IMPACT OF OPERATIONAL RESEARCH PROJECT ON AGRICULTURAL PRODUCTION

BY
G. SURENDRAN

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1982

DECLARATION

I hereby declare that this thesis entitled "IMPACT OF OPERATIONAL RESEARCH PROJECT ON AGRICULTURAL PRODUCTION" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title of any other University of Society.

G. GURUNGRAN

Vellayani,
15th December 1982.

CERTIFICATE

Certified that this thesis entitled "IMPACT OF OPERATIONAL RESEARCH PROJECT ON AGRICULTURAL PRODUCTION" is a record of research done independently by Sri. G. Surendran under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

Dr. G. THIAGARAJAN NAIR
Chairman
Advisory Committee
Associate Professor, Agricultural Extension
Kerala Agricultural University

Vellayani,
15th Decemoer 1982.

APPROVED BY:

Chairman:

Dr. G. THIAGARAJAN NAIR

Members:

1. Dr. A. MURALEEDHARAN TAMPI

2. Dr. JAMES MATHEW

3. Sri. R. BALAKRISHNANASAN

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(G. SURENDRAN)

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INTRODUCTION

System approach to development has been under trial in many fields of development. The system model demands that we treat the phenomena and the concepts for organizing the phenomena as if there existed organization, interaction, interdependency and integration of parts and elements. Agriculture isasystem which has many sub-systems. It can be considered as an inters/stem model which involves many systems connected together. The system approach to agricultural development assumes a high degree of interdependence of elements. Change in one part of the system may lead to unforeseen, sometimes, undesirable consequences in another part due to interdependence of elements. It also assumes that changes can be effected in one element not only through a frontal attack upon it, but also by indirect manipulation of other elements. The system approach to development directs attention to the multiple possibilities of intervention with respect to a single problem. Any alternative to produce changes in agriculture must take into account its effect on all parts and system as a whole.

The system approach to agricultural development has been under implementation in India from the fifth plan. The operational research projects initiated by the Indian Council of Agricultural Research (I.C.A.R.) is a system approach to development. These projects involve integrated approach to problems. They are designed to identify the major operational problems in the transfer of a new agricultural technology through the co-operation of a team of experts from the different sub-system fields, local agencies, departments, universities etc.

According to I.C.A.R. (1980) about 27 operational research projects for different farming systems are being implemented throughout the country. In Kerala four such operational research projects are under operation in the different parts of the state.

The success of such a project can be decided only on the basis of the impact it made in the farmers of the operational area. To evaluate the impact of any project which is implemented for the development of rural community, not only the economic aspects should be assessed but also the behavioural changes brought in the farmer for a better utilization of the transferred technology should be considered. It is necessary to have

systematic studies, to assess impact of the operational research projects. No such systematic study has been undertaken in Kerala to assess the impact of the system approach followed in the operational research projects. The present study is an attempt in that direction.

Objectives

The following were the specific objectives of the study.

1. To study and compare the level of knowledge on new agricultural technology, attitude towards improved agricultural practices and adoption of recommended practices of the farmers of the scheme area and shadow area.
2. To study the perception about the scheme.
3. To study the social, administrative, organizational and technical problems involved in the transfer of technology in the project area.

Scope and Limitations of the study

The present study provided a comprehensive idea about the impact of operational research project in terms of knowledge, attitude and adoption level of farmers. In addition to the above it also identified the problems in the working of this project.

The present study had the limitation of resources, which prevented the researcher to cover all the operational research projects being implemented in Kerala state. The findings of the study may not be applicable to other projects. However, the findings of the study will be useful in giving an indication about the usefulness of system approach to problems in the field of agriculture.

THEORETICAL ORIENTATION

CHAPTER - II

THEORETICAL ORIENTATION

The purpose of this chapter is to develop a frame work for the research problem by linking the topic with whatever research findings exist in the area of study. For this an extensive review of literature was made. Research studies on operational research project were very few. However, an effort has been made to review studies in the related fields also. The review deals with the following aspects.

1. Concept of operational research
2. Operational research project on agriculture
3. Impact of operational research project
4. Factors influencing the effectiveness of operational research project
5. Hypotheses formulated

(1) Concept of operational research

An outstanding contribution of system approach to managing came with the introduction of operational research or, as it is some times called, system analysis, in the areas of planning and control. The British people use the term operational research for operations research.

The operational research was developed during the second world war. From the beginning of world war II, Great Britain was under great pressure at sea and in the air, it made them to utilize the available weapons in the best manner and also decided to improve the pattern of search activities for submarines and establishing bombing pattern in the most effective manner. For this they called scientists from different disciplines to study the problems involved in the operations and to derive the best solution/alternative for achieving the objective. This was the first operational research team. The approach was named as operational research since scientists were used to analyse the operational problems involved in the activity.

After the war the early practioners of operational research concentrated in using these techniques developed during war in the industrial sector.

In the case of industry the objective of operational research is to provide the manager of the organization with scientific basis for solving the problems which involve interactions of various components of the organization. It also helps to find out the best decision from different alternatives available.

Hayness and Massie (1964) defined operations research in terms of its important goal: an overall understanding of optimal solutions to executive-type problems in organizations.

Harold and Cyril (1976) defined operations research as applied to decision making as follows:

"Operations research is the application of scientific method of study of alternatives in a problem situation with a view to providing a quantitative basis for arriving at an optimum solution in terms of goal sought".

The Council of United Kingdom Operational Research Society founded early 1950's defines operational research as "the attack of modern science on complex problems arising in the direction and management of large systems of men, machines, materials and money in industry, business, givernment and defence".

The Council goes on to state that the distinctive approach is to develop a scientific model system, incorporating measurement of factors such as chance risk, in order to predict and compare the outcomes of alternative decisions, strategies and controls. The purpose is to help management to determine its policy and actions scientifically. Summarising this definition the Council

said that operational research is concerned with allocation and planning of complex situations involving scarce resources.

According to Haimann et al (1978) the first characteristic of operational research is that it attempts to deal with problems that arise in the operating systems. The activity of any part of an organization generally has some effect on the activities of other parts. Hence to evaluate any decisions or actions with an organization it is necessary to identify all the significant interactions and to evaluate their combined impact on the performance of the organization as a whole, not merely on the part originally involved. The approach aims to investigate, over an entire area under a manager's control, the implication of proposed solution to a problem, rather than cutting down the problems into smaller size and isolating problems from the immediate environment.

Second characteristic of operational research is that it tends to use team approach, involving the personnel from different disciplines. In operational research the project team must examine the alternatives and select an appropriate approach, possibly borrowing ideas from several different background disciplines.

The third essential characteristic of operational research is that of adaptation of scientific method and use of models. In research and development, experimental methods are used which are primarily based on the laboratory and pilot plant scales of operation. In operational research this is not appropriate, in that the experimentation would have to be carried out by making trial changes within organization which might, not naturally, be unwilling to allow such experimentation. For this operational research tries to build a suitable model to describe the operations of the system which it is going to consider. This model will be formulated in terms of number of variables under the control of manager. When models are formulated then it should be possible to devise methods to use them in a predictive manner.

According to Moore (1968) operational research project can be broadly split into six phases. They are:

1. Definition of problems and objective,
2. Representation (or model) of situation,
3. Test of model against actual conditions,
4. Analysis of model to select optimum conditions to meet objective,
5. Pilot implementation test, and
6. Implementation.

In setting down the problem, the yardstick by which various alternative solutions are to be compared must be defined and if necessary, a method devised for combining the elements within the system so as to be able to achieve an overall measure of effectiveness of each proposed solution.

In second phase, some model or representation of the system has to be built along the lines already discussed. Once the model has been formulated, the third phase, namely its manipulation, aims at manipulating the model to the actual conditions.

The fourth phase of study is the selection of optimum set of conditions to meet objective. It is important not only to estimate the required set of optimum conditions under the various constraints built into the model but also to examine how sensitive these solutions are to changes in these constraints. Such manipulation makes it possible to see how critically the unique solution that was originally obtained depends upon the original assumptions built into the problem.

The two final phases of the study are connected with its implementation, first a pilot implementation test and then full scale implementation. Any proposed solution should be tested as stringently as possible before is

completely accepted and put into use. Neglect to do this can lead to vital factors being overlooked whose inclusion would markedly alter the solution. The best form of pilot implementation is one where the solution is completely implemented for a portion only of total system, which will provide better form of discipline than trying to run the complete solutions in parallel with the previous method of operation. It is also important that, when the final implementation stage is reached, those responsible for the project should still be available only by being present then can they see that the solution is being correctly implemented and also that, if there are any snags, these are ironed out and the experience gained used in tackling future problem of this kind.

(2) Operational research project on agriculture

The national demonstration projects, started in the year 1965, provided an opportunity to scientists to demonstrate the validity and relevance of their experimental findings in the farmers' field. It provided the way for establishing closer linkage between the farmer and scientists from which both have derived immense benefits. Through national demonstration projects it became clear that the blanket recommendations for the entire block or even village was not appropriate. These demonstrations

also provided to the farmer an opportunity to assess for himself the suitability of new agricultural technology in his own farm.

The results obtained in the national demonstration projects indicated the potentiality of increasing yields of various crops oy 2 - 3 times over the national average yield of such crops. It was also made clear that scientific management of land, water, crops and availability of necessary inputs to small farmers will be very effective in raising good crops on small farms. This is because a good farm management under conditions of small holdings involves two kinds of actions, one set of practices like of choice of variety, ploughing, weeding and harvesting can be done by an individual farmer, whereas another set of practices like water management, pest control and fertilizer use during monsoon period can be more effective if there is group endeavour among farmers in a contigous area. This revealed that the gap between the yields obtained under the national demonstration project on farmers fields and those from other farmers can be narrowed to a great extent by proper transfer of technology.

Based on the results obtained in national demonstration projects, I.C.A.R. decided to extent the concept of national demonstration into an area or watershed basis. Thus the

whole village or watershed operational research projects on agriculture were initiated by I.C.A.R. during the 5th plan period.

According to Swaminathan (1975) the aim of operational research project is to have an integrated approach to rural community problems through co-operation of local agencies, voluntary organizations, state developmental departments, agricultural universities, socio-economic institutes etc.

Sharma (1975) stated that the operational research projects are designed to identify the major operational problems in the transfer of technology from research station to the cultivators field.

Rajammal (1975) noted that the concept of operational research project is based on the involvement of entire village on the transfer of technology to enable the individual, families and the whole community to perform better whatever they are doing at present.

According to Padmanabhan (1975) the operational research project on rice has been initiated to study the bottle necks met within the process of transfer of technology and devise means for overcoming them.

According to I.C.A.R. (1979), the general objectives of operational research projects are:

1. To test, adopt and modify, if necessary, the findings of research so as to make them suitable for large scale adoption by farmers

2. Understand the constraints that impede the acceptance of such findings, and

3. Find out the profitability of the technology

According to Sharma (1975), the following are the concepts involved in operational research projects.

1. The basic concept of operational research project is to introduce the scientific land and water use planning in our villages.

2. Intended to generate more opportunities for gainful employment.

3. The pathway chosen for development should be one which will involve an appropriate blend of monetary and non-monetary inputs.

4. The projects should help to promote self generating growth.

5. Another important concept involved in operational research project is the concept of social audit in rural transformation. This concept aims at improving the economic well being of farm families having an annual income of rupees thousand or less.

6. Another feature of operational research project is that the technical programme is drawn by scientists on the basis of understanding of the potential of the area and then it is presented to the farmers for their comments and criticism. Thus the final project will be the outcome of the joint effort of scientists, extension workers and farmers.

7. The approach of these projects to use the available resources of soil, water, plants, animals and man will be a total and a integrated one. The aim is to involve entire rural community including children.

The projects being implemented by I.C.A.R. are broadly grouped into following farming systems:

1. Crop production - to increase productivity, employment and income of the farmers;
2. Mixed farming - integrated milk and crop production;
3. Composite fish culture;
4. Reclamation of alkali soils and management of arid land; and
5. Integrated control of insect pests of rice, cotton, oilseeds and pulses.

Of the four operational research projects being implemented in Kerala, one, in paddy, is the operational

research project on integrated control of rice pests in Kuttanad.

Report of operational research project on integrated control of rice pests in Kuttanad (1980) stated that in the early 70's there was a severe outbreak of major rice pest Brown Plant Hopper in Kuttanad region, which caused great crop loss. This pest was an important constraint in rice production in Kuttanad region. To save the crop from this severe pest farmers resorted to large scale and frequent application of insecticides. Excessive and indiscriminate use of broad spectrum insecticides created many problems like pest resurgence, toxic hazards, environmental pollution etc.

This situation called for a new thinking in pest management with minimum use of insecticides. In this context, the operational research project on integrated control of rice pests, involving an appropriate blend of genetic, agronomic, biological and chemical method of pest control, was launched in Kuttanad in the year 1975.

The broad objectives of operational research project on itegrated control of rice pests in Kuttanad are:

1. Introduction and practice of integrated control of rice pests with special reference to Brown Plant Hopper involving, cultural, biological and chemical methods.

2. Evaluation of efficacy of integrated control of rice pest over insecticidal control and cost benefit ratios.

3. Determination of economic thresholds of various pests to minimise the insecticidal application and

4. Evaluate the effect on socio-economic condition of rice cultivators.

(3) Impact of operational research project

The operational research projects have also been evaluated by various organizations and individual researchers.

I.C.A.R. (1978) reported that as a result of operational research project on integrated pest control in cotton in the district of Faridkot the number of spraying with pesticides for the control of insect pest in cotton was reduced to seven to ten as compared with fifteen to twenty that normal farmers followed.

Ram and Sirohi (1979) conducted an economic evaluation study of operational research project in rural Delhi. They found that the execution of the project brought out a lot changes in the intercropping pattern, use of seeds and fertilizers, yield, costs and return. They also reported

that the project had significant impact in terms of increased use of fertilizers and increased production and income. The area under most of the crops increased. The increase in yield was more spectacular.

I.C.A.R. (1979) reported that in the operational research project on integrated control of rice pests implemented at Cuttack district, the incidence of Brown Plant Hopper has been greatly reduced by the use of insecticide at the boot stage in rabi paddy. As a result of integrated pest management practices, the use of pesticide has been reduced by 50%. In the district of Raipur, which is an endemic area for gall midge of paddy 60% of the area has been covered with resistant varieties.

Sharma (1979) reported that encouraging results have been obtained in various operational research projects, particularly those covering the following farming systems; (1) Crop production to increase productivity and employment and farm income; (2) mixed farming-integrated milk and crop production; (3) fish production; (4) reclamation of alkali soils and arid land management; and (5) integrated control of white grub and insect pests of cotton and rice.

I.C.A.R. (1980) reported that due to the operational research project on integrated control of rice pests, the technology on integrated control of rice pests has been

widely accepted in the district of Warangal and Bapatla. The yield increased by 2.5 to 4 tons per hectare in the operational area and the use of insecticidal sprays came down from 3.4 to 0.2 in the villages covered under the projects.

Operational research project on integrated management of rice implemented by Andhra Pradesh Agricultural University, increased the yield of rice 22 - 25% than the control area.

Report on operational research project on Kuttanad (1980) pointed out that an initial evaluation survey undertaken in 1976-77 to study the average yield and cost of cultivation between project and control area revealed that there was no significant difference between project and control area.

In 1977-78 they conducted another survey which reveal that there was large scale change over in the adoption of scientific method of rice cultivation in the project area.

In 1979-80 a survey was conducted to study the constraints in the yield gap which revealed that the major constraints in rice production were pest and disease incidence, lack of pest resistant variety, lack of irrigation and drainage facilities, weed problem, low price of paddy,

high wage rate, lack of technical knowledge, high cost of inputs, lack of capital etc.

C.T.C.R.I. (1982) noted in their report that after the implementation of operational research project on intercropping of tapioca, the yield of tapioca was raised to 29.5 to 43.95 tons per hectare. The cassava mosaic disease intensity was reduced to 53% which was almost 100% when the programme was stated.

The above reviews indicate that many of the previous studies measured the effectiveness of operational research project in terms of increase in knowledge, increase adoption, increase in yield, reduction of pest attack, gain in income etc. Research workers like Jha and Sharma (1972), Singh and Singh (1974), Rao (1971), Behera and Sahoo (1975), Supe and Salode (1975), Pathak et al. (1979) and Kamarudeen (1981) considered difference in knowledge, attitude, adoption, awareness, perception about the practices etc. as indicators for evaluating the impact of national demonstration. A scientific evaluation of operational research project should indicate how far the farmers in the operational research project are different in knowledge about recommended practices, attitude towards practices, perception about the practices and adoption of practices recommended by operational research project than the farmers

of the other area. Such differences will indicate the true impact of operational research project.

Considering above reviews it was decided to evaluate the impact of operational research project in terms of difference in knowledge level of recommended practices, attitude towards practices, adoption of recommended practices and perception of practices between farmers in operational research project area and shadow area.

(4) Factors influencing the effectiveness of operational research project

As stated above the difference in level of knowledge about recommended practices, attitude towards practices, adoption and perception about recommended practices between the project and shadow area will give an idea regarding the impact of operational research project. Hence any factors which can influence the increase in knowledge, attitude and adoption have an influence in the impact of operational research project.

Many research reports have brought out the relationship between innumerable independent factors related with the project, project staff, the farmers and the situation and the various components of impact stated earlier.

A review of all these reports in detail will become volumeness and hence the most pertinent results indicating

the factors and their relationship are presented in tabular form in Table-1.

It is not possible by one researcher, in a small research project like this to include all the possible factors researched by the other researchers. Hence a small set of manageable factors were selected.

The following were the factors selected for the study.

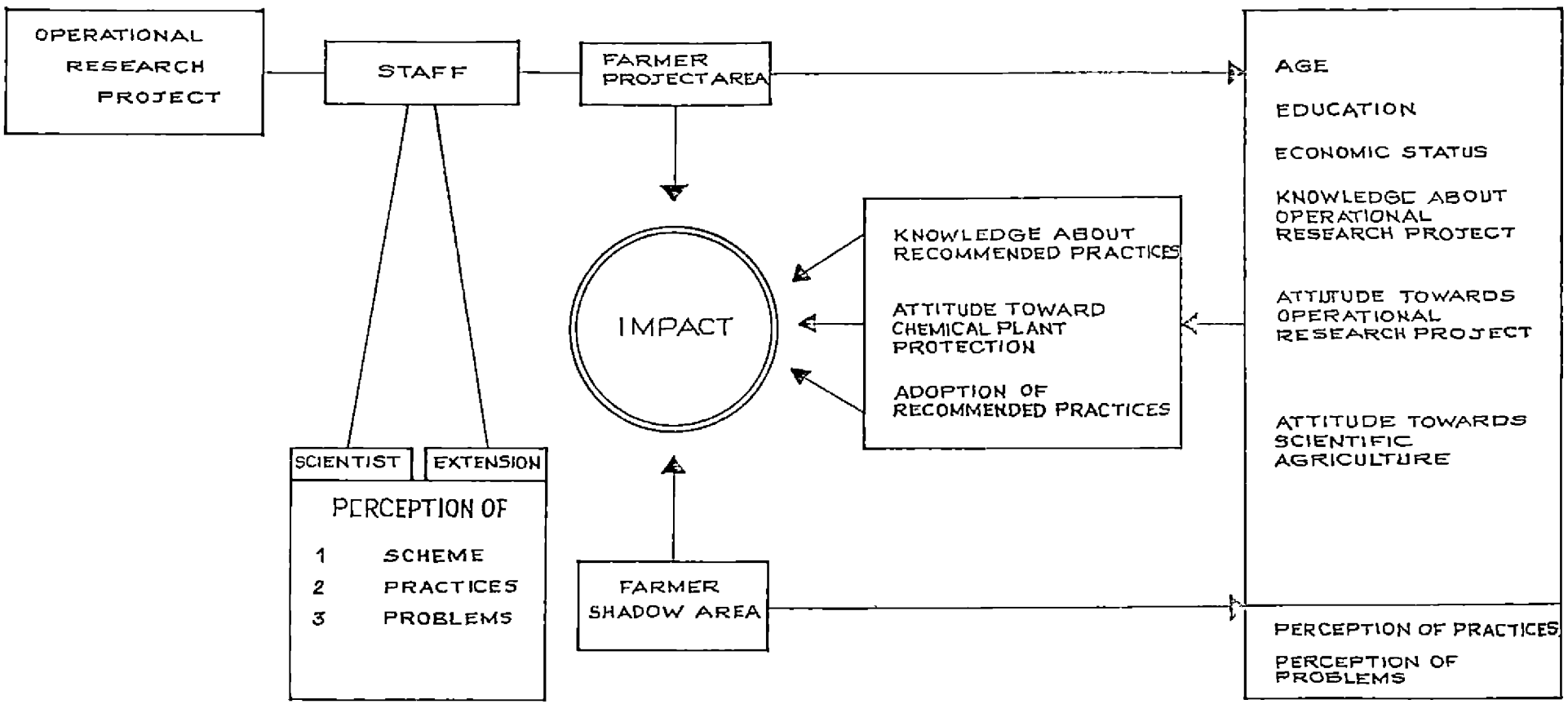
1. Age
2. Education
3. Economic status
4. Knowledge about operational research project
5. Attitude towards operational research project
6. Attitude towards scientific agriculture.

Apart from the above factors the following aspects were also studied.

1. Farmers' perception about the project and recommended practices
2. Perception of problems by farmers
3. Perception of staff about the project and recommended practices
4. Perception of problems by staff.

The above aproach of the research project is summarised as a model in Fig.1.

FIG 1 CONCEPTUAL MODEL OF THE STUDY



(5) Hypotheses developed for the study

The following specific hypotheses were developed for the study.

A-1 There will be significant difference in the extent of knowledge on combined recommended practices between farmers of project area and shadow area.

A-2 There will be significant difference between the farmers of project area and shadow area in their attitude towards chemical plant protection.

A-3 There will be significant difference in the extent of adoption of combined recommended practices between farmers of project area and shadow area.

A-4 There will be significant positive relationship between knowledge on combined recommended practices and adoption of combined recommended practices.

A-5 Knowledge about chemical plant protection will have significant positive relationship with adoption of chemical plant protection.

A-6 Attitude towards chemical plant protection will have significant positive relationship with adoption of chemical plant protection.

B-1 There will be no significant relationship between farmers age and knowledge on combined recommended practices.

B-2 There will be significant positive relationship between education level and knowledge on combined recommended practices.

B-3 Economic status of farmer will have significant positive relationship with the level of knowledge on combined recommended practices.

B-4 Knowledge about operational research project will have significant positive relationship with knowledge on combined recommended practices.

B-5 Farmers' attitude towards operational research project will have significant positive relationship with level knowledge on combined recommended practices.

B-6 There will be significant positive relationship between attitude of farmers towards scientific agriculture and level of knowledge on combined recommended practices.

C-1 There will be no significant relationship between farmers age and attitude towards chemical plant protection.

C-2 There will be significant positive relationship between education of farmers and attitude towards chemical plant protection.

C-3 There will be significant positive relationship between farmers economic status and attitude towards chemical plant protection.

C-4 Knowledge about operational research project will have significant positive relationship with attitude towards chemical plant protection.

C-5 Farmers' attitude towards operational research project will have significant positive relationship with attitude towards chemical plant protection.

C-6 There will be significant positive relationship between farmers attitude towards scientific agriculture and attitude towards chemical plant protection.

D-1 There will be no significant relationship between age of farmers and adoption of combined recommended practices.

D-2 There will be significant positive relationship between farmers' education and adoption of combined recommended practices.

D-3 Economic status of farmers will have significant positive relationship with adoption of combined recommended practices.

D-4 Knowledge about operational research project will have significant positive relationship with adoption of combined recommended practices.

D-5 There will be significant positive relationship between farmers' attitude towards operational research project and adoption of combined recommended practices.

D-6 Farmers' attitude towards scientific agriculture will have significant positive relationship with adoption of combined recommended practices.

To conclude the study revealed that operational research project on integrated control of rice pests at Kuttanad increased the knowledge level of farmers on recommended practices, created favourable attitude towards improved practices and the project and increased the adoption level. The study also brought out that knowledge about operational research project and attitude towards operational research project got significant relationship with knowledge, attitude and adoption of recommended practices. This indicate that the operational research project has got significant impact among the farmers of the project area.

In addition to demonstrations and extension activities the project is providing training to agricultural labourers on plant protection aspects. The effectiveness of such trainings can be considered in the future works. The other operational research projects being implemented in the different parts of state as well as variables which were not considered in this study can also be considered in the future works.

The operational research project on integrated control of rice pests at Kuttanad is operated jointly by Kerala Agricultural University and State Department of Agriculture. For better implementation of such projects it need a proper co-ordination between these two agencies. Since the demonstrations are being carried out in the farmers' field, peoples' participation should be ensured to make them convince of the usefulness of improved technology.

1	2	3	4
Social participation	Kamarudeen	1981	Positive
	Mishra and Sinha	1981	Positive

Relationship of variables with attitude

Variable	Author(s)	Year	Relationship of variable with attitude
1	2	3	4
Age	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive
	Reddy and Reddy	1977	Not significant
Education	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive
	Singh and Singh	1971	Positive
	Reddy and Reddy	1977	Not significant
Occupation	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive
	Reddy and Reddy	1977	Not significant

(contd...)

1	2	3	4
Socio-economic status	Singh and Singh	1967	Positive
	Shirpurkar and Patil	1968	Positive
	Reddy and Reddy	1977	Positive
	Pathak	1981	Negative
Farm size	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive
	Singh and Singh	1971	Positive
	Reddy and Reddy	1977	Not significant
Income	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive
Material possessions	Reddy and Reddy	1977	Not significant
Social participation	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive
	Reddy and Reddy	1977	Not significant
Caste	Shirpurkar and Patil	1968	Positive
	Das and Sarkar	1970	Positive

(contd...)

Relationship of variables with adoption

Variable	Author(s)	Year	Relationship of the variable with adoption
1	2	3	4
Age	Wilkening	1952	Negative
	Chattopadhyay	1963	Not significant
	Lionberger	1960	Negative
	Reddy	1962	Not significant
	Bose and Saxena	1965	Not significant
	Bhatia	1966	Not significant
	Mahajan	1966	Not significant
	Das and Sarkar	1970	Positive
	Singh and Sinha	1970	Positive
	Perumal and Duraiswamy	1972	Positive
	Chandrakandan and Subramanyan	1975	Not significant
	Oliver *et al.*	1975	Positive
	Salunkhe and Throat	1975	Not significant
	Sunderaswamy and Duraiswamy	1975	Not significant
	Zeaudeen and Rajagopalan	1977	Not significant
	Prasad	1978	Not significant
	Pillai	1978	Negative

(contd...)

1	2	3	4
	Somasundaram and Singh	1979	Positive
	Shukla	1980	Not significant
	Sinha and Sinha	1980	Positive
	Titus	1981	Not significant
Education	Bose	1951	Positive
	Rahudkar	1962	Positive
	Reddy	1962	Positive
	Dasgupta	1965	Positive
	Singh and Sohal	1967	Positive
	Nair	1969	Not significant
	Das and Sarkar	1970	Positive
	Singh and Sinha	1970	Not significant
	Singh and Singh	1970	Positive
	Grewal and Sohal	1971	Positive
	Jha and Shaktwat	1972	Positive
	Perumal and Duraiswamy	1972	Positive
	Karim and Mahboob	1974	Positive
	Mathur *et al.*	1974	Positive
	Salunkhe and Throat	1975	Not significant
	Chandrakandan and Subramanyan	1975	Positive

(contd.....)

1	2	3	4
	Oliver *et al.*	1975	Positive
	Rao and Menon	1975	Not significant
	Sundraswamy and Duraiswamy	1975	Positive
	Muthiah and Duraiswamy	1977	Positive
	Prasad	1978	Positive
	Pillai	1978	Positive
	Kaleel	1978	Positive
	Shukla	1980	Not signfficant
	Sinha and Sinha	1980	Positive
	Titus	1981	Positive
Occupation	Das and Sarkar	1970	Positive
	Somasundaram and Singh	1979	Not significant
Caste	Das and Sarkar	1970	Positive
	Jha and Shaktawat	1972	Not significant
	Salunkhe and Throat	1975	Not significant
Economic status	Lionberger	1960	Positive
	Reddy	1962	Positive
	Grewal and Sohal	1971	Positive
	Jha and Shaktawat	1972	Positive
	Rao and Menon	1975	Not significant
	Sundaraswamy and Duraiswamy	1975	Positive
	Titus	1981	Positive

(contd.....)

1	2	3	4
Farm size	Reddy	1962	Positive
	Singh and Sohal	1967	Positive
	Nair	1969	Positive
	Das and Sarkar	1970	Positive
	Jaiswal et al.	1970	Positive
	Singh and Sinha	1970	Positive
	Singh and Singh	1970	Positive
	Patnak and Dargan	1971	Positive
	Jha and Sharma	1972	Not significant
	Karim and Mahboob	1974	Positive
	Malhotra et al.	1974	Positive
	Chandrakandan and Subramanyan	1975	Positive
	Oliver et al.	1975	Positive
	Supe and Salode	1975	Not significant
	Prasad	1978	Not significant
	Pillai	1978	Positive
	Sinha and Sinha	1980	Not significant
	Titus	1981	Negative
Social participation	Reddy	1962	Positive
	Dasgupta	1965	Positive
	Nair	1969	Positive
	Das and Sarkar	1970	Positive

(contd...)

1	2	3	4
	Singh and Sinha	1970	Positive
	Karim and Mahboob	1974	Positive
	Chandrakandan and Subramanyan	1975	Positive
	Rao and Menon	1975	Not significant
Attitude	Nair	1969	Positive
	Singh and Singh	1971	Positive
	Pillai	1978	Positive
Knowledge of innovations	Dasgupta	1965	Positive
	Nair	1969	Positive
	Kaleel	1978	Positive
	Prasad	1978	Positive
	Pillai	1978	Positive
	Samad	1979	Positive

METHODOLOGY

CHAPTER - III

METHODOLOGY

The following details are presented in this chapter.

1. Procedure of selection of project area of study
2. Procedure of selection of samples for the study
3. Procedures followed in the empirical measurement of the selected variables
4. Procedure followed for the collection of data
5. Procedures followed in the statistical analysis of the collected data.

I. Selection of project area of study

The four operational research projects being implemented in the Kerala state are: (1) Operational research project on integrated control of rice pests in Kuttanad - operated jointly by Kerala Agricultural University and State Agricultural Department, (2) Operational research project on intercropping of tapioca in Trivandrum which is being implemented by Central Tuber Crops Research Institute - Trivandrum (3) Operational research project on garden land management in Kasargod, by Central Plantation Crops Research Institute, Kasargod, and (4) Operational research project on root-wilt of coconut in Quilon, implemented by Central Plantation Crops Research Institute, Kayamkulam.

It is rather a big task to study all the four projects implemented in Kerala and the researcher had to limit the area of study to one project. So it was decided to select the operational research project on the important crop of Kerala, in paddy. Thus the operational research project on integrated control of rice pests in Kuttanad was selected as the area of study purposively.

Selection of samples for the study

Operational research project on integrated control of rice pests in Kuttanad adopted two villages viz. Pullicunnu (representing lower Kuttanad), Kizhakkumbhagam (representing upper Kuttanad) as the operational villages and two other villages viz. Champakulam and Kozhimukku as shadow villages. All these four villages were included in taking samples. List of paddy growers of these four villages were collected from operational research project office at Moncompu. The names of the farmers were arranged in alphabetical order. From the list by using random numbers 35 farmers from each village were selected. Thus, 70 respondents from project area and 70 from shadow area, which formed a total sample population of 140, were selected.

Empirical measurements

Before deciding the methodology of measurement of variables included in this study a brief review of methods

used by other researchers were made. This was useful to select appropriate methods of measurement. The results of the review and a detailed discussion of the method used for the study are presented below.

Knowledge

Shankariah and Singh (1967) measured the knowledge of farmers on improved method vegetable cultivation based on teacher made test. Equal weightage was given to all items assuming that all the items included had same difficulty to understand apply and recall. Then they calculated the knowledge index as follows.

$$\text{Knowledge index} = \frac{x1 + x2 + \ldots\ldots\ldots xn}{N} \times 100$$

where,

x1 = Number of correct answers of first practice

x2 = Number of correct answers of second practice

xn = Number of correct answers of nth practice

N = Total number of questions put to respondents to test his knowledge.

Singh, Jaiswal and Singh (1968) adopted the method of self apprisal to determine the level of knowledge of agricultural extension officers.

Jaiswal and Dave (1972) calculated knowledge score for measuring the knowledge level of farmers about

recommended agricultural innovations. For this, a score of one for right answer and score of zero for wrong anwer were given. The scores obtained by respondents were expressed in terms of percentage of total score.

$$\text{Knowledge score} = \frac{\text{Number of correct answers}}{\text{Total raw score}} \times 100$$

Singh and Prasad (1974), Singh and Singh (1974), Nachiappan and Murthy (1976) used the same type of measurement.

In the present study, a simple knowledge test was developed to measure the knowledge of farmers about the operational research project and the practices included under the integrated control of rice pests. For this the details about operational research project and the practices recommended for integrated control of rice pests were obtained from the annual reports of operational research project on integrated control of rice pests in Kuttanad (1978-81), Package of Practices Recommendation of the Kerala Agricultural University (1981) and discussion with officials working in the operational research project. Based on these, questions for measuring the knowledge of farmers about operational research project and integrated control of rice pests were prepared.

The total number of questions presented to farmers for measuring knowledge during the pre-test were 30. On the

basis of their responses suitable modifications were made for the final knowledge test. Twenty two questions with average level of difficulty were selected for the final knowledge test and some questions got sub-questions. A score of '1' was given to correct answer and '0' score for wrong answer. The score obtained by a respondent on all the questions were added upto obtain the knowledge score. The maximum knowledge score was 45.

Attitude

Edwards (1957) has demonstrated the usefulness of attitude measurement scales for quick and reliable quantitative measure of attitude with large groups. Such attitude scales provide us with the means of obtaining an assessment in quantitative terms, the degree of affect that an individual may associate with some phychological object. Attitude scale will contain statements (items) which can be selected by different methods. Items and their scale values are decided by a panel of judges in equal appearing interval scale and successive interval scale. Item analysis is the basis of selection of item in Likert scales. Scalogram analysis of Guttman can be followed in selecting items with uni-dimensionality.

The following methods were used in measuring the different attitudes included in this study.

Attitude towards operational research project

As the researcher was not having enough time to undertake any of the procedures followed for selection of statements for measuring respondents' attitude towards operational research project, an arbitary scale was developed to measure this variable. The following procedure was followed in developing this scale.

A large number of statements which reflected various degree of positive and negative attitude towards operational research project were identified through review and discussion. These items were edited according to the criteria suggested by Edwards (1969). These edited statements were given to experts in Agricultural Extension to assess the appropriateness of these statements for an attitude scale. Eight statements, which majority of experts rated as most appropriate, were finally selected.

The responses to these statements were obtained on a five point continuum ranging from 'Strongly Agree' to 'Strongly Disagree'. The scoring pattern were as follows:

Strongly Agree	-	5
Agree	-	4
Undecided	-	3
Disagree	-	2
Strongly Disagree	-	1

Negative statements were scored in the reverse manner. The attitude score of the respondents were obtained by adding up the score corresponding to their response pattern for each statements.

Attitude towards chemical plant protection

Manoharan (1979) used an attitude scale for measuring attitude towards chemical plant protection, which consisted of six statements scored in 5 point continuum. This scale was used in this study to measure the attitude of farmers towards chemical plant protection. The scoring pattern was follows. Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and strongly Disagree(1). Negative statements were scored in the reverse manner. The score of the respondents were obtained by adding up the score corresponding to their response pattern for each statements.

Attitude towards scientific agriculture.

In the present study the attitude of farmers towards scientific agriculture was measured by the scale used by Meera (1981). This scale consists of five statements. The responses to the statements were obtained in a five point continuum ranging from "Strongly Agree" to "Strongly Disagree". The scoring pattern were as follows. Strongly Agree (5), Agree (4), Undecided (3), Disagree (2) and Strongly Disagree (1). For negative statements the scoring

were in the reverse manner. The score of each respondent was obtained by adding up the score corresponding to their response pattern of each statement.

Adoption

Different researchers suggested different methods for measuring adoption in India and abroad. Of these Wilkening (1952), Marsh and Coleman (1955), Fliegel (1959), Beal and Rogers (1960), Chattopadhyay (1963) and Supe (1969) are some of the researchers who had contributed notable techniques of measurement of adoption.

Wilkening (1952) used an index for measuring adoption of improved practices. The index of adoption used was the percentage of practices adopted to the total number of practices applicable.

Marsh and Coleman (1955) used adoption score computed as the percentage of applicable practices adopted.

Fliegel (1959) constructed an index of adoption of farm practices using the correlation of several variables. In that he has given a score of one for adoption of a practice and score of zero for no adoption.

Supe (1969) used an unweighted practice adoption score. He selected 10 practices of cotton and for each practice the

total score for complete adoption was 6. Partial score were assigned to divisible practices.

Chattopadhyay(1963) constructed an 'adoption quotient' to measure farm practices adoption. He has taken into consideration of different factors like potentiality, extent, weight and time in developing adoption quotient.

Sengupta (1967) measured adoption level of farmer by calculating adoption quotient. The adoption quotient of the farmers was calculated on the basis of number of practices actually used by him out of the total number of practices applicable to him. Thus the adoption quotient is

$$\text{Adoption quotient} = \frac{\text{Number of practices used}}{\text{Number of applicable practices}} \times 100$$

Singh and Singh (1974) used the adoption quotient, method of Chattopadhyay (1963) with slight modification.

In this present study the method suggested by Singh and Singh (1974) was used. The formula for calculating the adoption quotient was as follow:

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

where,

Σ = the summation

e = extent of adoption of each selected practice

p = potentiality of adoption of each selected practice

N = total number of applicable practices

Using the above formula the adoption quotient was calculated for each respondent of the project area and shadow area.

The recommended practices selected for the study of adoption level of farmers were:

1. Cultivation of pest tolerant varieties
2. Advancing punja crop season
3. Balanced manuring
4. Chemical control of rice pests
5. Flood fallowing
6. Draining water from the field
7. Clean cultivation
8. Chemical weed control
9. Mixing urea with neem cake
10. Spreading non-phyto toxic oils in the field

Age

Age was measured as the number of years an individual has completed, since his birth, at the time of study.

Education

Sivaramkrishnan (1981) used the scoring method of Trivedi (1963) to measure the education level of farmers with modification. This was followed in this study also.

Illiterate	-	0
Can read only	-	1

Can read and write	-	2
Primary school	-	3
Middle school	-	4
High school	-	5
College	-	6
Above	-	7

Economic status

In this study the economic status of the farmer was measured in terms of farmsize, house type and material possessions.

Farm size

Farm size was measured in land units. The number of standard acres of land cultivated by the farmer was taken as the index of farm size. This include both dry and wet land.

House type

Trivedi (1963) developed a scale to measure the house type as follows:

No houses	-	0
Hut	-	1
Katcha	-	2
Mixed	-	3
Pacca house	-	4
Mansion	-	5

Prakash (1980) measured the house type as follows:

No house	-	0
Hut	-	1
Thatched house	-	2
Pacca house	-	3

For this study a modified form, more suitable to Kerala condition was used. It was follows:

No house	-	0
Hut	-	1
Thatched house	-	2
Tiled house	-	3
Terraced house	-	4
If it was, electrified	-	1
Plastered	-	1

Material possessions

Trivedi (1963) developed a scale for measuring the material possessions which included the following items:

1. Bullock cart	-	1
2. Cycle	-	1
3. Radio	-	1
4. Chair	-	1
5. Improved agricultural implements	-	2

Bhaskaran (1979) studied material possessions as the monetary value of goods possessed by respondents.

Prakash (1980) studied the material possessions with the following items and scores.

No animal	-	0
1-2 draught animal	-	1
2 and above	-	2
Cycle	-	1
Radio	-	1
Chair	-	1
Cots	-	1
Almarah	-	1
Agricultural implements	-	1

In the present study the material possessions was measured by using an index. The score was based on the monetary value of the goods the respondent possessed (in 1000). The following items were considered.

(1) Draught animal
(2) Power tiller
(3) Pump
(4) Iron plough
(5) Tractor
(6) Knapsack sprayer
(7) Power sprayer
(8) Cycle
(9) Scooter
(10) Boat

(11) Country boat
(12) Car
(13) Fan
(14) Mixe
(15) Fridge
(16) Radio
(17) Watch
(18) Others

The economic status score of an individual was obtained by adding up the scores obtained for farm size, house type and material possessions.

Perception

(a) Perception about operational research project

Perception about operational research project was measured by using statements. These respondents were asked to respond in a three point continuum as "Agree", "Undecided" and "Disagree". The percentage of respondents for each category were calculated.

(b) Perception of practices attributes

The perception of practice attributes were measured in a three point continuum. The attributes included were profitability, cost, difficult and usefulness of the practices. The responses were obtained in a three point continuum as follows:

Profitability	-	Very profitable, profitable, not profitable
Cost	-	Very costly, costly, not costly
Difficulty	-	Very difficult, difficult not difficult
Usefulness	-	Very useful, useful, not useful

Perception of problems in the adoption of recommended practices

Studying the problems involved in the adoption of recommended practices was one of the objectives of the study.

Based on the discussion with staff working in operational research project and the farmers of the area and also through a review of relevant literature, problems experienced by farmers in the adoption of recommended practices were identified. The list of problems was presented to the farmers.

The response to each problem was obtained in a three point continuum viz. 'Very important', 'Important' and 'Least important'. To find out the importance of the problems and to order them, a cumulative index was calculated. For this, a weightage of '3' was given to the response 'Very important', '2' to 'Important' and '1' 'Least important'. The frequency of response under each category was multiplied with the corresponding weightage and added upto get a cumulative index. Based on cumulative

index, the problems were ranked in the order of their importance.

Perception of problems by the officers working in the project

For this the officers were asked to write the social, administrative, organisational and technical problems faced by them in the transfer of technology.

Procedure followed in the collection of data

A draft of interview schedule was prepared for collecting data from farmers. Then it was pre-tested. Based on the results obtained from pre-test suitable modifications were made and thus the final interview schedule was prepared. The data from the farmers were collected by personal interview. The interview schedule was prepared in Malayalam. The interview schedule is given in Appendix - I (a).

For collecting the data from the staff working in the project, a questionnaire was used. By using the questionnaire the data were collected. The questionnaire is given in Appendix - I (b).

Procedures followed in statistical analysis

Normal deviate test

Normal deviate test was used to test the significance of difference between project area and shadow area with respect to knowledge level, attitude and adoption.

The formula used was:

$$t = \frac{m1 - m2}{\sqrt{\frac{S1^2}{n2} + \frac{S2^2}{n1}}}$$

where,

m1	=	mean score of the project area
m2	=	mean score of shadow area
$S1^2$	=	variance in the project area
$S2^2$	=	variance in the shadow area
n1	=	sample size of project area
n2	=	sample size of shadow area

Correlation co-efficient

To find out the extent of relationship between different variables, correlation co-efficients were calculated.

Level of significance

The level of significance fixed for the study was 0.05.

Frequency and percentage analysis

Frequency and percentage analysis also were used wherever applicable.

RESULTS

CHAPTER - IV

RESULTS

The results of the study are presented in the following sequence.

A. Impact of operational research project

I. Knowledge about recommended practices

(a) Level of knowledge on combined recommended practices.

(b) Level of knowledge about individual practices.

(c) Level of knowledge about chemical plant protection.

(d) Difference in knowledge on combined recommended practices between project and shadow area.

II. Attitude towards chemical plant protection

(a) Degree of attitude towards chemical plant protection.

(b) Difference in attitude towards chemical plant protection between project and shadow area.

III. Adoption of recommended practices

(a) Extent of adoption of combined recommended practices.

(b) Extent of adoption of each recommended practices.

(c) Difference in adoption of recommended practices between project and shadow area.

B. Relationship between the selected impact components

I. Relationship between knowledge and adoption of combined recommended practices.

II. Relationship between knowledge and adoption of chemical plant protection.

III. Relationship between attitude towards chemical plant protection and adoption of chemical plant protection.

C. Factors influencing the impact of operational research project

I. Age

(a) Relationship of age with knowledge on combined recommended practices.

(b) Relationship of age with attitude towards chemical plant protection.

(c) Relationship between age and adoption of combined recommended practices.

II. Education

(a) Level of education of the respondents.

(b) Relationship between education and knowledge on combined recommended practices.

(c) Relationship of education with attitude towards chemical plant protection.

(d) Relationship between education and adoption of combined recommended practices.

III. Economic status

(a) Economic status of the respondents.

(b) Relationship between economic status and knowledge on combined recommended practices.

(c) Relationship between economic status and attitude towards chemical plant protection.

(d) Relationship between economic status and adoption of combined recommended practices.

IV. Knowledge about operational research project

(a) Level of knowledge about operational research project in the project area.

(b) Relationship between knowledge about operational research project and knowledge on combined recommended practices.

(c) Relationship between knowledge about operational research project and attitude towards chemical plant protection.

(d) Relationship between knowledge about operational research project and adoption of combined recommended practices.

V. Attitude towards operational research project

(a) Degree of attitude towards operational research project.

(b) Relationship between attitude towards operational research project and knowledge on combined recommended practices.

(c) Relationship between attitude towards operational research project and attitude towards chemical plant protection.

(d) Relationship between attitude towards operational research project and adoption of combined recommended practices.

VI. Attitude towards scientific agriculture

(a) Degree of attitude towards scientific agriculture

(b) Relationship between attitude towards scientific agriculture and knowledge on combined recommended practices.

(c) Relationship between attitude towards scientific agriculture and attitude towards chemical plant protection.

(d) Relationship between attitude towards scientific agriculture and adoption of combined recommended practices.

D. Farmers' perception

I. Perception about operational research project.

II. Perception of the attributes of recommended practices.

(a) Perception of profitability of the recommended practices.

(b) Perception of difficulty of the recommended practices.

(c) Perception about the cost of the recommended practices.

(d) Perception of the usefulness of the recommended practices.

E. Perception of problems by farmers

F. Perception of staff

(a) Perception about the project and recommended practices.

(b) Perception of problems.

G. Suggestions by staff

A. The impact of operational research project

The impact of operational research was measured in terms of knowledge level on recommended practices, degree of attitude towards chemical plant protection and level of adoption of recommended practices.

I. Knowledge about recommended practices

(a) Level of knowledge on combined recommended practices

The distribution of respondents according to their level of knowledge score calculated from the knowledge level of all the recommended practices are presented in the taole - II (a).

The study revealed that there was no respondent in both project area and shadow area whose knowledge score was below 5.

In shadow area more than 50% of the respondents had knowledge score below 20, whereas in pro ect area it was only about 13%.

In the project area about 40% of the respondents had knowledge score above 30, whereas in shadow area it was only 6%.

In the project area the maximum number of respondents came in the score range of 30.1 to 35, that is 32.85% and in the shadow area the maximum respondents came in the score range 15.1 to 20, that is 28.57%. The mean knowledge score of project area was 27.94 and in shadow area it was 19.34. The maximum possible score was 45.

(b) Level of knowledge about individual practices

Percentages of farmers of the project and shadow area according to their level of knowledge about the individual recommended practices are given in the table - II (b) and a comparison chart shown in the Fig 2

The data revealed that the percentages of respondents having knowledge about recommended practices were more in project area than shadow area except for knowledge about the recommended spacing and knowledge about stem borer and the chemical for the control of it. No respondent from the project area and shadow area had knowledge about the recommended spacing.

Eventhough more than 85% of respondents in the project area had knowledge about the usefulness of wider spacing nobody had the knowledge about the recommended spacing.

In the case of chemical control of pests the percentage of respondents having knowledge about different aspects of chemical control of pest were almost same in project and shadow area.

In the case of chemical weed control all the respondents from the project area had knowledge about weedcide. But only about 36% of respondents from the project area and 16% from shadow area had knowledge about recommended dose of weedcide.

(c) Knowledge about chemical plant protection

Of the practices recommended for the integrated control of rice pests, the chemical method of pest control is an important

FIG. 2. Percentage of farmers having knowledge about each recommended practice in project and shadow area.

A. Knowledge about usefulness of cultivating pest tolerant varieties.

B. Knowledge about usefulness of advancing punja crop season.

C. Knowledge about the need of balanced application of NPK.

D. Knowledge about usefulness of flood fallowing.

E. Knowledge about usefulness of clean cultivation.

F. Knowledge about usefulness of draining off water from field.

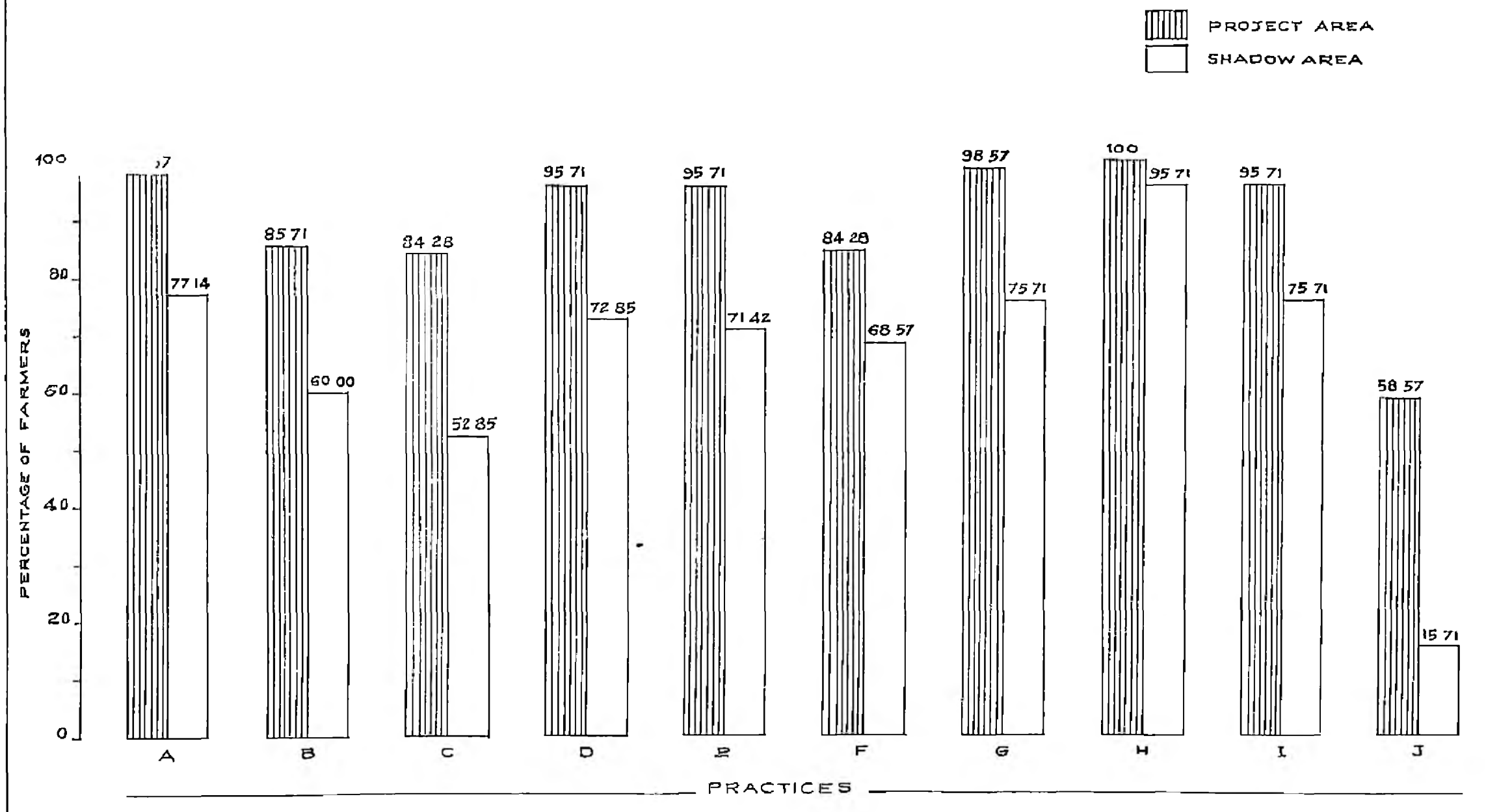
G. Knowledge about usefulness of the recommended dose of plant protection chemicals.

H. Knowledge about weedicide.

I. Knowledge about usefulness of mixing urea with neem or punna cake.

J. Knowledge about usefulness of spreading non-phytotoxic oils in the fields.

FIG 2 PERCENTAGE OF FARMERS HAVING KNOWLEDGE ABOUT EACH RECOMMENDED PRACTICE IN PROJECT AND SHADOW AREA



one. Hence the level of knowledge on chemical plant protection was calculated separately. The data are given in the table - II (c).

The data revealed that in the knowledge score range 0 - 5 there was only 11.42% respondents in the project area but in shadow area it was 38.57%.

In project area about 88% of the respondents had knowledge score above 6, where the mean score was 8.25. In shadow area 62% of respondents were below 6 and the mean score was 6.92.

The maximum number of respondents was in the score range of 6 - 10 both in the project area and shadow area and the percentages where 78.57% and 60% respectively. The maximum possible score was 15.

(d) Difference in knowledge on combined recommended practices

The calculated normal deviate value is presented in the table - III.

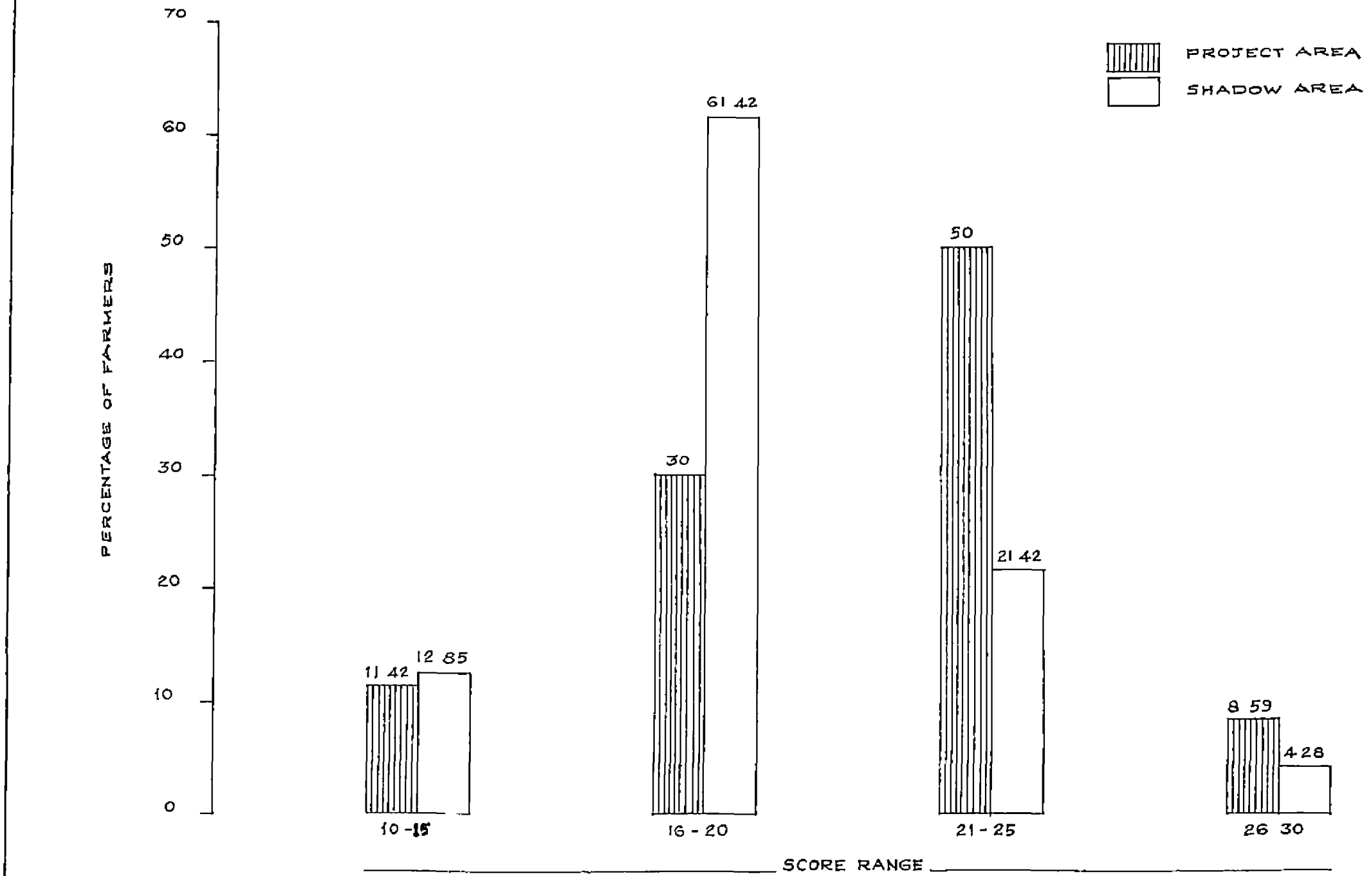
The calculated normal deviate value was higher than the table value which revealed that there was significant difference in knowledge on combined recommended practices between project area and shadow area. Hence the hypothesis A-I was accepted.

II. Attitude towards chemical plant protection

(a) Degree of attitude towards chemical plant protection

Frequency and percentage of respondents according to their attitude scores are presented in the table - IV and a bar chart at different score ranges is shown in the Fig 3

FIG 3 PERCENTAGE OF FARMERS IN DIFFERENT RANGES OF ATTITUDE SCORE TOWARDS CHEMICAL PLANT PROTECTION IN PROJECT AND SHADOW AREA



In the project area more than 58% of the respondents had attitude score above 21, where the mean score was 20.97. In shadow area only 30% of the respondents had attitude score above 21, where the mean score was 18.97.

There was 50% of respondents in the attitude score range of 21 - 25 in the project area. In shadow area the percentage of respondents in the score 16 - 20 was 61.42%. The maximum possible score was 30.

(b) Difference in attitude towards on chemical plant protection

The calculated normal deviate value is presented in the table - III.

The calculated value was higher than the table value which revealed significant difference in attitude towards chemical plant protection between project area and shadow area. Hence the hypothesis A-2 was accepted.

III. Adoption of recommended practices

(a) Extent of adoption of combined recommended practices.

The frequency and percentage of respondents according to their adoption score are presented in the table - V (a).

The data revealed that there was no respondent both in project and shadow area whose adoption score was below 10. There was no respondent in the project area whose adoption score was below 40 but 20% respondents were in this category is shadow area.

In project area more than 62% of the respondents had adoption score above 70, where the mean score was 72.57. But in shadow area it was only 16%, where the mean was 54.03. The maximum number of respondents come in the range 70.01 to 80 in project area.

(b) Extent of adoption of each recommended practices

The respondents were grouped into a full adopters, partial adopters and non adopters for each practice. The data in percentage are presented in the table - v (b). A comparison chart of full adopters is shown in the Fig 4

The data revealed that for all practices the percentage of full adopters were more in project area than that of shadow area except for providing wider spacing which was not adopted by any respondents from project and shadow area.

In the case of pest tolarent variety, chemical weed control and mixing urea with neem or punna cake the percentage of respondents who adopted the practices partially were more in project area than shadow area. The percentage of partial adopters were more in shadow area for balanced manuring and chemical control of Brown Plant Hopper.

For all the practices non adopters were more in shadow area. In the case of balanced manuring there was no respondent under no adoption category in both project and shadow area.

(c) Difference in adoption of combined recommended practices

The calculated normal deviate value is presented in the table - III.

FIG. 4. Percentage of full adopters for each recommended practice in project and shadow area.

A. Cultivation of pest tolerant varieties.

B. Advancing punja crop season.

C. Balanced manuring.

D. Flood fallowing.

E. Clean cultivation.

F. Adoption of chemical control for Brown Plant Hopper.

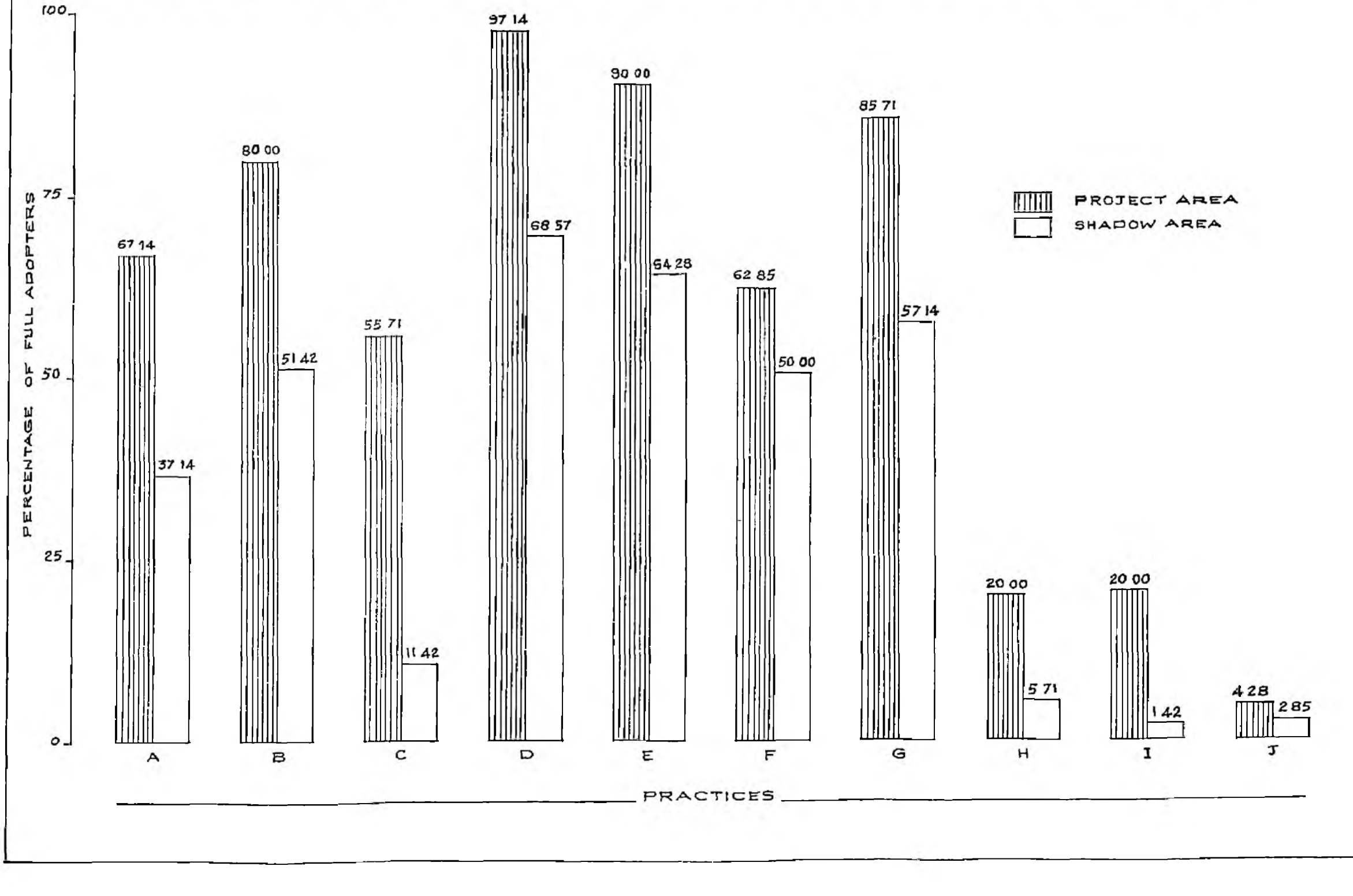
G. Draining off water from field.

H. Spreading non-phytotoxic oils in the field.

I. Chemical weed control.

J. Mixing urea with neem or punna cake.

FIG 4 PERCENTAGE OF FULL ADOPTERS FOR EACH RECOMMENDED PRACTICE IN PROJECT AND SHADOW AREA



The calculated value was higher than the table value which revealed significant difference in adoption of combined recommended practices between project and shadow area. Hence the hypothesis A-3 was accepted.

B. Relationship between the selected impact components

I. Relationship between knowledge of combined recommended practices and adoption of combined recommended practices.

Calculated correlation coefficients are presented in the table - VI (a).

The calculated correlation coefficients were higher than the table value and hence it was revealed that there was significant relationship between knowledge of combined recommended practices and adoption of combined recommended practices in project and shadow area. Hence the hypothesis A-4 was accepted.

II. Relationship between knowledge about chemical plant protection and adoption of chemical plant protection

The calculated correlation coefficients are presented in the table - VI (b).

The calculated correlation showed significant relationship between knowledge about chemical plant protection and adoption of chemical plant protection in project and shadow area. Hence the hypothesis A-5 was accepted.

III. Relationship between attitude towards chemical plant protection and adoption of chemical plant protection

Correlation coefficients were calculated to find out the relationship between attitude towards chemical plant

protection and adoption of chemical plant protection. The values are presented in the table - VI (c).

The findings indicated that there was no significant relationship between attitude towards chemical plant protection and adoption of chemical plant protection in the project area but it showed significant relationship in the shadow area. Hence the hypothesis A-6 was rejected with respect to project area.

C. Factors influencing the impact of operational research project

I. Age

(a) Relationship of age with knowledge on combined recommended practices

The calculated correlation coefficients are presented in the table - VII.

The calculated correlation coefficients values were not significant for the project and shadow area. Hence the hypothesis B-1 was accepted.

(b) Relationship of age with attitude towards chemical plant protection

The calculated correlation coefficients are presented in the table - VII.

The findings revealed that there was no significant relationship between age and attitude towards chemical plant protection in the project and shadow area. Hence the hypothesis C-1 was accepted.

(c) Relationship between age and adoption of combined recommended practices

The calculated correlation coefficients were shown in the table - VII.

The computed correlation coefficients were not significant which revealed that there was no significant relationship between age and adoption of combined recommended practices in the project and shadow area. Hence the hypothesis D-1 was accepted.

II. Education

(a) Level of education of respondents

Percentage and frequency of the respondents according to their education level are presented in the table - VIII(a).

The data revealed that more than 75% of the respondents in the project and shadow area were having education above middle school.

The mean scores were 4.45 and 4.41 respectively for project and shadow area.

(b) Relationship between education and knowledge on combined recommended practices

The calculated correlation coefficients are presented in the table - VIII (b).

The data revealed that there was no significant relationship between education and knowledge on combined recommended

Practices in the project area but it showed significant relationship in shadow area. Hence the hypothesis B-2 was rejected in the case of project area.

(c) Relationship between education and attitude towards chemical plant protection

The computed correlation coefficients are presented in the table - VIII (b).

The calculated correlation coefficient for project area was significant. But for the shadow area it was not significant. Hence the hypothesis C-2 was accepted in the case of project area.

(d) Relationship between education and adoption of combined recommended practices

Correlation coefficients are presented in the Table VIII (b).

It was revealed from the correlation coefficients that no significant relationship existed between education and adoption of combined recommended practices in the project and shadow area. Hence the hypothesis D-2 was rejected.

III. Economic status

(a) Economic status of the respondents

Frequency and percentage of respondents according to their level of economic status are presented in the table - IV (a).

More than 70% of the respondents in the project and shadow area were below the economic status score of 20. The mean economic status score were 21.75 and 10.82 for project and shadow area respectively.

The project area about 25% of the respondents had economic status score more than 90. In shadow area only about 8% of the respondents had the economic status score more than 20 and no respondent had the economic status more than 50.

(b) Relationship between economic status and knowledge on combined recommended practices

The calculated correlation coefficients are presented in the table - IX (b).

The calculated correlation coefficients revealed significant relationship between economic status and knowledge on combined recommended practices in the project and shadow area. Hence the hypothesis B-3 was accepted.

(c) Relationship between economic status and attitude towards chemical plant protection

The calculated correlation coefficients are presented in the table - IX (b).

The correlation coefficient values revealed that there was no significant relationship between economic status and attitude towards chemical plant protection in the project area. But it showed significant relationship in shadow area. Hence the hypothesis C-3 was rejected in the case of project area.

(d) Relationship between economic status and adoption of combined recommended practices

The calculated correlation coefficient values are presented in the table - IX (b).

The relationship was not significant in the project and shadow area. Hence the hypothesis D-3 was rejected.

IV. Knowledge about operational research project

(a) Level of knowledge about operational research project in the project area

Frequency and percentage of respondents according to their level of knowledge about operational research project are presented in the table - X (a).

The data revealed that more than 90% of the respondents had knowledge score above 3. The maximum possible score was 6. Only 8.57% respondents had knowledge score below 2. The mean score was 4.1.

(b) Relationship between knowledge about operational research project and knowledge on combined recommended practices in the project area

The calculated correlation coefficient value is presented in the table - X (b).

The computed correlation coefficient value revealed that there was significant relationship between these two variables. Hence the hypothesis B-4 was accepted.

(c) Relationship between knowledge about operational research project and attitude towards chemical plant protection in the project area

The calculated correlation coefficient is presented in the table - X (b).

The calculated correlation coefficient revealed significant relationship between these two variables. Hence the hypothesis C-4 was accepted.

(d) Relationship between knowledge about operational research project and adoption of combined recommended practices in the project area

The computed correlation coefficient is presented in the table - X (b).

The finding revealed significant relationship. Hence the hypothesis D-4 was accepted.

V. Attitude towards operational research project

(a) Degree of attitude towards operational research project in project area

Frequency and percentage of respondents according to their attitude score are presented in the table - XI (a).

The data revealed that more than 70% of the respondents had attitude score above 26. The maximum possible score was 40. Only about 6% of the respondents were below the attitude score of 16. The maximum number of respondents came in the range of 31 - 35. The mean attitude score was 27.62.

(b) Relationship between attitude towards operational research project and knowledge on combined recommended practices in the project area

The calculated correlation coefficient value is presented in the table - XI (b).

The calculated correlation coefficient showed significant relationship between the above two variable. Hence the hypothesis B-5 was accepted.

(c) Relationship between attitude towards operational research project and attitude towards chemical plant protection in the project area

The correlation coefficient value is presented in the table XI - (b).

The correlation coefficient value revealed that there was significant relationship between the above two variables. Hence the hypothesis C-5 was accepted.

(d) Relationship between attitude towards operational research project and adoption of combined recommended practices in the project area

The correlation coefficient is presented in the table - XI (b).

The correlation coefficient showed significant relationship. Hence the hypothesis D-6 was accepted.

VI. Attitude towards scientific agriculture

(a) Degree of attitude towards scientific agriculture

Frequency and percentage of respondents according to their attitude score are presented in the table - XII (a).

The data revealed that there was no respondent below the score of 6 both in project and shadow area. In shadow area more than 56% of the respondents were below the attitude of 15. The maximum possible score was 25. In project area 57.14%, respondents were in the range 16 - 20. In shadow area the maximum respondents came in the range of 11 - 15. The mean score were 15.87 and 14.82 for project and shadow area respectively.

(b) Relationship between attitude towards scientific agriculture and knowledge on combined recommended practices

The calculated correlation coefficient values are presented in the table - XII (b).

The values were significant in the project and shadow area. Hence the hypothesis 8-6 was accepted.

(c) Relationship between attitude towards scientific agriculture and attitude towards chemical plant protection

The calculated correlation coefficient values are presented in the table - XII (b).

The calculated correlation coefficient values revealed that there was significant relationship between the above

two variables in the project and shadow area. Hence the hypothesis C-6 was accepted.

(d) Relationship between attitude towards scientific agriculture and adoption of combined recommended practices

The calculated correlation coefficients are presented in the table - XII (b).

The findings revealed that there was significant relationship between the above two variables in project and shadow area. Hence the hypothesis D-6 was accepted.

A diagramatic representation of the relationship between dependent and independent variables is shown in the FIG 5

D. Farmers' perception

1. Perception about operational research project in the project area

Frequency and percentage of respondents according to their perception about operational research project is presented in the table - XIII (a).

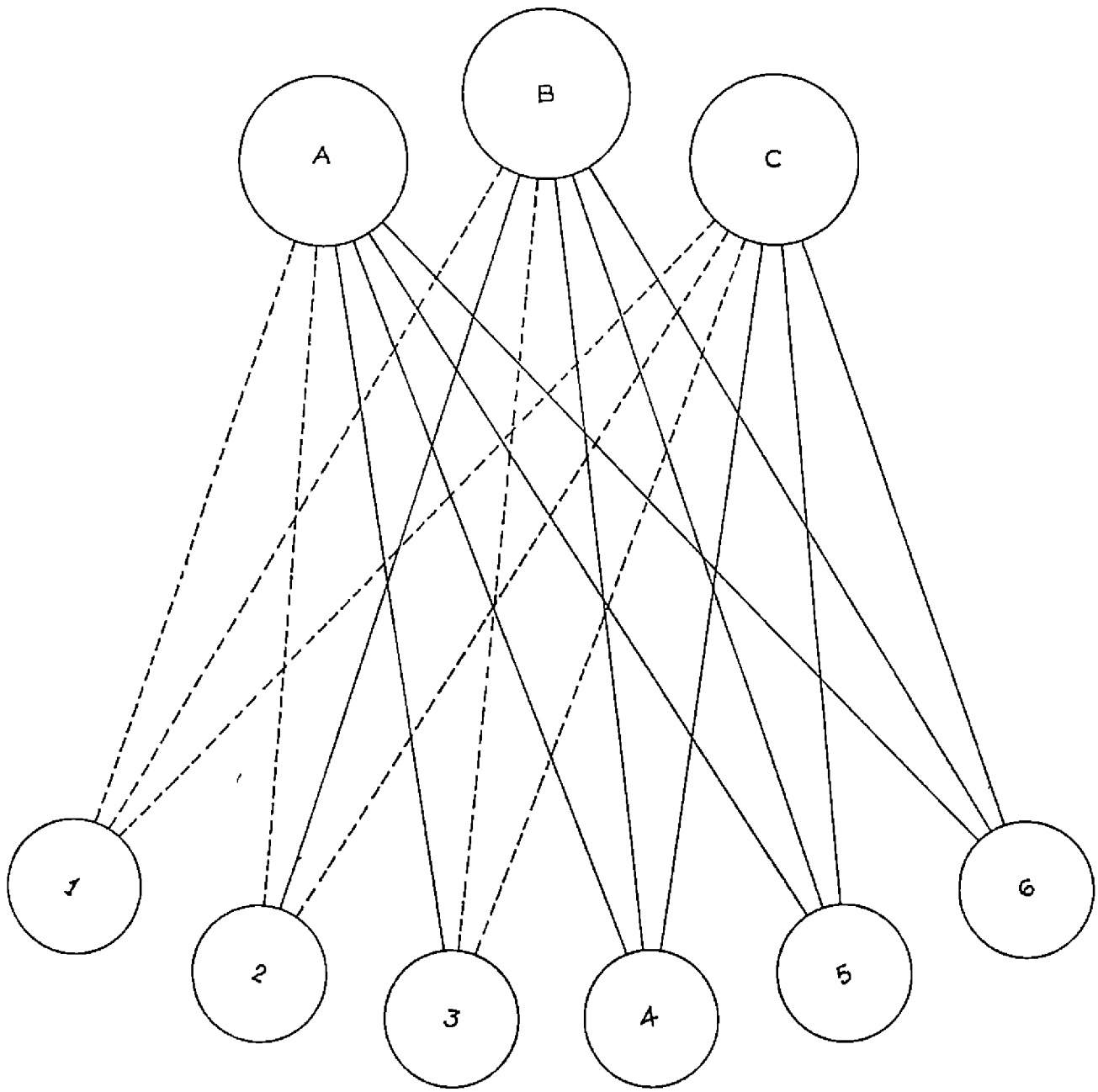
The data revealed that more than 90% of the respondents perceived that operational research was 'useful'. Only about 6% was perceived it was 'not useful'.

About 60% of the respondents felt that operational research project was 'helpful' for the control of rice pests.

More than 80% respondents perceived that operational research project increased knowledge level on new technology.

More than 65% of the respondents perceived that operational research project created interest among farmers to adopt new technology.

FIG 5 DIAGRAMATIC REPRESENTATION SHOWING THE RELATIONSHIP OF KNOWLEDGE ATTITUDE AND ADOPTION WITH INDEPENDANT VARIABLES



——————— SIGNIFICANT RELATIONSHIP

– – – – – – – – – – – – – – – NO RELATIONSHIP

A	KNOWLEDGE ON COMBINED RECOMMENDED PRACTICES
B	ATTITUDE TOWARDS CHEMICAL PLANT PROTECTION
C	ADOPTION OF COMBINED RECOMMENDED PRACTICES
1	AGE
2	EDUCATION
3	ECONOMIC STATUS
4	KNOWLEDGE ABOUT OPERATIONAL RESEARCH PROJECT
5	ATTITUDE TOWARDS OPERATIONAL RESEARCH PROJECT
6	ATTITUDE TOWARDS SCIENTIFIC AGRICULTURE

Thirty five per cent of the respondents perceived that operational research project increased the yield of rice and almost the same number perceived that the operational research project has helped only the rich farmers.

II. Perception of the attributes of the recommended practices

1. Perception of profitability of the recommended practices

Percentages of respondents according to their perception of profitability of each practices are presented in the table XIII (b).

The data revealed that the percentage of respondents was more in project area than shadow area who perceived the recommended practices as 'profitable' expect for the practice of providing 'wider spacing', no respondent from project and shadow area perceived it as 'profitable'.

2. Perception of difficulty of the recommended practices

The percentage of respondents according to their perception of difficulty of the recommended practices are presented in the table - XIII (c).

For all the practices the percentages of respondents in project and shadow area were almost same with regard to their perception of 'difficulty' of each recommended practice.

In the case of chemical pest control about 27% of respondents in the shadow area perceived it as a 'difficult'

practice but in project area nobody perceived it as a difficult practice.

3. Perception about the cost of the recommended practices

Percentages of respondents according to their perception about the cost involved in the adoption of individual practices are presented in the table - XIII (d).

For all practices the percentage of respondents were somewhat more in project area than in shadow area. The respondents in project area did not perceive the practices as 'costly' as the respondents in shadow area.

4. Perception of usefulness of recommended practices

Percentages of respondents according to their perception of usefulness of the practices are presented in the table - XIII (e).

The data revealed that for all the three practices the percentages of respondents were somewhat more in project area than shadow area. In the case of chemical weed control all the respondents in the project area perceived it as useful.

E. Perception of problems

The problems perceived by farmers of the project area in the adoption of recommended practices are presented in the table - XIV.

Of the 16 problems high cost of fertilizers, low price of paddy, lack of capital were the three important problems as per ranks. Non-availability of fertilizers and chemical

and non-availability of labourers in peak season were least important problems.

F. Perception of staff

1. Perception of staff about operational research project

Percentages of staff according to their perception about operational research project are presented in the table - XV (a).

All the staff in the project were of the opinion that operational research project was 'useful' in controlling rice pests and 'suitable' to Kuttanad region. But only 90% of the staff were of the view that this project should be extended to other areas also.

II. Perception of staff about the recommended practices attributes

(a) Perception of profitability of practices

The perception of profitability of the recommended practices are presented in the table - XV (b).

More than 80% of the staff perceived most of the recommended practices as profitable. In the case of providing wider spacing and spreading non-phytoxic oils only 50% and 70% of the staff respectively perceived as profitable practices.

(b) Perception of difficulty of the practices

Percentage of staff according to their perception of difficulty of adoption of the practices by farmers are presented in the table - XV (c).

The data revealed that advancing punja crop, clean cultivation and draining water from field were perceived as 'difficult' by 40%, 70% and 30% of the staff respectively. Majority of the staff perceived all the other practices as 'not difficult' practices for adoption.

(c) Perception about the cost of recommended practices

Percentages of staff according to their perception about the cost of the practices are presented in the table - XV (d).

Cultivation of pest tolerant variety and advancing punja crop season were perceived as 'not costly' practices by all the respondents. Clean cultivation and draining off water from the field were perceived as 'costly' practices by all the respondents.

More than 50% of the respondents perceived balanced manuring, providing wider spacing and chemical weed control as 'not costly' practices.

Only 10% respondents were of the opinion that flood fallowing and mixing urea were costly practices.

III. Perception of problems

The problems perceived by the staff working in the project are presented in the table-XV (e).

Of the 12 problems identified the most important among them were lack of co-ordination between Agricultural University and State Department of Agriculture, inadequate budget provision and lack of sufficient staff.

IV. Suggestions of staff

Suggestion of staff for the better implementation of the project are presented in the table - XV (f).

Twelve suggestions were put forward . by the staff for the better implementation of the project. The important ones were (1) project should be brought under single administrative head (2) number of staff should be increased and (3) adequate funds should be provided.

Table - II (a). Distribution of combined recommended practices knowledge score of the respondents in the project and shadow area.

Range of score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
0 - 5	0	0	0	0
5.1 - 10	0	0	6	8.57
10.1 - 15	2	2.85	14	20.00
15.1 - 20	7	10.00	20	28.57
20.1 - 25	14	20.00	14	20.00
25.1 - 30	19	27.15	12	17.14
30.1 - 35	23	32.85	4	5.72
35.1 - 40	5	7.15	0	0
Total	70		70	
Mean score	27.94		19.34	

Table - II (b). Percentage of farmers having knowledge of specific recommended practices.

Practices	Percentage of farmers having knowledge	
	Project area	Shadow area
1	2	3
Cultivation of pest tolerant varieties		
1. Knowledge about usefulness of cultivating pest tolerant varieties	98.57	77.14
2. Knowledge about pest tolerant variety	84.28	61.42
Advancing punja crop season		
1. Knowledge about usefulness of advancing punja crop season	85.71	60.00
2. Knowledge about the recommended month for starting punja crop	100.00	91.42
Providing recommended (wider) spacing		
1. Knowledge about usefulness of providing wider spacing	87.14	28.57
2. Knowledge about recommended spacing	0	0
Balanced manuring		
1. Knowledge about essential nutrients required by rice plants	74.28	45.71
2. Knowledge about the need of balanced application of NPK	84.28	52.85

(contd...)

1	2	3
3. Knowledge about recommended dose of nitrogen	77.14	35.71
4. Knowledge about recommended dose of phosphorus	65.71	20.00
5. Knowledge about recommended dose of potash	95.71	60.00
Flood fallowing		
1. Knowledge about usefulness of flood fallowing	95.71	72.85
2. Knowledge about advantages of flood fallowing	55.71	15.71
Clean cultivation		
1. Knowledge about usefulness of clean cultivation	95.71	71.42
2. Knowledge about the advantages of clean cultivation	44.28	12.85
Draining off water from field		
1. Knowledge about usefulness of draining off water from field	84.28	68.57
Chemical control of pests		
1. Knowledge about usefulness of the recommended dose of plant protection chemicals	98.57	75.71
2. Knowledge about the chemical for the control of Brown Plant Hopper (BPH)	97.14	85.71

(contd.....)

1	2	3
3. Knowledge about the dose of chemical for the control of BPH	75.71	50.00
4. Knowledge about Leaf Roller Pest	88.57	71.42
5. Knowledge about the chemical for the control of Leaf roller	84.28	58.57
6. Knowledge about the dose chemical for controlling leaf roller	51.42	22.85
7. Knowledge about stem borer	20	27.14
8. Knowledge about the chemical for the control of stem borer	18.57	24.28
9. Knowledge about the dose of chemical for the control stem borer	14.28	7.14
Chemical weed control		
1. Knowledge about weedicide	100	95.71
2. Knowledge about the recommended dose of weedicide	35.71	15.71
3. Knowledge about the recommended time of application of weedicide	85.71	64.28
Mixing area with neem or punna cake		
1. Knowledge about usefulness of mixing area with punna or neem cake	95.71	75.71
2. Knowledge about the ratio of mixing area with punna or neem cake	47.14	24.28

(contd.....)

1	2	3
Spreading non-phytoxic oils		
1. Knowledge about the usefulness of spreading non-phytoxic oils in the fields	58.57	15.71
2. Knowledge about recommended oils	87.14	70.00
3. Knowledge about the advantages of spreading oils in the fields	32.85	7.14

Table - II (c). Distribution of score on knowledge about chemical plant protection.

Range of score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
0 - 5	8	11.43	27	38.57
6 - 10	55	78.57	42	60.00
11 - 15	7	10.00	1	1.43
Total	70		70	
Mean score	8.25		6.92	

Table - III. Difference between project area and shadow area with respect to knowledge, attitude and adoption.

Variables	Normal deviate value	Inference
Knowledge on combined recommended practices	8.0948	Significant difference
Attitude towards chemical plant protection	3.3563	Significant difference
Adoption of combined recommended practices	8.0218	Significant difference

Significant at 0.05 level.

Table - IV. Distribution of scores on attitude towards chemical plant protection.

Range of score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
10 - 15	8	11.42	9	12.85
16 - 20	21	30.00	43	61.45
21 - 25	35	50.00	15	21.42
26 - 30	6	8.58	3	4.28
Total	70		70	
Mean score	20.97		18.97	

Table - V (a). Distribution of scores on adoption of combined recommended practices.

Range of score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
0 - 10	0	0	0	0
10.01 - 20	0	0	1	1.42
20.01 - 30	0	0	4	5.75
30.01 - 40	0	0	9	12.85
40.01 - 50	4	5.73	12	17.14
50.01 - 60	6	8.57	21	30.00
60.01 - 70	16	22.85	12	17.14
70.01 - 80	27	38.57	8	11.42
80.01 - 90	12	17.14	3	4.23
90.01 - 100	5	7.14	0	0
Total	70		70	
Mean score	72.57		54.03	

Table - V (b). Distribution of farmers on the basis of extent of adoption of each recommended practice in the project and shadow area.

Practice	Percentage of farmers					
	Full adoption		Partial adoption		No adoption	
	Project area	Shadow area	Project area	Shadow area	Project area	Shadow area
a. Cultivation of pest tolerant varieties	67.14	37.14	15.72	11.44	17.14	51.42
b. Advancing punja crop season	80.00	51.44	0	0	20.00	48.57
c. Providing wider spacing	0	0	0	0	100.00	100.00
d. Balanced manuring	55.72	11.42	44.28	88.58	0	0
e. Flood fallowing	97.15	68.57	0	0	2.85	31.43
f. Clean cultivation	90.00	64.28	0	0	10.00	35.72
g. Adoption of chemical control for Brown Plant Hopper	62.85	50.00	37.15	42.86	0	7.14
h. Draining water from field	85.72	57.15	0	0	14.28	42.85
i. Spreading non-phytoxic oils	20.00	5.71	2.85	0	78.85	92.85
j. Chemical weed control	20.00	1.43	60.00	58.57	20.00	40.00
k. Mixing urea with neem cake	4.28	2.85	47.15	30.00	48.57	67.15

Table - VI (a). Relationship between knowledge of combined recommended practices andadoption of combined recommended practices.

Area	Correlation coefficient	Inference
Project area	0.4803	Significant relation
Shadow area	0.7546	Significant relation

Table - VI (b). Relationship between knowledge of chemical plant protection and adoption of chemical plant protection.

Area	Correlation coefficients	Inference
Project area	0.2631	Significant relation
Shadow area	0.4501	Significant relation

Table - VI (c). Relationship between attitude towards chemical plant protection and adoption of chemical plan protection.

Area	Correlation coefficient	Inference
Project area	0.0248	Not significant
Shadow area	0.2529	Significant relation

Significant at 0.05 level

Table - VII. Relationship of age with dependent variables.

Dependent variables	Correlation coefficients	
	Project area	Shadow area
Knowledge about combined recommended practices	0.0017 N.S.	-0.1019 N.S.
Attitude towards chemical plant protection	-0.1473 N.S.	0.0337 N.S.
Adoption of combined recommended practices	-0.1701 N.S.	0.0599 N.S.

N.S. Not Significant

Table - VIII (a). Level of education of respondents.

Score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
0	0	0	0	0
1	0	0	0	0
2	2	2.86	1	1.43
3	8	11.43	12	17.14
4	27	38.57	20	28.57
5	28	40.00	33	47.14
6	5	7.14	4	5.72
Mean score	4.45		4.41	

Table - VIII (b). Relationship of education with dependent variables.

Dependent variables	Correlation coefficients	
	Project area	Shadow area
Knowledge about combined recommended practices	0.2285 N.S.	0.2901*
Attitude towards chemical plant protection	0.2498*	0.0670 N.S.
Adoption of combined recommended practices	-0.0261 N.S.	0.2116 N.S.

* Significant at 0.05 level

N.S. Not Significant

Table - IX (a). Distribution of economic status score of farmers in the project and shadow area.

Range of score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
0 - 10	27	38.57	38	54.28
11 - 20	25	35.75	26	37.14
21 - 30	5	7.14	4	5.73
31 - 40	6	8.57	2	2.85
41 - 50	1	1.42	0	0
51 - 60	0	0	0	0
61 - 70	0	0	0	0
71 - 80	0	0	0	0
81 - 90	0	0	0	0
91 - 100	2	2.85	0	0
101 - 110	2	2.85	0	0
111 - 120	2	2.85	0	0
Total	70		70	
Mean score	21.75		10.82	

Table - IX (b). Relationship of economic status with dependent variables.

Dependent variables	Correlation coefficients	
	Project area	Shadow area
Knowledge about combined recommended practices	0.4503*	0.3094*
Attitude towards chemical plant protection	0.0871 N.S.	0.2795*
Adoption of combined recommended practices	0.1132 N.S.	0.2304 N.S.

* Significant at 0.05 level

N.S. Not Significant

Table - X (a). Distribution of score on knowledge about operational research project.

Score range	Project area	
	Frequency	Percentage
0 - 2	6	8.57
3 - 4	32	45.72
5 - 6	32	45.71
Mean score	4.1	

Table - X (b). Relationship of knowledge about operational research project with dependent variables.

Dependent variables	Correlation coefficients
Knowledge about combined recommended practices	0.5531*
Attitude towards chemical plant protection	0.3421*
Adoption of combined recommended practices	0.3037*

* Significant at 0.05.

Taole - XI (a). Distrioution of farmers on the basis of scores on attitude towards operational research project in project area.

Range of score	Frequency	Percentage
0 - 5	4	5.73
6 - 10	0	0
11 - 15	0	0
16 - 20	5	7.14
21 - 25	10	14.28
26 - 30	21	30.00
31 - 35	24	34.28
36 - 40	6	8.57
Total	70	
Mean score	27.62	

Table - XI (b). Relationship of attitude towards operational research project with dependent variables.

Dependent variables	Correlation coefficients
Knowledge about combined recommended practices	0.5713*
Attitude towards chemical plant protection	0.2848*
Adoption of combined recommended practices	0.3671*

* Significant at 0.05 level

Table - XII (a). Distribution of scores on attitude towards scientific agriculture.

Range of score	Project area		Shadow area	
	Frequency	Percentage	Frequency	Percentage
0 - 5	0	0	0	0
6 - 10	1	1.42	4	5.71
11 - 15	28	40.00	36	51.44
16 - 20	40	57.16	26	37.14
21 - 25	1	1.42	4	5.71
Total	70		70	
Mean score	15.87		14.82	

Table - XII (b). Relationship of attitude towards scientific agriculture with dependent variables.

Dependent variables	Correlation coefficients	
	Project area	Shadow area
Knowledge about combined recommended practices	0.4176*	0.6587*
Attitude towards chemical plant protection	0.4535*	0.7257*
Adoption of combined recommended practices	0.4685*	0.5113*

* Significant at 0.05 level

Table - XIII (a). Distribution of farmers according to their perception about operational research project.

Attributes	Agree		Undecided		Disagree	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Useful	62	92.53	1	1.49	4	5.97
Not providing new technology	5	7.46	6	8.95	56	83.58
Helped in increasing knowledge about plant protection	54	80.59	7	10.44	6	8.95
Created interest to adopt practices	44	65.67	11	16.41	12	17.91
Helpful for the control of rice pests	40	59.70	6	8.95	56	83.58
Helped in increasing the yield of rice	24	35.82	4	5.97	39	58.20
Helpful only to rich farmers	25	37.31	2	2.98	40	59.70

Table - XIII (b). Distribution of farmers on the basis of perception of profitability of the practices.

Practices	Percentage of farmers			
	Project area		Shadow area	
	Profitable	Not Profitable	Profitable	Not profitable
Cultivation of pest tolerant varieties	88.57	11.42	71.42	28.57
Advancing punja crop season	71.42	28.57	52.85	47.14
Providing wider spacing	0	100.00	0	100.00
Balanced manuring	82.85	17.14	48.57	51.42
Flood fallowing	82.85	17.14	55.71	44.28
Clean cultivation	81.42	18.57	51.42	48.57
Draining off water from field	70.00	30.00	42.85	57.14
Chemical pest control	92.85	7.14	50.00	50.00
Spreading non-phytotoxicoils	20.00	80.00	7.14	92.85
Chemical weed control	100.00	0	97.14	2.85
Mixing Urea with neem cake	85.71	14.28	64.28	35.71

Table - XIII (c). Distribution of farmers on the basis of perception of difficulty of the practices.

Practices	Percentage of farmers			
	Project area		Shadow area	
	Difficult	Not difficult	Difficult	Not difficult
Cultivation of pest tolerant variety	8.57	91.42	25.71	74.28
Advancing punja crop season	87.14	12.85	87.14	12.85
Providing wider spacing	72.85	27.14	84.28	15.71
Balanced manuring	0	100	0	100
Flood fallowing	11.42	88.57	21.42	78.57
Clean cultivation	11.42	88.57	17.14	82.85
Draining water from field	15.71	84.28	27.14	72.85
Chemical pest control	0	100	27.14	72.85
Spreading non-phytotoxic oils	35.71	64.28	45.71	54.28
Chemical weed control	1.42	98.57	14.28	85.71
Mixing urea with neem cake	14.28	85.71	15.71	84.28

Table - XIII (d). Distribution of farmers on the basis of perception of cost of the practices.

Practices	Percentage of farmers			
	Project area		Shadow area	
	Costly	Not costly	Costly	Not costly
Cultivation of pest tolerant varieties	21.42	78.57	54.28	45.71
Advancing punja crop season	41.42	58.58	62.85	37.14
Balanced manuring	54.28	45.71	71.42	28.57
Flood fallowing	22.85	77.14	55.71	44.28
Clean cultivation	42.85	57.14	60.00	40.00
Draining water from field	44.28	55.71	71.42	28.57
Chemical pest control	85.71	14.85	92.85	7.14
Spreading non-phytoxic oils in the field	90.00	10.00	95.71	4.28
Mixing urea with neem cake	85.72	14.28	91.42	8.57

Table - XIII (e). Distribution of farmers on the basis of perception of usefulness of the practices.

Practices	Percentage of farmers			
	Project area		Shadow area	
	Useful	Not useful	Useful	Not useful
Advancing punja crop season	78.57	21.14	58.57	41.42
Balanced manuring	87.14	12.85	62.85	37.14
Chemical weed control	100.00	0	97.14	2.85

Table - XIV. Problems perceived by farmers in the adoption of recommended practices

Sl. No.	Problem	Score	Rank No.
1	High cost of chemical fertilizers	167	1
2	Low price of paddy	166	2
3	Lack of capital	164	3
4	High wage of rate of labourers	143	4
5	Lack of sincerity among labourers	142	5
6	Lack of provision for soil testing	122	6
7	Lack of facilities for repairing plant protection equipments	110	7
8	Less transport facilities	109	8
9	Lack of co-operation among farmers for better plant protection	109	9
10	Less availability of plant protection equipments	98	10
11	Lack of facilities to contact operational research project staff	97	11
12	Training and discussion are not conducting timely	96	12
13	Non availability of technical advise in time	94	13
14	Inadequate staff	90	14
15	Non availability of fertilizers and chemicals in time	82	15
16	Non availability of labourers in peak season	80	16

Table - XV (a). Distribution of staff according to their perception about operational research project.

Attributes	Percentage of staff	
	Useful	Not useful
Useful for controlling rice pests	100	0
	Suitable	Not suitable
Suitable to Kuttanad region	100	0
	Agree	Disagree
Should be extended to other areas	90	10

Table - XV (b). Distribution of staff according to their perception of profitability of the recommended practices.

Practices	Percentage of staff	
	Profitable	Not profitable
Cultivation of pest tolerant variety	100	0
Advancing punja crop	90	10
Balanced manuring	100	0
Providing recommended spacing	50	50
Clean cultivation	100	0
Flood fallowing	90	10
Draining off water from field	90	10
Chemical pest control	80	20
Spreading non-phytotoxic oils	70	30
Chemical weed control	100	0
Mixing urea with neem cake	100	0

Table - XV (c). Distribution of staff according their perception of difficulty of recommended practices.

Practices	Percentage of staff	
	Difficult	Not difficult
Cultivation of pest tolerant variety	10	90
Advancing punja crop	40	60
Balanced manuring	10	90
Clean cultivation	70	30
Flood fallowing	10	90
Draining off water from field	30	70
Mixing urea with neem cake	20	80

Table - XV (d). Distribution of staff according to their perception of about the cost of the recommended practices.

Practices	Percentage of staff	
	Costly	Not costly
Cultivation of pest tolerant variety	0	100
Advancing punja crop	0	100
Balanced manuring	30	70
Providing recommended spacing	40	60
Clean cultivation	100	0
Flood fallowing	10	90
Draining off water from field	70	30
Chemical pest control	100	0
Spreading non-phytoxic oils	70	30
Chemical weed control	50	50
Mixing urea with neem cake	10	90

Table - XV (e). Problems perceived by the staff working in the operational research project in the transfer of technology.

Sl. No.	Problems	Percentage of respondents	Rank No.
1	Lack of co-ordination between State Agricultural Department and Agricultural University	40	1
2	Inadequate budget provision	40	2
3	Lack of sufficient staff	30	3
4	Lack of infrastructural facilities	30	4
5	Lack of transport facilities	30	5
6	High wage rate of labourers	20	6
7	Labour problems	20	7
8	Lack of communication facilities	20	8
9	Risk involved in the adaptive trails are not compensated	10	9
10	Political involvements	10	10
11	Adverse climatic factors	10	11
12	Difference in opinion among farmers	10	12

Table - XV (f). Suggestions by the staff working in the operational research project for the better implementation of the project.

Sl. No.	Suggestions	Percentage of staff	Rank No.
1	Operational research project should be brought under single administrative head	30	1
2	The present staff number is inadequate, it should be strengthened	20	2
3	Provision for funds and transport facilities should be provided	20	3
4	Farmers should provide more incentives to conduct demonstrations	10	4
5	Agro clinics should be opened at different centres	10	5
6	Agro clinics should oe oriented in a scientific manner	10	6
7	Training should be provided to the staff in recent technological advances	10	7
8	Clerical staff number should be increased	10	8
9	Separate vehicle should be provided for the Agricultural Department	10	9
10	Provide adequate infrastructure facilities	10	10
11	Proper direction and co-ordination should be provided	10	11
12	Better to concentrate on one village	10	12

DISCUSSION

CHAPTER - V

DISCUSSION

The discussion of the findings of the study are presented below.

A. Impact of operational research project

I. Knowledge

The study revealed that the level of knowledge on combined recommended practices was more among the farmers in project area than shadow area. The calculated mean knowledge score was 27.94 in project area whereas in shadow area it was only 19.34. In project area more than 40% of the respondents had knowledge score above 30, whereas in shadow area it was only 6%. The above findings clearly indicated that the operational research project was very successful in increasing the farmers' knowledge. The scientific and systematic system approach used for the integrated control of rice pests was thus proved to be more efficient and effective than the other approaches. Similar findings were obtained by other researchers like Ram and Sirohi (1979), Sharma (1979) and I.C.A.R. (1980).

In the case of level of knowledge about individual practices the study revealed that the percentages of respondents who had knowledge about each recommended practices were more in project area than in shadow area. The finding

revealed that farmers in the project area have learned the details of all the scientific practices recommended by the project. The farmers in the project area have, due to the efforts of the staff of the operational research project, realised the importance of the improved practices recommended by the project staff. The farmers in the shadow area are giving more importance to the chemical control of pests only. This finding is an indication of the success of the operational research project.

With respect to knowledge about chemical plant protection the study revealed that the respondents in the project area had more knowledge about chemical plant protection than the respondents in the shadow area. The mean knowledge score were 8.25 and 6.92 for project and shadow area respectively. The knowledge about this practice was more in project area. Farmers in the shadow area also had a high level of knowledge about this practice. The concept of need based application at the economic threshold level has been accepted by the farmers project area. This reveals that one of the main objectives of the project has been achieved. The same line of findings were reported by I.C.A.R. (1978), (1979) and (1980).

II. Attitude

The study revealed that the respondents both in project and shadow area had favourable attitude towards chemical plant protection. However, the mean attitude score of the project

area was significantly higher. The need based and scientific application of chemicals for the control of rice pests might have produced favourable results in the project area, which inturn might have helped to create more favourable attitude towards this practice among farmers of the project area. Since the farmers in the shadow area were not resorting to integrated control they might not have obtained favourable results as in the project area. This can be the reason for the low level of attitude when compared to project area.

III. Adoption

The study revealed that the adoption of combined recommended practices was more among the farmers in the project area. The calculated mean adoption quotient for project and shadow areas were 72.57 and 54.03 respectively. The rate of adoption was more in the project area for each recommended practices. The only practice which was not adopted by any respondent both in project and shadow area, was providing wider spacing. The findings revealed that majority of the farmers in the shadow area were partial adopters while in the project area majority were full adopters. This difference is clearly due to the effect of operational research project. The farmers in the project area have not only more knowledge and favourable attitude but also they are much better in the adoption of the recommended practices. This is definetly duo to the impact of operational research project. The project

helped to create a conviction and thus motivated farmers to adopt the scientific methods of rice production.

The above finding was in conformity with Ram and Sirohi (1979), I.C.A.R.(1979) and (1980), report of operational research project at Kuttanad (1980) and C.T.C.R.I. (1982).

B. Relationship between selected impact components

I. Relationship between knowledge and adoption

The study revealed that there was significant relationship between knowledge on combined recommended practices and adoption of combined recommended practices. The same trend was seen in the case of knowledge about chemical plant protection and adoption of chemical plant protection. The findings were in conformity with the studies of Dasgupta (1965), Nair (1969), Kaleel (1978), Prasad (1978), Pillai (1978) and Samad (1979) who revealed that there was significant relationship between knowledge and adoption of the practices. Knowledge about the practices is a predisposing factor for adoption. New agricultural technology involves plenty of technical details. One who adopts the technology, naturally, should have a thorough knowledge about the technology. Farmers with the necessary technical details could be in a better position to understand, evaluate and accept the new practices.

II. Relationship between attitude towards chemical plant protection and adoption of chemical plant protection

The study revealed no significant relationship between attitude towards chemical plant protection and adoption of

chemical plant protection in project area. But in shadow area there was significant relationship. Research studies in adoption have frequently reported positive relationship between attitude and adoption. The finding with respect to the project area is in contrary with the findings of Nair (1969), Singh and Singh (1971) and Pillai (1978) who reported that there was positive relationship between attitude and adoption. Even the farmers who were not having very high favourable attitude towards chemical plant protection were adopting this practice in full, because without the adoption of this practice the raising of paddy crop is not possible in the area. This can also be due to the high level of knowledge that farmers in the project area are having with respect to chemical control of pests. This high level of knowledge have helped in creating a conviction in the necessity of adopting chemical methods of plant protection. At the same time they might have realised the bad effects the chemicals produce which might have created a not too favourable attitude. Conviction in the need of chemical plant protection was less in shadow area. Only farmers with favourable attitude adopted this practice in shadow area which resulted in positive relationship.

C. Factors influencing the impact of operational research project

I. Age

Age had no significant relationship with knowledge on combined recommended practices in project and shadow area.

The finding of the study is in line with the finding of Shankariah and Singh (1967), who concluded that age had no relationship with knowledge on recommended practices. The present study did not support the findings of Behera and Sahoo (1975) who reported positive relationship and Kamaradeen (1981) who found negative relationship.

The study revealed that age had no significant relationship with attitude towards chemical plant protection both in project and shadow area. The finding of the study is in line with the finding of Reddy and Reddy (1977) who concluded that age had no significant relationship with attitude. The present study did not support the findings of Shirpukar and Patil (1968) and Das and Sarkar (1970) who reported that there was significant relationship between age and attitude of farmers.

Age also had no significant relationship with adoption of recommended practices of the farmers in the project and shadow area. The finding is in confirmity the findings of Reddy (1962), Bose and Saxena (1965), Salunkhe and Throat (1975), Prasad (1978) and Titus (1981) who reported no significant relationship between age and adoption of recommended practices. The present study did not support the finding of Das and Sarkar (1970), Somasundaram and Singh (1979) who explained positive relationship between age and adoption.

Contrary to the findings of many researchers the study conclusively proved that the variable age had no influence

in the extent of knowledge, attitude and adoption of improved agricultural practices of farmers. Thus irrespective of the age, farmers try to obtain information on improved agricultural practices and accept the practices which are useful to them. The variation in knowledge, attitude and adoption of the farmers can thus be attributed to only factors other than age.

II. Education

The study revealed that there was no relationship between education and knowledge on recommended practices in project area but there was significant relationship in the case of shadow area.

Intensive extension works were undertaken in the project area in which farmers of all categories, more so weaker sections, very intensively participated. Because of their intensive participation all the farmers in the project area irrespective of their education level, acquired knowledge. This might be the reason for obtaining no relationship between education and knowledge on practices in the project area.

In shadow area no such intensive extension activities were undertaken. Hence in the shadow area farmers who had high education only have acquired knowledge on recommended practices. This finding is in line with the findings of Jha and Sharma (1972), Behera and Sahoo (1975), and Kaleel (1978) who reported positive relationship between education and knowledge level.

The study also revealed that there was significant relationship between education and attitude towards chemical plant protection in the project area, but it had no significant relationship in the shadow area. The finding with respect to project area was in line with the findings of Shirpurkar and Patil (1968), Das and Sarkar (1970) and Singh and Singh (1970) who revealed that there was positive relationship between education and attitude.

The need based application of chemicals is given importance in the project area. The project workers explain in detail the various advantages of need based application of chemicals for the control of pests. The more educated were more convinced about the need of chemical plant protection. Because of their capacity for comprehension, not only they acquired knowledge but also developed conviction in the usefulness of the practice. This might have resulted in the creation of more favourable attitude among educated farmers towards chemical plant protection.

It was also revealed that there was no significant relationship between education and adoption of combined recommended practices. The finding is in line with the findings of Nair (1969), Singh and Sinha (1970), Salunkhe and Throat (1975), Rao and Menon (1975) and Shukla (1980). The finding is not in confirmity with the hypothesis formed.

Adoption was not dependent on education level of the farmers. The education level was not a highly varying factor

among the respondents in project and shadow area. Majority of the farmers in both the sample had education above middle school. This could be the reason for the no relationship. This shows that when all the farmers are educated, education as a variable fails to explain the variation in adoption.

III. Economic status

The study revealed that there was significant relationship between economic status and knowledge on combined recommended practices in the project and shadow area. The finding is in conformity with the findings of Jha and Sharma (1972), Behera and Sahoo (1975) and Supe and Salode (1975) who reported significant relationship between socio-economic status and knowledge an recommended practices.

Economic status had no relationship with attitude towards chemical plant protection in project area, but it had significant relationship in shadow area . The finding of the study with respect to project area is not in line with the findings of Singh and Singh (1967), Shirpurkar and Patil (1968) and Reddy and Reddy (1977) who revealed that there was positive relationship between socio-economic status and attitude.

The intensive extension activities undertaken in the project area might have convinced all the farmers regarding the usefulness of improved technology recommended by the project. More emphasis is given to the weaker section in the project area. Hence almost all farmers, irrespective of the

economic status, have realised the importance of the chemical plant protection for the control of rice pests. Due to the absence of such an intensive work in shadow area the farmers of low economic status were not convinced about the need of plant protection and hence they had less favourable attitude. This might be the reason for not obtaining the positive relationship in the shadow area.

The study revealed that there was no significant relationship between economic status and adoption of combined recommended practices in the project and shadow area. The finding is in line with the finding of Rao and Menon (1975) who reported that there was no relationship between economic status and adoption. The result of the study is not supporting the findings of Lionoerger (1960), Reddy (1962), Grewal and Sohal (1971) and Titus (1981) who reported positive relationship between economic status and adoption.

The practices recommended are so important that unless the farmers adopt them, at least to some extent, raising of paddy crop will be very difficult in the project and shadow area. These areas come under "punja" crop system. The "punja" paddy crop is grown in summer period by dewatering the "kayal" area. Unless the farmers adopt some of the scientific practices, the cultivation of paddy never will be profitable in this area unlike other areas. Hence all farmers try to adopt the recommended practices.

IV. Knowledge

The study revealed that there was significant relationship between knowledge about operational research project and knowledge on combined recommended practices, attitude towards chemical plant protection and adoption of combined recommended practices.

Farmers who had proper knowledge about operational research project might have participated effectively in the activities of the project. This effective participation might have resulted in better knowledge and created a proper attitude resulting in better adoption of practices. This is again an indication of the success of operational research project. The objectives of the operational research project, when made known to farmers, help in producing a convinction in them regarding the usefulness of the project, which in turn result in desired changes in the farmers.

Attitude

As anticipated attitude towards operational research project had strong positive influence on knowledge, attitude towards practices and adoption. Proper attitude towards operational research project might have motivated the farmers for more effective participation, as in the case of knowledge, in the activities of operational research project which might have ultimately resulted in better knowledge about practices, proper attitude towards practices and increased adoption.

Significant relationships was also obtained in the case of attitude towards scientific agriculture and knowledge, towards practices and adoption of recommended practices. Farmers with scientific out look will try to get more information and thereby develop proper attitude towards them. They are more likely to accept recommended practices which are highly scientific. The finding is in line with the findings ofManoharan(1979) and Meera (1981).

D. Farmers' perception

I. Perception about operational research project in the project area

The study revealed that majority of the farmers perceived operational research project as useful. This favourable perception about the project by the farmers in the project area is another strong indication about the success of the project as a whole. Similarly majority of the farmers perceived the project as very helpful for them for the effective control of rice pests. The perception that this project helped in increasing their knowledge on new technology and created interest among farmers in scientific agriculture can be considered as good indicators of the favourable impact that programme had made in the project area. Such favourable perception about the project will ultimately lead to attaining the objectives set forth in the project.

II. Perception of the attributes of the recommended practices

Farmers in the project area have perceived most of the recommended practices as profitable than the farmers of the

shadow area. The extension work including demonstration undertaken by the staff were helpful in creating such a perception. Again this can be considered as a favourable impact that the programme has made. Similar favouraole perception regarding the difficulty, cost involved, usefulness of the recommended practices were obtained in the project area than in shadow area. Thus the operation of the project has helped in creating a favourable perception towards the most of the recommended practices, which will be conducive for the wide spread adoption of these practices by the farmers of the project area. Though no other researcher has studied the farmers' perception about different aspects of the recommended practices in the operational research project area, studies have been made in other areas. Sivaramakrishnan (1981) have found strong correlation between favourable perception of the attributes of practices and final adoption in the case of recommended practices of paddy, coconut and rubber. So it can be concluded that the favourable perception created in the project will ultimately lead to increased adoption, production and welfare of the farmers.

D. Perception of problems by farmers

The findings of the study are almost in agreement with findings of Samad (1979) and Sivaramakrishnan (1981) who also observed that high cost of inputs, low price of paddy, lack of capital and high wage-rate were main proolems felt by farmers

in the adoption of recommended practices. The price of inputs, viz. fertilizers, pesticides, fuel etc. are rising out at the same time the price of paddy is not increasing to that level. Such a situation will create more problems which will be perceived by farmers and which will ultimately led to reduction in the adoption of costly and difficult cultivation practices.

F. Perception of staff

Majority of the staff members perceived the project as useful and suitable to the area of the operation. Majority of the staff were in the opinion that the project should be extended to other areas also. This shows that they have favourable conviction about the project. This conviction will definitely help them to function effectively to attain the objectives of the project. The staff also perceived most of the recommended practices as profitable easy and not costly for the farmers to adopt.

They observed that lack of co-ordination, insufficient budget provision and staff are the main problems that stand against the way of attaining the objectives of the project. Their suggestion to bring the project under an uniadministrative head with more staff and funds needs favourable consideration.

SUMMARY

CHAPTER - VI

SUMMARY

The study was undertaken to assess the impact of operational research project in terms of difference in knowledge level, attitude and adoption of practices between project and shadow area. The study was conducted in operational research project on integrated control of rice pests in Kuttanad.

The specific objectives of this study were:

1. To study and compare the level of knowledge on new agricultural technology, attitude towards improved agricultural practices and adoption of recommended practices of the farmers of the scheme area and shadow area.
2. To study the perception about the scheme.
3. To study the social, administrative, organizational and technical problems involved in the transfer of technology in the project area.

Four villages, two from project area and two from shadow area, were selected. By random sampling procedure from each village 35 farmers were selected. The total number of respondents were 140. The staff working in the project were also included as respondents in the study.

The data were collected through personal interviews with respondent farmers. Questionnaire was used to collect data from staff. The interview schedule contained questions to measure the knowledge on combined recommended practices, attitude towards chemical plant protection and adoption of combined recommended practices, the dependent variables of the study. The independent variables included in the study were age, education, economic status, knowledge about operational research project, attitude towards operational research project and attitude towards scientific agriculture. The other factors studied were perception about operational research project, perception of recommended practices and problems of farmers. The perception about the scheme and about the recommended practices of staff were also studied.

The following measurement techniques were used to measure the variables.

Variable	Measurement technique
Knowledge	Simple knowledge test
Attitude towards chemical plant protection	Scale used by Manoharan (1979)
Adoption	Adoption Index of Singh and Singh (1974)
Age, Education	Simple questions
Economic status	Economic status scale
Attitude towards operational research project	Arbitrary attitude scale
Attitude towards scientific agriculture	Scale used by Meera (1981)

The statistical techniques used were the normal deviate test, correlation and percentage analysis.

The results of the study are summarised as follows:

Knowledge about recommended practices

1. Knowledge on combined recommended practices was more among the farmers in the project area than shadow area.
2. The percentages of respondents having knowledge about each recommended practices were more in project area than shadow area.
3. The respondents in the project area had more knowledge about chemical plant protection than respondents in the shadow area.
4. There was significant difference in knowledge on combined recommended practices between project and shadow area.

Attitude towards chemical plant protection

1. More than 58% of the respondents in the project area had favourable attitude towards chemical plant protection whereas in shadow area it was only 30%. The mean attitude scores were 20.97 and 18.97 for project and shadow area respectively.
2. There was significant difference in attitude towards chemical plant protection between project and shadow area.

Adoption of recommended practices

1. Adoption of combined recommended practices was more among the farmers in the project area than farmers in the shadow

area. In project area more than 62% of the respondents had adoption score above 70 with mean 72.57, but in shadow area it was only 16% with a mean of 54.03.

2. The percentages of full adopters for all the recommended practices were more in project area than shadow area expect for providing wider spacing which was not adopted by any respondent from project and shadow area.

3. There was significant difference in adoption of recommended practices between project and shadow area.

Relationship between selected impact components

1. There was significant relationship between knowledge on recommended practices and adoption of recommended practices both in project and shadow area.

2. There was significant relationship between knowledge about chemical plant protection and its adoption both in project and shadow area.

3. There was no significant relationship between attitude towards chemical plant protection and its adoption in project area but there was significant relationship in the shadow area.

Factors influencing the impact of operational research project

A. Age

There was no significant relationship between age and knowledge on combined recommended practices both in project and shadow area.

2. There was no significant relationship between age and attitude towards chemical plant protection both in project and shadow area.

3. There was no significant relationship between age and adoption of combined recommended practices both in project and shadow area.

B. Education

1. There was no significant relationship between education and knowledge on combined recommended practices in the project area but in shadow area there was significant relationship.

2. There was significant relationship between age and attitude towards chemical plant protection in project area but in shadow area there was no relationship.

3. There was no relationship between education and adoption of combined recommended practices both in project and shadow area.

C. Economic status

1. There was significant relationship between economic status and knowledge on combined recommended practices both in project and shadow area.

2. There was no relationship between economic status and attitude towards chemical plant protection in project area but there was significant relationship in shadow area.

3. There was no significant relationship between economic status and adoption of combined recommended practices both in project and shadow area.

D. Knowledge about operational research project

1. There was significant relationship between knowledge about operational research project and knowledge on combined recommended practices in the project area.

2. There was significant relationship between knowledge about operational research project and attitude towards chemical plant protection in the project area.

3. There was significant relationship between knowledge about operational research project and adoption of combined recommended practices in the project area.

E. Attitude towards operational research project

1. There was significant relationship between attitude towards operational research project and knowledge on combined recommended practices in the project area.

2. There was significant relationship between attitude towards operational research project and attitude towards chemical plant protection in the project area.

3. There was significant relationship between attitude towards operational research project and adoption of combined recommended practices in the project area.

F. Attitude towards scientific agriculture

1. There was significant relationship between attitude towards scientific agriculture and knowledge on combined recommended practices both in project and shadow area.

2. There was significant relationship between attitude towards scientific agriculture and attitude towards chemical plant protection both in project and shadow area.

3. There was significant relationship between attitude towards scientific agriculture and adoption of combined recommended practices both in project and shadow area.

Farmers' perception

A. Perception about project

1. More than 90% of the respondents perceived operational research project as 'useful'.

2. Sixty per cent of the respondents perceived operational research project as 'helpful' for the control of rice pests.

3. More than 80% of the respondents perceived that operational research project increased knowledge on new technology.

4. More than 65% of the respondents perceived that operational research project created 'interest' among farmers to adopt new technology.

5. Thirty five per cent of the respondents perceived that operational research project increased the yield of rice and almost same number perceived that operational research project has helped only the rich farmers.

B. Perception about practices

1. The percentage of respondents was more in project area than shadow area who perceived the recommended practices as 'profitable'.

2. The percentages of respondents in project and shadow area were almost same with regard to perception of 'difficulty' of each recommended practice.

3. The respondents in project area did not perceive the practices as 'costly' as the respondents in shadow area.

4. The percentage of respondents was more in project area than shadow with regard to perception of 'usefulness' of recommended practices.

C. Perception of problems

Of the 16 problems perceived the important were:

(1) high cost of fertilizers

(2) low price of paddy

(3) lack of capital

Perception of staff

1. All the staff working in the project perceived that operational research project.

(a) was 'useful' on controlling rice pests

(b) was 'suitable' to Kuttanad region

2. Ninety per cent of staff were in the opinion that project should be extended to other area also.

1. More than 80% of the staff perceived most of the recommended practices as 'profitable'.

2. Almost all the recommended practices were perceived as 'not difficult' practices for adoption by majority of the staff.

3. Majority of the staff perceived all practices expect for clean cultivation and draining off water field from field.

Perception of proolems

Of the 12 proolems identified the important were:

1. lack of co-ordination between Agricultural University and State Department of Agriculture
2. inadequate budget provision
3. lack of sufficient staff

Suggestions of staff

Twelve suggestions were put forwarded by the staff for the better implementation of the project. The important ones were:

1. project should be brought under single administrative head
2. number of staff should be increased
3. adequate funds should be provided

REFERENCES

REFERENCES

*Beal, G.M. and Rogers, E.M. (1960). The Adoption of Two Farm Practices in a Central Iowa Community. Special Report, 26, Iowa State University of Science and Technology, Ames, Iowa.

Behera, C. and Sahoo, M.S. (1975). Impact of National Demonstration on Adoption of Agricultural Practices. Indian J. Extn. Edn., 11 (1-2): 32 - 35.

Bhaskaran, C. (1979). A Critical Analysis of the Interpersonal Communication Behaviour of Small and other Farmers in a Less Progressive, Progressive and More Progressive Village in Kanyakumari District of Tamilnadu. Ph.D. Thesis, Department of Agricultural Extension, College of Agriculture, Dharwad.

Bhatia, R.P. (1966). A study on some Factors Affecting Adoption of Poultry Farming in Hissar District, Punjab. Summaries of Extension Research by Post-graduate Students, Punjab Agricultural University, Ludhiana.

*Bose, S.P. (1961). Characteristics of Farmers who Adopt Agricultural Practices in Indian Villages. Rural Sociology 26: 138 - 145.

*Bose, A.B. and Saxena, P.C. (1965). The Diffusion of Innovations in a Village in Western Rajastan. Eastern Anthropology, 18: 138 - 151.

Chandrakandan, K. and Subramanyan, V.S. (1975). Differential Perception of Farm Practice Attributes by Adopters and Non-adopters. Madras Agric. J., 62 (10-12): 862 - 863.

Chattopadhyay, S.N. (1963). A study of Some Phychological Correlates of Adoption of Innovations in Farming. Ph.D. Thesis, Division of Agril. Extn., I.A.R.I., New Delhi.

C.T.C.R.I. (1982). Report on Research Project - Their Objectives and Achievements. Central Tuber Crops Research Institute, Trivandrum.

Dasgupta, S. (1965). Communication and Innovation in Indian Villages. Social Forces, 43: 330 - 337.

Das, K.K. and Sarkar, D.R. (1970). Economic Motivation and Adoption of Farm Practices. Indian. J. Extn. Edn., 6 (1-2): 103 - 107.

Edwards, A.L. (1957). Techniques of Attitude Scale Construction. Vakils Feffer and Simons Pvt. Ltd., Bombay. (First Indian Reprint, 1969).

*Fliegel, F.C. (1959). A Multiple Correlation Analysis of Factors Associated with Adoption of Farm Practices. Rural Sociology, 21: 284 - 295.

Grewal, I.S. and Sohal, T.S. (1971). Comparative Role of Two Social Systems in the Speed of Adoption of Some Farm Practices. Indian J. Extn. Edn., 7 (1-2): 1 - 5.

Haimann, T., Scott, G.W. and Connor, E.P. (1978). Managing the Modern Organization. Houghton Mifflin Company Boston, Dallas.

Harold, Koontz and Cyril, O Donnell. (1976). Management - a Systems and Contigency analysis of Managerial Functions. Mc.Graw-Hill, Kogahusha, Ltd., Tokyo.

Hayness, W. Warren and Massie, L. Joseph (1964). Management analysis, concepts and cases. Prentice Hall of India (Pvt.) Ltd., New Delhi.

I.C.A.R. (1978). Research Highlights. Indian Council of Agricultural Research, New Delhi.

I.C.A.R. (1979). Research Highlights. Indian Council of Agricultural Research, New Delhi.

I.C.A.R. (1980). Research Highlights. Indian Council of Agricultural Research, New Delhi.

Jaiswal, N.K. and Dave, A.K. (1972). Measurement of Progressiveness in Farming. Sinha, P.R.R. Studies in Extension Education. National Institute of Community Development, Hyderbad. 115 - 127.

Jaiswal, N.K., Roy, N.K. and Singh, B.S.P. (1970). Effects of Size of Holding and Irrigational facilities on Adoption of High Yielding Varieties. Indian J. Extn. Edn., 6 (1-2): 8 - 15.

Jha, P.N. and Shaktawat, G.S. (1972). Adoption Behaviour of Farmers towards Hyorid Bajara Cultivation. Indian J. Extn. Edn., 7 (1-2): 24 - 31.

Jha, P.N. and Sharma, K.D. (1972). Impact of National Demonstration on High Yielding Varieties Programme. Sinha, P.R.R. Studies in Extension Education. National Institute of Community Development, Hyderbad. 129 - 137.

Kaleel, F.M. Humayun. (1978). A study on the Impact of Intensive Paddy Development Programme in Kerala. M.Sc. Thesis. Dept. Agril. Extension, College of Agriculture, Vellayani.

Kamarudeen, M. (1981). A study on the Impact of National Demonstration Programme on Paddy Cultivation in Trichur District. M.Sc. Thesis, Dept. of Agril. Extension, College of Agriculture, Vellayani.

Karim, A.S.M.Z. and Mahboob, S.G. (1974). Relationships of Selected Characteristic of Transplanted Anan Rice Growers with their Adoption of Fertilizers in a Rural Area in Bangladesh. Indian J. Extn. Edn., 10 (1-2): 16 - 22.

Kerala Agricultural University (1981). Package of Practices Recommendations. Directorate of Extension. Manmuthy.

*Lionberger, H.F. (1960). Adoption of New Ideas and Practices. The Iowa State University Press, Ames, Iowa.

*Mahajan, B.S. (1966). Relative Effectiveness of Selected Extension Methods in Acceptance of Agrosan on Seed treatment to cotton. Research Studies in Extension Education, Andhra Pradesh Agricultural University, Rajendra Nagar.

Malhotra, S.P., Joshi, P.L. and Rao. J.S. (1974). Relative Importance of Socio-Economic Factors in the Adoption of Agricultural Innovations. Indian J. Extn. Edn., 10 (1-2).

Manoharan, P.M. (1979). A study on the Role of Leadership in Agricultural Development in Rural Areas of Kerala. M.Sc. Thesis. Dept. of Agril. Extension, College of Agriculture, Vellayani.

Marsh, C.P. and Coleman, A.L. (1955). The Relationship of Farmer Characteristics to the Adoption of Recommended Farm Practices. Rural sociology, 20: 289 - 296.

Mathur, P.N., Singh, K.N. and Lokhanade, M.R. (1974). Source of Utilization and Rate of Speed of Information on High Yielding Varieties of Wheat in a Farming Community. Indian J. Extn. Edn., 10 (1-2): 23 - 29.

Meera, B.(1981). Impact of Farm Women's Training in Agriculture. M.Sc. Thesis. Dept. of Agril. Extension, College of Agriculture, Vellayani.

Mishra, S.P. and Sinha, B.P. (1981). Socio-Economic Correlates of Technical Know-how of Farm Enterpreneurs. Indian J. Extn. Edn., 17 (1-2): 54 - 63.

Moore, P.G. (1968). Basic Operational Research. Sir Isaac Pitman and Sons Ltd., London.

Muthian, M. and Duraiswamy, K.N. (1977). Influence of Literacy Level of the Farmers on the Effectiveness of Extension Methods in the Adoption of Plant Protection Practices. Madras Agri. J., 6 (4): 277 - 279.

Nachiappan, P.R. and Murthy, J.S. (1976). The Impact of S.F.D.A. on the Knowledge of the Participant Small Farmers of Tamil Nadu. Indian. J. Extn. Edn., 13 (3-4): 64 - 68.

Nair, G.T. (1969). A Multi-Variable Study on Adoption of High yielding Paddy Varieties by Farmers of Kerala State. Ph.D. Thesis. Division of Agril. Extension, I.A.R.I., New Delhi.

Oliver, J., Annamalai, R. and Parthasarthy, G. (1975). Influence of Socio-economic factors on Adoption of High Yielding Varieties. Madras Agric. J., 62 (10-12): 849 - 850.

O.R.P. (1978). Report on Operational Research Project on Integrated Control of Rice Pests in Kuttanad. Rice Research Station, Moncompu, Kerala.

O.R.P. (1980). A Brief Report Operational Research Project on Integrated Control of Rice Pests in Kuttanad, Kerala. Rice Research Station, Moncompu, Kerala.

O.R.P. (1981). Report on Operational Research Project on Integrated Control of Rice Pest in Kuttanad. Rice Research Station, Moncompu, Kerala.

Padmanabhan, S.Y. (1975). Operational Research Project on Rice. Indian Farming. 25 (5): 37 - 39.

Pathak, S. (1981). A Multiple Regression Analysis of Factors Related with Attitude of Farmers. Indian J. Extn. Edn., 17 (3-4): 73 - 80.

Pathak, S. and Dargan, K.S. (1971). Impact of Package Programme Works on Jute Growers and Their Reactions to Different Improved Practices on Jute Cultivation. Indian J. Extn. Edn., 7 (1-2): 21 - 28.

Pathak, S., Pal, M.K. and Roy, G. (1979). Impact of National Demonstration on Knowledge, Attitude and Adoption level of Farmers in West Bengal. Indian J. Extn. Edn., 15 (1-2): 49 - 54.

Perumal, C. and Duraiswamy, (1972). Influence of Personal and Situational charactors on the Adoption of Hybrid Maize Cultivation by Farmers of Coimbatore, District, Madras Agric. J., 59 (4): 209 - 213.

Pillai, G.B. (1978). A study on Adoption of Soil Conservation Measures by Farmers in Scheme Areas of Trivandrum District. M.Sc. Thesis, Dept. Agril. Extension, College of Agriculture, Vellayani.

Prakash, R. (1980). A study on the Impact of Agricultural Development Programmes Among the Tribals of Kerala. M.Sc. Thesis, Dept. Agril, Extension, College of Agriculture, Vellayani.

Prasad, R.M. (1978). A study on Farmer's Functional Literacy Programme. M.Sc. Thesis, Dept. Agril, Extension, College of Agriculture, Vellayani.

Rahudkar, W.B. (1962). Farmers Characteristics Associated with the Adoption and Diffusion of Improved Farm Practices. Indian J. Agric. Eco. 17: 82 - 85.

Rajammal, P.D. (1975). Role of Women in Social Transformation. Indian Farming 25 (5): 37 - 29.

Ram, G.S. and Sirohi, A.S. (1979). An Economic Evaluation Study of Operational Research Project in Rural Delhi. Indian J. Agric. Eco., 34 (4): 20 - 26.

Rao, C.A. (1971). Impact of National Demonstration on Farmers of Selected Villages in East Godavari District of Andhra Pradesh. M.Sc. Thesis. Tamil Nadu Agricultural University, College of Agriculture, Coimbatore.

Rao, G.A. and Menon, K.R. (1975). Farmers' Characteristics in Relation to Adoption of Improved Agricultural Practices Through National Demonstration. Madras Agric. J., 62 (10-12): 860 - 861.

Reddy, M.S.K. (1962). A study of Adoption of Improved Agricultural Practices as a Function of Some Socio-Economic Factors and Sources of Information. M.Sc. Thesis, Division Agril. Extension, I.A.R.I., New Delhi.

Reddy, M.S. and Reddy, S.V. (1977). Personal and Socio-Economic Characteristics Associated with Attitude of Farmers Towards Crop Loan System. Indian J. Extn. Edn., 13 (3-4): 68 - 70.

Salunkhe, G.V. and Throat, S.S. (1975). Adoption Behaviour of Small Farmers in Relation to their Personal Characteristics. Indian J. Extn. Edn., 11 (1-2): 67 - 69.

Samad, K.A. (1979). Response of Special Package Programme for Agricultural Development in Kerala. M.Sc. Thesis. Dept. Agril, Extension, College of Agriculture, Vellayani.

Sengupta, T. (1967). A Simple Adoption Scale for Selection of Farmers for High Yielding Varieties Programme on Rice. Indian J. Extn. Edn., 2 (1-3): 107 - 115.

Shankariah, Ch. and Singh, K.N. (1967). Predictive Analysis of Factors Related with Knowledge of Improved Practices of Vegetable Cultivation. Indian J. Extn. Edn., 3 (1-2): 67 - 73.

Sharma, D.K. (1966). Role of Information Sources and Communication Channels in Adoption of Improved Practices. Indian J. Extn. Edn., 2: 143 - 148.

Sharma, S.K. (1975). National Demonstration and Operational Research Projects. Indian Farming. 25 (5): 7 - 9.

Sharma, S.K. (1979). Operational Research Projects a Whole Village Approach - 50 years of Agricultural Research and Education. Indian Council of Agricultural Research, New Delhi.

Shirpurkar, G.R. and Patil, S.O. (1968). Village people's impression about Co-operative Farming. Indian J. Extn. Edn., 4 (1-2): 22 - 28.

Shukla, S.R. (1980). Adoption Behaviour of Small Farmers. Indian J. Extn. Edn., 16 (1-2): 55 - 58.

Singh, B.P., Jaiswal, N.K. and Singh, B.N. (1968). Analysis of Pre-service Training Programme of Agricultural Extension Officers. Indian J. Extn. Edn., 4 (3-4) 17 - 27.

Singh, N.P. and Prasad, C. (1974). Communication Behaviour and Source Credibility Perception of Young Farmers. Indian J. Extn. Edn., 10: 53 - 58.

Singh K.N. and Singh R.P. (1967). People's Image of Community Development Block. Indian J. Extn. Edn., 3 (1-2) 25 - 31.

Singh, S.N. and Singh, K.N. (1970). A Multi-variable Analysis of Adoption Behaviour of Farmers. Indian J. Extn.Edn., 6 (3-4): 39 - 44.

Singh, R.P. and Singh, K.N. (1971). An Investigation into Differential Attitudes of Farmers toward Improved Agricultural Practices. Indian J. Extn. Edn., 7 (1-2): 12 - 30.

Singh, K.M.P. and Singh, R.P. (1974). Impact of National Demonstration in the Adoption of High Yielding Varieties of Wheat. Indian J. Extn. Edn., 10 (1-2): 65 - 67.

Singh, K.N. and Sinha, P.R.R.(1970). Farmer's Characteristics and the Pattern of Decision making Process in the use of Artificial Fertilizer and Vegetable Cultivation. Indian J. Extn. Edn., 6 (1-2): 34 - 41.

Singh, R. and Sohal, T.S. (1967). Size of holding as Related to Acceptance of Crop Plans, Extension contacts and Education of the Farmers. Indian J. Extn. Edn., 3 (1-2): 42 - 48.

Sinha, H.S.P. and Sinha, S.K. (1980). Adoption of High Yielding Varieties of Maize by the Farmers of Sikkim. Indian J. Extn. Edn., 16 (1-2): 45 - 50.

Sivaramakrishnan, S. (1981). A study on the Differential Adoption of Recommended Agricultural Practices of Selected Crops. M.Sc. Thesis. Dept. Agril. Extension, College of Agriculture, Vellayani.

Somasundaram, D. and Singh, S.N. (1979). Differential Characteristics of Adopter and Non-adopter Small Farmers Growing Paddy. Madras Agric. J., 66 (4): 250 - 254.

Supe, S.V. (1969). Factors Related to Different Degrees of Rationality in Decision making Among Farmers in Buldana District. Ph.D. Thesis, Division Agril. Extension, I.A.R.I., New Delhi.

Supe, S.V. and Salode, M.S. (1975). Impact of National Demonstration on knowledge and Adoption level of Farmer Participants. Indian J. Extn. Edn., 2 (1-2): 36 - 39.

Swaminathan, M.S. (1975). I.C.A.R. Operational Research Project Purpose and Approach. Indian Farming, 25 (5): 3 - 6.

Sundaraswamy, B. and Duraiswamy, K.N. (1975). Characteristics of Farmers in Relation to Adoption of Recommended Practices of Hybrid Sorghum. Madras Agric. J. 62 (10-12): 721 - 725.

Titus, O.O. (1981). Adoption of Improved Farm Practices. A choice under uncertainty. Indian J. Extn. Edn., 17 (1-2): 30 - 35.

*Trivedi, G. (1963). Measurement and Analysis of socio-economic status of Rural Families - Kanjhawala Block. Ph.D. Thesis. Division of Agril. Extension, I.A.R.I., New Delhi.

Viswanathan, N., Menon, K.R., Arputharaj, C. and Selvaraj, P. (1975). Impact of High Yielding Varities of Rice on Small Farmers. Madras Agric. J., 62 (10-12): 773 -783.

*Wilkening, E.A. (1952). Acceptance of Improved Farm Practices. Agricultural Experiment Station Bulletin 92, North Carolina, U.S.A.

Zeaudeen, P. and Rajagopalan, V. (1977). Factors Influencing the Extent of Adoption of Hybrid Bajara in Coimbatore Taluk. Madras Agric. J., 64 (9): 580 - 588.

* Original not seen

APPENDICES

APPENDIX - I (a)

Department of Agricultural Extension

College of Agriculture

Vellayani

Impact of Operational Research Project on Agricultural Production

INTERVIEW SCHEDULE

Respondent No. :

I

A. 1. Name and address of farmer :

2. Age :

3. Education : (illiterate/can read only/can read and write/middle high school/ graduate/above)

4. Land	Wet land	Garden land	Total
(a) owned			
(b) cultivating			
(c) paddy field			
(d) coconut garden			
(e) other			

5. House type:

(a) hut/thatched/tiled/terraced

(b) plastered (Yes/No)

(c) electrified (Yes/No)

(contd...)

6. Agricultural implements and material possessions

(a) Draught animal

(b) Power tiller

(c) Pump

(d) Iron plough

(e) Tractor

(f) Knapsack sprayer

(g) Power sprayer

(h) Cycle

(i) Scooter

(j) Car

(k) Boat

(l) Country boat

(m) Fan

(n) Mixe

(o) Fridge

(p) Radio

(q) Watch

(r) Others

B. 1. Do you know about operational research project (Yes/No)

2. Where is its office located?

3. When did it start functioning?

4. What is the main objective of O.R.P.?

5. Do you know about the agro clinics which are functioning along with O.R.P? (Yes/No)

(contd..)

6. Do you know about the demonstrations conducted by O.R.P.?
(Yes/No)

C. Attitude of farmers towards O.R.P.

Some statements about O.R.P are given below. Indicate your degree of agreement or disagreement to these statements.

SA = Strongly Agree, A = Agree

UD = Undecided, D = Disagree

SDA = Strongly Disagree.

	SA	A	UD	DA	SDA
1. O.R.P. is very useful in controlling the rice pests.					
2. Control of rice pests has become very easy after the implementation of O.R.P.					
3. O.R.P. is not providing any new information to the farmers					
4. There has been considerable increase in scientific knowledge on control of pests among farmers after the implementation of O.R.P.					
5. O.R.P. has created an initiative among farmers to adopt new methods of pest control.					
6. O.R.P. has helped to increase the yield of rice.					
7. Only rich farmers are being benefited by O.R.P.					
8. Only Officers working in the project are being benefited by O.R.P.					

(contd...)

II.

(A) Cultivation of pest tolerant variety

(1) Do you think that cultivation of pest tolerant variety is useful in controlling rice pests?
(useful/not useful)

(2) What is your opinion about the cultivation of the recommended pest tolerant varieties?

(a) Profitable - (very profitable/profitable/not profitable)

(b) Easy - (very easy/easy/not easy)

(c) Costly - (very costly/costly/not costly)

(3) Name one rice variety which is tolerant to Brown Plant Hopper and which is suitable to your area?

(4) In the last punja season which variety did you cultivate?

a)

b) Area under this variety

B. Advancing punja crop season

(1) Do you think that advancing punja crop season will reduce pest infestation? (Yes/No)

(2) What is your opinion about advancing punja crop season?

(a) Difficult - (very difficult/difficult/not difficult)

(b) Profitable - (very profitable/profitable/not profitable)

(c) Costly - (very costly/costly/not costly)

(d) Useful - (very useful/useful/not useful)

(3) Which is the month recommended for starting punja crop season?

(a) September (b) October

(c) November early (d) November end

(contd..)

(4) When did you start the last punja season?

C. Providing recommended spacing

(1) Do you think that planting the seedlings at the recommended spacing will be useful in reducing pest infestation.

(useful/not useful)

(2) What is your opinion about providing recommended spacing?

(a) Profitable - (very profitable/profitable/not profitable)

(b) Difficult - (very difficult/difficult/not difficult)

(c) Costly - (very costly/costly/not costly)

(3) In the last punja season did you transplant your field?

(transplanted/not transplanted)

If transplanted, give the spacing.

What is the spacing recommended for transplanting rice?

D. Balanced manuring

(1) What are the essential nutrients required for the growth of rice plant?

(a) (c)

(b) (d)

(2) Do you think that balanced application of these nutrients is necessary for pest control?

(necessary/not necessary)

(3) What is your opinion about balanced manuring,

(a) Costly - (very costly/costly/not costly)

(b) Profitable- (very profitable/profitable/not profitable)

(c) Difficult - (very difficult/difficult/not difficult)

(d) Useful - (very useful/useful/not useful)

(contd..)

(4) How much quantity of the following fertilizers are required for one acre of paddy and give time of application.

Fertilizer	Quantity	Time of application
(a) Nitrogen		
(i) Amonium sulphate		
(ii) Urea		
(b) Phosphate		
(i) Super phosphate		
(ii) Rock phosphate		
(c) Potash		
(i) Muriate of potash		
(d) Mixture/complex		
(i) Factomphos		
(ii) 17:17:17		

5. (a) Did you apply any chemical fertilizers for the last punja crop? (applied/not applied)

(b) If applied,

Name of fertilizer	Area	Quantity		
		Basal	Top	Total
(i)				
(ii)				
(iii)				
(iv)				
(v)				

(contd..)

E. Flood fallowing

(1) Do you think that flood fallowing will be useful in reducing pest population? (useful/not useful)

(2) If useful, what are its advantages?

(i)

(ii)

(3) What is your opinion about flood fallowing

(a) Difficult - (very difficult/difficult/not difficult)

(b) Costly - (very costly/costly/not costly)

(c) Profitable - (very profitable/profitable/not profitable)

(4) i. In the last punja season have you practiced flood fallowing? (practiced/not practiced)

ii. If practiced, how much area?

F. Clean cultivation

(1) Do you think that clean cultivation will be useful in controlling pests? (useful/not useful)

(2) If it is useful, what are its advantages?

(i)

(ii)

(iii)

(3) What is your opinion about clean cultivation?

(a) Profitable - (very profitable/profitable/not profitable)

(b) Difficult - (very difficult/difficult/not difficult)

(c) Costly - (very costly/costly/not costly)

(contd..)

5. (i) In the last punja season have you adopted clean cultivation? (adopted/not adopted)

(ii) If adopted, area?

G. Draining off water from field

(1) Do you think that draining off water from field during Brown Plant Hopper attack will be useful to reducing the intensity of pest attack?
(useful/not useful)

(2) What is your opinion about draining off water from field,

(a) Difficult - (very difficult/difficult/not difficult)

(b) Costly - (very costly/costly/not costly)

(c) Profitable - (very profitable/profitable/not profitable)

(3) (i) In the last punja season whether there was any Brown Plant Hopper attack in your field?
(Yes/No)

(ii) If Yes, have you drained the field to reduce the intensity of pest attack?
(drained/not drained)

(iii) If drained, how much area?

H. Chemical control of rice pests.

(1) Do you think that the application of recommended dose of chemical will be useful in controlling rice pests?
(useful/not useful)

(2) What is your opinion about chemical control of pests?

(a) Profitable - (very profitable/profitable/not profitable)

(b) Costly - (very costly/costly/not costly)

(c) Difficult - (very difficult/difficult/not difficult)

(contd..)

(3) Name some rice pests and the chemicals used for their control with dose.

Pest	Chemical	Dose
(i)		
(ii)		
(iii)		
(iv)		
(v)		

(4) In the last punja season whether there was any pest attack in your field?

(Yes/No)

ii. If Yes, have you applied any chemicals?

If applied, (applied/not applied)

Post	Chemical	Dose
(i)		
(ii)		
(iii)		
(iv)		
(v)		

I. Chemical control of weeds.

(1) What is your opinion about chemical control of weeds?

(a) Profitable - (very profitable/profitable/not profitable)

(b) Useful - (very useful/useful/not useful)

(c) Difficult - (very difficult/difficult/not difficult)

(2) Name some weedicides their dose and time of application which are used controlling weeds in paddy fields?

Weedicide	dose	time of application
(i)		
(ii)		
(iii)		

(contd..)

(3)i. In the last punja season have you applied any weedicide to control the weeds.

(applied/not applied)

ii. If applied,

	Weedicide	dose	time of application
(i)			
(ii)			
(iii)			

J. Mixing urea with neem or punna cake.

(1) Do you think that application of urea mixed with neem or punna cake will be more useful? (useful/not useful)

(2) What is your opinion about mixing urea with neem or punna cake?

(a) Profitable - (very profitable/profitable/not profitable)

(b) Difficult - (very difficult/difficult/not difficult)

(c) Costly - (very costly/costly/not costly)

(3) How much quantity of punna or neem cake is required to mix with 10 kg urea?

(4) i. In the last punja season have applied urea mixed with punna or neem cake?

(applied/not applied)

ii. If applied, how much quantity of urea did you use in (a) the last punja season?

(b) On that how much quantity of urea was mixed with neem or punna cake?

K. Spreading non-phytotoxic oils in the fields

(1) Do you think that application of non-phytotoxic oils in the field will be useful in controlling rice pests. (useful/not useful)

(2) What is your opinion about spreading non-phytotoxic oils in the field.

(a) Difficult - (very difficult/difficult/not difficult)

(b) Profitable-(very profitable/profitable/not profitable)

(c) Costly - (very costly/costly/not costly)

(cont...)

(3) What are all the advantages of spreading non-phytotoxic oils in the field?

(i)

(ii)

(4) Name some of the non-phytotoxic oils which are recommended to spreading in the field.

(i) (ii) (iii)

(5) (1) Have you adopted this practice in the last punja crop season? (adopted/not adopted)

(ii) If adopted,

Name of the oil

Dose

Area covered

(L) Farmers' attitude towards chemical plant protection

Some statements about chemical plant protection are given below. Indicate your degree of agreement or disagreement to each statement.

	SA	A	UD	DA	SDA
1. Chemical method of plant protection is one of the important methods to increase production.					
2. Consumption of produces of crops sprayed with plant protection chemicals is not good for health.					
3. Plant protection chemicals will spoil the soil.					
4. There must be a land to enforce farmers to adopt chemical control of pests and diseases.					

(cond...)

	SA	A	UD	DA	SDA
5. All the farmers should use plant protection chemicals to control pests and diseases.					
6. Eventhough there are bad effect in the use plant protection chemicals, the good effects justify their use.					

M. Attitude towards scientific agriculture.

Some statements about scientific agriculture are given below. Indicate your agreement or disagreement to these statements.

	SA	A	UD	DA	SDA
1. Every farmers should adopt the recommended scientific practices for cultivation of crops.					
2. Scientific cultivation spoils structure and fertility status of soil.					
3. Only scientific agriculture can bring prosperity to our nation.					
4. It is very difficult to adopt scientific cultivation by an ordinary farmer.					
5. It will be possible to solve our food problem if all the farmers adopt scientific cultivation.					

N. Some problems of farmers are given below. Indicate its importance with respect to you.

	Very important	Important	Not important
(1) Effective pest control is difficult due to lack of co-operation among farmers.			
(2) Non-availability of fertilizers and chemicals in time			

(contd..)

	Very important	Important	Not important
3. High price of fertilizers.			
4. Lack of capital.			
5. Low price for paddy.			
6. Non-availability of labourers in the peak season.			
7. High wage rate for labourers.			
8. Lack of sincerity among labourers.			
9. Lack of facilities for soil testing.			
10. Lack of transport facilities.			
11. Lack of facilities for repairing plant protection equipments.			
12. Non-availability of plant protection equipments.			
13. Non-availability of technical advice from O.R.P. personnel at proper time.			
14. Inadequate facilities for training and discussion.			
15. Insufficient facilities to contact O.R.P. officials.			
16. Insufficient staff.			
17. Other problems			

APPENDIX - I (b)

QUESTIONNAIRE FOR THE STAFF WORKING IN OPERATIONAL RESEARCH PROJECT AT KUTTANAD.

.....

Please Don't write your name or any identification signs
(Anonymous)

Some statements about operational research project on integrated control of rice pests are given below. Please indicate your agreement or disagreement by marking (✓) in the appropriate position noted against each statement.

A.

1. Do you think operational research project on integrated control of rice pests is useful to farmers in controlling rice pests.

   (Very useful/Useful/Not useful)

2. Do you think ORP on integrated control of rice pests is suitable to Kuttanad region.

   (Very suitable/Suitable/Not suitable)

3. Do you think ORP on integrated control of rice pests should be extended to other areas also

   (Strongly Agree/Agree/Disagree)

B. What is your opinion about the following practices recommended on integrated control of rice pests.

1. Growing pest tolerant varieties:-

   a) Profitable - (very profitable/profitable/not profitable)

   b) Difficult - (very difficult/difficult/not difficult)

   b) Expensive - (very expensive/expensive/not expensive)

(contd..)

2. Advancing punja cropping season

a) Difficult - (very difficult/difficult/not difficult)

b) Expensive - (very expensive/expensive/not expensive)

c) Profitable - (very profitable/profitable/not profitable)

3. Balanced manuring

a) Expensive - (very expensive/expensive/not expensive)

b) Difficult - (very difficult/difficult/not difficult)

c) Profitable - (very profitable/profitable/not profitable)

4. Providing wider (recommended) spacing

a) Expensive - (very expensive/expensive/not expensive)

b) Profitable - (very profitable/profitable/not profitable)

5. Clean cultivation (destruction of weeds and crop residues)

a) Expensive - (very expensive/expensive/not expensive)

b) Difficult - (very difficult/difficult/not difficult)

c) Profitable - (very profitable/profitable/not profitable)

6. Flood fallowing

a) Difficult - (very difficult/difficult/not difficult)

b) Expensive - (very expensive/expensive/not expensive)

c) Profitable - (very profitable/profitable/not profitable)

7. Draining off water from the field

a) Profitable - (very profitable/profitable/not profitable)

b) Difficult - (very difficult/difficult/not difficult)

c) Expensive - (very expensive/expensive/not expensive)

(contd..)

8. Chemical control of pests

   a) Profitable - (very profitable/profitable/not profitable)

   b) Expensive - (very expensive/expensive/not expensive)

9. Spreading non-phytoxic oils in the field

   a) Profitable - (very profitable/profitable/not profitable)

   b) Expensive - (very expensive/expensive/not expensive)

10. Chemical control of weeds

   a) Profitable - (very profitable/profitable/not profitable)

   b) Expensive - (very expensive/expensive/not ox/ensive)

11. Mixing urea with neem or punna cake

   a) Expensive - (very expensive/expensive/not expensive)

   b) Profitable - (very profitable/profitable/not profitable)

   c) Difficult - (very difficult/difficult/not difficult)

(C)

Please state the social, technical, administrative and organizational problems you have experienced during your period in the ORP.

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

(D) What are your suggestions for improving the working of ORP.

IMPACT OF OPERATIONAL RESEARCH PROJECT ON AGRICULTURAL PRODUCTION

BY

G. SURENDRAN

ABSTRACT OF THE THESIS

SUBMITTED IN PARTIAL FULFILMENT OF THE

REQUIREMENT FOR THE DEGREE

MASTER OF SCIENCE IN AGRICULTURE

(AGRICULTURAL EXTENSION)

FACULTY OF AGRICULTURE

KERALA AGRICULTURAL UNIVERSITY

DEPARTMENT OF AGRICULTURAL EXTENSION

COLLEGE OF AGRICULTURE

VELLAYANI, TRIVANDRUM

1982

ABSTRACT

With a view to assess the impact of operational research project in terms of difference in knowledge level, attitude towards practices and adoption of recommended practices between project and shadow area, a study was conducted in operational research project on integrated control of rice pests at Kuttanad. Independent variables viz., age, education, economic status, knowledge about operational research project, attitude towards operational research project and attitude towards scientific agriculture were included to study their relationship with dependent variables. Other factors considered in the study were farmers' and staff's perception about the project, practices and problems.

The study revealed that farmers of the project area had more knowledge about recommended practices, more favourable attitude towards chemical plant protection and higher level of adoption of recommended practices than the farmers of the shadow area. There was significant relationship between knowledge on combined recommended practices and adoption of combined recommended practices but there was no significant relationship between attitude towards chemical plant protection and adoption of chemical plant protection.

Of the six independent variables age had no significant relationship with dependent variables viz., knowledge on combined

recommended practices, attitude towards chemical plant protection and adoption of combined recommended practices. In the case of education and economic status expect for knowledge on combined recommended there were no significant relationships with other dependent variables. Other three independent variables viz., knowledge about operational research project, attitude towards operational research project and attitude towards scientific agriculture showed significant relationship with dependent variables.

Majority of the farmers and staff of the project showed favourable perception about the project and the recommended practices. The important problems perceived by farmers were high cost of fertilizers, low price of paddy and lack of capital. The problems identified by the staff in the transfer of technology were lack of co-ordination between Agricultural University and State Department of Agriculture, inadequate budget provision, lack of sufficient staff.