural practices.	2.5	V
13	Poor market demand for products.	1.65	XIII
14	Recommended practices do not provide assured financial gains.	2.5	V
15	Belief that modern agriculture is harmful to the soil of the farmers.	2.14	IX

basis of importance assigned to them by the farmers. The Constraint Perception Index (CPI) was worked out for each constraint by dividing the cumulative index of the constraint with the total frequency of responses.

Among the 15 constraints rated for the importance attached to them, 'high wage rate of labourers' ranked top followed by 'high costs on inputs', 'lack of availability of inputs', 'high fertilizer demanding nature of new varieties' and the complaint that 'adoption of recommended practices do not assure regular monitary gain'. Higher wage rate of agricultural labourers has made farming operations very much expensive in Kerala, especially in rice cultivation. (High cost of labour and non-availability of farm labourers during the peak season were reported as the most important constraints, especially in rice cultivation by the Taskforce of Government of Kerala on Agriculture infrastructure,1997.) This lead even to conversion of paddy fields for non agricultural purposes and an erosion in the total paddy area of the State. Including labour, the inputs are becoming costlier day by day. Financial back supports from Government in the form of subsidies or loans are also showing a declining trend. According to the officials, the Government gives this aspect utmost significance. As a result, policy regulations are being made to assist the farmers. Floor price was announced for major crops including coconut.

For high cost and unavailability of inputs, farmers were showing a tendency of finding fault with Government. Instead if the group farming *samithis* are equipped with sufficient facilities, the group activity can be strengthened further and farmers can become self-supporting. Next to this came a complaint heard frequently regarding the recommended technologies. ie. These technologies do not lead to income generating subsidiary occupations, in which farmers are much interested and benefited. In this regard , more thrust is being given under the new concept of National Agricultural Technology Project (NATP).

Lack of interest in deviating from the traditional methods and also lack of interest in trying out new methods ranked very low. This indicates that, in the view of farmers, the lower rate of adoption of technology is not because of lack of awareness and interest on the part of the farmers but because of some other constraints.

4.7.2 Constraints experienced by sesamum farmers in adoption of improved practices.

The most important constraint, as perceived by sesamum cultivators, was 'high wage rate of labourers'. They say that the profitability of the crop depends on the extent of involvement of family labour. The high wage rate of labourers is a problem prevalent is the state as a whole. Mechanisation is the remedy for the problem suggested

Table 46. Constraints experienced by the sesamum farmers in adopting recommended practices

N = 50

Sl. No	Constraints	Constraint Perception Index ,CPI)	Rank
1	Unaware of modern agricultural practices	2.36	VI
2	High costs of inputs	2.74	II
3	Lack of availability of inputs	1.82	XII
4	Recommended improved varieties demand larger quantities of in-organic fertilizers.	2.54	III
5	Lack of technical guidance	2.24	VII
6	Lack of interest in trying new methods	1.64	XIII
7	Modern techniques of cultivation are not easily understandable	2.2	VIII
8	High wage rate of labourers	2.9	I
9	Insufficient financial assistance	1.88	XI
10	Lack of credibility in technocrats.	1.92	X
11	Lack of interest to give up traditional methods of cultivation	1.46	XV
12	Lack of proper training in modern agricultural practices.	2.5	V
13	Poor market demand for products.	1.64	XIII
14	Recommended practices do not provide assured financial gains.	2.54	III
15	Belief that modern agriculture is harmful to the soil.	1.94	IX

by the technocrats, for which the fragmentation of land holdings stands as a barrier. Here also the significance of group approach is to be thought of seriously.

'High cost of inputs' was perceived as second in the order of importance. Generation of low cost technologies and suitable government policies will help to remedy this. Third important constraint was 'unavailability of seeds and fertilizers at correct time'. For this the SDA can take some favorable decision to supply good quality inputs at correct time. 'The higher demand for fertilizers when HYV (s) are grown' was also perceived to be equally important. Lack of proportionate yield increase might have been the reason behind this comment, which again indicates the adequacy of scientific management of farm. 'Lack of training on the recommended technologies' was an important constraint identified, which invites the attention of extension personnel as well as researchers. Another important problem pointed out was that the 'recommended technologies are not highly profit oriented'. Naturally farmers are most concerned about the monitory benefit of a technology rather than the socio- environmental impacts. Export oriented floriculture, vegetable cultivation, commercial level bio-fertilizer, vermiculture etc can be more popularized. More over future research works also can be more oriented towards this end.

The cumbersome nature of technologies was reported as another problem, which again can be due to lack of technical know-how of the farmers. Lack of technical assistance from extension officials of SDA was indicated as the main reason for this. In this context, 'let them do, we will see' approach of farmers also is to be considered. Farmers should take genuine interest in the training programmes and other extension activities organised for them.

'Insufficient credit availability' also hinders the adoption of new techniques. Linkage with credit organizations should be strengthened under the project so that unnecessary delay in giving credits can be reduced. Besides these constraints, the farmers believe that the new methods will affect the quality of soil and hence they show reluctance to adopt it. Making them aware of the need and necessity of adopting organic and inorganic fertilizers in a balanced manner and the environment-friendly approaches taken now a days is the solution for this. Adoption of technologies in a proper manner will no way affect the soil quality. Loss of credibility in technical persons, unawareness about modern cultural practices etc came next in the order of importance. These are due to poor extension effort and weaker linkage between scientists and farmers.

Poor market demand for the products, lack of interest in trying new methods and lack of willingness to deviate from traditional method

of cultivation practices were rated by sesamum cultivators as less important problems, as far as technology adoption in concerned.

4.8 Relationship of selected profile characteristics of farmers with their extent of awareness, knowledge and adoption

4.8.1 Correlation of selected characteristics of farmers with their awareness about NARP

Simple correlation was worked out to see whether there exists any relationship between the selected characteristics of farmers with their awareness about the programme so that the factors, which have a bearing on the extent of awareness of farmers can be clearly understood.

4.8.1.1 Correlation of selected characteristics of rice farmers with their awareness about NARP

The results of correlation analysis showing the relationship of selected profile characteristics of rice farmers with their level of awareness about NARP are shown in table 47.

The table shows that training, attitude towards scientific agriculture, information source utilization pattern, extension participation, perception about demonstration and perception about

Table 47. Correlation of selected profile characteristics of rice farmers with their awareness about NARP

n=100

Variable Number	Name of Characteristics	Correlation Coefficient 'r'
X1	Education	0.0443^{ns}
X2	Farm size	0.0616^{ns}
X3	Economic motivation	0.0250^{ns}
X4	Training	0.1965 *
X5	Innovation proneness	0.0818^{ns}
X6	Risk orientation	0.0065^{ns}
X7	Management orientation	0.0074^{ns}
X8	Level of aspiration	0.0948^{ns}
X9	Attitude towards scientific Agriculture	0.2487 *
X10	Credit orientation	0.0787^{ns}
X11	Information source utilization	0.1925**
X12	Extension participation	0.3312 *
X13	Perception about demonstration	0.2410 *
X14	Perception about farm trials	0.2012 *

* - Significant at 5% level
** - Significant at 1% level
ns- Not significant

farm trials were having positive and significant relationship with the level of awareness of farmers about NARP. There fore the hypothesis that there would be no significant relationship between the selected characteristics and the awareness of farmers about NARP was rejected.

Training was found positively and significantly associated with the awareness about NARP. After the implementation of NARP, the linkage of research as well as extension system with client system has improved considerably. As a result, the number of training programmes offered to farmers also has increased which may naturally create awareness among farmers about the programme. Thus those farmers who had received more number of training might be having better knowledge about the programme.

Attitude towards scientific agriculture was found to be positively and significantly related with farmers' awareness about the Programme. Farmers having a favourable attitude towards scientific agriculture will show interest in knowing about agricultural development programmes /projects and research activities. Hence there is a chance for persons with favourable attitude towards scientific agriculture to have high awareness about NARP. The result is in conformity with the results obtained by Kamarudeen (1981), Nandakumar (1981) and Jnanadevan (1993).

Information source utilization was also having positive and significant association with awareness level of NARP. It is quite natural that a person who utilize more number and types of information sources may gather more information on the subject of his interest. A progressive farmer can make utilization of different types of information sources ie., personal sources, formal and informal, impersonal and commercial sources. These will provide information, which will help the farmers to be up to date in their awareness level about the agricultural development programmes and policies. Hence the positive and significant association between information source utilization and awareness about NARP is self-explanatory. The result is in conformity with the findings of many other researchers like Theodore (1988), Kunju (1990), Jnanadevan (1993) etc.

Likewise a positive and significant association was observed between extension participation and awareness level of farmers about NARP. Observations of Selvakumar (1988), Kunju (1990) and Jnanadevan (1993) are also on line with the results obtained here. Extension participation refers to the degree of participation in various extension activities conducted by development agencies in the farmer-respondents' locality. A farmer who attend the programmes like meetings, seminars, symposiums, demonstrations etc will get every chance to know about with research programmes and get acquainted with new developments in the field. This will explain the positive and

significant association observed between extension participation and awareness of farmers about NARP.

Those farmers who were aware of the NARP will be also having good awareness about the programme objectives and activities undertaken under the project. Farm trials and demonstrations are two front line extension activities under NARP, which is closely linked with farmers. The success of these two depends greatly on the extent of awareness about it among farmers and the degree of involvement of farmers in it. Therefore the farmers who have awareness about project will have good awareness about farm trails and demonstrations compared to those who have not heard of it. Hence the positive and significant association observed between awareness level of farmers about NARP and the perception of farmers about farm trials and demonstrations is justified.

Positive, but non-significant association was observed in the relationship of the variables, education, farm size, economic motivation, innovation proneness, risk orientation, management orientation, level of aspiration and credit orientation with the awareness level of farmers about NARP. Hence in the case of these variables, the hypothesis that there would be no significant association between the selected characteristics and awareness level of farmers was accepted.

4.8.1.2 Correlation of selected characteristics of sesamum farmers with their awareness about NARP

Table 48 shows that economic motivation, innovation proneness, level of aspiration, attitude towards scientific agriculture, information source utilization, perception about demonstrations and perception about farm trials were found to be positively and significantly associated with the extent of awareness of sesamum farmers about NARP. This lead to rejection of the hypothesis that there would be no relationship between the profile characteristics of farmers and their awareness about NARP. The other variables, except farm size, had a positive but non-significant relationship with awareness of sesamum farmers about NARP.

Economically motivated people will show more interested in the technologies generated in areas of their interest with the aim of deriving more monitory returns. In agricultural sector income generating avenues are advocated though different development programmes. Hence farmers with high economic motivation will gather awareness about such programmes, which is evident from positive and significant association between economic motivation of sesamum farmers and their awareness about NARP.

Table 48. Correlation of selected profile characteristics of sesamum farmers with their awareness about NARP

n=50

Variable Number	Name of Characteristics	Correlation Coefficient 'r'
X1	Education	0.0815 ^{ns}
X2	Farm size	-0.2153^{ns}
X3	Economic motivation	0.3056 *
X4	Training	0.1045 ^{ns}
X5	Innovation proneness	0.2700 *
X6	Risk orientation	0.0825 ^{ns}
X7	Management orientation	0.0668 ^{ns}
X8	Level of aspiration	0.3665 **
X9	Attitude towards scientific Agriculture	0.3417 *
X10	Credit orientation	0.0261 ^{ns}
X11	Information source utilization	0.3527 *
X12	Extension participation	0.0889 ^{ns}
X13	Perception about demonstration	0.3773 **
X14	Perception about farm trials	0.4458 **

* - Significant at 5% level
** - Significant at 1% level
ns- Not significant

Innovation proneness, which is a behaviour pattern compelling individuals to seek changes in the concerned field and apply them in their own situation, is closely linked with awareness about a development project. An innovative farmer will be ready to receive any innovative recommendations for changing from the current system. Hence, about a research project like NARP, which brought about surprising changes in sesamum cultivation through improved varieties and scientific management, the innovative farmers should be aware of which is clear from the positive and significant relationship noticed.

Level of aspiration means the overall objective, a man is struggling to achieve, in his practical life. He will be axiom by receiving any message, which would be of help in achieving the objective. A farmer with a high level of aspiration will gather information about agricultural development programmes and hence will have good awareness about NARP. This fact substantiates the relationship between level of aspiration and awareness about NARP.

As in the case of rice farmers, a highly favourable attitude towards scientific agriculture was found to be helpful in being aware of the research project in the case of sesamum farmers also. This was evident from the positive and significant association observed between attitude towards scientific agriculture and awareness about NARP.

In the case of the variable information sources utilization also, a positive and significant association was observed to be existing with awareness about NARP. Awareness of research projects can be created among the farmers through different information sources, especially among literate.

Regarding the perception about demonstration and farm trials, the finding was similar to that in the case of rice farmers. Both the items showed positive and significant relationship with the awareness about NARP. Those who are aware of the project will be having awareness about the programme components like farm trials and demonstrations, which lead to a positive and significant relationship between them.

4.8.2 Correlation of selected profile characteristics of farmers with their knowledge about improved practices

4.8.2.1 Correlation of selected profile characteristics of rice farmers with their knowledge about improved practices

Education, economic motivation, innovation proneness, risk orientation, attitude towards scientific agriculture and information source utilization were found to have positive and significant relationship with knowledge level of farmers about improved practices and varieties. Sethy *et al* (1984) Sinha and Ray (1985) and Anithakumari. Hence the hypothesis that there would be no significant relationship

Table 49. Correlation of selected profile characteristics of rice farmers with their knowledge about improved practices

n=100

Variable Number	Name of Characteristics	Correlation Coefficient 'r'
X1	Education	0.2221 *
X2	Farm size	-0.0124 ns
X3	Economic motivation	0.2888 **
X4	Training	0.0579 ns
X5	Innovation proneness	0.2037 *
X6	Risk orientation	0.2379 *
X7	Management orientation	0.1411 ns
X8	Level of aspiration	0.0313 ns
X9	Attitude towards scientific Agriculture	0.2340 *
X10	Credit orientation	0.1789 ns
X11	Information source utilization	0.2117 *
X12	Extension participation	0.1664 ns

* - Significant at 5% level
** - Significant at 1% level
ns- Not significant

between the selected characteristics and the knowledge level of farmers about NARP was rejected.

Educational level of respondents was categorized into different categories from illiterate to ' college level of education' will get more chance to understand the recommendations of the Agricultural University for scientific cultivation of crops. More knowledge can be gained through print medium and he can go through those literature which will help to clarify doubts and gain sound knowledge, without seeking in help of extension workers or other personal sources. This might be the reason behind the positive and significant association between educational level and knowledge about improved practices.

Farmers with high economic motivation will place a high value on economic ends. He will be enthusiastic in getting some means to increase his agricultural production and thereby the income level. They will show keen interest on the improvements made in the field and the new recommendations made by scientists to improve crop improvement. They will resort to scientific management techniques with the intention of income enhancement. Hence their knowledge level about improved practices will be comparatively high and this fact substantiate the positive and significant relationship observed between knowledge level and economic motivation.

Innovation proneness refers to the behaviour pattern of the farmers who have interest in and desire to seek changes in farming techniques and to bring about the advancements in their own fields at practical level. Innovative farmers will acquire knowledge about improved farming practices at their own initiative and will try those in their own land. Therefore the relationship between innovation proneness and knowledge level about improved agricultural practices can be positive and significant as seen in the table. Persons with high risk orientation quality are of the opinion that one should be ready to take greater risks, grow more number of crops in scientific way rather than being contented with a small and less risky farming, to get more profit. Such individuals usually possess high awareness about technological advancements in areas of their interests. Hence a farmer with high risk orientation will be having good knowledge even about even about agricultural innovations, which are never tried before by others, as they are ready to take any risk involved in trying out the innovation in his field. Hence the positive and significant relationship between risk orientation and knowledge level about improved practices and varieties is justified.

Attitude towards scientific agriculture was found positively and significantly associated with the knowledge about improved agricultural practices. A highly positive affect towards scientific management of agriculture will motivate a person to acquire more knowledge about

concerned technologies. It is a pre- requisite for adopting recommended practices in their own fields. Hence the relationship observed is nothing unexpected.

Knowledge is a body of acquired knowledge. The individual formulates it as a result of consolidation of pieces of information received from different information sources during his lifetime. As in any other field, innovations are transmitted among farmers through different information sources like personal, impersonal, formal and informal sources. The intensity in which the farmer is using these information sources will decide, to a greater extent, the knowledge level of farmers.

Negative, but not significant relationship was observed between farmsize and knowledge level. As the area under cultivation increases, the farmer's confidence in the cultural practices followed by him traditionally will be more. Since big farmers are possessing larger area and thereby high production, the investment / input requirement will be also more to make a change in the existing pattern of cultivation. Risk involvement will be also more in trying out a new practice at large scale and hence they will be having only very little interest in gathering information on the innovative approaches. Better than this, they will wait somebody to try the technology at smaller scale and see the result. This may be the reason behind the negative association observed between farm size and adoption. All other variables such as training,

management orientation, level of aspiration and credit orientation, were having positive and non-significant relationships with knowledge levels with improved varieties and practices.

4.8.2.2 Correlation of selected profile characteristics of sesamum farmers with their knowledge about improved practices

Table 50 shows that economic motivation, training, innovation proneness, level of aspiration, information source utilization pattern and extension participation have positive and significant association with the knowledge of sesamum farmers about improved varieties and practices. Here the hypothesis that there would be no relationship between the profile characteristics of farmers and their knowledge about improved practices is rejected.

Economically motivated farmers would gather more information on different means for enhancing income. As far as sesamum growers are concerned, means to improve the production attracts attention of economically motivated farmers Hence about NARP, as a project releasing HYVs like *soma, surya, thilak* and making recommendations for better production, economically motivated farmers will be aware of. Hence a positive and significant association observed between economic motivation and knowledge about improved varieties and practices is substantiated.

Table 50. Correlation of selected profile characteristics of sesamum farmers with their knowledge about improved practices

n=50

Variable Number	Name of Characteristics	Correlation Coefficient 'r'
X1	Education	0.0846 ns
X2	Farm size	0.0048 ns
X3	Economic motivation	0.4195 **
X4	Training	0.3086 *
X5	Innovation proneness	0.2623 *
X6	Risk orientation	0.2527 ns
X7	Management orientation	0.0725 ns
X8	Level of aspiration	0.4279 **
X9	Attitude towards scientific Agriculture	0.2619 ns
X10	Credit orientation	0.0800 ns
X11	Information source utilization	0.3896 **
X12	Extension participation	0.3214 *

* - Significant at 5% level
** - Significant at 1% level
ns- Not significant

Training was also found to be positively and significantly associated with knowledge about improved varieties and practices. It is quite natural that the more the number of training received, higher will be the level of knowledge. About the HYVs of sesamum and scientific management practices, the level of knowledge will be more for those farmers who had attended more number of training. Like that innovative farmers will acquire more knowledge about development projects in search of ways to adopt innovative techniques for improving production.

A higher level of aspiration will motivate a farmer to gain knowledge about ways to improve his farm income. Therefore such farmers will having better knowledge about improved varieties and scientific practices which will help them to increase yield and thereby the income. The positive and significant influence of level of aspiration on knowledge level is evident from the table.

Information source utilization and extension participation were also found to have positive and significant association with knowledge level of sesamum cultivators about improved practices and varieties. Higher use of information source will help farmers to gain knowledge about improved agricultural practices. Active participation in extension activities organized by SDA and other extension agencies is an effective means of linkage between farmers and SDA which will lead to acquirement of knowledge.

Education, farm size, innovation proneness, risk orientation, management orientation, attitude towards scientific agriculture and credit orientation were found to have positive but non significant association with knowledge of sesamum farmers about improved varieties and practices of Agriculture.

4.8.3 Correlation of selected profile characteristics of farmers with their extent of adoption of improved practices

4.8.3.1 Correlation of selected profile characteristics of rice farmers with their extent of adoption of improved practices

It is evident from Table 51 that innovation proneness, level of aspiration, information source utilization, extension participation and knowledge about improved agricultural practices influence the extent of adoption of recommended practices by farmers in a positive and significant manner. Hence the hypothesis that there would be no relationship between the profile characteristics of farmers and their extent of adoption of improved practices is rejected.

Innovative farmers will be searching for changes in the existing cultural practices and will eagerly adopt any new recommendations to improve the farm income. They will come under the category of early adopters who are venturesome and have a highly favorable attitude towards innovative approaches in cultivation of crops. This might be the

Table 51. Correlation of selected profile characteristics of rice farmers with their extent of adoption

n=100

Variable Number	Name of Characteristics	Correlation Coefficient 'r'
X1	Education	0.1430 ns
X2	Farm size	-0.2368 *
X3	Economic motivation	0.0774 ns
X4	Training	0.1293 ns
X5	Innovation proneness	0.2068 *
X6	Risk orientation	0.0294 ns
X7	Management orientation	0.1603 ns
X8	Level of aspiration	0.2477 *
X9	Attitude towards scientific Agriculture	0.1981 ns
X10	Credit orientation	0.0960 ns
X11	Information source utilization	0.2392 *
X12	Extension participation	0.1945 *
X13	Knowledge level	0.2646 **

* - Significant at 5% level
** - Significant at 1% level
ns- Not significant

reason behind the positive relationship observed between innovation proneness and extent of adoption.

Level of aspiration of farmer has a major role in formulating his adoption decisions. It is the overall life goals in his reality world that a farmer is striving for and it will influence his activities and behaviour. A farmer with high level of aspiration will be striving to achieve his goals through any means. As a result, farmers with high level of aspiration will adopt new technologies and this explains the positive and significant association that level of aspiration show with extent of adoption.

Information source utilization has a major role in building up one's knowledge about the developments in outside world. To a farmer, advances in agricultural practices are of utmost importance and the adoption of those improved methods demand clear knowledge about them. For this, utilization of different information sources is the most effective method. The farmer who uses these information sources effectively will be having current knowledge about improved practices. In a state like Kerala, which first achieved cent per cent literacy in the country, the role of media including print and visual gains more importance whereas the adoption of technology is concerned. Hence the positive and significant association between information source utilization and extend of adoption is justified.

Adoption decisions taken by a farmer will be greatly influenced by the extent to which he participates in extension activities including meetings, seminars, exhibitions, film shows, farmer's day, demonstration etc. which are effective means of transfer of technology. These will convey necessary information for adopting a new/improved technology. Hence persons with high level of extension participation will be more oriented towards adoption of a new technology. This relationship is indicated through the positive and significant association observed between extension participation and adoption.

Knowledge is the pre-requisite for adoption of a technology. Knowledge is gained about a technology when one gets attracted by a technology and is interested to try it at his level. A person with clear and complete knowledge about an innovation is likely to adopt in the near future. Hence knowledge and adoption are positively and significantly associated.

Farm size, as in the case of knowledge about improved practices, was negatively but significantly associated with extent of adoption. Big farmers will not be ready to deviate from the practices followed by them traditionally. This may be because of the fact that the adoption of a technology at a larger rate in big farms carries more risk and also because of the cost component. In a big farm, implementation of a new technology costs more compared to a small/medium farm. More over

demonstration of technologies are often conducted at small-scale level, which may be not sufficient to create confidence among big farmers. These might be the reasons behind the negative and significant relationship observed between farm size and rate of adoption. In the case of other variables though association was found positive, it was non-significant.

4.8.3.2 Correlation of selected profile characteristics of sesamum farmers with their extent of adoption of improved practices

Table 52 gives a vivid picture of the profile characteristics of sesamum farmers, which sway the extent of adoption of improved practices. Economic motivation, innovation proneness, management orientation, level of aspiration, information source utilization and extent of knowledge about improved practices comes in the list. Consequently the hypothesis that there would be no relationship between the profile characteristics of farmers and their extent of adoption of improved practices is rejected.

Economic motivation will lead a farmer to search all the means suggested by scientists and demonstrated by extension persons for improving production. For a sesamum farmer, who is having high economic motivation, adoption of improved varieties like *surya* and *thilak* and also improved management practices like proper application or organic and inorganic fertilizers and plant protection measures,

Table 52. Correlation of selected profile characteristics of sesamum farmers with their extent of adoption

n=50

Variable Number	Name of Characteristics	Correlation Coefficient 'r'
X1	Education	0.0109 ns
X2	Farm size	0.1547 ns
X3	Economic motivation	0.2808 *
X4	Training	0.0359 ns
X5	Innovation proneness	0.3478 *
X6	Risk orientation	0.2034 ns
X7	Management orientation	0.3677 **
X8	Level of aspiration	0.2617 *
X9	Attitude towards scientific Agriculture	0.1612 ns
X10	Credit orientation	0.0673 ns
X11	Information source utilization	0.3397 *
X12	Extension participation	0.0632 ns
X13	Knowledge level	0.3676 **

* - Significant at 5% level
** - Significant at 1% level
ns- Not significant

weedicide application, plant spacing etc is the best choice for improving production and thereby the farm income. Hence economic motivation will be positively and significantly influence the extent of adoption of recommended practices as evidenced from the table.

As in the case of rice farmers the quality of innovation proneness was found to have a bearing on the extent of adoption of improved practices in a positive and significant manner. Innovative attitude of a farmer is one of the most significant factors in deciding the extent of adoption, because such farmers will be ready to adopt new recommendations , in their own field without much effort from the part of extension system.

Management orientation of farmers at three levels, ie, planning, production and marketing has a very strong influence on his mental set up for taking adoption decisions. In the planning stage the farmer has to take decisions on area to be cultivated, type of seed, mode of operations etc. At the stage important decisions on adoption of any new techniques is taken. Likewise at production and marketing stage also adoption decision are taken on the production techniques and also on techniques to get maximum market price and storage life for products. Hence the management orientation of the farmers will also influence the adoption decisions which is evident from the positive and significant association between management orientation and adoption level.

Level of aspiration and information source utilization were also found to be positively and significantly associated with extent of adoption as observed in the case of rice farmers. The extent of knowledge one possesses regarding a technology will positively and significantly influence the adoption decision taken regarding the technology. Gaining knowledge on a technology itself is an indication of adopting that technology, ie, it can be considered as a pre-requisite for adoption.

The results are on par with the findings of Saed(1989), Ramachandran (1992), Sumana and Reddy (1998), Sujatha and Annamalai (1998) and Bavalatti and Sundaraswamy (1990).

4.9 Evaluative perception of scientists

Evaluative perception of scientists was ascertained by analyzing their responses about six statements in a five-point continuum based on the degree of importance attached to that. The results of the frequency and percentage analysis are given below;

4.9.1 Research concept of NARP

The scientists response was mostly towards agreement side with respect to all the items (Table 53). Among the different items rated under research concept of NARP, maximum number of scientists recorded their strong agreement towards the concept of joined field visits made by multi-disciplinary teams

Table 53. Evaluative perception of scientists on research concept of NARP

N = 41

Sl. No	Statements		SA	A	UD	DA	SDA	AV
			5	4	3	2	1	
1	Consequent to the implementation of NARP, the basic research is strengthened.	No	10	23	1	6	1	3.85
		%	24.4	56.1	2.4	14.6	2.4	
2	Applied research problems are given attention under NARP.	No	19	20	0	2	0	4.40
		%	46.3	48.8	0.0	4.9	0.0	
3	Under NARP research problems are prioritised in consultation with the farmers of the locality.	No	9	17	2	9	4	3.40
		%	22.0	41.5	4.9	22.0	9.8	
4	On farm trials under NARP helps to try out research results at field condition.	No	15	26	0	0	0	4.40
		%	36.6	63.4	0.0	0.0	0.0	
5	Joint field visits help to make problem identification and problem solving more efficiently.	No	22	17	2	0	0	4.50
		%	53.7	41.5	4.9	0.0	0.0	
6	NARP gives emphasis for low cost tchnologies.demonstrations, have proven unsuccesfull in farmers field.	No	7	22	4	5	3	3.60
		%	17.1	53.7	9.8	12.2	7.3	

Nobody expressed disagreement with the statements, 'applied research problems are given attention under NARP', and 'On farm trials under NARP helps to try out research results at field'. In nutshell, the average score for all the six statements were above mean value, indicating that scientists perceive the research concept of NARP in a very favourable way. The perceptions of scientists towards the different components were analysed later in detail.

Compared to other statements, the degree of disagreement was slightly high with the statement 'research prioritization was done in consultation with the farmers of the locality'. In their opinion, even though thrust has been given to this concept under NARP for the past so many years, researchers are still self- oriented in selecting research problems. As a result, research will become resource oriented and person oriented rather than becoming problem oriented.

Strong agreement was recorded more in the case of two items ie, usefulness of joint field visits in identification and problem solving and also with the concept of giving proper attention to applied research problems under NARP. Both the items are related ie, Now and again, multi-disciplinary approach is given top priority, identifying its significance in diagnosing field problems and solving them efficiently. Joint field visit is included under NARP as a main component in order to give attention to field problems. Research itself will become location

specific and need based. Hence the scientists under NARP strongly supported this concept. The degree of agreement was less regarding the concept of giving emphasis for low cost technologies. The scientists say that preference is not given for low cost technology development to the extent expected and that may be one of the reason for the lower adoption. The results obtained by Balaguru and Rajagopalan (1984), Venkateswarlu and Rajagopalan (1984) and Saha (1985) support these findings.

4.9.2 Infrastructure facility development

From Table 54 it is evident that with regard to infra- structure facility development, score of majority of the scientists was just above mean. They expressed satisfaction on improvement made on items like library facilities and scientific staff availability after NARP. Library at RARS *Vellayani* has been improved with the additional fund allocation from ICAR in 1992. But this was not the case with other stations.

Many of them couldn't agree that implementation of NARP has helped to improve the transport facilities. Likewise the degree of discord was comparatively high in the case of building and laboratory facilities. The scientists opined that, proportionate to the increase in staff, there is no improvement in the case of building and laboratory facilities which may hinder the research activities to some extent. In general, most of the respondents were of the perception that NARP has helped to improve the infrastructure facilities.

Table 54. Evaluative perception of scientists on infrastructure development

N = 41

Sl. No	Statements		SA	A	UD	DA	SDA	AV
			5	4	3	2	1	
1	NARP has helped to improve the availability of scientific staff considerably.	No	10	16	2	10	3	3.50
		%	24.4	39.0	4.8	24.4	7.3	
2	Sufficient buildings are made available for research purpose under NARP.	No	3	23	0	12	3	3.30
		%	7.3	56.0	0	29.3	7.3	
3	The laboratory facilities in the research station have improved much after the inception of NARP.	No	13	24	1	1	2	4.10
		%	31.7	58.5	2.4	2.4	4.8	
4	NARP has very much helped to improve the library facilities of the station.	No	6	20	3	7	5	3.40
		%	14.6	48.8	7.3	17.1	12.2	
5	Consequent to the implementation of NARP, the transport facilities for staff have improved much.	No	3	18	3	12	5	3.00
		%	7.3	43.9	7.3	29.3	12.2	

4.9.3 Augmentation of research capabilities

The table 55 shows that even though the proportion of respondents falling under the 'strongly agree' category was less, their number was more under 'Agree' category. Thus majority perceived that NARP has helped to augment the research capacities of the University. Maximum agreement was noted in the case two items ie, research stations established under NARP have helped to improve the research capability of State Agricultural University (SAU). Next was regarding the increased attention paid to location specific problems, especially after the Associate Director Research has been given more liberty and responsibility of planning and implementing research in the zone. This amendment had made procedure for research problem identification and conduct of research more simple and convenient. Nobody disagreed with the statements supporting the view that NARP has helped to improve the research capabilities of SAU.

4.9.4 Multi-disciplinary research facilities

Out of the six positive statements given for rating, disagreement recorded was practically nil (Table 56). More than 70 per cent agreed that multi-disciplinary research facilities provided under NARP is helpful in problem identification, conducting problem-oriented research and in achieving efficiency in field experiments . They also agreed that multi-disciplinary research helps to save time and money. According to the

Table 55. Evaluative perception of scientists on Augmentation of research capabilities

N = 41

Sl. No	Statements		SA 5	A 4	UD 3	DA 2	SDA 1	AV
1	The research stations established under NARP in each of the Agro -climatic zones have improved the researchcapability of SAU.	No	16	23	2	0	0	4.30
		%	39.0	56.1	4.9	0.0	0.0	
2	After NARP, the research efforts on food grain is improved.	No	1	20	8	10	2	3.20
		%	2.4	48.8	19.5	24.4	4.9	
3	Under NARP agronomic practices are evolved with suitable modifications for the cropsgrown in the zone.	No	3	26	2	10	0	3.50
		%	7.3	63.4	4.9	24.4	0.0	
4	Research on soil and water conservation techniques are strengthened after NARP.	No	2	18	9	12	0	3.20
		%	4.9	43.9	22.0	29.3	0.0	
5	Research needs of rice and oil seeds grown in the zone are given proper attention in NARP.	No	0	24	6	11	0	3.30
		%	0.0	58.5	14.6	26.8	0.0	
6	Under NARP location specific problems are given proper attention since the Associate Director of Research is responsible for planning and implementing research.	No	13	26	0	2	0	4.20
		%	31.7	63.4	0.0	4.9	0.0	

Table 56. Evaluative perception of scientists on Multi-disciplinary research facilities

N = 41

Sl. No	Statements		SA 5	A 4	UD 3	DA 2	SDA 1	AV
1	Multi-disciplinary research facilities provided under NARP has improved the quality of research.	No	6	24	6	5	0	3.80
		%	14.6	58.5	14.6	12.2	0.0	
2	Problem identification is done very efficiently through the multi-disciplinary approach.	No	8	21	7	5	0	3.80
		%	19.5	51.2	17.1	12.2	0.0	
3	Under multi-disciplinary approach research is problem oriented rather than disciplineoriented.	No	11	19	10	1	0	4.00
		%	26.8	46.3	24.4	2.4	0.0	
4	Field experiment are done more effectively since different aspects are handled simultaneously.	No	4	25	9	2	0	3.70
		%	9.8	61.0	22.0	4.9	0.0	
5	Laboratory studies are done perfectly through involvement of multi-disciplinary team.	No	0	22	14	5	0	3.40
		%	0.0	53.7	34.1	12.2	0.0	
6	Multi-disciplinary research approach helps to save time and money.	No	3	24	10	4	0	3.60
		%	7.3	58.5	24.4	9.8	0.0	

scientists, the research projects would become problem-oriented, rather than discipline oriented. But the respondents were not that much satisfied with the laboratory studies done under multi-disciplinary concept. This may be due to the inadequacy of laboratory facilities which was reported under infra-structure facility development.

4.9.5 Inter-disciplinary research facilities

It is clear from table 57 that the response pattern of scientists regarding inter- disciplinary research facilities was almost similar to that towards multi-disciplinary research facilities.

Majority of the scientists agreed that NARP has helped to improve the inter-disciplinary research approach which helps to improve the quality of research in general. Here also the number of scientists on the disagreement side was negligible. This indicates that scientists were in full agreement with the concept of inter-disciplinary research facilities and the opinion that NARP has helped to improve this type of research. While majority was in conformity with the concepts of multi- disciplinary and disciplinary research, they were not satisfied with the infrastructure facilities provided like lab equipment, computer facilities etc in the centres.

Table 57. Evaluative perception of scientists on Inter- disciplinary research facilities

N = 41

Sl. No	Statements		SA	A	UD	DA	SDA	AV
			5	4	3	2	1	
1	Inter-disciplinary research concept under NARP has helped to improve the quality of your research.	No	7	29	2	3	0	4.00
		%	17.1	70.7	4.9	7.3	0.0	
2	Inter-disciplinary approach is helpful in efficient problem-solving.	No	8	28	3	2	0	4.00
		%	19.5	68.3	7.3	4.9	0.0	
3	Inter-disciplinary approach helps to save money and time.	No	7	21	5	8	0	3.70
		%	17.1	51.2	12.2	19.5	0.0	
4	Inter disciplinary approach leads to deterioration in the quality of research.	No	11	26	2	1	1	4.00
		%	26.8	63.4	4.9	2.4	2.4	
5	Facilities provided under NARP are sufficient to carry out research on inter-disciplinary line.	No	3	19	5	14	0	3.30
		%	7.3	46.3	12.2	34.1	0.0	
6	Inter disciplinary approach leads to wastage of funds and efforts .	No	8	23	6	4	0	3.90
		%	19.5	56.1	14.6	9.8	0.0	
7	Inter –disciplinary approach leads to unhealthy competition among different departments	No	8	21	9	2	1	3.80
		%	19.5	51.2	22.0	4.9	2.4	

4.9.6 Linkage problems experienced by the scientists under NARP

Frequency and percentage analysis were done to find out the degree of importance attached to the linkage problems by the scientists an the results are given in the Table 58. These problems were ranked based on the ratio of cumulative index to total frequency of responses.

It was found that the major linkage problems under NARP , which was perceived by the majority of scientists as most important, were the inadequate field visits of extension personnel of SDA. This leads to poor feed back in monthly workshops. Scientists were found to show a tendency of finding fault with extension personnel of SDA for the shortcomings in the linkage mechanism. Because, as the second most important problem, the scientists indicated poor participation of extension personnel of SDA in the zonal workshops which affect the linkage between research and extension system. Visits by extension staff to research stations, which is an important linkage mechanism was also reported to be not carried out properly and it was the third important problem as perceived by scientists. These results reveal that extension personnel of SDA are not paying much attention for be in touch with the research system and naturally the technology transfer process. They are busy with their routine departmental work. The grass-root level extension staff of SDA are overloaded with office work as well as administrative work. Including the poor transportation facilities and

Table 58. Evaluative perception of scientists on Linkage problems experienced

N=41

Sl. No	Constraints		Most Imp	Impo-rtant	Least Imp	Aver-age
1	Participation of extension personnel of the state Department of Agriculture is poor in the zonal workshops which affect the linkage between research and extension system.	No %	22 53.7	14 34.0	5 12.3	**2.40**
2	Extension personnel do not visit farmer's field frequently which leads to poor feed back in monthly workshops.	No %	23 56.0	15 36.6	3 7.4	**2.50**
3	In state Technical Committees proper chances are not provided for better interaction between extension staff and scientists.	No %	13 31.7	23 56.0	5 12.3	**2.20**
4	Extension staff are no given adequate training by the research staff which affects the linkage problem between them.	No %	13 31.7	20 48.8	8 19.5	**2.10**
5	Visits of research station by extension staff which strengthens the linkage among them is not carried out properly.	No %	12 29.3	25 61.0	4 9.8	**2.20**
6	Visits of farmers field by research staff which improves the linkage between researchers and farmers is not done satisfactorily.	No %	8 19.5	26 63.4	7 17.1	**2.00**
7	Farmers participation in farm trials is poor which weakens the linkage between farmers and scientists.	No %	14 34.0	21 51.2	6 14.8	**2.20**
8	Extension staff of Department of Agriculture show less interest in the conduct of farm trials and this reduces their linkage with researchers.	No %	11 26.8	23 56.0	7 17.2	**2.10**
9	Under NARP , input agencies are not given chance to have linkage with scientists.	No %	6 14.8	14 34.0	21 51.2	**1.60**
10	Under NARP, input agencies have no linkage with extension staff of Department of Agriculture.	No %	1 24.0	18 43.9	22 53.7	**1.50**

frequent transfers, they have pointed out so many constraints in performing their role items successfully (Ashaletha, 1993). This can be reason behind the poor interest shown by extension staff of SDA.

In addition to this, poor participation of farmers in extension activities like farm trials was also indicated as an important linkage problem. For the successful implementation of any development programme, people's participation is a major factor.

In state technical committee proper chances are not provided for extension personnel for proper interaction. Even though the committee meetings are organized regularly, the concept of establishing good linkage meant through NARP might not have perceived properly by the organizers.

In spite of all these, the scientists admit that research staff are not providing adequate training to the extension personnel for which they again listed out many reasons like lack of fund, infra-structure facilities etc. Another interesting finding is that while the scientists criticizes that the extension staff of SDA are not showing much interest in the field activities of NARP like farm trials , they agree that visits of farmers field by research staff (multi-disciplinary team visits) are also not up to the mark. Even though their self-assessment is satisfactory, the general appraisal of the scientists community is no so attractive in this respect.

Like wise the linkage with input agencies is also not satisfactory according to the scientists. There are no formally approved patterns to be followed for strengthening the linkage among research, clientele, extension and input system which can be reason behind the poor liaison between them. This state can be improved an integrated effort of all these systems.

4.9.7 Constraints experienced by scientists implementing NARP effectively

Ranking of the constraints experienced by scientists was done based on the Constraints Perception Index (CPI) (Table 59).

As mentioned in the case of linkage problems, poor research-extension linkage was pointed out by scientists as the most important constraint in the effective implementation of NARP. The probable reasons for this finding was discussed under linkage problems like workload of extension staff under SDA, not allowing them to pay much attention to NARP activities, less number of training organised by researchers for extension staff, poor interaction between researchers and scientists etc. These can be tackled effectively if the researchers as well as the extension functionaries take joint effort sincerely.

As the second most important problem, two items came up. Small sized holdings which are a characteristic of Indian Agriculture was

Table 59. Evaluative perception of scientists on constraints experienced

N = 41

Sl. No	Constraints		Most Imp	Impo-rtant	Least Imp	CPI & (Rank)
1	Income generating subsidiary farming occupations are not promoted under NARP.	No	12	23	6	**2.10**
		%	29.3	56.0	14.7	**(V)**
2	Farmer participation programmes are not operating.	No	9	22	10	**2.00**
		%	22.0	53.7	24.3	**(VII)**
3	Lack of office space in the station.	No	10	11	20	**1.80**
		%	24.3	26.9	48.8	**(IX)**
4	Lack of library facilities in the station.	No	6	22	13	**1.80**
		%	14.7	53.7	31.7	**(IX)**
5	Adverse soil conditions in the state.	No	3	15	23	**1.50**
		%	7.3	36.6	56.1	**(XIV)**
6	Unawareness of the farmers about the technologies generated.	No	17	19	5	**2.30**
		%	41.5	46.3	12.2	**(II)**
7	Small size of holdings of the farmers.	No	16	20	5	**2.30**
		%	39.0	48.8	12.2	**(II)**
8	High cost of inputs.	No	22	16	3	**2.50**
		%	53.7	39.0	7.3	**(I)**
9	Poor research – extension linkage.	No	13	22	6	**2.20**
		%	31.7	53.7	14.6	**(IV)**
10	Lack of credit facilities.	No	7	29	5	**2.00**
		%	17.1	70.7	12.2	**(VII)**
11	Poor marketing facilities.	No	12	19	10	**2.10**
		%	29.3	46.3	2.4	**(V)**
12	Farmers are unwilling to deviate from age-hold practices.	No	9	14	18	**1.80**
		%	22.0	34.0	44.0	**(IX)**
13	Technologies developed are market based	No	4	17	20	**1.60**
		%	9.8	41.5	48.7	**(XIII)**
14	Technologies recommended are complicated.	No	3	8	30	**1.30**
		%	7.5	19.5	73.0	**(XV)**
15	Extension workers lack confidence on the technologies generated.	No	6	21	14	**1.80**
		%	14.7	51.2	34.1	**(IX)**

Note: Figures in paranthesis are ranks

pointed out as a limiting factor. In Kerala the problem is severe which stands as a major constraint on the path of mechanization. Under NARP also mechanization cannot be recommended considering this aspect.

Unawareness of farmers about the technologies generated was another equally important problem. The poor interest and participation of the extension personnel of SDA, which has become very predominant after T&V, can be a reason behind this. The linkage between farmers and research system is also not maintained properly. Hence people's awareness as well as participation have become poor. For this constraint, another reason was also pointed out. ie, High cost of inputs, which restrict farmers in adopting new techniques.

The next important problems in the order were, not promoting income generating subsidiary occupations under NARP. Since farmers are more interested in income generating occupations, they wont show interest in other types of technologies which puts extension staff as well as scientists into difficulty. Poor marketing facilities were also indicated as another coercion which will directly affect the net returns. According to scientists, this also plays a very important role in restricting the adoption of technologies.

Further, lack of credit facilities and lack of farmer participation programmes were also indicated which can be reason for poor

involvement of farmers. Scientists were not satisfied with the office space, poor laboratory facilities provided under NARP. There are only few aspects like scientific manpower, library, land area for experiments etc, which might have got proper attention while modifications and refinement were carried previously. Farmers' un-willingness to deviate from 'age-old practices' due to known and unknown reasons was also indicated as a constraint some times. Another surprising observation of scientists was that extension personnel also some times fail in developing confidence in the technologies, generated. For this, phenomenon, scientists were indicating lack of awareness on the part of the extension personnel as the main reason, for which research system is also partially responsible. In scientists' view, complicated nature of technologies recommended was the least important constraint. According to them, technologies are developed giving importance to the easiness in adoption, cost element etc, but they are not transferred properly to the farmers for which the research system is no way responsible.

4.10 Evaluative perception of extension personnel

Frequency and percentage analysis were done to quantify the evaluative perception of extension personnel about NARP and categorized under five items; (a) impact of NARP on farmers (b) linkage (c) NARP workshops (d) Farm trials and (e) demonstrations.

4.10.1 Impact of NARP on farmers

Majority of the extension persons (79 per cent) agreed that NARP has helped to improve crop production (Table 60). In their opinion, farmer participation programmes have been increased after NARP, but participation of farmers in the project is very meager. The venues of farmers participation in project activities is limited to farm trials and demonstrations. Approaches like Participatory Technology Development (PTD) are not given much significance. Non- involvement of farmers in the programme is a matter of great concern and challenge to agricultural development. No development programme can be successful without the involvement of farmers (Kumari and Narendar, 1999).

According to the extension personnel the technologies developed and recommended through NARP have found failure in different field situations due to different reasons. The lesser involvement of farmers itself can be a major reason for it. More over some other constraints in adoption can also be there like cost factor, situational/social factors or technological constraints, which can be solved through bringing suitable modifications based on the feed back. Even then they agree that the rate of adoption of advanced technologies have increased comparing to the period prior to NARP.

Table 60. Evaluative perception of extension personnel about the impact of NARP

N = 62

Sl. No	Statements		SA 5	A 4	UD 3	DA 2	SDA 1	AV
1	NARP has helped to improve crop production.	No	15	34	10	1	2	3.95
		%	24.2	54.8	16.1	1.6	3.2	
2	After the inception of NARP , farmer participation programmes have been increased.	No	5	35	19	3	0	3.67
		%	8.1	56.5	30.6	4.8	0.0	
3	Location specific problems are given sufficient significance.	No	9	30	19	4	0	3.70
		%	14.5	48.4	30.6	6.5	0.0	
4	As a consequence of the inception of NARP farmers are adopting advanced technologyat a higher rate.	No	12	25	18	7	0	3.67
		%	19.4	40.3	29.0	11.3	0.0	
5	NARP helps to strengthen the linkage between farmers and researchers.	No	7	30	15	10	0	3.55
		%	11.3	38.4	24.2	16.1	0.0	
6	NARP has no helped to improve the income level of the farmers.	No	6	22	20	11	3	3.72
		%	9.7	35.5	32.3	17.7	4.8	
7	The ultimate use of the project in for researchers, not for farmers.	No	6	18	23	11	4	3.82
		%	9.7	29.0	37.1	17.7	6.5	
8	The technologies developed through NARP are not successful at farmers' field situation.	No	7	30	12	11	2	2.50
		%	11.3	48.4	19.4	17.7	3.2	
9	Farmers' participation in the project is very limited.	No	6	20	11	19	6	3.02
		%	9.7	32.3	17.7	30.6	9.7	
10	The on farm trials conducted NARP leads to economic loss of the farmers.	No	6	36	11	8	1	3.61
		%	9.7	58.0	17.7	12.9	1.6	

The extension personnel agree that location specific problems are getting comparatively more significance after NARP. They also agreed that the ultimate use of the project is for farmers not for researchers and opined that on farm trials will never cause economic loss of the farmers.

4.10.2 Linkage between research, extension, farmers and input systems

Under this item, the maximum agreement was with the statement that monthly workshops in NARP helps to promote linkage between scientists and extension workers (Table 61). But they were of the opinion that the duration of the workshops has been restricted to one day, which was earlier two days i.e., during Training and Visit (T&V) days. Zonal workshops are also perceived as very much helpful in improving the linkage between scientists and extension personnel . Here also the workshops were convened twice a year , one for Kharif and other for Rabi till 1986. The frequency was later limited to once annually till 1992. But based on the feed back , these meetings , twice a year, have been revived. They also opined that monthly workshops are helpful in efficient feed back of field problems and their prioritization, discussions of research results etc. But they criticized that scientists are not so particular in making regular field visits, which are effective measures for keeping good linkage with farmers. There is an urgent need to modify service arrangements in such a way that these scientists come into

Table 61. Perception of extension personnel about the Linkage between research, extension, farmers and input systems

N =62

Sl. No	Statements		SA	A	UD	DA	SDA	AV
1	The monthly workshops in NARP helps to promote linkage among scientists and extension workers.	No	19	27	9	7	0	3.90
		%	30.6	43.5	14.5	11.3	0.0	
2	Zonal workshops improve the linkage between scientist and extension personnel.	No	12	31	16	3	0	3.84
		%	19.4	50.0	25.8	4.8	0.0	
3	The linkage between extension personnel of state Department of Agriculture andsenior researchers is improved in State Technical Committees.	No	9	24	21	8	0	3.55
		%	14.5	38.7	33.9	12.9	0.0	
4	Scientists of NARP arrange training programmes for extension staff, which promote the linkage between them.	No	5	29	16	12	0	3.43
		%	8.1	46.8	25.8	19.4	0.0	
5	Visits made by the extension staff to the research stations promote the linkage between research and extension systems.	No	11	31	12	7	1	3.70
		%	17.7	50.0	19.4	11.3	1.6	
6	Research staffs do not participate in the activities of the State Department ofAgriculture.	No	7	24	10	16	5	3.19
		%	11.3	30.7	16.1	25.8	8.1	
7	As scientists do not visit farmer's field, they lack linkage with the farming community.	No	5	25	11	14	7	3.11
		%	8.1	40.3	17.7	22.6	11.3	
8	Under NARP concept, input agencies are not encouraged to have link with research and extension system.	No	7	18	21	12	4	3.19
		%	11.3	29.0	33.9	19.4	6.5	
9	After NARP, farmers' awareness about research activities is lessened.	No	8	31	14	8	1	3.10
		%	12.9	50.0	22.6	12.9	1.6	
10	Under NARP Farmer's participation is low in the programmes of state Department of Agriculture.	No	7	21	20	14	0	3.34
		%	11.3	33.9	32.3	22.6	0.0	

regular direct communication with farmers, which is the best opportunity for the scientists to study the field conditions and problems at first hand (Dwivedi and Kaul,1998).

Likewise, regarding the extend of commitment of scientists in activities of SDA also, the extension staff were not satisfied. This is due to a basic concept of scientists that they are to restrict themselves to research activities only and need not involve in the extension activities organized at field level. According to extension personnel the input dealers are not given proper opportunities for interaction and hence the linkage with them is weak under NARP set up. Proper provisions should be given so as to get all the sections equally benefited. Participation of input agencies should be assured in exhibitions and training programmes organised.

In general, out of the ten statements , the extension personnel of SDA scored above mean for five statements. They claimed that visits to research stations benefit them to a greater extent and the training offered by researchers update their knowledge level and also act as excellent linkage mechanisms. But they complained that frequency of these opportunities are not sufficient

4.10.3 NARP Workshops

Majority of the extension personnel marked their agreement with the statement that monthly workshops are helpful in promoting the linkage between research and extension system and also the linkage of these two systems with the clientele system (Table 62). In NARP workshops field problems are presented for prioritization and taking up action. Feed back from the SDA, which is very important at this stage and after adoption of the technology, is very feeble after T&V system. They agree that in NARP workshops the location specific problems are getting more attention.

NARP workshops play a major role in formulating the production recommendations for an area. This is done in two ways; if some modifications alone will meet the requirements , it will be done based on research results on the existing package of practices recommended for the specific area. Otherwise, research will be carried out on the specific problem and new recommendations will be made to suit the needs of the particular area. The production recommendations can be regarding a farming systems or the quantity of a particular fertilizer or plant protection chemical to be applied.

Inspite of all the benefits, the extension personnel expressed their dissatisfaction with the priorities given for enterprises. Income

Table 62. Perception of extension personnel about the NARP workshops

N =62

Sl. No	Statements		SA 5	A 4	UD 3	DA 2	SDA 1	AV
1	The monthly workshops in NARP have no role in the formulation of the production recommendations of the area	No	8	35	8	8	3	3.60
		%	12.9	56.5	12.9	12.9	4.8	
2	Scientists and extension workers are given equal significance in NARP workshops	No	8	32	11	8	3	3.55
		%	12.9	51.6	17.7	12.9	4.8	
3	Field situation is not considered while interpreting and analysing the results of farm trials in the workshops	No	4	28	10	18	2	2.77
		%	6.5	45.2	16.1	29.0	3.2	
4	In NARP workshops, suitable modifications are made in the general recommendations which helps to improve crop production.	No	11	24	14	11	2	3.50
		%	17.7	38.7	22.6	17.7	3.2	
5	Topics for farm trials are suggested in the workshops giving thrust to the location specific problems.	No	11	30	14	7	0	3.73
		%	17.7	48.4	22.6	11.3	0.0	
6	In the workshops production recommendations are made just as a repetition of the general POP recommendations.	No	3	20	15	22	2	3.00
		%	4.8	32.3	24.2	35.5	3.2	
7	NARP workshops are helpful to promote the linkage among researchers, extension personnel and farmers	No	11	40	8	3	0	3.95
		%	17.7	64.5	12.9	4.8	0.0	
8	In the workshops production recommendations are made aiming mainly at the financially sound farmers.	No	8	26	12	14	2	3.39
		%	12.9	41.9	19.4	22.6	3.2	
9	Income generating subsidiary farming occupations are not given proper attention in NARP workshops.	No	2	12	18	24	6	2.68
		%	3.2	19.4	29.0	38.7	9.7	
10	The location specific production recommendations evolved through the workshops improve the level of income of the farmers	No	10	25	16	8	3	3.50
		%	16.2	40.3	25.8	12.9	4.8	

generating subsidiary farming occupations like export oriented horticulture products, piscicultue, sericulture etc are not given proper attention. Many times, the production recommendations are made just as the repetition of the existing practices. This type of feed back is generated when the revised recommendation also become unfruitful. This can be remedied through proper field testing and follow up. Field situation is not thoroughly analysed before taking up research and making the recommendations, which was indicated as one of the major demerits. Before making the recommendations, the feed back from field should be analyzed thoroughly in the workshops, so that wastage of precious time and effort of research system can be avoided. Aiming at the benefit of poorer sections, high cost involvement in technology adoption was also suggested to be avoided, as far as possible.

4.10.4 Farm Trials

The extension personnel of the SDA were in full support of the view that farm trials are inevitable in the development of a location specific technology (Table 63). According to them the practical viability of a technology can be tested only through the conduct of farm trials. Eighty two and eighty three per cent of extension personnel marked there agreement with the above views respectively. The extent of disagreement was very little regarding the re two statements, 'farm trials are conducted for the benefit of farmers' and 'proper technical guidance

Table 63. Perception of extension personnel about the Farm trials

N =62

Sl. No	Statements		SA 5	A 4	UD 3	DA 2	SDA 1	AV
1	Farm trials under NARP helps to test the practical viability of technology.	No	18	34	6	3	1	4.04
		%	29.0	54.8	9.7	4.8	1.6	
2	Farm trials are conducted after assuming the need for the technology in that area.	No	11	24	15	11	1	3.53
		%	17.7	38.7	24.2	17.7	1.6	
3	There is enough people's participation in the conduct of farm trials under NARP.	No	9	22	16	14	1	3.39
		%	14.5	35.5	25.8	22.6	1.6	
4	For conducting farm trials, proper technical guidance is provided under NARP.	No	6	33	15	6	2	3.56
		%	9.7	53.2	24.2	9.7	3.2	
5	For conducting farm trials, financial assistance is provided to the participant farmer.	No	3	18	17	19	5	2.91
		%	4.8	29.0	27.4	30.6	8.1	
6	Farm trials are absolutely essential for developing a location specific technology.	No	21	30	6	5	0	4.08
		%	33.9	48.4	9.7	8.1	0.0	
7	After farm trials proper follow up is done on the adoption of the technologies.	No	7	13	21	17	4	2.87
		%	11.3	21.0	33.9	27.4	6.5	
8	The farm trials are ultimately useful to the farmers, not to the researchers.	No	6	32	20	4	0	3.64
		%	9.7	51.6	32.3	6.5	0.0	

is provided under NARP'. But regarding the technical guidance, they added that the farmers can be encouraged to adopt a technology at a higher rate and technical supervision can be provided during adoption, which comes under the role of extension functionaries. But for monitoring and follow up, the researchers pay only little attention. They also agreed that farm trials of technologies are done only after analyzing the need for such a technology in that particular area and it was indicated as a major change in trend observed after implementing NARP.

But regarding the component of people's participation, only fifty percent agreed that the extent of participation at present is satisfactory. The rest of the respondents; opinion was similar to that of the scientists. Financial assistance was demanded by farmers for giving consent for conducting farm trials in their fields, which is a clear indication of the very poor involvement of farmers in the conduct of farm trials. This again is because of the lack of awareness of farmers about the details of the technology generated, why it is being brought to the field situation, what is the comparative advantage of the technology etc. At least they should know that farm trial is something carried out for their own benefit, and not for the researcher. The responsibility of making them aware of these factors rests on the shoulder of extension personnel.

4.10.5 Demonstrations

The extension personnel opined that demonstrations conducted at farmers' field situation, to transfer skill as well as knowledge about a technology, are extremely useful (Table 64). But only 56 per cent agreed that scientists, while conducting demonstrations, consider the situational factors like rainfall, soil condition, irrigation facility etc. Without considering these factors, demonstrations cannot be carried out successfully which was indicated as a lacuna in the conduct of demonstrations. Twenty nine per cent of respondents disagreed with the criticism that in selecting areas for farmtrials, there is injustice on the part of officials. This type of remarks are common among farmers during the implementation of any development programme, which is not their fault, but of the social system in which they are living . Any way, a considerable proportion (30 per cent) took a neutral stand in this regard.

About the level of co-operation of input agencies in the conduct of demonstrations, 43 per cent of respondents were found contended, while about 36 per cent was not happy with their extent of co-operation. The involvement of input agencies will also help to attract attention of more farmers and build confidence on them and hence it should be viewed seriously.

Table 64. Perception of extension personnel about the demonstrations

N =62

Sl. No	Statements		SA 5	A 4	UD 3	DA 2	SDA 1	AV
1	While conducting demonstrations, scientists are not bothered about the situational factors like rain fall, soil condition,irrigation facility etc.	No	16	19	21	6	0	2.20
		%	25.8	30.6	33.9	9.7	0.0	
2	Under NARP, people's participation is given importance in the conduct of demonstrations	No	5	28	16	10	3	3.35
		%	8.1	45.2	25.8	16.1	4.8	
3	Level of education and economic conditions of the farmers of the area are not considered before conducting demonstrations.	No	4	11	16	28	3	3.24
		%	6.5	17.7	25.8	45.2	4.8	
4	Input agencies are made to co-operate in the demonstrations which increase the confidence of people.	No	8	19	13	20	2	3.17
		%	12.9	30.6	21.0	32.3	3.2	
5	After the demonstration, no follow up is done under NARP.	No	2	10	16	25	9	3.46
		%	3.2	16.1	25.8	40.3	14.5	
6	Demonstrations proves successful as the adopters get proper technical guidance.	No	5	32	16	9	0	3.53
		%	8.1	51.6	25.8	14.5	0.0	
7	In NARP, the demonstrations are often done in some selected pockets only.	No	2	16	19	24	1	3.10
		%	3.2	25.8	30.6	38.7	1.6	
8	Mostly demonstration of technologies relevant to income generating avenues is done under NARP	No	7	20	16	17	2	3.20
		%	11.3	32.3	25.8	27.4	3.2	

Even though the respondents were having no doubt regarding the essentiality of demonstrations, 50 per cent of respondents pointed out one lacuna while conducting demonstrations ie, the socio-economic factors of the farmer of the area are not taken into consideration. An analysis of at least the level of education and economic status will help much in this regard. And regarding the technical assistance, especially for follow up, majority (55 per cent) showed dissatisfaction. They opined that a larger proportion of people are inflamed to adopt technologies and their confidence and credibility on the scientists will get reduced if the follow up is not done properly. Discontinuance will be the result of this type of approach, which is a severe draw back in the present transfer of technology approach.

4.10.6 Constraints experienced by extension Personnel in implementing NARP

Table 65 shows the 12 different constraints rated by the extension personnel for their significance. Among them, high cost of labour was perceived as most important by majority the respondents (76 per cent) . An interesting finding is that not a single respondent rated it as a least important one. The extension officials explained, during informal discussions, that labour problem, both as scarcity and high cost, is one of the most important constraints affecting agricultural sector. The problem is very severe in labour intensive crops like paddy. High cost of

Table 65. Constraints experienced by extension personnel

N= 62

Sl No	Constraints		Most Imp	Imp	Least imp	CPI & (Rank)
1	High cost of inputs	No	38	22	2	**2.58**
		%	61.2	35.5	3.2	**(II)**
2	High cost of labour	No	47	15	0	**2.76**
		%	75.8	24.2	0	**(I)**
3	Lack of availability of inputs	No	13	29	20	**1.89**
		%	21	46.8	32.3	**(IX)**
4	Lack of availability of demonstration plots	No	13	17	32	**1.69**
		%	20.9	27.4	51.6	**(XII)**
5	Lack of technical knowledge	No	11	25	26	**1.76**
		%	17.7	40.3	41.9	**(XI)**
6	Lack of sufficient training	No	12	34	16	**1.94**
		%	19.4	54.8	25.8	**(VIII)**
7	Lack of credibility about the technology	No	28	21	13	**2.24**
		%	45.2	33.9	21	**(V)**
8	Lack of incentives and rewards	No	30	25	7	**2.37**
		%	48.4	40.3	11.3	**(III)**
9	Poor people's participation in project activities	No	21	31	10	**2.17**
		%	33.9	50	16.1	**(VI)**
10	Innovatives are often cumbersome	No	13	28	21	**1.87**
		%	21	45.2	33.9	**(X)**
11	Un awareness of farmers about the technologies	No	19	29	14	**2.08**
		%	30.6	46.8	22.6	**(VII)**
12	Lack of Linkage between research and extension system	No	25	28	9	**2.26**
		%	40.3	45.2	14.5	**(IV)**

Note: Figures in paranthesis are ranks

inputs was the second most important constraints, for which the unscientific Government policies are also a major reason. Anyway, more efforts can be taken by the research sector to develop low cost technologies like *bio- fertilizers, vermicompost* etc which can be of much help to the poorer sections. More over promotion of farmer participatory research will give way to standardization of many indigenous technical knowledge and application of it at field level, of course, at low expense.

For better performance in any field programmes, incentive and rewards have a very significant role, especially at small scale levels. During the field extension activities, provision of incentives and rewards can bring about amazing results. Lack of linkage between farmers and scientists was indicated as the next important constraint, which may be due to the irregular nature of field visits made by scientists and also due to low participation of farmers in project activities. Lack of credibility in the technologies by farmers was also rated as an important constraint, followed by the poor participation of people in project activities. This can be remedied by the way of proper extension effort through which the reasons for failure, if any, can be made clear and technology can be transferred assuring a higher chance of success. Before recommending a technology different types of constraints(Production, marketing , administrative, technical, socio-economic) should be analyzed thoroughly in a particular locality.

Unawareness of farmers about the technologies also came up as an important constraint which can be solved absolutely through proper extension effort. Lack of training received from research stations was next in the order of importance, which was admitted as a lacuna on their part by the scientists. The problems like lack of fund and infrastructure, pointed out by scientists, if provided, can improve the condition.

The other constraints indicated include lack of availability of inputs, cumbersome nature of innovations, lack of technical knowledge etc. Lack of availability of inputs may be due to the defective administrative procedures of SDA which leads to untimely supply of spurious inputs and also due to lack of understanding with the input dealers. Lack of technical know- how and the feeling on the part of the farmers that innovations are cumbersome are inter-related. Through proper training , required knowledge and skill can be transferred, which will remove these types of difficulties. Lack of availability of demonstration plots was the least important constraint, which is a good indication, giving hope that farmers still are ready to receive innovations.

4.11 Correlation of experience with the perception about NARP

4.11.1 Correlation of experience of scientists under NARP with their perception about NARP

The table 66 shows that experience of scientists is negatively correlated with their perception about NARP. In other words, number of years of service under NARP was having a negative bearing on their perception about research concept about NARP, infrastructure development, augmentation of research capabilities, multi-disciplinary research facilities and inter-disciplinary research facilities.

Younger generation, who have little experience were found more mollified compared to the more experienced scientists. For the newcomers, the research facilities provided under NARP would appear to be very much comfortable and hence they will be satisfied with the available facilities and resources. But to a scientist, who has been working for a long time under NARP, the facilities available would appear to be not at all satisfactory, as he knows the possibilities and provisions that could be utilised. The present set up, in his view, is only a part of the requirement put forward by the older generation and he may be eagerly waiting for some more facilities. This might be the

Table 66. Correlation of experience of scientists with their perception about NARP

Variable No.	Name of characteristic	Correlation Co-efficient	
X1	Perception about research concept of NARP	-0.1125	ns
X2	Perception about infrastructure development	-0.252	ns
X3	Perception about augmentation of research capabilities	-0.1928	ns
X4	Perception about multi disciplinary research facilities	-0.1368	ns
X5	Perception about inter disciplinary research facilities.	-0.2771	ns
X6	Perception about linkage problems experienced.	0.2050	*
X7	Perception about constraints in implementation of NARP.	-0.1658	ns

ns - not significant
* - significant at 5% level

possible reason behind the negative alliance found between the experience of extension personnel and their perception about NARP.

But regarding linkage problems, a positive and significant association was exceptionally observed. Old-time scientists were of the notion that linkage, especially, with the extension personnel of SDA was much better than what is existing now in earlier days. The more frequently scheduled field visits and regular time schedules followed under T&V system might have been the reason behind this. After T&V, that much sincerity is not seen among the extension officials in the perception by the scientists, which is reflected in the positive and significant association between experience and perception about linkage problems. In their opinion, the co-operative attitude from the part of farmers is also gradually reducing and for this they pointed out one reason, that is obvious in our State. The educated unemployed youth, are fighting with the Government to get a job and going abroad in search of any kind of job opportunities or will waste time unproductively at home. Even then they are not coming forward to take up agricultural enterprises. This shows the eroding status of agriculture as an occupation which is to be improved at the earliest with sincere and concentrated efforts.

4.11.2 Correlation of experience of extension personnel with their perception about NARP

The table 67 shows that perception of extension personnel about the impact of NARP, perception about NARP workshops and perception about constraints were having negative influence over experience of extension personnel.

As experience increases, the perception about the impact of NARP is becoming less attractive, which shows the high expectation they were having about NARP during the initial periods. Likewise regarding the workshops also extension personnel were expecting a good floor for creative interaction, which is also loosing its image through years. The extension personnel were not satisfied with the limited opportunities and abolition of some posts at sub-division level has also aggravated the situation.

The perception about linkage, farm trials and demonstrations were positively associated with the experience of extension personnel. No-a-days, the research system is comparatively more conscious about transferring the generated technology to the field . Because research evidences are there indicating that only thirty percent of the generated technologies are reaching the farmers' field. The concept about a scientist

Table 67. Correlation of experience of extension personnel with their perception about NARP

Variable No.	Name of characteristic	Correlation Co-efficient
X1	Perception about impact of NARP	-0. 0505 ns
X2	Perception about linkage	0.191 ns
X3	Perception about NARP work shops	0.0439 ns
X4	Perception about farm trials	-0.3037 ns
X5	Perception about demonstrations	-0.1043 ns
X6	Perception about constraints	-0.3607 ns

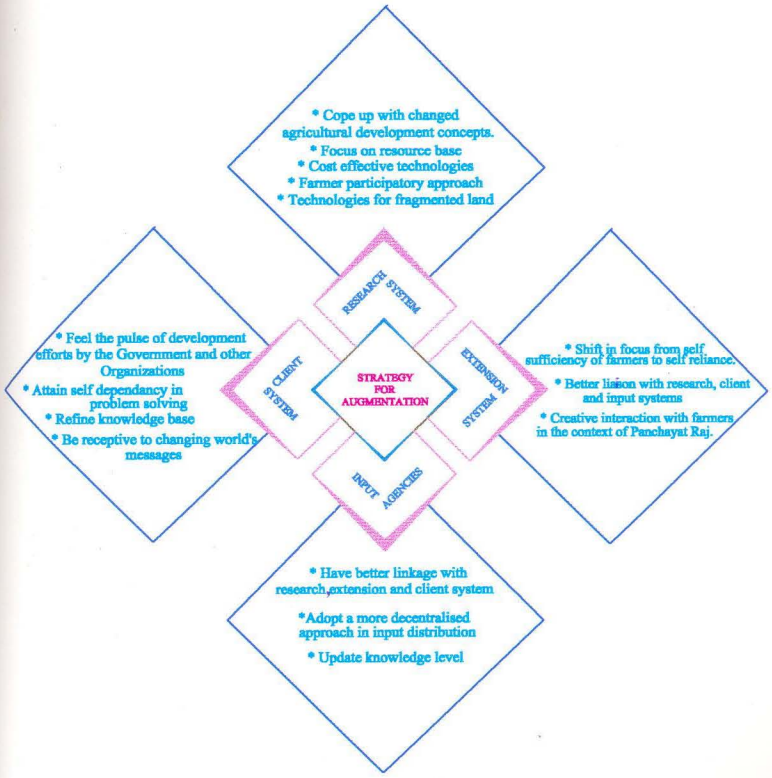
ns - not significant

has also changed notably- he is not supposed to do some laboratory experiments or file works , sitting in his ivory castle, but is expected to face the field realities and torment of the farmers.

4.12 Strategy for Augmentation

From the results of the study it could be found that while formulating research projects, due significance was not attributed to the important aspects like location suitability, cost factor, sustainability, people's participation, linkage etc. Share of agricultural sector both as a proportion to the State's GDP and as per capita income of those who depend on agriculture for their livelihood is declining. In this context, a strategy is formulated for augmenting the efficiency of the programme. Due consideration is given to the changing concerns like sustainable development, resource conservation, cost effective and income generating technology development etc. (Fig 21 and Table 68). This gains significance under the present setup of Panchayat Raj and is hoped to be of much help to improve the efficiency of any development programmes, especially National Agricultural Technology Project (NATP).

Fig. 18 Strategy for Augmentation



Strategy suggested for improvement

Agencies involved	Development objectives	Strategy suggested
Research system	Cope up with changed Agricultural development concepts	Different farming system for different micro climates prevailing Integrated farming systems giving thrust to sustainable development of agriculture Income generating avenues for educated unemployed youth
	Focus on resource base rather than produces	Heterogenous resource based farming systems Technology recommendations considering resource potential of the locality Multiple opportunity endowed farming systems giving thrust to small homesteads Integrated nutrient management based on existing nutrient status of the locality.
	Cost effective technologies through effective input use	Optimization of inorganic fertilizer use based on balanced use of organic and inorganic fertilizers Avoid over dependency on commercial feed stuff in cattle rearing and inorganic fertilizers in crop husbandry.

		Cost effective irrigation systems for plantation crops Less labour demanding technology development Less input demanding HYVs Value addition for surplus products
	Technological advancements for fragmented land structure	Small farm mechanisation Promote group approach in cultivation operations Design efficient watermanagement systems for fragmented land structures
	Farmer participatory research in the context of Panchayath Raj	Attribute more thrust to Group farming samithis Involve NGOs in project preparation and implementation Give significance to watershed approach Encourage participatory technology development Have good liaison with karma samithis at Panchayath level Active involvement in extension activities of SDA Strengthen the linkage mechanism with the extension system

Extension system	Attribute significance to self reliance of farmers rather than self sufficiency.	More involvement of Group farming Samithis More decentralised approach during project implementation. Involve NGO's in technology transfer process. Encourage farmers' research
	Better liason with research system to communicate with recent changes in farmers' demands as well as to update the knowledge base.	Pay more visits to research stations Attend training programmes Gather informations on innovations as well as policy changes Active participation in discussion groups of farmers as well as scientists. Assure participation of research community in field level extension activities.
	Creative interaction with farmers in the context of Panchayat Raj	Make farmers aware of their unfelt needs during project formulations Interact on changes in technologies as well as agricultural policies and provide feed back on implications of both. More involvement at Panchayat level, Agricultural project formulation and implementation.

Client System	Shift to self dependancy in problem solving	Rather than crying for employment, think of self help programmes in agriculture. Participate in the agricultural project activities Assure reception of technical as well as finanial assistance for starting enterprises from Government as well as technocrats.
	Feel the pulse of development efforts of Government and other development agencies.	Review the ongoing programmes and policies and reap the benefits through concentrated efforts Identify potentials of further development and contribute during project formulations
	Refinement of knowledge base	Be ready to receive messages from research system Utilize all opportunities for attending trainings and extension programmes. Provide feed back to reseach system through direct interaction Make utilize all the information sources available
	Be receptive to changing world's messages	Attribute significance to experimantations at farm level Develop genuine inner motivation rather than mere economic motivation in adopting new technologies. Give importance to human resourses development.

		Be interactive in training sessions and 'Ayalkkoottams'
Input Agencies	Have better linkage with reseach, extension and client systems	Attend seminars, symposia and training programme organized by research system Provide feed back on impact of new products Participate in extension activities like exhibitions, melas etc. and provide feed back to extention system. Arrange demonstations on new products of farmers' interests.
	Adopt a more ecentralized approach.	For activities like seed production, bio-fertilizer production a decentralized set up preferred Input supply units should function at farmers convenience and preference. According to change in thrust for sustainable development outlets for inputs like bio fertilizer, vermi-compost, new seed materials should be opened up.
	Update knowledge level	Keep in touch with research advancement of agriculture to predict future demends. Have good link with Government as well as private agencies carrying out research and development works related with inputs

SUMMARY AND CONCLUSION

5. Summary and conclusion

NARP has been launched by ICAR on 1st January 1979, with intention to strengthen the regional research capabilities of the SAUs so as strengthen the research efforts for location specific technology generation. this study, an attempt is made to throw some light to the impact of NARP agricultural development. The specific objectives of the study are;

- To analyze the trends in area, production and productivity major crops in the region.
- To study the extent of awareness about NARP, level of knowled and adoption of the improved varieties and recommended practices by t farmers.
- To study the perception of extension personnel about the impa of NARP on farmers.
- To study the perception of extension personnel and farmers abo the extension components of NARP.

- To study the perception of scientists about the implementation of the research concept of NARP.

- To study the perception of scientists and extension personnel about the linkage existing among researchers, extension personnel, input agencies and farmers.

- To study the perception of scientists, extension personnel and farmers about the constraints experienced during the implementation of NARP.

The state is divided into five Agro-climatic regions, out of which southern region was randomly selected for the study due to limitations of time and resources. The southern region comprises five districts, *Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha,* and *Kottayam.*

In the study there were three categories of respondents; scientists, extension personnel and farmers. Sample of farmers included two categories i.e., rice and sesamum cultivators.

Rice farmers were selected from the five districts in proportion to the percentage of area under rice in each of those districts. The rice farmers were selected randomly @fourteen, nineteen, nine, thirty seven and twenty one

from *Thiruvananthapuram, Kollam, Pathanamthitta, Alappuzha* and *Kottayam* districts respectively forming a sample size of 100 rice farmers. Fifty sesamum cultivators were selected from the *Bharanikkavu* Krishibhavan of *Alappuzha* district, where sesamum is cultivated extensively in south zone forming the sample for the study. Thus the total sample size of farmers was150.

All the available scientists working in the southern zone of NARP of KAU formed the scientist respondents of the study. A total of 42 scientists responded for the survey. For selecting the sample of extension personnel, all the officials of the State Department of Agriculture in the five districts, who attend the NARP workshops were selected, forming a sample size of 62.

The variables for the study include awareness of farmers about NARP, knowledge and adoption of improved varieties and practices, perception about farm trials, demonstrations and constraints in adoption of improved practices. Besides, twelve profile characteristics of farmers were also selected and quantified.

The perception of scientists about the implementation of research concept of NARP, augmentation of research facilities under NARP, infra structure facility development, multi-disciplinary research facilities, inter and

intra-disciplinary research facilities, linkage problems and constraints in implementing NARP were quantified. More over, data on the perception of extension personnel about the impact of NARP on farmers, perception about on-farm trials, demonstrations and monthly workshops, linkage problem experienced and constraints experienced during the implementation of NARP were collected.

Regarding measurement of variables, a teacher-made questionnaire was developed for measuring the awareness of farmers about NARP and a knowledge test was developed for quantifying the extent of knowledge about improved practices. Adoption was measured using a scale developed by Singh and Singh (1974) and modified by Ramachandran (1992) with suitable modification.

For measuring perception of farmers about demonstrations and farm trials under NARP, semi-structured measurement devices were developed separately. The constraints were ranked based on a Constraint Perception Index worked out.

The profile characteristics were quantified with the help of standardised scales after bringing out necessary modifications. Evaluative

perception of scientists was quantified with the help of semi-standardized scales developed for the purpose. For measuring the constraints, the same procedure used for farmers was followed.

The evaluative perception of extension personnel was quantified with the help of semi-standardized measurement devices developed.

Separate questionnaires were prepared for scientists and extension personnel. For farmer respondents, an interview schedule was prepared in Malayalam. For rice farmers and sesamum cultivators separate schedules were prepared and pre-tested. Questionnaires for scientists and extension personnel were distributed in person. From the farmers, the responses were collected through interviewing them directly. The data collection was done during 1997.

The salient findings of the study are summarised and presented below:

The trends in area, production and productivity of major crops grown in the south zone was analysed in the present study by applying the method of moving averages. Statistical methods like percentage, mean, correlation, range etc were applied to analyze the data collected suitably.

After the implementation of NARP, the productivity of rice was showing an increasing trend irrespective of the decline in area and production. But it is not reflected in total rice production as the rice area is reducing substantially. The decrease in production, in spite of the increase in productivity, can be due to the serious decline in paddy area.

In the case of crops like tapioca and sesamum, the productivity has increased. But production constraints are more preventing the yield increase like rodent attack, lack of awareness and infrastructure for value addition for tapioca, decline in area under cultivation and lack efficient marketing network in sesamum.

Regarding coconut, the productivity was showing a substantial increase, but incidence of pest and disease affected the productivity and hence the production. In the case of banana, productivity has not improved much, which can be due to the poor attention received by the commercially important varieties.

The awareness about NARP among rice farmers was very low. Only thirty percentage of the respondents was aware of the programme. The least extent of awareness was noticed with respect to the existence of NARP. Out of

the ten, the score for awareness of sesamum farmers for six statements were less than average indicating that majority of the respondents was in the low awareness category (54 per cent).

Regarding the knowledge of rice farmers, majority possessed higher knowledge (70 per cent). Among the 12 improved practices recommended, the level of knowledge of farmers were found very low in the case of only one practice, i.e. control of blast disease. Majority (66.6 per cent) of the sesamum farmers was having good knowledge about improved practices in sesamum. The item about which maximum number of people possessed correct knowledge was regarding 'Thilak' as a good recommend variety of sesamum. The least extent of knowledge was expressed regarding the name, dose and time of application of fertilizers for sesamum.

In the case of rice farmers, based on their adoption quotient, more than half (55 per cent) of the respondents belonged to medium category, followed low adopters (28 per cent) and the number of farmers under high adoption was very low (17 per cent). Maximum adoption was in selecting HYV rice followed by adoption of plant protection and the soil test. Minimum level of adoption was noticed in the case of seed treatment and 'weedicide application'.

As far as sesamum farmers are concerned, the adoption was maximum in the case of HYV followed by seed rate and area under high yielding variety. The least amount of adoption was noticed in the case of weeding operation followed by management of phyllody disease of sesamum. 'Partial adoption' was more in the case of inorganic fertilizer application. Twenty eight percentage of respondents was 'high adopters.' This shows that among sesamum farmers, rate of technology adoption was comparatively better.

The score for all the ten items rated for measuring the perception of farmers about farmtrials were above mean indicating that rice farmers were having favourable opinion regarding farm trials. The mean scores for the nine out of ten statements were above average in the case of sesamum farmers, showing their highly favourable attitude.

As in the case of farm trial opinion regarding demonstrations was also highly favourable in the case rice farmers. As in the case of rice farmers, the mean scores of nine out of ten items were above mean for sesamum farmers. Even then, the farmers were not satisfied with the economic aspect of the demonstrations.

Among the 15 constraints rated for the importance attached to them, 'high wage rate of labourers' ranked top followed by 'high costs on inputs', 'lack of availability of inputs', 'high fertilizer demanding nature of new varieties' and the complaint that 'adoption of recommended practices do not assure regular monitory gain'. Lack of interest in deviating from the traditional methods and also lack of interest in trying out new methods ranked very low.

The most important constraint, as perceived by sesamum cultivators, was 'high wage rate of labourers'. 'High cost of inputs' was perceived as second in the order of importance. 'Lack of training on the recommended technologies' was an important constraint identified.

Besides these constraints, the farmers believe that the new methods will affect the quality of soil and hence they show reluctance to adopt it. Poor market demand for the products, lack of interest in trying new methods and lack of willingness to deviate from traditional method of cultivation practices were rated by sesamum cultivators as less important problems, as far as technology adoption in concerned.

Results of the correlation study shows that training, attitude towards scientific agriculture, information source utilization pattern, extension participation, perception about demonstration and perception about farm trials of farmers were having positive and significant relationship with their level of awareness about NARP. Economic motivation, innovation proneness, level of aspiration, attitude towards scientific agriculture, information source utilization, perception about demonstrations and perception about farm trials were found to be positively and significantly associated with the extent of awareness of sesamum farmers about NARP.

Regarding the relationship of profile characteristics and knowledge level of rice farmers, education, economic motivation, innovation proneness, risk orientation, attitude towards scientific agriculture and information source utilization were found to have positive and significant relationship. Economic motivation, training, innovation proneness, level of aspiration, information source utilization pattern and extension participation were found to have positive and significant association with the knowledge of sesamum farmers about improved varieties and practices.

Innovation proneness, level of aspiration, information source utilization, extension participation and knowledge about improved agricultural practices

were found to influence the extent of adoption of recommended practices by rice farmers in a positive and significant manner. Economic motivation, innovation proneness, management orientation, level of aspiration, information source utilization and extent of knowledge about improved practices were observed to be the influencing characteristics of adoption in sesamum farmers.

The results of statistical analysis done on the evaluative perception of scientists are furnished below;

The scientists response was mostly towards agreement side with respect to all the statements rated under research concept of NARP. Maximum number of scientists recorded their strong agreement towards the concept of joined field visits made by multi-disciplinary teams.

With regard to infrastructure facility development, score of majority of the scientists was just above mean. They expressed satisfaction on improvement made on items like library facilities and scientific staff availability after NARP. But many of them couldn't agree that implementation of NARP has helped to improve the transporting facilities.

Majority perceived that NARP has helped to augment the research capacities of the University. Maximum agreement was noted in the case two items ie, research stations established under NARP have helped to improve the research capability of SAUs.

Out of the six positive statements given for rating, disagreement was practically nil regarding multi-disciplinary research facilities provided under NARP. More than 70 per cent agreed that multi-disciplinary research facilities are helpful in problem identification, conducting problem-oriented research and in achieving efficiency in field experiments . But the respondents were not that much satisfied with the laboratory studies done under multi-disciplinary concept.

The response pattern of scientists regarding inter-disciplinary research facilities was almost similar to that towards multi-disciplinary research facilities. Majority of the scientists agreed that NARP has helped to improve the inter-disciplinary research approach.

It was found that the major linkage problem under NARP was the inadequate field visits of extension personnel of Department of Agriculture. This leads to poor feed back in monthly workshops. Visits by extension staff

to research stations were also reported to be not carried out properly. These results reveal that extension personnel of State Department are not paying much attention for be in touch with the research system and naturally the technology transfer process.

Poor research- extension linkage was pointed out by scientists as the most important constraint in the effective implementation of NARP. As the second most important problem, two items came up ie., Small sized holdings and unawareness of farmers about the technologies. The next important problem in the order was not promoting income generating subsidiary occupations under NARP. According to scientists, this plays a very important role in restricting the adoption of technologies.

Scientists were not satisfied with the office space and poor laboratory facilities provided under NARP. Another surprising observation of scientists was that extension personnel also some times fail in developing confidence in the technologies generated. In scientists' view, technologies are developed giving importance to the easiness in adoption, cost element etc, but they are not transferred properly to the farmers for which the research system is no way responsible.

Results of frequency and percentage analysis done to quantify the evaluative perception of extension personnel about NARP and categorized under five items; (a) impact of NARP on farmers (b) linkage (c) NARP workshops (d) Farm trials and (e) demonstrations are presented below.

Majority of the extension personnel (79 per cent) agreed that NARP has helped to improve crop production. In their opinion, farmer participation programmes have been increased after NARP, but participation of farmers in the project is very meager. They also agree that location specific problems are getting comparatively more significance after NARP and ultimate use of the project is for farmers and not for researchers.

Regarding the linkage under NARP, the maximum agreement was with the statement that monthly workshops in NARP help to promote linkage between scientists and extension workers. But they were complaining that the duration of the workshops has been restricted to one day, which was earlier two days. But they criticized that scientists are not so particular in making regular field visits, which are effective measures for keeping good linkage with farmers.

Majority of the extension personnel marked their agreement with the statement that monthly workshops are helpful in promoting the linkage between research and extension system and also the linkage of these two systems with the clientele system. They agree that in NARP workshops the location specific problems are getting more attention. Inspite of all the benefits, the extension personnel expressed their dissatisfaction with the priorities given for enterprises. Income generating subsidiary farming occupations are not given proper attention. Aiming at the benefit of poorer sections, high cost involvement in technology adoption was also suggested to be avoided.

The extension personnel were in full support of the view that farm trials are inevitable in the development of a location specific technology. But regarding the technical guidance, they added that the farmers can be encouraged to adopt a technology, but for monitoring and follow up, the researchers pay only little attention. Regarding the component of people's participation, only fifty percent agreed that the extent of participation at present is satisfactory.

Regarding demonstrations, extension personnel were having favourable opinion. But only 56 per cent agreed that scientists, while conducting

demonstrations, consider the situational factors. About the level of co-operation of input agencies in the conduct of demonstrations, 43 per cent of respondents were found contended.

Among the 12 different constraints rated by the extension personnel for their significance, majority perceived high cost of labour as most important. An interesting finding is that nobody rated it as a least important one. Lack of linkage between farmers and scientists was indicated as the next important constraint.

Unawareness of farmers about the technologies also came up as an important constraint, which can be solved absolutely through proper extension effort. Lack of training received from research stations was next in the order of importance, which was admitted as a lacuna on their part by the scientists. Lack of availability of demonstration plots was the least important constraint.

Results of the correlation analysis shows that experience of scientists is negatively related with their perception about NARP. In other words, number of years of service under NARP was having a negative bearing on their perception about research concept about NARP, infrastructure development,

augmentation of research capabilities, multi-disciplinary research facilities and inter-disciplinary research facilities. But regarding linkage problems, a positive and significant association was exceptionally observed. They were of the notion that linkage with the extension personnel was much better than what is existing now in earlier days.

Perception of extension personnel about the impact of NARP, NARP workshops and about constraints were having negative influence over experience of extension personnel. The perception about linkage, farm trials and demonstrations were positively associated with the experience of extension personnel. They opined that now a days, the research system is comparatively more conscious about transferring the generated technology to the field.

Based on the results of the study, strategy is formulated giving due consideration to the factors like sustainable development, resource conservation, cost effective and income generating technology development etc. The four systems of research, extension, client and input are given equal roles and this gains significance under the present setup of Panchayat Raj. It is hoped to be of much help to augment the functioning of any development programme, especially National Agricultural Technology Project (NATP).

REFERENCES

REFERENCES

Adhiguru,P and Perumal, G.1994. Adoption of Technology by IPRD Beneficiaries and its Impact . *Journal of Extension Education.* 5 (4).

Agble, W.K., Oppong, E.N.W and Oparesem, D.K. 1977. Agricultural Systems in Ghana. Proceedings of the Workshop on Agricultural Research Administration, Nairobi, Kenya.27-30 June, 1977. Association for the Advancement of Agricultural Sciences in Africa (AAASA) and the International Development Research Centre (IDRC) PP 10-14.

Ahmed, M., Kareem, M.R and Baset, M.A. 1999. Extent of seed fertilizer technology adoption in rice farming systems in Bangladesh. *Economic Affairs.* 44(4).

Alex, J.P. 1994. Role of Agriculture Labourers in Decision making in Paddy Production by Farmers of Thiruvananthapuram District. *M.Sc(Ag.). Thesis* (unpub.), College of Agriculture., Vellayani.

Allow, A.V and Schwass, R.H.1982. The Farm Adviser - A Discussion of Agricultural Extension for Developing Countries. *FETC Book Series* No.23.Taiwan.

Al-Mogel, A.I.1985. Factors Associated with the Adoption of Recommended Farm Practices Among Wheat Growing Farmers in Soudi-Arabia. *Dissertation Abstracts International.* Humanities and Social Sciences.45(11)

Ambasta,C.K and Singh ,K.N.1977. *Communication Pattern of Farm Scientists, a System Analysis., Indian Journal of Extension Education.*13 (1&2).

Anantharaman, M.1977. A Study of Training needs of Small and marginal farmers. *M.Sc. (Ag.). Thesis* (unpub.), Agricultural College and Research Institute, Coimbatore.

Anbalakan, S. 1974. A study of factors influencing the adoption of Package of

practices for High Yielding Varities of Paddy *M.Sc(Ag) Thesis* (unpub.), Agricultural College and Research Institute., Coimbatore.

Anonymous 1987. Proceedings of the Zonal Research Advisory Council Meetings, Kharif. 1988. RARS., Anakapalle, Andhra Pradesh Agricultural University.

Anonymous 1987. Proceedings of the Zonal research and Extension Advisory Council meetings, Rabi. 1988-89. RARS, Lam, Andhra Pradesh Agricultural University.

Anonymous 1993. Formulation of Research Programmes Guidelines, Andhra Pradesh Agricultural University.

Andrew, P. U. 1977. Development of Agricultural Research Administration-, Narobi, Kenya., Agricultural Sciences in Africa (AAASA) and International Development Research Centre (IDRC).

Anithakumari, P. 1989. Transfer of Technology on Pulses and Oilseed Cultivation in the Onattukara Tract of Kerala. *M.Sc(Ag) Thesis* (unpub.), College of Agriculture, Vellayani.

Anithavijayan. 1988. Adoption of Technology for Cultivation of Banana Variety , Nendran in Thrissur District. *M.Sc. (Ag.) Thesis* (unpub.), College of Horticulture, Vellanikkara, Thrissur.

Aristotle,D. 1981. Impact of Village Adoption Scheme of a Nationalised Bank. *M.Sc. (Ag.) Thesis,* (unpub.), Agricultural college and Research Institute Coimbatore.

Ashaletha, S. 1993. Role of Agricultural Assistants in Agricultural development in Thiruvananthapuram District. *M.Sc(Ag) Thesis.*, College of Agriculture, Vellayani.

Athimuthu, P. 1990. Diaganostic Study on Information Management, Learning Experience and Extent of Adoption of Nutrient use Technology for Rice. *Ph. D. Thesis.*(unpub.), Tamil Nadu Agricultural University, Coimbatore.

Babu, S.K., Asan, B.R., Regeena, S., Bhaskaran, C., Mohanakumaran, N and

Kunju, M.U. 1993. Trends in Area, Production and Productivity of Major Crops in Kerala - Report. (unpub.), NARP South Zone, Kerala Agricultural University, Vellayani.

Baker, D .1991. Reorientation, not Reversal African Farmer-based Experimentation. *Journal of Farming Systems -Research-Extension.*2:1, 125-147.

Balaguru, T and Rajagopalam, M. 1984. A Case study on the Implementation of the First phase of NARP at the Regional Research Station, Bawal, National Academy of Agricultural Research Management , Hyderabad.

Balaguru,T and Raman, K.V. 1985. Case study on the First phase of NARP at Sriganganagar, Rajasthan, National Academy of Agricultural Research Management , Hyderabad.

Balaguru,T.,Venkateswarlu,K and Rajagopalan, M. 1988. Implementation of World Bank Aided NARP in India: A Case Study. *Agricultural Administration and Extension.* 29.

Balan, S. 1987. Utilization of Soil Test Recommendations by the Farmers in Trivandrum District. *M.Sc. (Ag.) Thesis*, (unpub), College of Agriculture, Vellayani.

Balasubramanian, R. 1985. Spread and Acceptance of Pulses' Technology. *M.Sc.(Ag.). Thesis.*(unpub.), Agricultural College and Research Institute , Coimbatore.

Balu,S.R.A. 1980. A Study on the Functioning of Integrated Dryland Agricultural Development Project. *M.Sc.(Ag.). Thesis.* (Unpub.) Tamil Nadu Agricultural University ,Coimbatore.

Bavalatti, V.G. and Sundaraswamy B.1990. Adoption of dryland Practices by the Farmers of Bijapur district. *Indian Journal of Extension Education.* Vol.XXVI.

Beal, G.M. and Sibley, D.N. 1967. Adoption of Agricultural Technology by the Indians of Gautimala. *Rural sociology Reports.* 62. Department of Sociology

and Anthropology, Iowa State University.

Benor, D and Baxter, D.C. 1984. *Training and Visit System,* World Bank, Washington D.C.

Benor, D and Harrison, J.Q. 1977. *Agricultural Extension-The Training and visit system,* World Bank, Washington D.C.

Bhaskaran, C. 1979. A Critical Analysis of the Inter-personal Communication Behaviour of Small and Other Farmers in a Less Progressive and More Progressive Villages in Kanyakumari District. *Ph. D. Thesis (unpub.),* University of Agricultural Sciences, Bangalore.

Bhaskaran, K and Mahajan, B.S. 1968. Effectiveness of extension methods in gaining knowledge about and acceptance of Agrosan and sea treatment to cotton. *Indian Journal of Extension Education* . 4 (1 &2).

Bhaskaran, S. 1978. Study on the Impact of Institutional Credit and its Influence on the Behaviour of Farmers in Adopting High Yielding Varieties of Paddy Cultivation. *M.Sc. (Ag.) Thesis,* (unpub), College of Agriculture, Vellayani.

Bhaskaran,K and Praveena,C. 1982. Adoption of Improved Dryland Agricultural Technology in an Integratedland Agricultural Technology Project in Andhra Pradesh. *Indian Journal of Extension Education.* 26 (3&4).

Bhatnagar,O.P., Desai, G.R and Reddy, M.R. 1986. Management of Agricultural Extension Under T&V System in India: An Overview. *Journal of Rural Development* . 5 (5).

Binoo,B.P.1991. Adoption of Improved Agricultural Practices by Commercial Vegetable Growers of Ollukkara Block in Thrissur District. *M.Sc. (Ag.) Thesis* (unpub.) , college of Horticulture Vellanikkara.

Burns , D.J.1987. The effects of Uniqueness Seeking and Sensation Seeking upon Innovative Behaviour and the Adoption Process. Kent State University. *Dissertation Abstracts International.* 48 (11): 2926.

Chandrakandan, K. 1973. A Study on Farm Practice Attributes and Socio-Personal Factors in Relation to Adoption of Agricultural Practices in Thanjavur. *M.Sc.(Ag.) Thesis.*(unpub.), Tamil Nadu Agricultural University ,Coimbatore.

Chantalakhana, 1977. Some Important Steps in the Research Process in Agricultural Research Management , Asia, SEARCA College , Laguna, Phillippines, vol I PP 309-313.

Chattopadhyay, S.N. 1963. A Study of Some Psychological Correlates of Adoption of Innovation in Farming. *Ph. D. Thesis* (unpub.), IARI, New Delhi

Chaubey, A.K and Pandey, B.D. 1988. A Study of Lab to Land Programme of Varanasi , Uttar Pradesh. *Extension Education- a FEAT.* Compendium published by Banaras Hindu University, Varanasi .

Cheriyan, K. Betty. 1984. Awareness and Attitude of Farmers, Agricultural Extension Workers and Officials Towards T and V System. *M.Sc. (Ag.) Thesis.* (unpub), College of Agriculture, Vellayani.

Crawford, P.R and Berclay, A.H. 1982. AID Experience in Agricultural Research . A Review of Project Evaluation Office or Evaluation Bureau for Programme and Policy Co-ordination, Agency for International Development, Washington D.C. 20523,U.S.A.

Cummings ,R. 1981. Strengthening Linkage between Agricultural Research and Farmers: An Overview Presented at Workshop on Linkage between Agricultural Research and Farmers in Developing countries.(13th & 14th May,1981).

Dwivedi,R.P and Kaul, P.N. 1998. Scientist Farmer Communication: The Source for Selection of Research Problems. *50 Years of Communication Research Abstracts.* Pande, K.N.(Ed.), National Council for Development Communication. Varanasi.

Extension Education- a FEAT. Compendium published by Banaras Hindu

University, Varanasi.

Farooqui. H.F., Khan, S.M and Mahajan, B.S.1993. A Study of the Extent of Adoption of Water Management Practices of Wheat and Summer Ground nut Crops. *Maharashtra Journal of Extension Education.*

Francis, C.A., Arnold, R.G. Deshazer, J.A., Hanway, D.G.and Ontevedit, I.T.1982. The Challenges and Potentials of Interdisciplinary Research in Agriculture Enabling Interdisciplinary Research: Perspectives from Agriculture, Forestry and Home Economics Martha Garrett Russel (Ed.) Miscellaneous Publication .19. Agricultural Experiment Station, University of Minnesota, USA .

Fuller, M.A and Waldron, W. M. 1989. Outreach in Agriculture in Rural Development . South-North Partnership in Strengthening Higher education in Agriculture.

Gaikwad, S.M and Ingle, P.O. 1992. Impact of Koradi Nalla Irrigation Project. *Indian Journal of Extension Education.* XXVIII. (3 & 4).

Ganesan,R and Muthaiah, M. 1991. Awareness levels of Agricultural Development Schemes. *Indian journal of Extension Education.*XXVII (3&4).

Geethakutty,P.S. 1993. Fertilizer Use Behaviour of Rice Farmers of Kerala. *Ph.D. Thesis.* (unpub.), Vellayani ,Kerala Agricultural University.

Getahum, A.L.Z and Samu, N.H.M. 1977. Agricultural Research systems in Ethiopia Proceedings of Workshop on Agricultural Research Administration, Nairobi, Kenya,(27th to 30th June ,1977).

Godhandapani, G. 1985. Knowledge and Adoption of Nutrient Recommendation for Irrigated Groundnut. *Ph. D. Thesis* (Unpub).,Tamil Nadu Agricultural University, Coimbatore.

Gogoi, S.K. and Gogoi, D.K. 1989. Adoption of Recommended Plant Protection Practices in Rice - a Multi- variate Analysis. *Indian Journal of Extension Education,* 25(1 & 2).

Goode, W. J. and Hatt, P.K. 1952. *Methods in Social Research.* McGraw-Hill Kogakhusha Ltd., NewYork.

Government of India, 1976. Report of National Commission on Agriculture, Ministry of Agriculture and Irrigation, New Delhi.

Govind, S. 1992. Integrated Pest Management in Rice - Achievement and Opportunities. *Ph. D. Thesis* (unpub.), Agricultural College and Research Institute, TNAU, Coimbatore.

Gowda, N.K., Jayaramaiah, K.M and Gangadharappa, N.R. 1993. Impact of T&V System. *Indian journal of Extension Education* . XXIX (1&2).

Haraprasad, D. 1982. Study on the Impact of the Agricultural Programme Implemented by the Small Farmers Development Agency among Farmers of Trivandrum District. *M.Sc. (Ag.) Thesis.* (unpub.), College of Agriculture, Vellayani.

ICAR, 1982. A Manual on National Agricultural Research Project (ICAR-IBRD) ICAR, Krishibhavan, New Delhi.

Iyamabo D.E. 1977. Agricultural Research Systems in Nigeria. Proceedings of the Workshop on Agricultural Research Administration Nairobi, Kenya. Association for the Advancement of Agricultural Sciences in Africa (AAASA) and the International Development Research Centre. (IDRC) .

Jaiswal, N.K and Arya, H.P.S. 1981. Management of Transfer of Farm Technology., NIRD, Hyderabad.

Jaiswal, P.K and Dave, N.K. 1972. Measurement of Progressiveness in Farming . Sinha, P.R (Ed.), Studies in Extension Education. NICD. Hyderabad.

Jaiswal, P.K. and Sharma, P.N. 1990. Constraints in adoption of improved technology of Rice. Maharashtra Journal of Extension Education. 9 (10).

Jaleel, M.M. 1992. Factors Influencing the Development of Agriculture Among the Kanikkar Tribe of Kerala. *M.Sc. (Ag.). Thesis.* Kerala Agricultural

University, Vellanikkara.

Jayakrishnan, S. 1984. Adoption of Low Cost Technology among Paddy Growers. *M.Sc.(Ag). Thesis* (unpub.), Agricultural College and Research Institute, Coimbatore.

Jayalekshmi,N. and Alagesan. 1998. Technology Adoption and Production Constraints in Sesamum in Cauvery Mettur Project Area. *Journal of Extension Education.* 9 (3).

Jayapalan, R. 1985. Constraints involved in certified seed production- an analysis. *M.Sc. (Ag.). Thesis.* (unpub.), Agricultural College and Research Institute, Coimbatore.

Jayaraman, M.N. 1988. A Study of the Adoption of Neem-coated Urea for Paddy. *M.Sc.(Ag.). Thesis.* (unpub.), Agricultural College and Research Institute, Coimbatore.

Jnanadevan, R. 1993. An Analysis of Selected Development Programmes for Promoting Coconut Production in Kerala. *M.Sc. (Ag.) Thesis.* (unpub.), College of Agriculture, Vellayani.

Jodha, N.C. 1979. Proceedings of International Workshop on Socio-economic Constraints to Development of Semi-arid Tropical Agriculture, Hyderabad. ICRISAT, Andhra Pradesh.

Kaleel,F.M.H. 1978. A study on the Impact of Intensive Paddy Development Programme in Kerala. *M.Sc. (Ag.) Thesis*, (unpub.), College of Agriculture, Vellayani.

Kalivaradan, J., Nanjayyan, K and Seetharaman, N. 1996. Awareness of Women Beneficiaries about IRDP-An Analysis. *Indian journal of Extension Education.* 4 (3)

Kamarudeen, M. 1981. A Study on the Impact of National Demonstration Programme on Paddy Cultivation in Trichur District. *M.Sc.(Ag.) Thesis* (unpub). College of Agriculture , Vellayani.

Kareem, K.A and Jayaramaiah,K.M.1997. Problems Perceived by the Staff in the Planning and Implementation of IRDP. *Madras Agricultural Journal.* 84 (7).

Keller,K.R. 1983. *Generation of Technology in Agriculture in the 21st century* (Ed) John W. Roseulu,. John Wiley & Sons , New york.

Khan,M.A, Sharma, R.C and Sharma, P.N. 1997. Farmers' characteristics and adoption of Paddy Technology in Eastern Madhya Pradesh -a path analysis. *Journal of Extension Education.* 4 (8).

Knight, A.J. and Singh, K.N. 1975 . A Study On Personal Social Characteristics of Farm Broadcast Listners that are Associated with Gain in Knowledge. *Madras Agricultural Journal.* 62, (10-12).

Krishnamurthy,R.1984. Transfer of Dry-land Technology Acceptance and Constraint Analysis. *M.Sc. (Ag.) Thesis.* (unpub.), Agricultural College and Research Institute , Coimbatore.

Krishnankutty, J and Nair. 1988. Integrated Rural Development Programme-A Case study. Kerala Agricultural University, Vellanikkara.

Kumar ,B and Dhawan, K.C. 1992. Impact of Land development Programmes on Socio-Economic Parameters in Kandi Areas of Punjab. *Journal of Rural Development.* 11 (3).

Kunju, O.A.R. 1992. *Transfer of Agricultural Technology- Structural and Functional Linkages.* Concept Publishing Company, New Delhi.

Kunju, V. 1990. Constraints in The Utilization Of Development Schemes by Cardamom Growers of Kerala. *M.Sc. (Ag.). Thesis.* (unpub.), College of Horticulture, Vellanikkara.

Kunju,O.A.R. 1989. Structural and Functional Linkages in the Transfer of Technology of Improved Rice Varieties Released by the Kerala Agricultural University-A System Analysis. *Ph.D Thesis,* Kerala Agricultural University ,College of Agriculture.,Vellayani.

Lakshmi, T and Manoharan , M. 1993. Extent of Awareness and Attitude Towards Improved Dryland Agricultural Technology . *Indian journal of Extension Education* . 4 (3).

Lalitha, K.C. 1986. A Study on the Impact of Training Under 'WYTEP' on Knowledge and Adoption Level of Farm Women in Bangalore District of Karnataka State. *M.Sc (Ag). Thesis.* (unpub.). University of Agricultural Sciences, Bangalore.

Leagans, J.P. 1985. Adoption of Technology by Small Farmers- A Model of Strategy Builders. *Journal of Extension Systems.*1(19-24).

Lionberger,H.R. 1960. Adoption of New Ideas and Practices . Iowa University Press, America.

Litterer, J.A. 1973. *The Analysis of Organization* ., Wiley Publishing Co., NewYork.

Mani, K. C. 1980. A Study on the Knowledge and Extent of Adoption of Sunflower Growers. *M.Sc. (Ag.) Thesis* (unpub.), Agricultural College and Research Institute , Coimbatore.

Manivannan, N. 1980. A Study on the Knowledge and Extent of Adoption of Sunflower Growers. *M.Sc (Ag.). Thesis.* (unpub.), Agricultural College and Research Institute, Coimbatore.

Manjunath, B.N., Lakshminarayan, M.T and Pillegowda, S.M. 1996. Knowledge of Farmers on Dryfarming Practices. *Journal of Extension Education.* 6&7 (4&1).

Marathy, P. and Reddy , R.P .1998. A Study on the Extent of Adoption and Yield Gap in Paddy. *Journal of Extension Education.* 9 (1).

Marsh, C.O. and Coleman, A.C. 1955. The Relation of Farmers' Characteristics to the Adoption of Recommended Farm Practices. *Rural Sociology.* 20.

Maroof, A.M and Singh,V. 1981. Studies on the Impact of SFDA Programme on

Socio-Economic Status of the Beneficiaries of Bihar Block of Nalanda district, Bihar- Extension Education- a FEAT. Compendium published by Banaras Hindu University, Varanasi.

Meera, B. 1981. Impact of Farm Women's Training in Agriculture. *M.Sc. (Ag.). Thesis.* (unpub.), College of Agriculture, Vellayani.

Mishra,R.N. and Jha,P.N. 1985. Impact of Lab to Land Programme in Increasing Adoption, Productivity and Income of Farmers in North Bihar. *Indian journal of Extension Education* .21 (1& 2).

Moscher, A.T. 1975. *Serving Agricultural Development.* INC Publishers, Newyork.

Moulik, T.K. 1965. A Study of the Perspective Values of Some Factors of Adoption of Nitrogenous Fertilizers and the Influence of Sources of Information on Adoption Behavior. *Ph. D. Thesis.* (Unpub.), IARI, New Delhi.

Nagabhushanam, B and Chandbasha, B. 1981. What and Why of Agricultural Technology. *Kurukshetra.* 29(14).

Naik,B.K.1981. Awareness and attitude of farmers and extension workers towards Intensive Agricultural Extension System (T&V) in Andhra Pradesh. *M.Sc. (Ag.) Thesis* (unpub.). , S.V. Agricultural College, Thirupathi.

Nair,G.T. 1969. A Multivariate Study on Adoption of High Yielding Paddy Varieties by the Farmers of Kerala State. *Ph.D Thesis.* (unpub.) . I.A.R.I, New Delhi.

Nandakumar, P.P. 1988. Impact of ITDP on Yerva Tribal Community in Virajpet in Karnataka. *M.Sc.(Ag). Thesis* (Unpub.). University of Agricultural Sciences., Bangalore.

Nandakumar,A.C. 1980. Critical Analysis of the Functioning of Drought Prone Area Programme. *M.Sc. (Ag.) Thesis.* (unpub.), Agricultural College and Research Institute , Coimbatore.

Nanjappa, D., Gangadharappa, N.R., and Shivalingegowda, N.S. 1997. Whole Farm Demonstration as a Tool of Effective Communication. *50 Years of*

Communication Research Abstract. Edited by Pandey, K.N. National Council of Development Communication, Varanasi.

Nanjayyan,K. 1985. Rationality in Decision Making By Small Farmers. *Ph. D. Thesis* (unpub.)., University of Agricultural Sciences., Bangalore.

NARP Status Report , 1985. Directorate of Research, Kerala Agricultural University , Vellanikkara.

NARP Status Report , 1989. Directorate of Research, Kerala Agricultural University , Vellanikkara.

Nataraju, M.S., Venkataranga naika, K and Krishnamurthy, B.1996. Technology Utilization Pattern under NARP in Karnataka. *Journal of Extension Education.* 7 (1).

Nataraju, M.S., Perumal, G and Nagaraja, G.N., 1991. Transfer of Technololgy in Training and visiting system. *Indian Journal of Extension Education,* 27(3 & 4).

Noman, D.W and Hays, H. 1980. The Farming System Approach Relevancy for Small Farmers. Michigan State University, Rural Development Paper No: 5, East lansing, M1, Michigan State University.

Ogunfidifimi, T.O. 1961. Adoption of Improved Farm Practices. A Choice Under Uncertainty. *Indian Journal of Extension Education.* 17 (1&2).

Olowu, T.A, Iloka, A.I and Ekpere, J.A. 1988. Farmers' Characteristsics and Adoption of Improved Cassava Varieties. *Indian Journal of Extension Education,* 24(1&2).

Oppenheim, A.N. 1966. *Questionnaire Design and Attitude Measurement.* Heinemann, London.

Padmaiah, M. 1987. Report on Technology Development Process of the Scientists at RARS., Anakapalle, NAARM, Hyderabad.

Pandey, K.N and Pandey , B.D. 1984. Adoption of Agricultural Innovations by

Small and Marginal Farmers of Varanasi, U.P. *Ph.D. Thesis.* Institute of Agricultural Science , Banaras Hindu University.

Pandey,S.K and Sharma. 1990. *Universe of Knowledge and Research Methodology.* Ken Publications., New Delhi.

Pandurangaiah, B.M. 1987. A Study on Identification, Profile, Communication Pattern and Adoption Behaviour of Opinion Leaders with respect to Dairy Enterprises. *M.Sc (Ag). Thesis* (unpub.)., UAS, Bangalore.

Parameswaran, K.A. 1973. A Study on The Impact of Cotton Package Programme on the Adoption of Improved Farm Practices by the Farmers of Madukkaria Block, Coimbatore. *M.Sc. (Ag.) Thesis.* (unpub.), Agricultural College and Research Institute , Coimbatore.

Pathak, S. and Sasmal, B.C. 1992. Adoption of Jute Technologies. *Indian Journal of Extension Education* . XXVIII (1&2).

Perumal, G and Mariappan, K. 1982. A Study on the Influence of Rural Community Settings on the Adoption of Improved Cultural Practices. *Rural Development Review.* 1 (2).

Pillai, G.B. 1978. A Study on Adoption of Soil Conservation Measures by Farmers in Scheme Areas of Trivandrum District. *M.Sc(Ag) Thesis (unpub.)* ,College of Agriculture, Vellayani.

Pollisco, F.S. 1976. *Techniques of Improving the Research Process in Forestry Research.* Agricultural Research Management . Asia. SEARCA College, Laguna, Philippines. Vol.IP56.

Ponnappan, C. 1982. Fish Farmers Development Programme -An Analysis. Kerala Agricultural University, Vellanikkara.

Prakash, R. 1980. A Study on the Impact of Agricultural Development Programme Among the Tribals of Kerala. M.Sc. (Ag.). Thesis. (unpub.), College of Agriculture, Vellayani.

Prasannan, K. M. 1987. Extent of Adoption of Messages by Contact Farmers in T

& V system. M.Sc. (Ag.). Thesis. (unpub.), College of Agriculture, Vellayani.

Pushpa, R., Chandrakandan, K., Sujatha, J and Annamalai,R. 1993 perception on the existing Research- Extension- Clientle- Linkage and Feed back-A Study. *Journal of Extension Education 4(1): 624-628.*

Pushpa, J and Seetharaman, R.N., 1998. Information Sources Utilised and Awareness About Development Programmes. *Journal of Extension Education* .9(2)

Rahim, K.M.B and Sharma, V.K. 1983. Factors Affecting Adoption and Non-adoption of Improved Terracing in Ramganga Catchment in UP Hills. *Agricultural Situation in India.* 39 (9).

Rajapandy, S. 1983. Water Management Knowledge and Use of Irrigation Practices Under Irrigated Conditions. M.Sc. (Ag.). Thesis. (unpub.), Agricultural College and Research Institute, Coimbatore.

Rajendran. P. 1978. A Study of Factors Affecting the Adoption of Selected Agricultural Practices. M.Sc. (Ag.). Thesis. (unpub.), College of Agriculture, Vellayani.

Ramachandran, C. 1994. Impact of Minikit Trials on the Adoption Behaviour of Farmers. M.Sc.(Ag.). Thesis. (unpub.), College of Agriculture, Vellayani..

Ramanathan, S., Ananthaṙaman, M. and Lakshmi, K.R. 1987. Constraints in adoption of High Yielding Cassava Varieties. *Indian Journal of Extension Education.*

Rani, G.J. 1985. Scientific Productivity of Agricultural Scientists. An Activity Analysis Approach. *Ph.d thesis*,(Unpub.), Andhra Pradesh Agricultural University ,Hyderabad.

Rani,S. and Singh, U. 1999. Impact of Independent Variables on the Level of Mechanization in Paddy Cultivation. *Indian Journal of Social Research.* 40 (1).

Rao, A.A 1981 Strengthening the Capability of Experimental Stations.

Agricultural Research management.Vol 3., AISA, SEARCA College, Laguna, Phillipines.

Ravichandran, M. 1980. Study on Attitude, Extent of Adoption and Problems Encountered by Registered Sugarcane growers. *M.Sc.(Ag.). Thesis.* (unpub.), Agricultural College and Research Institute, Coimbatore.

Recommendations of MSEE Seminar on Extension Stratagies for Watershed Development. 1993. College of Agriculture, Nagpur.

Reddy, C. R., Kumar and Suresh, B.V. 1982. Impact of Reserve Bank of India's Credit on Farm Economy. *Education Rural India.*

Reddy, H.C.V. 1987. Attitude and Adoption Behaviour of Farmers Relating to Watershed Development Programme in Bangalore District of Karnataka State. *M.Sc. (Ag.). Thesis.* (unpub.), UAS, Bangalore.

Reddy, S.M and Iqbal, M. 1993. Knowledge of Beneficiaries and Non-beneficiaries on Watershed Development *Programme. Maharashtra Journal of Extension Education.* XII. 181-184.

Reddy, V.M and Reddy, M.S. 1988. Relationship Between Selected Characteristsics of Contact Farmers and their Knowledge and Adoption of Improved Paddy Cultivation Practices. *Indian Journal of Extension Education* .24 (3 & 4).

Reddy, K.P. 1984. Analysis of Information Flow and Communication Linkages in Transfer of Dairy Management Practices- A Systems Perspective. *Ph.d thesis,* Andhra Pradesh Agricultural University., Hyderabad.

Reddy, P. 1986. Extension Systems in Relation with Research and Client Systems -An inter System Analysis. *Journal of Extension Systems* .2(2).

Reddy, S.S. 1987. Report on Field Experience Training Programme at RARS, LAM, Guntur, NAARM., Hyderabad.

Reference Materials for 'Training in NARP- Cocepts and Objectives' for the Scientists of Southern Zone, Kerala Agricultural University. 1991. NARP

(Southern Region), Kerala Agricultural University, Vellayani.

Report of NARP (Southern Region) Presented at Regional Group Meeting at Bangalore. 1995. Directorate of Research, Kerala Agricultural University, Vellanikkara.

Report of Review Committee on Agricultural Universities, ICAR. 1978. Krishibhavan, New Delhi.

Report of the ICAR Research Review Committee for Kerala Agricultural University. 1980. ICAR, Krishibhavan, New Delhi.

Report of the Task Force on Agricultural Infrastructure. 1997. State Planning Board, Thiruvananthapuram.

Report of the Task Force on Field crops. 1997. State Planning Board, Thiruvananthapuram.

Rogers, E.M and Shoemaker, F. 1970. Communication of Innovations - A Cross Cultural Approach. The Free Press., New York.

Roy, A., Adhikari, M.M., Mondal, T and Chowdhary, B.R. 1992. Impact of Special Jute Development Programme. *Indian Journal of Extension Education.* XXVII .(1&2).

Sabarathnam,V.E. 1985. Heterogencity on Dissemination Lingages among ARS Scientists, Paper Presented at the National Seminar on Mangement of Agricultural and Rural Development Programmes, College of Agriculture, Nagpur.

Sabarathnam,V.E. 1987. A Study on the Process of Development and Dissemination of Dryland Agricultural Technology (Identification Measurement , Production and Effect) *Ph.d Thesis*, Andhrapradesh Agricultural University, Hyderabad.

Sabhapathi, K.K. 1988. Training Needs in Agriculture of Irulas of Attappady. M.Sc. (Ag.). Thesis. (unpub.), College of Agriculture, Vellayani.

Sabharwab, K., Dahiya, R., Grover, I and Kashyapis.1999. Demonstration Method More Successful . Income Generating Activities for Rural Women. *Communicator.* April-June.

Saed, A.M. 1989. Socio-Economic Models of Adoption of Agricultural Innovations in Sudan and their Implications for Agricultural Developemnt Programmes. Cornell University. *Dissertation Abstracts International.* 50(3).

Saha, S.N.1985. A Case Study on the Implementation of the NARP at Regional Research Station, Arnej Gujarat Agricultural University , National Academy of Agricultural Research Management ,Hyderabad.

Sainath, S. 1982. A Study on Adoption Behaviour and Motivation Pattern of Grape Cultivators in Bangalore District of Karnataka State. *M.Sc (Ag). Thesis (*unpub.)., University of Agricultural Sciences, Bangalore.

Sajeevchandran, A. 1989. Impact of Development Programmes in Promoting Pepper Production in Kerala. *M.Sc(Ag) Thesis* (unpub.), College of Agriculture, Vellayani.

Sakthivel, K. 1979. Influence of Farmer Characteristsics and Attributes of Innovation on Adoption. *M.Sc. (Ag.). Thesis.* (unpub.)., Agricultural College and Research Institute, Coimbatore.

Samad,AK. 1979. Response for Special Package Programme for Agricultural Development in Kerala. *M.Sc. (Ag.). Thesis.* (unpub.), College of Agriculture, Vellayani.

Samantha, R.K. 1977. A Study on Some Agro-Economic, Socio-Psychological and Communication Variables Associated with Repayment of Agricultural Credit Users of Nationalized Banks. *Ph.D. Thesis,* (unpub.), Bidhan Chandra Krishi Viswavidyalaya Nadia, West Bengal.

Sangeetha, K.G. 1997. Managerial Behavior of Commercial Banana Growers in Thiruvananthapuram District. *M.Sc.(Ag.) Thesis.* Kerala Agricultural University, Vellanikkara.

Sankaran, R. 1987. Impact of Minikit Programme on Knowledge and Adoption of Ground nut Technology. *M. Sc.(Ag.). Thesis.* (unpub.), Centre for Agricultural and Rural development Studies, TNAU, Coimbatore.

Sanoria, Y.C and Sharma, D.K. 1983. Comparative Analysis of Adoption Behavior of Beneficiaries of Farm Develeopment Programme. *Indian Journal of Extension Education.* 19 (1 & 2).

Sanoria,Y.C.1987. Correlate of communications efficiency of Agricultural Scientists. A system analysis. *Indian Journal of Extension Education* .,16 (1 &2).

Saradamani, K. 1983. *Declining Employment of Labour- Increasing Involvement by Land Owing Women in Rice Farming.* Grower Publishing Company, New Delhi.

Sarkkar, A.D. and Reddy, V.S. 1980. A Study on the Impact of Intensive Agricultural Extension System (T & V System) in West Bengal. *Research studies in Extension Education,* APAU.

Satapathy. 1981. Retrospect and Prospect of Pulse Cultivation in Orissa. *Ph. D. Thesis.* (Unpub.), IARI, New Delhi.

Satheesh, E. 1990. A Study on Knowledge and Adoption of Chawki Rearing Practices by Silkworm Rearers of Kanakapura Taluk. *M. Sc. (Ag.). Thesis.* (unpub.), GKVK., UAS, Bangalore.

Sawant, C.K., Pawar, H.S and Shinde, S.B. 1993. Constraints of Farm Scientists in Generating the Farm Technology. *Maharashtra Journal of Extension Education.,* Vol.XII.

Saxena, K.N., Palaokeyo, A., Seshu, K.V., Omolo, E.O and Nagode,L. 1989. Insect Pest Management and Socio-Economic Circumstances of Small -scale Farmers for Food Crop Production in Western Kenya: A case Study . *Insect Science Applications.*, 10 (4).

Sekar ,V and Algesan. 1998. Growth and Instability in Groundnut in South Arcot

District of Tamil Nad. *Journal of Extension Education.*9

Selvakumar, B. 1988. Information Support Utilization for Awareness, Conviction And Adoption of Cotton White Fly Control Measures by Contact and Non-Contact Farmers. *M.Sc.(Ag.). Thesis.* (unpub.), Agricultural College and Research Institute, Coimbatore.

Sen, D and Das, P.K. 1986. Factors Influencing Improvement in Oil Seed Production by Small Land Holders. *Journal of Rural Development. 5(1).*

Sen, D. 1984. *Changing Perspectives in Extention-Some Relevant Issues; Changing Perspectives in Extension.*(Mimeo) N.I.R.D., Hyderabad.

Senfalguni and Ahmad, 1980. *Management of Human Resources in ICAR Institutes, Management of Agricultural Research: Problems and Perspectives* (Ed). Aqueil Ahmad, Administrative Staff College of India, Hyderabad.

Sethy,B, Sinha, B.P. and Rahul, R. 1984. Some Entepreneurial Charactiristics in Adoption of an Improved Farm Technology. *Indian Journal of Extension Education.* 20 (1&2.

Shankariah, C.H and Reithmuller, P.C. 1977. Value orientation of Grazers in South West Queensland. *Indian Journal of Extension Education.*

Sharma, A.R. , Shirmali, S.S and Bhalla,S.K. 1989. Adoption of improved Technology by the Farmers Under Lab to land Programme. *Indian Journal of Extension Education.* XXV. 3&4.

Sharma, J.C.1982. Linkages Among Research, Extension, Farmers and Input and Credit Organization at Various Levels. *Indian Journal of Extension Education.*,18(1&2).

Sheoran, V.K and Kumar, R. 1988. Correlation of Adoption of Dairy innovations of I.R.D.P. Beneficiaries. *Indian Journal of Extension Education.* 24 (1 & 2).

Shukla, S.R. 1980. Adoption Behavior of Small Farmers. *Indian Journal of Extension Education* .,26 (1 & 2).

Sigman, V.A and Swanson, B.E. 1984. *Problems Facing National Agricultural Extension Organization in Developing Countries.* INTERPAKS Research Series, NO.3.University of Illinois at Urbana Champaign.

Singh, A.K and Ray, G.L. 1985. Variables Contributing to the Level of Fertilizer Use by Farmers. *Indian Journal of Extension Education.* 21 (3 & 4).

Singh, I.V. and Sahay, B.N. 1970. Communication Behaviour of Kosi Farmers in Relation to High Yielding Variety Programme. *Indian Journal of Extension Education,* 6(3 & 4).

Singh, K.M.P. and Singh, R.P. 1974. Impact of National Demonstration on the Adoption of high yielding Varieties of Wheat. *Indian Journal of Extension Education.,10(1&2).*

Singh,C.K. and Singh ,V.K. 1991. Prospects and Barriers to Transfer of Dry Land Farm Technology in District of Mirzapur, UttarPradesh. Extension Education- a FEAT. Compendium published by Banaras Hindu University, Varanasi .

Singh,K.N. 1984. Developing Linkage Between Research, Extension and Farmers; Changing Perspectives in Extension (Mimeo), NIRD, Hyderabad.

Singh,V and Israel, P. 1989. A Study of Contact and Non-Contact Farmers of T&V System. *Indian Journal of Extension Education* .XXV (3&4).

Sinha, A.K and Ray, G.L. 1985. Variables Contributing to the Level of Fertilizer Use of Farmers. *Indian Journal of Extension Education.* 17 (1&2).

Sivanarayana, G and Reddy, J.S. 1994. Correletes of Adoption of Recommended Technologioes. *Indian Journal of Extension Education,* 30(1 to 4).

Sivaramakrishnan, 1981. A Study on the differential Adoption of Recommended Agricultural Practices of Selected Crops. M.Sc. (Ag.). Thesis. (unpub.), College of Agriculture, Vellayani.

Somasundaram, D. 1976. A Diagnostic Study of Small Farmers with Respect to

New Agricultural Technology and its Effective Communication For Adoption. *Ph. D. Thesis* (unpub.), I.A.R.I, New Delhi.

Sreedhar,1989. Report on Field Experience Training at RARS, Anakapally, NAARM, Hyderabad.

Sreekumar, N. 1985. Comparative Analysis of Adoption Behaviur, Economic Performance and Management Orientation of Borrowers and Non-Borrowers of Bank Credit of Calicut District of Kerala State. *M.Sc. (Ag.). Thesis.* (unpub.), Bangalore.

Srivastava, U.K., Shenoy, G.V and Sharma, S.C.1989. *Quantitative Techniques for Managerial Decisions.* Wiley Eastern Ltd, Dawragange, New Delhi.

Sudha, V.K. 1987. A Study of The Impact of Lab To Land Programme of Tribal and Non-tribal Participants in Kerala Agricultural University. *M.Sc. (Ag.) Thesis.* (unpub.), College of Horticulture, Vellanikkara.

Sudha, M. 1987. Report of the Field Experience Training at RARS , Tirupathi, NAARM, Hyderabad.

Sujatha, P and Annamalai, R.1998. Differential Adoption Behaviour by Different Categories of Farmers and their Characteristics Associated with Adoption Behaviour . *Journal of Extension Education.*9 (1).

Sulaiman ,R.V. 1989. Evaluative Perception of the Recommended Fertilizer Management Practices. *M.Sc. (Ag.). Thesis.*, College of Horticulture, Vellanikkara.

Sumana, A and Reddy, M.V. 1998. Awareness of Farm Women About Technologies of Watershed Development Projects in Prakasam District of Andhra Pradesh. *The Andhra agricultural Journal.* 45 (1&2).

Supe, S. V and Salode, M.S. 1975. Impact of National Demonstration on knowledge and adoption level of Farmer Participants. *Indian Journal of Extension Education., 11 (1&2).*

Supe, S.V. 1969. Factors Related to Different Degrees of Rationality in Decision

Making Among Farmers. *M.Sc.(Ag.). Thesis.* (unpub.), I.A.R.I, New Delhi.

Surendran, G. 1982. Impact of Operational Research Project on Agricultural Production. M.Sc. (Ag.). Thesis., Kerala Agricultural University, College of Agriculture, Vellayani.

Sureshkumar, B and Venkataramaiah, P. 1992. Attitude of Beneficiaries Towards Jawahar Rozgar Yojana. *Indian Journal of Extension Education* XXVIII (3&4).

Suryavanshi, S.D., Patil, R.G and Kapse, P.M. 1978. Credit Requirement Availability and its Gap on the Farmers of the Girna Command Area of Maharashtra. *Indian Journal of Agricultural Economics* ., 33(4).

Swaminathan, N. 1986. Impact of Pulse Minikit Demonstration for Small and Marginal Farmers in Chengalpattu District. M.Sc.(Ag.). Thesis. (unpub.), Agricultural College and Research Institute, Coimbatore.

Syamala, K.S. 1988. An Analysis of the Effectiveness of National Demonstrations Conducted by the Kerala Agricultural University. *M.Sc. (Ag.). Thesis* (unpub.), College of Horticulture, Vellanikkara.

Theodore, R. 1988. Awareness, Conviction and Adoption of Technological Units of Contingency Farming Practices for Rice by Contact and Other Farmers of Thanjavoor Dist. M.Sc.(Ag.). Thesis. (unpub.), Agricultural College and Research Institute, Coimbatore.

Thyagarajan. 1981. The Determinants of Summer Cropping in IADP District. *M.Sc.(Ag). Thesis.* (Unpub.), Tamil Nadu Agricultural University, Coimbatore.

Thimmappa, H. 1981. A Study of Adoption Behaviour and Motivation Pattern of Coconut Cultivation in Tumkur District of Karnataka State. *M.Sc. (Ag). Thesis.* (unpub.)., Bangalore.

Trivedi, G. 1963. Measurement Analysis of Socio-economic Status of Rural Families. *Ph.D. Thesis (unpub),* I.A.R.I., New Delhi.

Tyagi, K.C and Sohal, T.S. 1984. Factors Associated with Adoption of Dairy Innovations. *Indian Journal of Extension Education.* 20 (3 &4).

Umale, P.B., Bhople, R.S and Sagame, M.A. 1991. Adoption of Agroforestry by Farmers . *Maharashtra Journal of Extension Education.*10(1).

Van Den Ban, A.W and Hawkins, H.S. 1990. *Agricultural Extension.* Longman Scientific and Technical Publishers.

Varadan, K.M and Jayakumar, M. 1990. An Approach to Watershed Planning -A Case Study of Vattawada Watershed. Paper Presented in Seminar on Erosion and Sedimentation in Kerala, Centre for Water resources development and Management ,Kozhikode, Kerala.

Veeraraghavareddy , M and Venkureddy, S.1988. Relashionship Between Selected Characteristics of Contact Farmers and Their Knowledge and Adoption of Improved Paddy Cultivation Practices. *Indian Journal of Extension Education.* XXIV (3&4).

Venkateswarlu,K and Rajagopalan, M. 1984. A Case Study on the Performance and Evaluation of NARP Sub-project of Regional Research Station, Tirupathi (Ed).S.N. Saha Venkateswarulu,K. Performance and Evaluation of National Agricultural Research Sub-Projects, NAARM,Hyderabad.

Venkitaraman, A. 1988. Gaps in Extension Service. *Survey of Indian Agriculture,* The Hindu Madras.

Venugopalam,M and Perumal ,G. 1992. Criteria for Choice of Research Problem in Dryland Research , *Indian Journal of Extension Education,* Vol.XXVIII,Nos (1&2).

Vijaya, K. 1982. An Evaluate Study on the Impact of Intensive Agricultural Extension System (T & V System) in Thungabhadra Command Area in Ananthpuri District of Andrapradesh. *M.Sc. (Ag). Thesis.* (unpub.). S.V. Agricultural College, Thirupathy.

Vijayakumar, P. 1983. Impact of Special Agricultural Development Units on

Agricultural Development of Rural Areas of Kerala. *M.Sc.(Ag.). Thesis* (unpub.), College of Agriculture, Vellayani.

Viju, A. 1985. Adoption Behaviour of Tribal Farmers. *M.Sc.(Ag.). Thesis.* (unpub.), College of Agriculture, Vellayani.

Viswanathan, N. 1975. A Study on the Impact of High Yielding Varieties of Paddy on Small Farmers of Mohannur Block, Salem District. *M.Sc.(Ag.). Thesis.* (unpub.), Agricultural College and Research Institute, Coimbatore.

Waghmare, R.R, Kulkarni, R.R and Thanbre, B.M. 1998. A Study of the Awareness of Horticultural Development Programme Amongst the Fruit and Vegetable Growers. *Maharashtra Journal of Extension Education.* 7.

Waghmare, S.K and Pandit, V.K. 1982. Constraints in Adoption of Wheat Technology by the Tribal Farmers of Madhya Pradesh. *Indian Journal of Extension Education.* 18 (1 &2).

Wilkening, E.A. 1953. Acceptance of improved Farm Practices. Agricultural Experiment Station Bulletin., 92, North Carolina., USA.

Wilson, M.J and Chaturvedy, J. 1985. Adoption of Improved Technology of Flue-cured Virgina Tobacco in Andhra Pradesh. *Indian Journal of Extension Education.* 21 (3 &4).

World Bank, 1991. The Challenge of development. World Development Report-1991, Oxford University Press, U.K.

Zonal Research Report of XVIII NARP Workshop (Southern Region). 1996. Kerala Agricultural University, Vellayani.

APPENDICES

APPENDIX I

കർഷകർക്കായുള്ള ചോദ്യാവലി

1 കർഷകന്റെ പേര് :

അഡ്രസ്സ് :

2. ജില്ല :

3. അടുത്ത കൃഷിഭവൻ :

4. മുഖ്യവിള :

5 കൃഷി സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം :

6. ഉത്പാദനം :

ആകെ :

തോത് :

7. കൃഷി ചെയ്യുന്ന വിളകളുടെ ക്രമം :

8. വരുമാനം :

9. **ദേശീയ കാർഷിക ഗവേഷണ പദ്ധതി (NARP) യെക്കുറിച്ചുള്ള അറിവ്:**

	ഉണ്ട്	ഇല്ല
എ. താങ്കൾ NARP യെക്കുറിച്ച് കേട്ടിട്ടുണ്ടോ ? ഉണ്ട് എങ്കിൽ ? :		
ബി. നിങ്ങളുടെ പ്രദേശത്തുള്ള NARP സ്റ്റേഷൻ ഏതാണ് ? :		
സി. NARP ഇപ്പോഴും നിലവിലുണ്ടോ ? :		
ഡി. നിങ്ങളുടെ പ്രദേശത്തുള്ള NARP സ്റ്റേഷൻ ഏത് വിളയിലാണ് ഗവേഷണം നടത്തുന്നത് ? :		
ഇ. NARP യുടെ കീഴിൽ നടത്താറുള്ള കൃഷിയിടങ്ങളിലെ ഡെമോൺസ്ട്രേഷനുകളെക്കുറിച്ച് കേട്ടിട്ടുണ്ടോ ? :		
എഫ്. NARP നടത്താറുള്ള ഫാംട്രയലുകളെപ്പറ്റി കേട്ടിട്ടുണ്ടോ ? :		
ജി. NARP യുടെ പ്രതിമാസ വർക്കുകളെപ്പറ്റി കേട്ടിട്ടുണ്ടോ ? :		
എച്ച്.നിങ്ങൽ നേരിടുന്ന കാർഷിക രംഗത്തെ പ്രശ്നങ്ങൾക്ക് NARP വഴി പരിഹാരം ലഭ്യമാകുമെന്നറിയാമോ ? :		
ഐ. നിങ്ങളുടെ പ്രദേശത്തിന് പ്രത്യേകമായി യോജിച്ച തരം സാങ്കേതിക വിദ്യകളാണ് NARP സ്റ്റേഷനുകളിൽ വികസിപ്പിച്ചെടുക്കുന്നതെന്ന് അറിയാമോ ? :		
ജെ. NARP യുടെ കീഴിലുള്ള സംയോജിത കൃഷിയിട സന്ദർശന പരിപാടിയെക്കുറിച്ച് അറിയാമോ ? :		

ഫാം ട്രയലുകളെപ്പറ്റിയുള്ള കർഷകരുടെ അഭിപ്രായം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളോരോന്നിനോടും നിങ്ങൾ എത്രമാത്രം യോജിക്കുന്നു ?
(SA-പൂർണ്ണമായും യോജിക്കുന്നു, A - യോജിക്കുന്നു, U.D തീരുമാനിച്ചില്ല, D.A വിയോജിക്കുന്നു, SDA പൂർണ്ണമായും വിയോജിക്കുന്നു)

നമ്പർ	വാക്യങ്ങൾ	SA	A	UD	DA	SDA	AV
1.	നൂതന സാങ്കേതിക വിദ്യകൾ കർഷകരിലെത്തിക്കാൻ ഫാം ട്രയലുകൾ അത്യാവശ്യമാണ്.						
2.	ഫാം ട്രയലുകൾ കർഷകർക്ക് ആധുനിക കൃഷി സമ്പ്രദായങ്ങളോടുള്ള താൽപ്പര്യം വർദ്ധിപ്പിക്കുന്നു.						
3.	ഫാം ട്രയലുകൾ ഒരു പ്രയോജനവുമില്ലാത്ത ഒരു പരിപാടിയാണ്.						
4.	ആധുനിക സാങ്കേതിക വിദ്യകൾ പരീക്ഷിക്കുവാൻ തൽപരരായ കർഷകർക്ക് ഫാം ട്രയലുകൾ സംതൃപ്തി നൽകുന്നു.						
5.	ഫാം ട്രയലുകൾ കർഷകർക്ക് ധനനഷ്ടം വരുത്തുന്നു.						
6.	ഫാം ട്രയലുകൾ നടത്തുക വഴി കർഷകരും ശാസ്ത്രജ്ഞരും തമ്മിലുള്ള ബന്ധം മെച്ചപ്പെടുന്നു.						
7.	ശരിയായ വിദഗ്ധ മേൽനോട്ടക്കുറവ് ഫാം ട്രയലുകളുടെ നടത്തിപ്പിന് തടസ്സമാകുന്നു						
8.	വൻകിട കർഷകർക്കാണ് ഫാം ട്രയലുകൾ ഉപയോഗപ്പെടാറുള്ളത്.						
9.	ഒരു പുതിയ സാങ്കേതിക വിദ്യ ഒരു സ്ഥലത്തിന നുയോജ്യമാണോയെന്നറിയാൻ ഫാം ട്രയലുകൾ കൂടിയേ തീരു.						
10.	ഫാം ട്രയലുകൾ ശാസ്ത്രജ്ഞരുടെ താൽപര്യാർത്ഥമാണ് നടത്താറ്						

പരിഷ്കൃത കൃഷി സമ്പ്രദായങ്ങൾ സ്വീകരിക്കുന്നതിന് കർഷകർക്ക് തടസ്സമാകാറുള്ള കാര്യങ്ങളാണ്. താഴെ കൊടുത്തിരിക്കുന്നത്. അവയോരോന്നിനേയും പ്രധാന്യത്തിന്റെ അടിസ്ഥാനത്തിൽ തരം തിരിക്കുക.

ഏറ്റവും പ്രധാനം MI പ്രധാനം I പ്രധാന്യം കുറഞ്ഞത് LI

	MP	I	LI
1. ആധുനിക കൃഷി രീതികളെക്കുറിച്ചുള്ള അറിവില്ലായ്മ			
2. വിത്ത്, വളം തുടങ്ങിയവയുടെ ഉയർന്ന വില			
3. യഥാസമയത്ത് വിത്തും വളവും മറ്റും ലഭ്യമല്ല			
4. ശുപാർശ ചെയ്തിരിക്കുന്ന മുന്തിയ ഇനങ്ങൾ കൃഷിചെയ്യാൻ കൂടിയ അളവിൽ രാസവളം വേണം			
5. കൃഷിയ്ക്കാവശ്യമായ സാങ്കേതികോപദേശം ലഭ്യമല്ല			
6. പുതിയ സമ്പ്രദായങ്ങൾ പരീക്ഷിച്ചു നോക്കുന്നതിനുള്ള താൽപ്പര്യമില്ലായ്മ			
7. ആധുനിക സാങ്കേതിക വിദ്യകൾ പലതും സാധാരണക്കാരന് മനസ്സിലാക്കാൻ പ്രയാസമാണ്.			
8. തൊഴിലാളികളുടെ ഉയർന്ന കൂലി നിരക്ക്			
9. ആവശ്യത്തിന് സാമ്പത്തിക സഹായം ലഭ്യമല്ല			
10. സാങ്കേതിക വിദഗ്ദ്ധരിലുള്ള വിശ്വാസമില്ലായ്മ			
11. പരമ്പരാഗത രീതികൾ ഉപേക്ഷിക്കാനുള്ള മടി			
12. ആധുനിക രീതികളെക്കുറിച്ച് ആവശ്യത്തിന് പരിശീലനം ലഭിക്കാറില്ല			
13. ഉത്പന്നങ്ങൾക്ക് മാർക്കറ്റ് കിട്ടില്ല			
14. ശുപാർശ ചെയ്യുന്ന കൃഷി രീതികൾ സാമ്പത്തിക നേട്ടം തരുന്നവയല്ല			
15. പരിഷ്കൃത സമ്പ്രദായങ്ങൾ മണ്ണിന് ദോഷം വരുത്തുന്നവയാണ് എന്ന് വിശ്വാസം			

കൃഷിയിടത്തിലെ ഡെമോൺസ്ട്രേഷനുകളെക്കുറിച്ച് കർഷകരുടെ അഭിപ്രായം

താഴെപ്പറയുന്ന വാചകങ്ങളോട് നിങ്ങൾ എത്രമാത്രം യോജിക്കുന്നു

	SA	A	UD	DA	SDA
1. ഒരു ആധുനിക സാങ്കേതിക വിദ്യ പ്രായോഗികമാക്കുന്ന വിധം വിശദീകരിക്കുവാൻ ഡെമോൺസ്ട്രേഷനുകൾ അത്യാവശ്യമാണ്.					
2. നൂതന സാങ്കേതിക വിദ്യകളിലേക്ക് ജനശ്രദ്ധ ആകർഷിക്കുവാൻ ഡെമോൺസ്ട്രേഷനുകൾ സഹായിക്കുന്നു.					
3. ഡെമോൺസ്ട്രേഷനുകൾ എന്നാൽ പണത്തിന്റെയും സമയത്തിന്റെയും ദുർവ്യയം മാത്രമാണ്.					
4. നൂതന സാങ്കേതിക വിദ്യയുടെ മേന്മ കർഷകരെ ബോദ്ധ്യപ്പെടുത്താൻ ഡെമോൺസ്ട്രേഷനുകൾ സഹായിക്കുന്നു.					
5. ഡെമോൺസ്ട്രേഷനുകളിൽ വിജയകരമായി കണ്ട പല സാങ്കേതിക വിദ്യകളും കർഷകർക്ക് സ്വന്തമായി നടപ്പിലാക്കുമ്പോൾ പരാജയമാകാറുണ്ട്.					
6. ശാസ്ത്രജ്ഞരുടെ നേട്ടത്തിനായാണ് മിക്ക ഡെമോൺസ്ട്രേഷനുകളും നടത്തുന്നത്.					
7. സാധാരണ കൃഷിയിടത്തിലുള്ളതിൽ നിന്നും വ്യത്യസ്തമായ സാഹചര്യങ്ങളിലാണ് ഡെമോൺസ്ട്രേഷനുകൾ നടത്താറുള്ളത്.					
8. നൂതന സമ്പ്രദായങ്ങളുടെ ദൂഷ്യഫലങ്ങളെപ്പറ്റിയുള്ള കർഷകരുടെ ആശങ്കയെ ഡെമോൺസ്ട്രേഷനുകൾ അകറ്റുന്നു.					
9. ഡെമോൺസ്ട്രേഷനുകൾ കർഷകർക്ക് ധനനഷ്ടം ഉണ്ടാക്കുന്നു.					
10. ആധുനിക സാങ്കേതി വിദ്യകൾ പ്രയോഗകമാക്കുമ്പോൾ ഉണ്ടാകാവുന്ന സംശയങ്ങൾക്ക് ഡെമോൺസ്ട്രേഷനുകൾ മറുവടി നൽകുന്നു.					

എള്ള് കർഷകർക്കായുള്ള വിജ്ഞാന പരീക്ഷ

താഴെ കൊടുത്തിരിക്കുന്ന ചോദ്യങ്ങൾക്ക് ഉത്തരം പറയുക

1. ഒരു അത്യുൽപാദന ശേഷിയുള്ള എള്ളിനത്തിന്റെ പേര് .....
2. ഒരു സെന്റ് സ്ഥലത്ത് എള്ള് കൃഷി ചെയ്യുന്നതിനാവശ്യമായ എള്ള് വിത്ത് എത്ര ?
3. ഒരു സെന്ററിൽ എള്ളു കൃഷി ചെയ്താൽ കൃഷി സ്ഥലത്തിടേണ്ട ജൈവ വളത്തിന്റെ അളവ് .....
4. എള്ള് കൃഷി ചെയ്യുമ്പോൾ ചെടിക്കാവശ്യമായ പാകൃജനകം നൽകാൻ പ്രയോഗിക്കേണ്ട ഒരു രാസവളമാണ് .....
5. ..... എന്ന രാസവളം ചെടിക്കാവശ്യമായ ഭാവകം പ്രധാനം ചെയ്യുന്നു.
6. ഒരു സെന്റിൽ എള്ള് കൃഷി ചെയ്യുമ്പോൾ പ്രയോഗിക്കേണ്ട രാസവളത്തിന്റെ തോത് എത്ര ?

വളം	അളവ്	പ്രയോഗിക്കുന്ന സമയം
N		
P		
K		

7. തിലക് എന്നത് ..... ആണ്
8. എള്ള് ചെടിയുടെ കായ് തുരപ്പനെതിരെ പ്രയോഗിക്കുന്ന കീടനാശിനിയാണ് .....
9. നിങ്ങളുടെ പ്രദേശത്ത് എള്ളിനെ ബാധിക്കുന്ന പ്രധാന രോഗമാണ് .....
10. ഇല കുരുടിക്കൽ രോഗം ബാധിച്ചാൽ മരുന്നു തളിച്ചാൽ രോഗം ..... (ഭേദമാകും, ഭേദമാകില്ല)

എള്ള് കർഷകർ ശാസ്ത്രീയ കൃഷിമുറകളും മുന്തിയ ഇനങ്ങളും എത്രത്തോളം സ്വീകരിച്ചിട്ടുണ്ട് എന്നറിയാനുള്ള ചോദ്യവലി

1. നിങ്ങൾ കൃഷി ചെയ്യുന്ന എള്ളിനം .....
2. അത്യുൽപാദന ശേഷിയുള്ള ഇനം എള്ള് കൃഷി ചെയ്തിരിക്കുന്ന കൃഷി സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം .....
3. കൃഷിയിടത്തിൽ ജൈവ വളം ചേർക്കുന്നതിന്റെ തോത് ?

വളത്തിന്റെ പേര്	അളവ്

4. വിത്തിടുന്നതിന്റെ തോത് .....
5. നിങ്ങളുടെ കൃഷി സ്ഥലത്ത് നിങ്ങൾ പ്രയോഗിക്കുന്ന രാസവളത്തിന്റെ ക്രമം

രാസവളത്തിന്റെ പേര്	അളവ്

6. ചെടി വളർന്ന് അരയടി പൊക്കമാകുമ്പോൾ ചെടികൾക്കിടയിൽ ഉണ്ടായിരിക്കേണ്ടുന്നഅകലം ?
7. നിങ്ങൾ കള നശിപ്പിക്കാറുണ്ടോ ? ഉണ്ട് / ഇല്ല
8. ഇലയും കായും തിന്നുന്ന പുഴുവിനെതിരേ നിങ്ങൾ പ്രയോഗിക്കുന്ന കീടനാശിനിയേത് ?
9. ഇല കുരുടിക്കൽ രോഗം ബാധിച്ചാൽ നിങ്ങൾ എന്തു പ്രതിരോധ നടപടിയാണ് സ്വീകരിക്കുക ?
10. നടാൻ വേണ്ടി സൂക്ഷിക്കുന്ന വിത്തുകൾ ചാരവുമായി കലർത്തി സൂക്ഷിക്കാറുണ്ടോ ? (ഉണ്ട് / ഇല്ല)

നെൽകൃഷിക്കാർക്കുള്ള വിജ്ഞാന പരീക്ഷ

1. നിങ്ങളുടെ പ്രദേശത്ത് കൃഷി ചെയ്യാൻ അനുയോജ്യമായ ഒരു അത്യുൽപാദനശേഷിയുള്ള നെല്ലിനത്തിന്റെ പേര് പറയുക .....

2. വിരിപ്പു കൃഷിക്ക് നടുന്ന ഒരു ഹ്രസ്വകാലയിനം നെൽവിത്തിന്റെ നടീലകലം എത്ര ?

   (20 X20 സെ. മീ, 25 X 25 സെ. മീ, 15 X10 സെ. മീ, 10 X10 സെ. മീ)

3. കൊല്ലം, പത്തനംതിട്ട പോലെയുള്ള ജലദൗർലഭ്യമുള്ളതും ഉയർന്നതുമായ നിലങ്ങളിൽ നടാൻ അനുയോജ്യമായ ഒരു നെല്ലിനം ഏത് ?

4. നടുന്നതിന് മുൻപ് നെൽവിത്തിൽ മരുന്നു പുരട്ടുന്നത്

   എ. വിത്തിലുള്ള പ്രാണികളെ നശിപ്പിക്കാനാണ്.

   ബി. രോഗകാരികളായ സൂക്ഷ്മ ജീവികളെ കൊല്ലാനാണ്.

   സി. കളകളുടെ വിത്തുകളെ നശിപ്പിക്കാനാണ്.

   ഡി. മണ്ണിലുള്ള രോഗാണുക്കളെ നശിപ്പിക്കാനാണ്

6. പോളകരിച്ചിലും പോളചീയലും കൂടുതലായി ബാധിച്ചാൽ എന്തു പ്രതിവിധിയാണ് സ്വീകരിക്കുക ?

   എ. കൂടുതൽ ഭാവഹ വളം ചേർക്കും

   ബി.കാർബോഫുറാനും നിമാറ്റസൈഡും വിറ്റാവാക്സ് എന്ന കുമിൾ നാശിയോടെ ചേർത്തു ൽകും

   സി. മറ്റേതെങ്കിലും ഉപാധി

   ഡി. ഇവ രണ്ടു മാർഗ്ഗവും സ്വീകരിക്കും.

7. നിങ്ങൾ അമോണിയം സൾഫേറ്റ് / യൂറിയ നിലത്തിലുടുന്നതെങ്ങനെയാണ് ?

   എ. മുഴുവൻ വളവും അടിസ്ഥാനവളമായി നൽകും.

   ബി. മുഴുവൻ വളവും മേൽവളമായി നൽകും

   സി. പല തവണകളായി വളർച്ചയുടെ വിവിധ ദശകളിൽ നൽകും

8. നിങ്ങളുടെ നിലത്തിൽ മൂഞ്ഞ ശല്യമുണ്ടോ ? ഉണ്ടെങ്കിൽ എന്തു പ്രതിവിധിയാണതിനെതിരെ സ്വീകരിക്കുന്നത് ?

   എ. പ്രതിരോധ ശേഷിയുള്ളയിനം വിത്തു നടും

   ബി. മറ്റു രീതിയിൽ സ്വീകരിക്കും

9. എന്താണ് സെവിൻ ?

   എ. കുമിൾ നാശിനി, ബി. കീടനാശിനി, സി. കളനാശിനി, ഡി. വളം

10. തണ്ടു തുരപ്പനെതിരേ പ്രയോഗിക്കുന്ന കീടനാശിനി ?

    (എ) സെവിൻ; (ബി) ഇക്കാലത്ത്; (സി) ബി. എച്ച്. സി; (ഡി) ഡി. ഡി. റ്റി

11. മണ്ണുപരിശോധനയ്ക്കായി എടുക്കേണ്ട മണ്ണു സാംപിളിന്റെ അളവ് എത്ര ?
    എ. 200 ഗ്രാം, ബി. 1 കി. ഗ്രാം, സി. 1/2 കി. ഗ്രാം, ഡി. 2 കി. ഗ്രാം

നെൽകൃഷികർഷകർ എൻ. എ. ആർ. പി. യുടെ നിർദ്ദേശാനുസരണം ശാസ്ത്രീയ കൃഷിരീതികളും മുതലായ ഇനങ്ങളും എത്രത്തോളം സ്വീകരിച്ചിരിക്കുന്നു എന്നറിയാനുള്ള ചോദ്യാവലി

1. നിങ്ങളുടെ നിലത്തിൽ കൃഷി ചെയ്യുന്ന നെല്ലിനം ഏതാണ് ?

   നാടൻ/അത്യുൽപാദനശേഷിയുള്ള അനുയോജ്യമല്ലാത്തിനം / അത്യുൽപാദനശേഷിയുള്ള അനുയോജ്യമായയിനം

2. വിത്തിൽ മരുന്നു പുരട്ടാറുണ്ടോ ? ഉണ്ടെങ്കിൽ

   എ. ഉപയോഗിക്കുന്ന മരുന്നിന്റെ പേര്

   ബി. ഉപയോഗിക്കുന്ന മരുന്നിന്റെ അളവ്

   സി. നെൽവിത്തിന്റെ അളവ്

   ഡി. മരുന്നു പുരട്ടുന്ന സമ്പ്രദായം

3. നിങ്ങൾ മണ്ണു പരിശോധിച്ചിട്ടുണ്ടോ ? ഉണ്ടെങ്കിൽ

   എ. പരിശോധനയ്ക്കു കൊടുത്ത മണ്ണിന്റെ സാമ്പിളിന്റെ തൂക്കം

   ബി. സാമ്പിളെടുത്തത് ഏത് സ്ഥലത്തുനിന്നാണ് ?

   സി. സാമ്പിളെടുത്തത് ഏതു കാലാവസ്ഥയിലാണ് ?

4. നിങ്ങൾ നിലത്തിൽ കുമ്മായമിടുമോ ? ഇടുമെങ്കിൽ, മണ്ണു പരിശോധിച്ച ശേഷമാണെങ്കിൽ :

കുമ്മായം	അളവ്	സയമം
ഡോളമൈറ്റ്		

   മണ്ണ് പരിശോധിക്കാതെയാണെങ്കിൽ

കുമ്മായം	അളവ്	സമയം
ഡോളമൈറ്റ്		

5. നിങ്ങളുടെ നിലത്തിൽ വിളകൾ കൃഷി ചെയ്യുന്ന ക്രമം ഏത് ?

   നെല്ല്, നെല്ല് - നെല്ല്
   നെല്ല് - നെല്ല് - മറ്റുവിളകൾ (ശുപാർശ ചെയ്യപ്പെട്ടതല്ലാത്ത ഇനം)
   നെല്ല് - നെല്ല് - മറ്റുവിളകൾ (ശുപാർശ ചെയ്യപ്പെട്ട ഇനം)

6. നിങ്ങൾ നിലത്തിൽ കളനാശിനി പ്രയോഗിക്കാറുണ്ടോ?

   ഉണ്ട് / ഇല്ല. ഉണ്ടെങ്കിൽ

   കളയുടെ പേര് കീടനാശിനി

7. കൃഷിയിടത്തിൽ മണലിന്റെ അംശം കൂടുതലുണ്ടെങ്കിൽ പ്രത്യേക മാർഗ്ഗങ്ങൾ ഏവ ?

   എ. എൻ. പി. കെ. പലതവണകളായി നൽകും

   ബി. കൂടുതൽ ജൈവവളം നൽകും

   സി. കളിമണ്ണ് ചേർക്കും

   ഡി. ഇവയൊന്നും ചേർക്കുകയില്ല

8. നിലത്തിൽ കൊയ്ത്തു യന്ത്രം ഉപയോഗിച്ചു പതിവുണ്ടോ ?

   ഉണ്ട് / ഇല്ല ഉണ്ടെങ്കിൽ / വല്ലപ്പോഴും

9. നിങ്ങൾ രാസവളപ്രയോഗം നടത്താറുണ്ടോ ?

ഉണ്ട് / ഇല്ല ഉണ്ടെങ്കിൽ

മണ്ണു പരിശോധന ഫലത്തിന്റെ അടിസ്ഥാനത്തിൽ :

	അടിവളം	മേൽവളം	ആകെ
എൻ. പി. കെ			

മണ്ണു പരിശോധിക്കാതെ നൽകുന്നുവെങ്കിൽ

	അടിവളം	മേൽവളം	ആകെ
എൻ. പി. കെ			

10. കൃഷിസ്ഥലത്ത് രോഗബാധയുണ്ടായാൽ മരുന്ന് തളിക്കാറുണ്ടോ

ഉണ്ട് / ഇല്ല ഉണ്ടെങ്കിൽ

രോഗം		മരുന്ന്	അളവ്
1.			
2.			
കീടം			
1.			
2			

1. വിദ്യാഭ്യാസ യോഗ്യത

താഴെ പറയുന്നവയിൽ നിങ്ങളുടെ വിദ്യാഭ്യാസ യോഗ്യത ഏത് വിഭാഗത്തിൽപ്പെടും? ശരിയായ ഉത്തരത്തിന് നേരെ (✓) മാർക്ക് രേഖപ്പെടുത്തുക.

വിദ്യാഭ്യാസ നിലവാരം		സ്കോർ
1. നിരക്ഷരൻ	( )	0
2. വായിക്കാൻ മാത്രം അറിയാം	( )	1
3. വായിക്കാനും എഴുതാനും അറിയാം	( )	2
4. പ്രൈമറി സ്കൂൾ വിദ്യാഭ്യാസം	( )	3
5. മിഡിൽ സ്കൂൾ വിദ്യാഭ്യാസം	( )	4
6. ഹൈസ്കൂൾ വിദ്യാഭ്യാസം	( )	5
7. കോളേജ് തലവും അതിനുപരിയും	( )	6

2. കൃഷിയിടത്തിന്റെ വിസ്തീർണ്ണം

നിങ്ങളുടെ കൃഷി സ്ഥലത്തിന്റെ വിസ്തീർണ്ണം ജലസേചന സൗകര്യമുള്ളത്, ഇല്ലാത്തത് ഇവ സ്വന്തം ഭൂമിയോ പാട്ടത്തിനെടുത്തതോ എത്ര എന്ന് വിവരമുൾപ്പെടെ എത്ര എന്നു പറയുക.

വിവരണം	സ്വന്തം പേരിലുള്ളത്	പാട്ടത്തിനെടുത്തത്	പാട്ടത്തിന് കൊടുത്തത്
ജലസേചന സൗകര്യമുള്ളത്			
ജലസേചന സൗകര്യമില്ലാത്തത്			

സാമ്പത്തിക നേട്ടത്തിനുള്ള പ്രേരണ

താഴെ കൊടുത്തിരിക്കുന്ന മൂന്ന് വിഭാഗങ്ങളിൽ ഓരോന്നിലും മൂന്ന് വാക്യങ്ങൾ വീതം ഉണ്ട്. അവയിൽ നിങ്ങൾക്ക് യോഗ്യമായതും, യോജ്യമല്ലാത്തതും ഓരോന്ന് വീതം മൂന്ന് വിഭാഗത്തിലും അടയാളപ്പെടുത്തുക.

സാമ്പത്തിക നേട്ടത്തിനായുള്ള പ്രേരണ		അനുയോജ്യമായ	യോജ്യമല്ലാത്ത
എ (1)	എന്റെ കൃഷിസ്ഥലത്ത് നിന്ന് എന്റെ കുടുംബത്തിന് ഒരു ശരാശരി ജീവിതത്തിനാവശ്യമായ വരുമാനം ലഭിക്കണം (1)		
2.	ഒരു ശരാശരി ജീവിതത്തിനാവശ്യമായ വരുമാനം കിട്ടുന്നതിലുപരി, കാർഷിക വൃത്തി നൽകുന്ന ആഹ്ളാദമാണ് എനിക്ക് പ്രധാനം (2)		
3.	കൃഷിയിൽ നിന്നും വമ്പിച്ച ആദായം ലഭിക്കുന്നതിനായി വൻതോതിൽ മുതൽ മുടക്കണമെന്നാണെന്റെ അഭിപ്രായം (3)		
ബി 1.	എന്റെ കൃഷി സ്ഥലത്ത് നല്ല നിലയിൽ കൃഷി നടത്തുവാനായി എത്ര വലിയ തുക കടം വാങ്ങുന്നതിനും എനിക്ക് മടിയില്ല. (3)		
2.	കൂടുതൽ വരുമാനം തരുന്ന പുതിയ നാണ്യവിളകളേക്കാൾ ഞാൻ ഇഷ്ടപ്പെടുന്നത് സ്ഥിരമായി ഞാൻ പിൻതുടർന്നിരുന്ന കൃഷി സമ്പ്രദായം തന്നെ തുടരാനാണ്. (1)		
3.	സാമ്പത്തിക നേട്ടം മാത്രമല്ല കൃഷിയിൽ നിന്നും ലഭിക്കുന്ന അഹ്ളാദവും കൂടിയാണ് എനിക്ക് സംതൃപ്തി തരുന്നത്. (2)		
സി (1)	എന്റെ കൃഷി നല്ല നിലയ്ക്ക് നടത്തി		

	കൊണ്ട് പോകുവാൻ വേണ്ടിയായാലും കടം വാങ്ങുവാൻ എനിക്ക് മടിയാണ്. (1)		
2.	നാണ്യ വിളകൾ കൃഷി ചെയ്ത് പരമാവധി ലാഭമുണ്ടാക്കുക എന്നതാണ് സ്വന്തം കുടുംബാംഗങ്ങൾക്ക് ആവശ്യമായ കൃഷിചെയ്യുന്നതിലും പ്രാധാന്യം. (3)		
3.	കൃഷിയിറക്കുന്നതിലേക്കായി വലിയ തുകകൾ കടം വാങ്ങുന്നതിനോട് എനിക്ക് യോജിപ്പില്ല. (2)		

4. കർഷകർക്ക് ലഭിച്ച പരിശീലനം

നിങ്ങൾക്ക് ലഭിച്ചിട്ടുള്ള കാർഷിക പരിശീലന പരിപാടിയുടെ എണ്ണം കാലയളവ് ഇവ രേഖപ്പെടുത്തുക.

എണ്ണം	ലഭിച്ചിട്ടുള്ള പരിശീലനം	ദൈർഘ്യം	വർഷം

5. പുരോഗമനാത്മകത

താഴെ കൊടുത്തിരിക്കുന്ന മൂന്ന് വിഭാഗങ്ങളിൽ ഒരോന്നിലും മൂന്നു വാക്യങ്ങൾ വീതമുണ്ട്. അവയിൽ നിങ്ങൾക്ക് യോജിപ്പുള്ളതും യോജിപ്പില്ലാത്തതുമായ ഓരോന്ന് വീതം മൂന്നു വിഭാഗത്തിലും അടയാളപ്പെടുത്തുക.

എണ്ണം	പുരോഗമനാത്മകത	അനുയോജ്യമായത്	യോജ്യമല്ലാത്തത്
എ 1	കാർഷിക രംഗത്തുണ്ടാകുന്ന എല്ലാ ആധുനിക സമ്പ്രദായങ്ങളേയുംകുറിച്ച് അപ്പോൾ മനസ്സിലാക്കാറുണ്ടെങ്കിലും അവയെല്ലാം തന്നെ ഞാൻ സ്വീകരിക്കാറില്ല.		
2.	ഞാൻ കേട്ടറിഞ്ഞ ഒരു പുതിയ കൃഷി രീതി പരീക്ഷിച്ചു നോക്കും വരെ എനിക്ക് സമാധാനമാകില്ല.		
ബി. 1.	ഇക്കഴിഞ്ഞ കുറേ വർഷങ്ങളായി ഞാൻ കേട്ടറിഞ്ഞ എല്ലാ നവീന കൃഷിരീതികളും ഞാൻ പരീക്ഷിച്ചു നോക്കിയിട്ടുണ്ട്.		
2.	നവീന കൃഷി രീതികൾ മറ്റുള്ളവർ പരീക്ഷിച്ച് അതിന്റെ അനുഭവം അറിഞ്ഞ ശേഷം മാത്രമേ ഞാൻ പരീക്ഷിച്ചുനോക്കാറുള്ളൂ.		
3.	എന്തൊക്കെയായാലും നമ്മുടെ പുരാതന കൃഷി സമ്പ്രദായങ്ങൾ തന്നെയാണ് നല്ലത് എന്നാണെന്റെ വിശ്വാസം.		

സി. 1.	ഒരു ആധുനിക കൃഷി സമ്പ്രദായം പരീക്ഷിക്കുന്ന കാര്യത്തിൽ ഞാൻ വളരെ ശ്രദ്ധാലുവാണ്.		
2.	നമ്മുടെ മുൻഗാമികൾ പിൻതുടർന്ന കൃഷിസമ്പ്രദായം നല്ലതായിരുന്നു എന്നും അവ മാറ്റേണ്ട കാര്യമില്ല എന്നുമാണെന്റെ അഭിപ്രായം		
3.	പല പുതിയ കൃഷി രീതികളും പരാജയത്തിൽ കലാശിക്കാറുണ്ട് എങ്കിലും അവ വൻലാഭമുറപ്പുതരുന്നവയായതിനാൽ ഞാൻ അവ സ്വകരിക്കാൻ തത്പരനാണ്.		

6. വെല്ലുവിളികളെ നേരിടാനുള്ള സന്നദ്ധത

താഴെ കൊടുത്തിരിക്കുന്ന വാചകങ്ങളോരോന്നി നോടും നിങ്ങൽ എത്രമാത്രം യോജിക്കുന്നു എന്ന് പറയുക.

(SA ശക്തമായി യോജിക്കുന്നു, A യോജിക്കുന്നു, UD തീരുമാനിച്ചില്ല, DA വിയോജിക്കുന്നു, SDA ശക്തമായി വിയോജിക്കുന്നു)

വിവരണം	SA	A	UD	DA	SDA
1. ഒന്നോ രണ്ടോ വിളകൾ നഷ്ടമായാൽപ്പോലും അതിനെ അതിജീവിക്കുവാൻ തക്കവിധം പലതരം വിളകൾ കർഷകർ കൃഷി ചെയ്യേണ്ടതാണ്.					
2. വെല്ലുവിളികൾ കുറഞ്ഞ ചെറിയ തോതിലുള്ള കൃഷി വഴിയുള്ള ചെറിയ ലാഭത്തേക്കാൾ വൻ വെല്ലുവിളികൾ നേരിട്ട് കനത്ത ലാഭമുണ്ടാക്കാനാണ് കർഷകർ ശ്രമിക്കേണ്ടത്.					
3. സാധാരണ കർഷകനെ അപേക്ഷിച്ച് കൂടുതൽ വെല്ലുവിളി നേരിടാൻ ധൈര്യം കാണിക്കുന്നത് നല്ല സാമ്പത്തിക നിലയിലുള്ള കർഷകരാണ്.					
4. വിജയ സാദ്ധ്യത കൂടുതലാണെന്ന് ബോദ്ധ്യമുണ്ടെങ്കിൽ ഒരു കർഷകൻ എത്ര വലിയ വെല്ലുവിളിയും നേരിടണം.					
5. ചുറ്റുപാടുമുള്ളവരെല്ലാം പരീക്ഷിച്ച് വിജയകരമാണെന്ന് കാണുന്നത് വരെ പുതിയ കൃഷി രീതികൾ പരീക്ഷിക്കാനൊരുങ്ങരുത്.					
6. തികച്ചും പുതിയ ഒരു കൃഷി സമ്പ്രദായം പരീക്ഷിച്ചു നോക്കുമ്പോൾ പരാജയ ഭീഷണിയുണ്ടെങ്കിൽ കൂടി അത് ഗുണകരമാണ്.					

7. മാനേജ് ചെയ്യാനുള്ള കഴിവ്

താഴെ പറയുന്നവയോരോന്നിനോടും നിങ്ങൾ യോജിക്കുന്നുവോ ഇല്ലയോ എന്നു പറയുക.

എ.	പ്ളാൻ ചെയ്യൽ	യോജിക്കുന്നു	യോജിക്കുന്നില്ല
1.	ഓരോ വർഷവും അതാത് വർഷങ്ങളിൽ കൃഷിചെയ്യേണ്ടത് ഏത് വിളയാണെന്ന് കർഷകൻ ചിന്തിച്ച് തീരുമാനിക്കണം.		
2.	കൃഷി ചെയ്യും മുൻപ് ഏത് വിളയാണ് കൃഷി ചെയ്യേണ്ടത് എന്ന് ചിന്തിക്കേണ്ടതില്ല.		
3.	ഓരോ വിളയും കൃഷിചെയ്യാനാരംഭിക്കുന്നതിന് മുൻപ് അതാത് വിളകൾക്ക് ആവശ്യമായി വരുന്ന വിത്ത്, വളം, കീടനാശിനി ഇവ എത്രയെന്ന് കണക്കാക്കണം.		

8. ജീവിതാഭിലാഷങ്ങൾ

താഴെ കൊടുത്തിരിക്കുന്നവയിൽ താങ്കളുടെ ജീവിതത്തിലെ ആഗ്രഹങ്ങൾ എന്താണെന്ന് പറയുക.

എണ്ണം		ശരി	തെറ്റ്
1.	ഉയർന്ന വരുമാനം നേടുക		
2.	കൃഷിഭൂമി പരിഷ്കരിച്ച് വികസിപ്പിക്കുക		
3.	നല്ല ഒരു ജോലി ലഭിക്കുക		
4.	മറ്റു ചെറുകിട വ്യവസായങ്ങൾ ആരംഭിക്കുക		
5.	ഒരു ചെറിയ കട നടത്തുക		
6.	കന്നുകാലി വളർത്തൽ ആരംഭിക്കുക		
7.	മറ്റ് എന്തെങ്കിലും		
	1.		
	2.		
	3.		

9. ശാസ്ത്രീയ കൃഷിസമ്പ്രദായത്തോടുള്ള മനോഭാവം

താഴെ കൊടുത്തിരിക്കുന്ന വാക്യങ്ങളോരോന്നിനോടും നിങ്ങൾ എത്രമാത്രം യോജിക്കുന്നു എന്നു പറയുക? (SA ശക്തമായി യോജിക്കുന്നു, A യോജിക്കുന്നു, UD തീരുമാനിച്ചില്ല, DA വിയോജിക്കുന്നു, SDA ശക്തമായി വിയോജിക്കുന്നു)

എണ്ണം	വിവരണം	SA	A	UD	DA	SDA
1.	അത്യുല്പാദന ശേഷിയുള്ള ഇനങ്ങൾ കൃഷി ചെയ്താൽ മാത്രമേ ഭക്ഷ്യോൽപാദനം വർദ്ധിക്കുകയുള്ളൂ.					
2.	അത്യുൽപാദന ശേഷിയുള്ള ഇനങ്ങൾ കൃഷിചെയ്യുക വഴി മണ്ണിന്റെ ഗുണം നഷ്ടമാകും.					
3.	രാസവളങ്ങൾ കാർഷികോൽപാദനം വർദ്ധിപ്പിക്കും.					
4.	രാസവളങ്ങളുടെ തുടർച്ചയായുള്ള ഉപയോഗം മണ്ണിന്റെ ഗുണമേന്മ കുറയ്ക്കും.					
5.	രാസവളങ്ങളുടെ ഉപയോഗത്തിലൂടെ മാത്രമേ ഉത്പാദനം വർദ്ധിപ്പാക്കാനാകൂ.					
6.	രാസവളങ്ങളുടെ ഉപയോഗം ധനത്തിന്റെയും നഷ്ടത്തിന് വഴിതെളിക്കുന്നു.					
7.	ചെടി നടുമ്പോൾ ശുപാർശ പ്രകാരമുള്ള അകലം ചെടികൾക്കിടയിൽ സൂക്ഷിച്ചാൽ തുടർന്നുള്ള കൃഷിപ്പണികൾ എളുപ്പമാകും.					
8.	ചെടികൾക്കിടയ്ക്ക് ഇടയകലം പാലിക്കുന്നത് കൃഷി സ്ഥലം പാഴാക്കുവാനേ ഉപകരിക്കൂ.					
9.	കീടനാശിനി പ്രയോഗം വിളകൾക്ക് ദോഷകരമാണ്.					
10.	കീടനാശിനി പ്രയോഗം ഒരിക്കലും ലാഭകരമല്ല					

എണ്ണം	വിവരണം	SA	A	UD	DA	SDA
11.	കീടനാശിനി പ്രയോഗം അന്തരീക്ഷ മലീനികരണത്തിന് കാരണമാകുന്നു.					
12.	ആധുനിക സസ്യ സംരക്ഷണ മാർഗ്ഗങ്ങൾ നിലവിൽ വന്നശേഷം കനത്ത വിളനാശങ്ങൾ സംഭവിച്ചിട്ടില്ല.					
13.	ആധുനിക സസ്യ സംരക്ഷണ മാർഗ്ഗങ്ങൾ നിലവിൽവന്നശേഷം കനത്ത വിളനാശങ്ങൾ സംഭവിച്ചിട്ടില്ല.					
14.	വിജയകരമായി കൃഷി ചെയ്യുവാനാഗ്രഹമുള്ള ഏതൊരു കർഷകനും കീടനാശിനികളും കുമിൾനാശിനികളും പ്രയോഗിച്ചേ തീരു.					

10. ഋണബാദ്ധ്യതയോടുള്ള മനോഭാവം

ദയവായി താഴെ പറയുന്ന ചോദ്യങ്ങൾ ഓരോന്നിനും അനുയോജ്യമായ ഉത്തരം തിരഞ്ഞെടുക്കുക

എണ്ണം	ചോദ്യങ്ങൾ ഉത്തരം	
എ	നിങ്ങളെപ്പോലൊരു കർഷകർ കൃഷി ആവശ്യത്തിനായി കടം വാങ്ങേണ്ടതുണ്ടോ ?	ഉണ്ട് ഇല്ല
ബി.	നിങ്ങളുടെ അഭിപ്രായത്തിൽ കാർഷിക ആവശ്യത്തിന് വായ്പ കിട്ടാൻ എത്രത്തോളം ബുദ്ധിമുട്ട് അനുഭവപ്പെടുന്നു ?	വളരെ ബുദ്ധിമുട്ടാണ് കുറച്ചൊക്കെ ബുദ്ധിമുട്ടാണ് എളുപ്പമാണ് വളരെ എളുപ്പമാണ്
സി	വായ്പയ്ക്കായി ചെല്ലുന്ന ഒരു കർഷകനോട് എന്തുതരം സമീപനമാണ് ഉണ്ടാകാറുള്ളത്	വളരെ മോശം മോശം നല്ലത് വളരെ നല്ലത്
ഡി	കൃഷി ആവശ്യത്തിനായി സ്ഥാപനങ്ങളിൽ നിന്ന് വായ്പയെടുക്കുന്നതിൽ തെറ്റൊന്നുമില്ല	തികച്ചും യോജിക്കും യോജിക്കുന്നു വിയോജിക്കുന്നു തികച്ചും വിയോജിക്കുന്നു.
ഇ	നിങ്ങൾ കാർഷിക ആവശ്യത്തിനായി വായ്പയെടുത്തിട്ടുണ്ടോ?	ഉണ്ട് ഇല്ല

11. വാർത്താ വിനിമയോപാധികളുടെ ഉപയോഗം

താഴെ കൊടുത്തിരിക്കുന്ന കൃഷിയെസംബന്ധിച്ച വിവരങ്ങൾ ലഭ്യമാക്കുന്ന സ്രോതസ്സുകളാണ്. നിങ്ങൾക്ക് ഇതിൽ അറിവ് ലഭിക്കുന്നത് എത്ര ഇടവേളയിൽ ആണെന്ന് പറയുക.

	സ്രോതസ്സുകൾ	പതിവായി	ഇടയ്ക്കിടെ	ഒരിക്കലുമില്ല
1.	മനുഷ്യ സ്രോതസ്സുകൾ			
എ.	റേഡിയോ			
ബി.	ന്യൂസ് പേപ്പർ			
സി.	കാർഷിക മാഗസിനുകൾ			
ഡി.	ടി വി			
ഇ.	ആഴ്ചപ്പതിപ്പുകളിലും മറ്റുമുള്ള കാർഷിക ലേഖനങ്ങൾ			
2.	ഔപചാരിക വ്യക്തികൾ			
എ.	ഗ്രാമസേവകൻ/കൃഷി അസിസ്റ്റന്റ്			
ബി.	കൃഷി ഓഫീസർ			
സി.	ശാസ്ത്രജ്ഞൻ			
3.	അനൗപചാരിക വ്യക്തികൾ			
എ.	കുടുംബാംഗങ്ങൾ			
ബി.	സുഹൃത്തുക്കളും ബന്ധുക്കളും			
സി.	അയൽക്കാർ/കൂട്ടുകൃഷിക്കാർ			
ഡി.	പുരോഗമനവാദികളായ കർഷകർ			
ഇ.	സ്ഥലത്തെ ജനപ്രതിനിധികൾ			
4.	സാമ്പത്തികപരമായ സ്രോതസ്സുകൾ			
എ.	വളം വിതരണക്കാർ			
ബി.	കീടനാശിനികൾ			
സി.	സഹകരണ സൊസൈറ്റി ജീവനക്കാർ			
ഡി.	ബാങ്ക് ജീവനക്കാർ			
5.	മറ്റുള്ളവ			
എ.	ഡെമോൺസ്ട്രേഷനുകൾ			
ബി.	പ്രദർശനങ്ങൾ/മേളകൾ/ഫെസ്റ്റിവലുകൾ			
സി.	മീറ്റിംഗുകൾ			
ഡി.	ട്രെയിനിംഗുകൾ			
ഇ.	മറ്റുള്ളവ			

12. വിജ്ഞാന വ്യാപാന പ്രക്രിയകളിലുള്ള പങ്കാളിത്തം

നിങ്ങളുടെ സ്ഥലത്ത് താഴെപറയുന്ന പ്രവർത്തികളിൽ നിങ്ങൾ എത്രത്തോളം പങ്കെടുക്കും എന്ന് പറയുക.

	സ്രോതസ്സുകൾ	എല്ലായ്പ്പോഴും	ഇടയ്ക്കൊക്കെ	ഒരിക്കലുമില്ല
എ.	മീറ്റിംഗുകൾ			
ബി.	സെമിനാറുകൾ			
സി.	എക്സിബിഷനുകൾ			
ഡി.	സിനിമാ പ്രദർശനം			
ഇ.	കർഷക ദിനം			
എഫ്.	ഡെമോൺസ്ട്രേഷനുകൾ			
ജി.	വിളയെടുപ്പുത്സവങ്ങൾ			
എച്ച്.	മറ്റെന്തെങ്കിലും			
1.				
2.				
3.				

APPENDIX I (English version)

SCHEDULE FOR FARMERS

1 Name
Address
2 District
3 Nearest KrishiBhavan
4 Major Crop
5 Area
6 Production
Total
Productivity
7 Cropping Pattern
8 Income

9 Farmers' awareness about NARP

Sl. No	Statement	Yes	No
a)	Have you heard about NARP ? If yes,		
b)	Which is the NARP station in your region?		
c)	Is NARP in existance now ?		
d)	In which crop the NARP research station in your area is conducting research ?		
e)	Have you heard about the demonstrations conducted under NARP ?		
f)	Have you heard about farm trials under NARP ?		
g)	Have you heard about the monthly workshops under NARP ?		
h)	Are you aware of the fact that your agricultural problems can be solved through NARP ?		
I)	Do you know that technologies particularly suitable to your locations are developed in the NARP station of your region ?		
j)	Are you aware of the regular multi-disciplinary team field visits under NARP ?		

Knowledge of rice farmers about improved varieties and practices

Sl. No	Statements	Incorrect Answer	Correct Answer
1	A high yielding variety of paddy recommended for your area ?		
2	What is a spacing for a short duration variety of paddy in virippu season?		
3	Name a paddy variety suitable for areas like Kollam and Pathanamthitta with high elevation and water scarcity.		
4	Why chemicals are applied on seeds before sowing ?		
5	Why lime is applied in rice field ? a) To reduce the soil alkalinity b) To reduce soil acidity c) To improve the water holding capacity of soil d) To destroy pathogens in soil		
6	For controlling blast disease and stem rot of rice, what measure is to be adopted? a) More phosphatic fertilizer application b) Apply Carbofuran and nematicide along with the fungicide, vitavax c) Any other measures d) The above two measures together will be adopted		
7	What is the mode of application of ammonium sulphate/ urea in field? a) Full quantity as basal dose b) Full quantity as basal dressing c) Split application will be done		
8	What measure is to be adopted against BPH infestation? a) Cultivate BPH resistant varieties b) Spray chemicals c) Any other measures		
9	What is Sevin ? a) Fungicide b) Pesticide c) Weedicide d) Fertilizer		
10	The chemical applied against the attack of stem borer? a) Sevin b) Ekalux c) BHC d)		

11	What is your opinion about cutting of leaf tips of paddy seedlings before planting? a) It promotes better growth b) It has no influence on crop performance c) It is harmful		
12	What is the quantity of soil to be taken for soil sampling? a) 200 gms b) 1 Kg c) 1/2 kg d) 2 Kg		

Knowledge of sesamum farmers about improved practices

Sl. No	Statements	Correct	Incorrect
1)	Name a high yielding variety of sesamum		
2)	What is the seed rate for cultivating sesamum in one		
3)	What is the quantity of organic matter to be applied for		
4)	Name the fertilizer to be applied for supplying nitrogen		
5)	Which is the phosphatic fertilizer to be applied for		
6)	What is the quantity of fertilizers to be applied for Fertilizer Quantity Time of application N P K		
7)	What is Thilak?		
8)	Name the pesticide applied against pod borer of sesamum?		
9)	What is the major disease affecting sesamum?		
10)	Is it possible to control the little leaf disease of sesamum		

Adoption of recommended varieties and practices by rice farmers

Sl. No	Recommended practice	Non-adoption	Partial adopt	Full adoption
1	Variety			
2	Seed treatment			
3	Soil testing			
4	Liming			
5	Cropping pattern			
6	Weedicide application			
7	Management of sandy soil			
8	Use of mini-harvester			
9	Inorganic fertiliser application			
10	Plant Protection			

Adoption of recommended varieties and practices by sesamum farmers

Sl.No	**Recommendations**	Non-adoptio	Partial adopt	Full adoptior
1)	Variety			
2)	Area under high yielding variety			
3)	Organic fertilizer application			
4)	Seed rate			
5)	Inorganic fertilizer application			
6)	Spacing			
7)	Weeding operation			
8)	Control of pod borer			
9)	Control of little leaf disease			
10)	Seed preservation			

Perception of farmers about Farm Trials

SA - Strongly Agree, A - Agree, UD - Un decided, DA - Dis Agree, SDA- Strongly Dis Agree

Sl. No	Statements	SA	A	UD	DA	SDA
1	Farm trials are essential for transfering new technologies to farmers					
2	Farm trials help to increase the interest of farmers towards modern agricultural practices					
3	Farm trials are of no use					
4	Farm trials satiisfy those farmers who are interested to try new techniques.					
5	Farm trials lead to economic loss to farmers					
6	Farm trials help to improve linkage between farmersand scientists					
7	Lack of proper supervision is a problem while conducting farm trials					
8	Farm trials are useful for big farms					
9	Farm trials are essential for testing the suitability ofa new technology in particular location					
10	Farm trials are conducted for the benefit of scientists					

Perception of farmers about Demonstrations

SA - Strongly Agree, A - Agree, UD - Un decided, DA - Dis Agree, SDA- Strongly Dis Agree

Sl. No	Statements	SA	A	UD	DA	SDA	AV
1	Demonstrations are essential to show the method of practical application a new technology.						
2	Demonstrations help to direct the attention of people towards innovations						
3	Demonstrations are mere wastage of money and time.						
4	Demonstrations are necessary for convincing the fertilizers about the benefits of newtechnology.						
5	Many technologies found viable in demonstrations, have proven unsuccesfull infarmers field.						
6	Demonstrations are conducted for the benefit of scientists.						
7	Demonstrations are conducted under a situation which is entirely different from farmer's field.						
8	Demonstrations help to solve the anxiety of farmers about the ill effects of newtechnologies.						
9	Demonstrations lead to economic loss of the farmers.						
10	Demonstrations help to clear the doubts of farmers about the practical aspects ofthe technology.						

Constraints experienced by the farmers in adopting recommended practices under NARP

MI - Most Important, I- Important, LI - Least Important

Sl. No	Constraints	MI	I	LI
1	Unaware of modern agricultural practices			
2	High costs of inputs			
3	Lack of availability of inputs			
4	Recommended improved varieties demand larger quantities of in-organic fertilizers.			
5	Lack of technical guidance			
6	Lack of interest in trying new methods			
7	Modern techniques of cultivation are not easily understandable			
8	High wage rate of labourers			
9	Insufficient financial assistance			
10	Lack of credibility in technocrats.			
11	Lack of interest to give up traditional methods of cultivation			
12	Lack of proper training in modern agricultural practices.			
13	Poor market demand for products.			
14	Recommended practices do not provide assured financial gains.			
15	Belief that modern agriculture is harmful to the soil of the farmers.			

Profile characteristics of farmers influencing their awareness, knowledge and adoption

1. Education

Put tick ( ) mark against the suitable item

Level of Education	Score
1. Illiterate ( )	0
2. Can read ( )	1
3. Can read and write ( )	2
4. Primary school ( )	3
5. Middle school ( )	4
6. High school ( )	5
7. College and above ( )	6

2. Land Area

Description	Own land	Taken for lease	Given for lease
1.Irrigated			
2.Rainfed			

Mark one item each in the three sets of statements which is most suiting to you and one which is not at all suiting to you.

Sl.No	Statements	Suitable	Unsuitable
A	(1)I should get an average income from my farm for my livelihood (1) (2)The pleasure received from the agricultural occupation is more important than the income from it (2) (3)In my opinion, one should invest large amount in his farm for getting good profit (3)		
B	(1) One should borrow any amount for doing large scale farming (3) (2)I like to follow the traditional farming better than going for more profitable cash crops (1) (3) It is not only the profit, but also the pleasure of farming , which gives me satisfaction (2)		
C	1. I don't like to borrow for the purpose of farming (1) 2.Cultivation of cash crops for better income is more important than doing traditional farming for meeting house hold expenses. (3) 3.I can't agree with the idea of borrowing huge amounts for the purpose of farming (2)		

4. Training

Number	Training	Duration	Year

5. Innovation Proneness

Mark one item each in the three sets of statements which is most suiting to you and one which is not at all suiting to you.

No	Progressiveness	Suitable	Unsuitable
A	1.Even though I gain knowledge about modern agricultural technologies, I won't adopt them soon - (1) 2. I want to try a modern agricultural practice soon after I gain knowledge about it. (3) 3.It is better to wait for sometime and think more before adopting a new technology(2)		
B	1. I have tried all the innovative techniques of the past few years in my farm(3) 2. I will try an innovative technique only after observing the experience of others(2) 3. In my opinion traditional system of agriculture is better than the modern techniques(1).		
C	1. I am very cautious about trying a modern agricultural practice.(2) 2. There is no need to deviate from the cultivation practices of our ancestors.(1) 3. Even though some new techniques are proven as failure in field, I like to try them, if they are profitable(3)		

6. Risk orientation

(SA - Strongly agree, A- Agree, UD – Undecided, DA- Dis agree, SDA- Strongly dis agree)
One should cultivate multiple crops

No	Description	SA	A	UD	DA	SDA
	One should cultivate different crops to over come the loss due to failure of one or two crops					
2	One should try to make more profit facing challenges rather than doing small scale farming with very low risk.					
3	Only rich farmers can do large scale farming taking high risks than an average farmer					
4	If the chance for success is assured, one should take any risk involved in farming.					
5	One should not adopt innovative techniques before observing the experience of others					
6	Trying an innovative farming technique is beneficial even though an element of failure is involved in it.					

7. **Management orientation**

Say whether you agree or disagree with the statements

No	Items	Agree	Disagree
1.	Planning A .One should plan about the crop to be cultivated every year B. One should plan about the crop every season C. Before raising a crop, one should plan about the inputs like seed, fertilizer, plant protection chemicals etc. needed D. Before raising a crop one should work out the total cost of cultivation E. Before raising the crop it is not necessary that one shopul discuss with experts. F. Before doing cultivation, if a proper planning is done, agricultural production will improve.		
B	A.. Proper time of planting is highly essential for better production B. A farmer can add fertilizer for his crops as per his discretion C. It is beneficial to apply fertilizer for crops following soil test results D. Weedicide should be utilized for destruction of weeds in field E. Seed rate should be decided as per the recommendation F. Irrigation facility should be provided in field, if water scarcity is there		
C	A. One should have proper market information for getting better price for his products B. Grading is very much essential for getting good price for the Products C. Wearhouses help the farmers to stock their products properly and fetch good prices D. It is better to sell theproduces in the nearest market without wasting time for enquiring about the market rate E. The inputs like seed, fertilizer etc should be purchased from the same source from where one's relatives are purchasing F. One should decide the crop for cultivation only after enquiring about the market demand of products		

8. Level of aspiration

Mark the aspirations in your life from the list given below

No	Items	Yes	No
1.	A) Earn higher income B) Develop the agricultural land C) Get a good job D) To start any small enterprises other than agriculture E) To run a petty shop F) To start cattle rearing G) Any other (Please mention) 1. 2. 3.		

9. Attitude towards scientific agriculture

Please mark your degree of agreement with the following statements

(SA - Strongly agree, A- Agree, UD – Undecided, DA- Dis agree, SDA- Strongly dis agree)

No	Items	SA	A	UD	DA	SDA
1.	High Yielding Varieties are to be cultivated to increase agricultural production					
2.	Cultivation of High Yielding Varieties will cause deterioration of soil quality					
3.	Inorganic fertilizers are required for increasing agricultural production					
4.	Continuous application of fertilizers will cause deterioration of soil quality					
5.	Only through application of inorganic fertilizers agricultural production can be enhanced					
6	Application of chemical fertilizers lead to loss of money.					
7	Proper spacing while planting helps to undertake other cultivation operations.					
8	Following recommended spacing will lead to unnecessary wastage of space.					
9	Application of plant protection chemicals is harmful to crops					
10	Application of plant protection chemicals will no way lead to financial benefit					
11	Application of plant protection chemicals will lead to pollution					

12	Modern plant protection measures will lead to save time and money					
13	After the spread of modern plant protection measures heavy crop losses have not happened					
14	Any farmer who wants to be successful in his profession should adopt pesticides and fungicides.					

10. Credit Orientation

Please rate the degree of agreement with the following statements

No	Statements	Fuully agree	Partially agree	Disagree
A	A farmer like you should not borrow for agricultural purpose			
B	It is very difficult to get loan for agricultural purpose			
C	The attitude towards the borrowing farmer is very poor			
D	There is nothing wrong in taking loans from financing institutions for agricultural purpose			
E	You have taken loans for agricultural purpose			

11.Information source utilisation

Please indicate the extent of utilization of information sources in the following pattern

No	Items	Regularly	Occasional	Never
1	Mass media			
	A. Radio			
	B. News paper			
	C. Magazines			
	D. Television			
	E. Popular article			
2	Formal sources			
	A. Demonstrator			
	B. Agricultural officer			
	C. Scientist			
3	Informal sources			
	A. .Family members			
	B. Friends and relatives			
	C. Neighbours and other farmers			
	D. Progressive farmers			
	E. People's representatives			
4	Institutional sources			
	A. Fertilizer dealers			

5	B. Pesticide dealers C. Co-operative society D. Banks Others A. Demonstratons B. Exhibitions, Melas,Festivals C. Meetings D. Training E. Others			

12.Extension participation

Please indicate your extent of participation

No	Activities	Always	Occasional	Never
A	Meetings			
B	Seminars			
C	Exhibitions			
D	Film shows			
E	Field days			
F	Demonstrations			
G	Harvest melas			
H	Others			
	1.			
	2.			
	3.			

APPENDIX II

QUESTIONNAIRE FOR SCIENTISTS WORKING IN THE SOUTHERN ZONE OF NARP OF KAU

BACKGROUND INFORMATION

1 Name
2 Official Address
3 Research Station
4 Age
5 Experience (NARP)
6 Education

7 Evaluative perception about NARP.
Below are given certain statements regarding NARP, please indicate the extent to which you agree with them by putting tick mark ( ) in the appropriate column.

(SA = Strongly Agree, A = Agree, UD = Undecided, DA= Disagree
SDA = Strongly Disagree)

(a) **Research Concept**

Sl. No	Statements	SA	A	UD	DA	SDA
1	Consequent to the implementation of NARP, the basic research is strengthened.					
2	Applied research problems are given attention under NARP.					
3	Under NARP research problems are prioritised in consultation with the farmers of the locality.					
4	On farm trials under NARP helps to try out research results at field condition.					
5	Joint field visits help to make problem identification and problem solving more efficiently.					
6	NARP gives emphasis for low cost tchnologies.demonstrations, have proven unsuccesfull in farmers field.					

(b) Infrastructure Development

Sl. No	Statements	SA	A	UD	DA	SDA
1	NARP has helped to improve the availability of scientific staff considerably.					
2	Sufficient buildings are made available for research purpose under NARP.					
3	The laboratory facilities in the research station have improved much after the inception of NARP.					
4	NARP has very much helped to improve the library facilities of the station.					
5	Consequent to the implementation of NARP, the transport facilities for staff have improved much.					

(C) Augmentation of Research Capabilities

Sl. No	Statements	SA	A	UD	DA	SDA
1	The research stations established under NARP in each of the Agro -climatic zones have improved the researchcapability of SAU.					
2	After NARP, the research efforts on food grain is improved.					
3	Under NARP agronomic practices are evolved with suitable modifications for the cropsgrown in the zone.					
4	Research on soil and water conservation techniques are strengthened after NARP.					
5	Research needs of rice and oil seeds grown in the zone are given proper attention in NARP.					
6	Under NARP location specific problems are given proper attention since the Associate Director of Research is responsible for planning and implementing research.					

(d) **Multi- Disciplinary research facilities**

Sl. No	Statements	SA	A	UD	DA	SDA
1	Multi-disciplinary research facilities provided under NARP has improved the quality of research.					
2	Problem identification is done very efficiently through the multi-disciplinary approach.					
3	Under multi-disciplinary approach research is problem oriented rather than disciplineoriented.					
4	Field experiment are done more effectively since different aspects are handled simultaneously.					
5	Laboratory studies are done perfectly through involvement of multi-disciplinary team.					
6	Multi-disciplinary research approach helps to save time and money.					

(e) **Inter- disciplinary research facilities**

Sl. No	Statements	SA	A	UD	DA	SDA
1	Inter-disciplinary research concept under NARP has helped to improve the quality of your research.					
2	Inter-disciplinary approach is helpful in efficient problem-solving.					
3	Inter-disciplinary approach helps to save money and time.					
4	Inter disciplinary approach leads to deterioration in the quality of research.					
5	Facilities provided under NARP are sufficient to carry out research on inter-disciplinary line.					
6	Inter disciplinary approach leads to wastage of funds and efforts .					
7	Inter –disciplinary approach leads to unhealthy competition among different departments					

(8) Linkage problems experienced

Some linkage problems experienced under the NARP set up is listed below. Please rate each of them according to the degree of importance by marking tick ( ) to the appropriate columns.
(Most Imp = Most Important, Imp = Important, Least Imp = Least Important)

Sl. No	Constraints	Most Imp	Impo-rtant	Least Imp	
1	Participation of extension personnel of the state Department of Agriculture is poor in the zonal workshops which affect the linkage between research and extension system.				
2	Extension personnel do not visit farmer's field frequently which leads to poor feed back in monthly workshops.				
3	In state Technical Committees proper chances are not provided for better interaction between extension staff and scientists.				
4	Extension staff are no given adequate training by the research staff which affects the linkage problem between them.				
5	Visits of research station by extension staff which strengthens the linkage among them is not carried out properly.				
6	Visits of farmers field by research staff which improves the linkage between researchers and farmers is not done satisfactorily.				
7	Farmers participation in farm trials is poor which weakens the linkage between farmers and scientists.				
8	Extension staff of Department of Agriculture show less interest in the conduct of farm trials and this reduces their linkage with researchers.				
9	Under NARP , input agencies are not given chance to have linkage with scientists.				
10	Under NARP, input agencies have no linkage with extension staff of Department of Agriculture.				

(9) Constraints experienced

Below are given some constraints experienced in implementing NARP. Please rate each of them according to the degree of importance by marking tick ( ) to the appropriate columns.
(Most Imp = Most Important, Imp = Important, Least Imp = Least Important)

Sl. No	Constraints	Most Imp	Impo-rtant	Least Imp
1	Income generating subsidiary farming occupations are not promoted under NARP.			
2	Farmer participation programmes are not operating.			
3	Lack of office space in the station.			
4	Lack of library facilities in the station.			
5	Adverse soil conditions in the state.			
6	Unawareness of the farmers about the technologies generated.			
7	Small size of holdings of the farmers.			
8	High cost of inputs.			
9	Poor research – extension linkage.			
10	Lack of credit facilities.			
11	Poor marketing facilities.			
12	Farmers are unwilling to deviate from age-hold practices.			
13	Technologies developed are market based			
14	Technologies recommended are complicated.			
15	Extension workers lack confidence on the technologies generated.			

APPENDIX III

QUESTIONNAIRE FOR EXTENSION PERSONNEL OF THE DEPARTMENT OF AGRICULTURE

BACKGROUND INFORMATION

1 Name
2 Official Address
3 Name of District
4 Experience with in Department

5 Below are given certain statements regarding NARP, please indicate the extent to which you agree with them by putting tick mark ( ) in the appropriate column.

(SA = Strongly Agree, A = Agree, UD = Undecided, DA= Disagree
SDA = Strongly Disagree)

(a) Impact of NARP on farmers

Sl. No	Statements	SA	A	UD	DA	SDA
1	NARP has helped to improve crop production.					
2	After the inception of NARP , farmer participation programmes have been increased.					
3	Location specific problems are given sufficient significance.					
4	As a consequence of the inception of NARP farmers are adopting advanced technologyat a higher rate.					
5	NARP helps to strengthen the linkage between farmers and researchers.					
6	NARP has no helped to improve the income level of the farmers.					
7	The ultimate use of the project in for researchers, not for farmers.					
8	The technologies developed through NARP are not successful at farmers' field situation.					
9	Farmers' participation in the project is very limited.					
10	The on farm trials conducted NARP leads to economic loss of the farmers.					

(B) Linkage between research, extension, farmers and input systems

Sl. No	Statements	SA	A	UD	DA	SDA
1	The monthly workshops in NARP helps to promote linkage among scientists and extension workers.					
2	Zonal workshops improve the linkage between scientist and extension personnel.					
3	The linkage between extension personnel of state Department of Agriculture andsenior researchers is improved in State Technical Committees.					
4	Scientists of NARP arrange training programmes for extension staff, which promote the linkage between them.					
5	Visits made by the extension staff to the research stations promote the linkage between research and extension systems.					
6	Research staffs do not participate in the activities of the State Department of Agriculture.					
7	As scientists do not visit farmer's field, they lack linkage with the farming community.					
8	Under NARP concept, input agencies are not encouraged to have link with research and extension system.					
9	After NARP, farmers' awareness about research activities is lessened.					
10	Under NARP Farmer's participation is low in the programmes of state Department of Agriculture.					

(C) NARP Workshops

Sl. No	Statements	SA	A	UD	DA	SDA
1	The monthly workshops in NARP have no role in the formulation of the production recommendations of the area					
2	Scientists and extension workers are given equal significance in NARP workshops					
3	Field situation is not considered while interpreting and analysing the results of farm trials in the workshops					
4	In NARP workshops, suitable modifications are made in the general recommendations which helps to improve crop production.					
5	Topics for farm trials are suggested in the workshops giving thrust to the location specific problems.					
6	In the workshops production recommendations are made just as a repetition of the general POP recommendations.					
7	NARP workshops are helpful to promote the linkage among researchers, extension personnel and farmers					
8	In the workshops production recommendations are made aiming mainly at the financially sound farmers.					
9	Income generating subsidiary farming occupations are not given proper attention in NARP workshops.					
10	The location specific production recommendations evolved through the workshops improve the level of income of the farmers					

(d) **Farm Trials**

Sl. No	Statements	SA	A	UD	DA	SDA
1	Farm trials under NARP helps to test the practical viability of technology.					
2	Farm trials are conducted after assuming the need for the technology in that area.					
3	There is enough people's participation in the conduct of farm trials under NARP.					
4	For conducting farm trials, proper technical guidance is provided under NARP.					
5	For conducting farm trials, financial assistance is provided to the participant farmer.					
6	Farm trials are absolutely essential for developing a location specific technology.					
7	After farm trials proper follow up is done on the adoption of the technologies.					
8	The farm trials are ultimately useful to the farmers, not to the researchers.					

(e) Demonstrations

Sl. No	Statements	SA	A	UD	DA	SDA
1	While conducting demonstrations, scientists are not bothered about the situational factors like rain fall, soil condition,irrigation facility etc.					
2	Under NARP, people's participation is given importance in the conduct of demonstrations					
3	Level of education and economic conditions of the farmers of the area are not considered before conducting demonstrations.					
4	Input agencies are made to co-operate in the demonstrations which increase the confidence of people.					
5	After the demonstration, no follow up is done under NARP.					
6	Demonstrations proves successful as the adopters get proper technical guidance.					
7	In NARP, the demonstrations are often done in some selected pockets only.					
8	Mostly demonstration of technologies relevant to income generating avenues is done under NARP					

(6) Constraints experienced

Below are given some constraints experineced by extension personnel in implementing NARP. Please rate each of them according to the degree of importance by marking tick ( ) to the appropriate columns.

(Most Imp = Most Important, Imp = Important, Least Imp = Least Important)

Sl. No	Constraints	Most Imp	Impo-rtant	Least Imp
1	High cost of inputs			
2	High cost of labour			
3	Lack of availability of inputs			
4	Lack of availability of demonstration plots			
5	Lack of technical knowledge			
6	Lack of sufficient training			
7	Lack of credibility about the technology			
8	Lack of incentives and rewards			
9	Poor people's participation in project activities			
10	Innovatives are often cumbersome			
11	Un awareness of farmers about the technologies			
12	Lack of Linkage between research and extension system			

IMPACT OF NARP ON AGRICULTURAL DEVELOPMENT IN THE SOUTHERN AGRO-CLIMATIC ZONE OF KERALA

By

Smt. Ashaletha. S., M.Sc (Ag)

ABSTRACT OF THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR THE DEGREE

DOCTOR OF PHILOSOPHY

(Agricultural Extension)
Faculty of Agriculture
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Department of Agricultural Extension
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ABSTRACT

A research study entitled 'Impact of NARP on Agricultural Development in the Southern Agroclimatic Zone of Kerala' was undertaken with a view to study the impact made by NARP on agricultural development as perceived by the officials as well as beneficiaries.

Impact was assessed through an ex-post facto analysis of the project by analyzing the area, production and productivity of major crops in the zone.

There were three categories of respondents; the scientists working under the project, extension personnel of the department of Agriculture involved in the project and the beneficiaries of the project comprising rice and sesamum farmers. Data on the evaluative perception of scientists about the research concept of NARP, augmentation of research capabilities, the infrastructure facilities, multi and inter- disciplinary facilities and also on the linkage problems were gathered from scientists. The extension personnel were contacted for collecting response on their perception about the impact of NARP, linkage under NARP, farm trials, demonstrations and workshops. From the farmers, data on the extent of awareness about NARP, level of knowledge and adoption of the recommended practices, perception about farm trials and demonstrations were collected. Twelve selected profile characteristics were quantified to analyse the relationship of these variables with the awareness, knowledge and adoption of farmers. More over the constraints experienced by the respondents during the implementation of the project were also ascertained.

The study was undertaken in the southern zone of Kerala comprising five districts. Separate questionnaires were prepared to collect data from the scientists and extension personnel and interview schedules were prepared in Malayalam separately for rice and sesamum farmers. Appropriate statistical methods were adopted for processing the data.

The results of trend analysis indicate that after the implementation of NARP, the productivity of tapioca, sesamum and coconut increased while that of rice and

after 15 years of implementation of the project, the farmers were unaware of the project and its objectives. But their knowledge about improved practices and extent of adoption were fairly good. The relationship of the selected profile characteristics of farmers with their awareness, knowledge level and adoption was also analysed. Education, economic motivation, innovation proneness, risk orientation, attitude towards scientific agriculture and information source utilization were positively and significantly related with knowledge level of farmers. Innovation proneness, level of aspiration, information source utilization and knowledge about improved practices were observed to be positively and significantly influencing adoption behavior of farmers.

The perception of scientists on NARP was generally good except on some items like laboratory facilities, transportation facilities etc. About the research-extension linkage prevailing under NARP also, the scientists were not that much satisfied. In their opinion, the component of people's participation was also not up to the level in the project implementation.

The perception on extension personnel on the extension components of NARP like Farm trials, Demonstrations and Workshops was comparatively good. But regarding the representation of input agencies as well as the farmers, they were not satisfied. The duration of workshops was also not sufficient for proper interaction in their opinion. Likewise, the extension personnel were not at all pleased with the involvement of scientists in the field level extension activities. According to them the field contacts of research community was not at all satisfactory.

The analysis of different constraints revealed that both the categories were not satisfied with the linkage mechanism existing under NARP among research- extension-farmer-input systems. Lack of peoples' participation in the project activities and lack of attention given for income generating occupations by the researchers were also projected as important constraints. In farmers' perception, the high wage rate, scarcity of labourers and high cost of inputs were important problems restricting adoption of improved technologies. Based on the results of the study a strategy was developed for augmenting the efficacy of any development programmes with special reference to National Agricultural Technology Project.