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TRAINING NEEDS OF FARMERS IN RELATION TO
HIGH-YIELDING VARIETIES OF PADDY

By

Nawal Kishor Roy

A Thesis

submitted to the Faculty of the Post Graduate School,
Indian Agricultural Research Institute, New Delhi
in partial fulfilment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

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CERTIFICATE

This is to certify that the thesis entitled, "Training Needs of Farmers in Relation to High-yielding Varieties of Paddy", submitted by Shri Nawal Kishor Roy in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy to the Post Graduate School, Indian Agricultural Research Institute, New Delhi, is a record of bona fide research work carried out by him under my guidance and supervision. No part of this thesis has been submitted for any other degree or diploma. The assistance and help received during the course of investigation and sources of literature have been duly acknowledged.

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(Nawal Kishor Roy) 30/11/72

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CHAPTER I

INTRODUCTION

Indian agriculture is in the throes of change from a tradition-bound subsistence farming to scientific cultivation of land. The technological breakthrough in agricultural research in recent years has provided immense opportunities for increasing agricultural production. One of the most significant advances in the agricultural technology in recent years has been the introduction of non-lodging, fertilizer-responsive, high-yielding, short duration varieties of food crops and the concept of multiple and relay cropping. The main strategy of agricultural production in the Fourth Five Year Plan is the maximisation of production per unit area per unit time. It is to be achieved by following multiple cropping, using high-yielding varieties in conjunction with the best agronomic, and soil and water management practices. The new strategy of agricultural production envisages a coverage of 62.50 million acres under high-yielding varieties and 40 million acres under Multiple Cropping Programmes. The success of this strategy will depend to a great extent on our ability to involve a large number of farmers and to impart them knowledge and skills necessary for the large scale use of new agricultural technology and sophisticated inputs in an intensive manner. One of the ways to impart new knowledge and skills to the farmers will be to have a continuous training programme for them. Choudhary's (1969) observations support this view. According to Choudhary (1969 : 1), it is now well recognised that training the

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farmers in package of improved farm practices is an essential first step in modernising agriculture. This matter has assumed further importance and urgency in the context of the targets of High Yielding Varieties and Multiple Cropping Programmes in the Fourth Plan which are likely to cover some 20 million farmers. This multitude has to be trained quickly and effectively, and within the outlay and effort that the country is in a position to afford. Therefore, one of the objectives of this study will be to analyse the training needs of the farmers in relation to high-yielding varieties of paddy.

The Problem

The High Yielding Varieties Programme was introduced in the farmers' fields during the year 1966-67. While in the case of wheat, the impact of high-yielding varieties and the new technology on the extension of acreage and increase in yields has been dramatic, in the case of rice it has not been so. The high-yielding varieties of paddy have not nearly done as well but improvements in this crop have been made in the recent years and a major breakthrough in rice production can be expected in near future. The average yields of rice in the national demonstrations have varied from 41.95 to 59.46 quintal per hectare. The yields have been gradually increasing and they are nearly three to four times the average yields of the country (Kanwar, 1971 : 19).

Ladefjinsky (1969 : 148), reviewing the progress of green revolution in the Kosi area, commented "Purnea is overwhelmingly a paddy district but wheat, not paddy is the pivot around which the green revolution is

centred... measured quantitatively there is no green revolution for paddy yet, but some of its ingredients are already there in terms of the existing trials and errors and the prevalent aspiration to expand the paddy output."

The technology of high-yielding varieties of paddy is highly complex and sophisticated. It requires a thorough understanding and repeated practice of different skills on the part of farmers to effectively exploit the sophisticated technology of high-yielding varieties of paddy. The available researches on adoption of high-yielding varieties of paddy indicate that one of the most important reasons for partial and non-adoption of the recommended package of practices is the lack of knowledge of the practices (P.E.O., 1968; 1969b; and Nair, 1969). The inputs are not so much a limitation as the lack of precise knowledge about the package of practices for non-adoption of the recommended package of practices (Sharma, 1972: 2).

With the wider use of high-yielding varieties, agriculture has ceased to be a source of subsistence alone; the new agriculture has attained the status of a modern business. Therefore, the farmers should be trained in specific operation and technical know-how and skills embracing all phases of production for maximising their economic returns.

A cursory review of researches conducted on farmers' training reveals that whereas some information is available on criteria for selection of farmers for training, relative effectiveness of various training methods, impact of training programmes etc. others are comparatively unexplored amongst which training needs of farmers in relation to high-yielding

varieties of paddy occupies an important place. So a empirical study of training needs of farmers with respect to high-yielding varieties of paddy is needed. Such study should answer questions like: What are the training needs of farmers in relation to high-yielding varieties of paddy? Are there any differences in the training needs of farmers as perceived by the farmers themselves and the trainers? What should be the optimum size of training group, timing, duration, interval, venue and follow-up activities to make the farmers' training more effective and meaningful? The present study is a systematic attempt to answer few of these questions.

Objectives

The over-all objective of the study is to analyse the training needs of farmers in relation to high-yielding varieties of paddy as perceived by the farmers themselves and the trainers, and to suggest ways and means to make the Farmers' Training Programme more realistic and problem-oriented. The specific objectives of the study are:

1. To identify and determine the main areas of training in relation to high-yielding varieties of paddy for farmers as perceived by the farmers themselves and the trainers.
2. To measure the knowledge of farmers in the main areas of training in relation to high-yielding varieties of paddy.
3. To determine the relative importance of the sub-areas of training as perceived by the farmers and the trainers.

4. To determine the training needs of the farmers in the sub-areas of training as perceived by farmers and trainers.
5. To study the association, if any, between the selected socio-personal characteristics of the farmers and their training needs.
6. To determine the relative suitability of venues, months, timing, duration, size of training group, training methods and follow-up activities for farmers' training in relation to high-yielding varieties of paddy as perceived by the farmers and the trainers.

Scope and Importance of the Study

The study was planned at the district level for field investigation. It was hoped that the findings of the study would help to organise Farmers' Training Programme on the genuine needs and interests of the farmers. The knowledge of training needs of the different categories of farmers will help to formulate suitable training programmes for different categories of farmers to meet their training needs. The findings of the study will also help to know the farmers' preferences for venue, duration, training methods, follow-up and various other components of the training programme.

Limitations of the Study

The present study suffered from the limitations of time, money and conveyance usually faced by a student investigator. However, considerable care and thoughts have been exercised in making the study as objective and systematic as possible. The data relate to a small sample of 187 farmers and projection of the findings to arrive at conclusions valid

for the whole State of Bihar is not envisaged. The findings of this study should not be generalised beyond the limits of Purnea district where the study was conducted and to those areas which do not have similar conditions as the villages under study.

Lay-out of the Dissertation

This dissertation is divided into five chapters. The second chapter, following the first of introduction, deals with review of researches conducted on training needs of farmers and related aspects. The third chapter deals with the research methods and techniques used in this study. The fourth chapter deals with the analysis of data and discussion. A brief summary and implications of the findings have been presented in the last chapter.

Term Defined

Training need may be operationally defined as the gap between the farmers' existing and desirable levels of cognitive and action behaviour.

In this chapter, the problem of the study was carried out. In the next chapter, a brief of literature will be presented.

CHAPTER II

REVIEW OF LITERATURE

In the previous chapter the problem of the study was discussed. In the present chapter, relevant literature related with the problem will be discussed. A comprehensive review of literature is an essential part of any scientific investigation. It is necessary for the researcher to acquaint himself with the work done in the past to delineate the important problem areas. However, isolating such a review to a single chapter of the thesis may have amounted to assigning it a ritualistic rather than a functional role. Therefore, the use of the relevant references has also been made in other parts of the thesis apart from discussed here. For the convenience of discussion, the relevant literature available has been reviewed under the following sections. Each of the three sections will be discussed separately.

1. Theoretical Orientation.

- (a) Conceptual meaning of training.
- (b) Schematic model of training.
- (c) Phases of training.

2. Genesis of Farmers' Training Programme.

3. Review of Research Studies.

- (a) Training needs of farmers.
- (b) General studies in farmers' training.
- (c) Recommendations of workshop on farmers' training.

4. Derivation of Hypotheses.

1. Theoretical Orientation

Conceptual Meaning of Training - The word "training" according to Webster (1947) means: an act, process or method of one who trains.

Plenty et al (1948) describe training as "Training in commerce and industry is a specialised and very practical form of education. Basically, it prepares people to do their jobs well. To accomplish this it develops the skills that make for rapid, effective work, the knowledge that is meant for intelligent actions and attitudes that bring willing cooperation with fellow employees and with management."

The psychological and psychoanalytical dictionary (1959) gives the meaning of training as "The totality of instructions, planned circumstances, and directed activity to which an animal or person is subjected to induce learning."

Flippo (1961) has explained training as "...the act of increasing the knowledge and skill of an employee for doing a particular job."

Taylor (1961) elaborated the meaning of training as "The means to bring about a continuous improvement in the quality of work performed by the staff and the individuals. It should equip the leaders with necessary knowledge, skills or abilities and attitudes to perform their job."

Milton Hall (1962) gave the definition of employee training as "The process of aiding employees to gain effectiveness in their present or future work through the development of appropriate habits of thought and action, skills, knowledge and attitudes."

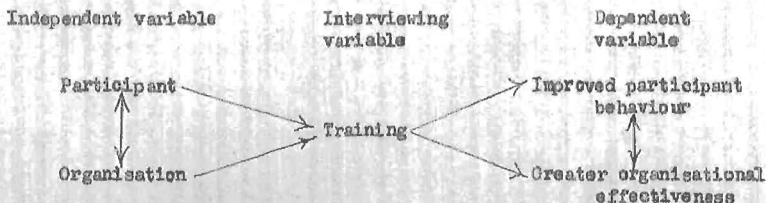
Lynton and Pareek (1967) while explaining the concept of training have stated that

"Training as we see it aims at a lasting improvement on the job. The kind of education we call training - more of the distinctions latter is in truth, not for knowing more but to behave differently. Training, then is concerned with people - on - the job - in organisation - the whole of this universally amalgam."

Rao (1969) defined farmers' training as "... is a kind of learning process where a selected group of individuals undergo learning experiences to internalise the skills, resulting in the modifications of behaviour towards specific job performance."

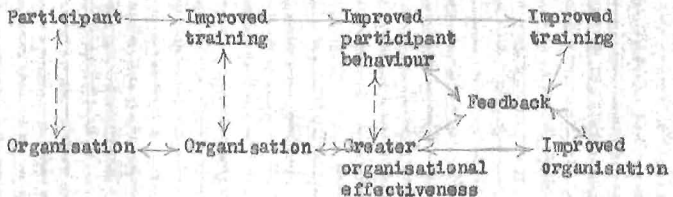
Schematic Models of Training - According to Lynton and Pareek (1967) there are two concepts of training in practice. These are the "prevailing concept" and the "new concept". The fundamental distinction between these two concepts is based on motivation of the participants and the work organisation. The authors believe that motivation is lacking in the prevailing concept, whereas in the "new concept" motivation is the main focus to enrol and train more participants and work organisations for training. According to them there are three models of any training process. These are - "simple model" of the training process, "elaborate model" of the training process and the "spiral model." In the following lines, it seems quite important to give a brief description of each of these models.

Simple Model of Training Process - The model can be represented diagrammatically as below:



Simple model conceives training as the intervening variable which contributes to the participant's improved behaviour indirect sense and to greater organisational effectiveness in an indirect way.

Elaborate Model of Training Process - The elaborate model includes the element of feed back in addition to the four elements - participant, organisation, training and institution depicted in the simple model of training. Diagrammatically it has been represented as follows:



The diagram stresses the relationships which exist between the participant, work organisation, institution and training. Feedback contributes to the improved efficiency of the participant and the organisation.

Spiral Model of the Training Process - The spiral model takes into consideration three components (participant, institution and work organisation) and three stages of the phases of training (pre-training, training and post-training). It visualises the training programme as a whole, and also, each event and the series of events which make up the programme. For each training session there is a before and after phase, and, in between, the actual phase of the transmission of new knowledge and skill. All the phases together form a complete training programme.

While comparing these three models of training, one is likely to infer that there are great similarities among them. The difference may be one of terminology only or that of the addition of one or more elements. All the same, these models help us to understand the training process more clearly. After discussing the various models of training, the phases of the training programme will be discussed.

Phases of the Training Programme - A complete training programme is composed of a number of phases to make it a unit. Discussing the phases of a training programme, Lynton and Pareek (1967) have given three main phases. These phases are: Pre-training phase, training phase and post-training phase.

(i) **Pre-training phase** - The pre-training phase, in the first instance, is concerned with the process of building up of the expectations and motivations by the training institutions to make them feel the need of it. In fact, training institutions try to create a favourable mental attitude towards a training programme. As viewed by the authors, a given training programme may not be motivating to the elements - participants, and work organisation at the same time. Therefore, efforts should be directed to correlate the understanding in order to achieve good results in a training.

(ii) **Training phase** - In this phase the participants are exposed to the opportunities for learning. As a result of such exposures the participants are to adopt a series of five stage sequences. The sequences are: selection of items of learning, initial trial of experience, feedback from the initial trial, reinforcement and continued practice and

interrelation of what has already been learned by the participant.

(iii) Post-training phases - It is under this phase that the participant is able to put his newly acquired learning into practice. At this stage, if the participant is given approval, encouragement and help to use the knowledge acquired in training, he will internalise the learning experience.

The preceding discussion about the meaning of training, its models and phases may be summarised as follows:

(i) The training is the process of helping employees to acquire appropriate habits of thought and action, skill, knowledge and attitude.

(ii) The training is never static. It is an active process which is necessary for sustained growth of a system.

(iii) A good training programme is dynamic, purposive, developmental, comprehensive, scientific, imaginative and normative in nature.

(iv) The training is a two-way process in which the participant, work organisation and the institution all gain in terms of further improvements.

(v) The different models of training are almost identical except for the differences of terminology and addition of a few elements.

(vi) The phases of training are pre-training, training and post-training.

After discussing the conceptual framework of training, now a historical genesis of the Farmers' Training Programme will be discussed to relate the problem.

2. Genesis of Farmers' Training Programme in India /

Education and training of village leaders used to be one of the most important aspects of the rural reconstruction programme in India even prior to launching of the nation-wide Community Development Programme in 1952. According to Mayer (1958), the Etawah Pilot Project from its inception in 1948 also included farmers' training programme as one of the project activities. Village leaders training camps were organised regularly in the villages. In these integrated training camps almost all aspects of rural development programme were covered. These camps were organised for about six or seven days, followed by a study trip for two or three days.

With the launching of the Community Development Programme in 1952, training of village leaders became a part of the Community Development Programme as reported by the Programme Evaluation Organisation (1961). Training camps were organised in the project areas with a view to secure extensive peoples' participation in the various aspects of the programme. The objectives of these training camps were generally to broaden the outlook of the trainees and particularly to impart them training in improved methods of agriculture and livestock, and knowledge of scientific practices in the fields like health and sanitation. The instructional part of the training programme consisted of lectures and demonstrations while the practical part included field work involving manual labour. The camps lasted from one to two weeks and the main part of the training consisted of discussions and lectures pertaining to various aspects of rural development programmes.

The Programme Evaluation Organisation made a study of these camps in 1954. In this study they observed that there was greater need for maintaining effective contact between the trained village leaders and block extension personnel. All the subject matter specialists on the project staffs should be utilized to a greater extent in the training camp. These camps helped in developing some local leadership.

The sixth Annual Conference on Community Development in the year 1957 gave a new direction to the training programme in the light of the emphasis on agricultural production in the Community Development Programme. The conference recommended that for purposes of the training in the villages four categories of subjects might be taken into account. The various aspects of Community Development programme be grouped into the following categories:

- i) Agriculture group comprising of agriculture, animal husbandry and minor irrigation
- ii) Village institution groups
- iii) Education group, comprising of education, social education, health and sanitation and
- iv) Women's programme.

However, "agriculture group" comprising of agriculture, animal husbandry and minor irrigation was given first preference for the training. A new nomenclature was given to the trained farmers as Gram Sahayaks. According to Taylor, Ensminger and others (1965) this training of Gram Sahayaks helped to promote adoption of improved agricultural practices

by his fellow farmers and to promote all agricultural activities leading to increased production.

At the annual Conference on Community Development in 1959, it was decided that one or two per cent of the Gram Sahayaks would be given additional training in order to improve their own agricultural practices and that of their neighbours. A scheme was designed in the Third Five Year Plan to provide intensive training for 2,50,000 selected "progressive farmers" for about two weeks at selected Extension Training Centres, Agriculture Schools and Agricultural Colleges. Thus, it was proposed to train about 50,000 farmers every year during the Third Five Year Plan. The farmers' training was institutionalised in the country, taking the farmers from their own farm to other places, whether this was a sound step is a very controversial subject. According to the Directorate of Extension (1965), for this purpose sixty-three such training centres were put into operation in various States of the country during the Third Five Year Plan. One significant thing that can be observed was, that greater emphasis was gradually being shifted from development of rural leadership in general to agricultural leadership in particular.

The advent of Intensive Agricultural District Programme (1961) and 'Intensive Agricultural Area Programme (1964) changed the emphasis and pattern of farmers' training. The training was of short duration. The focus and emphasis of the training was more towards specific jobs to be done by the farmers for particular crops to step up agricultural production. In addition to training of farmers, schemes were envisaged to train farm

women, and for exchange visits by farm leaders in the country.

Barsoah (1965) reported that a number of new training programmes for the farmers have been initiated during the last two to three years under the auspices of the Ministry of Food and Agriculture. They are:

- i) Specialised training of selected progressive farmers in agriculture and allied fields
- ii) Training of progressive farmers in the Intensive Agricultural District Programme and Intensive Agricultural Area Blocks
- iii) Training of farmers in the non-intensive areas
- iv) Exchange of farmers within the country
- v) Training of farm women in agricultural production
- vi) Association of manufacturers, distributors and importers of agricultural inputs with the training of farmers

Farmers' Training and Education Programme

Urgent need for an effective, integrated farmers' training programme was felt with the introduction of high-yielding varieties because of the sophisticated and complex nature of the technology of these new varieties. Hence, a comprehensive scheme for the systematic training of farmers, farm women and young farmers in the cultivation of high-yielding varieties was drawn up for implementation during the Fourth Five Year Plan. The chief feature of the Farmers' Training and Education Programme is discussed below.

The Objective - Farmers' Training and Education Programme aims at improving the efficiency of the human input in an effort to rapidly increase the rate of agricultural production particularly with reference

to the cultivation of the high-yielding varieties. The programme seeks to impart necessary skills to the farmers for undertaking improved agricultural operations, to make available to them timely information on improved practices in an easily understandable form suited to their literacy level and to create in them a favourable attitude for innovation and change.

The concept, approach and dimensions of the Farmers' Training Programme have emerged from a careful analysis and assessment of the education and training needs of the farmers in the context of the current agricultural programme. The concept of the audio-visual approach to farmers' education and training and the important role assigned in it to demonstrations; radio broadcast and voluntary village group action via the nucleus of farmers' discussion groups was conceived of as the most important tool in this training effort, in consonance with the level of literacy in the countryside and the limitations of printed word in carrying new ideas to the rural audience. The programme provides for an integrated approach to the problem of training the millions of farmers on the basis of active collaboration with All India Radio and the Functional Literacy Programme of the Ministry of Education.

Components of the Programme and Their Contents

The three components of the Farmers' Training and Education Programme are: Farmers' Training, Functional Literacy and Farm Broadcasts. The programme covers the entire farm family, that is, the practising farmers, the farm women and the young farmers. It consists of institutional and non-institutional training as follows:

i) Wider short duration field based training dealing mostly with the package of practices carried out through production-cum-demonstration training camps.

ii) Institutional training covering farmers, farm women and sons and daughters of farmers (that is, young farmers) dealing with topics of special interest, creating a nucleus for scientific farming through well organised courses of 7 to 15 days and 3 months' duration.

iii) Production-oriented voluntary discussion groups (Charcha Mandals) inclined to group listening of the agricultural programmes on the radio twice a week followed by group discussion for keeping abreast of the latest thinking and development in agriculture.

✓ Coverage - The idea of imparting training to the farmers was given shape in 1966-67 when the Farmers' Training Programme was introduced on a pilot basis in five districts, namely, Akola (Maharashtra), Coimbatore (Tamil Nadu), Raichur (Mysore), Ludhiana (Punjab) and Lucknow (Uttar Pradesh). The number of centres was raised to 25 in 1967-68 and 50 in 1968-69. It is proposed to extend the programme to 100 districts as envisaged in the scheme during the Fourth Plan period. According to the programme outline, approximately 23,000 farmers, farm women and young farmers per district are to be trained every year. The phased programme aims at covering about 5 million farm families in a period of five years.

Revised Programme - When the Farmers' Training Programme was started in 1966-67, institutional training received considerable emphasis. But, on

the basis of experiences gained in the implementation of this part of the programme during the first three years as well as the points brought out in the four Regional Consultative Committees the programme has been revised.

The revised scheme effective from 1970-71 makes a major deviation from the original scheme in the sense that it lays greater emphasis on non-institutional training duly supported by audio-visual aids in which National Demonstrations form focal point of training. As per the revised programme, the national demonstrations supported by other visual aids, radio broadcasts and farmers' discussion groups are the only institutions around which the education and training programme are to be organised.

After discussing the genesis of farmers' training programme in India, a brief review of researches conducted in farmers' training programme is presented below.

3. Review of Research Studies

Training Needs of Farmers - Sidhu and Patel (1968) analysed the opinions of trained farmers and concerned officials on the organisation of farmers' training camps at the village level. The study was conducted in Olpad taluka of Surat district. Eighty trained farmers were selected by random sampling method. The second category of respondents consisted of Agricultural Extension Officers who were incharge of the training programme in the talukas of Surat district. Data were collected with the help of a structured schedule. Some of the salient findings are as follows:

(i) The priority given by farmers on topics in order of importance were plant protection, fertilizers, improved seeds, irrigation, improved

implements, intercultural operations, soil preparation, soil conservation and harvesting. There were similarities in ranking the subject matter areas by farmers and trainers.

(ii) The methods preferred by farmers to be used in training were: lecture, group discussion, lecture followed by group discussion and method demonstration.

(iii) Cent per cent of the farmers and trained farmers favoured to organize kharif camps in the months of April-May and rabi camps in the months of September-October. Training camps should be ^{of} 2-3 days duration as the farmers cannot spare more time continuously. Majority of the farmers and trainers preferred that 20-25 members group was a convenient size. Majority of the respondents of both the categories opined that the duration of time for lectures should be half an hour, for group discussion three-fourths of an hour and for practicals one and a half hours. In order to make the follow-up effective, they suggested that the Taluka Development Officer and President of Taluka Panchayat should contact the trained farmers on their visits to the villages. The Agricultural Extension Officers and Village Level Workers should make frequent visits to the farms of trained farmers at different stages of farm operations.

Sohal and Yanakani (1970) analysed the training programme for young farmers organised by the Punjab Agricultural University. Some of their salient findings are as follows:

(1) The top priority in course content should be given to agronomy, farm machinery and plant protection. The majority of respondents suggested

that more emphasis should be given to principal crops and the practical training should be given top priority.

(ii) A group comprising 25 to 30 trainees should be an appropriate size.

(iii) The training programme should be organised during the months of January, February and March. The duration should be of three months and the courses should be held at the Punjab Agricultural University.

Extension Education Institute, Rajendra Nagar (1971) analysed the training needs of farmers in relation to new agricultural technology. The study was conducted in three districts of Andhra Pradesh, namely, Hyderabad, Chittore and West Godavari with a random sample of 320 farmers. Data were collected with the help of a schedule by personal interview method. Some of the important findings are given below:

(1) Training in plant protection is the foremost need of farmers followed by training in the use of fertilizers and new seed varieties.

(ii) The subject matter priorities in the training programme . . . Plant protection, manures and fertilizers, improved seeds, multiple cropping, use of improved implements including plant protection equipments, irrigation and water management, dairy farming, poultry farming, soil conservation and farm mechanisation.

Satyanarayana and Bhaskaran (1971) studied the training needs of farmers in relation to adoption of high-yielding varieties of paddy, jowar and bajra in Hyderabad district. The study was conducted in three blocks of Hyderabad district. Six villages at the rate of two villages from each of the three blocks were selected randomly. One hundred and

eighty farmers were selected by random sampling method. Data were collected with the help of an interview schedule. Some of the salient findings are as follows:

(i) The areas where the knowledge and skills of farmers need to be improved were determination of fertilizer doses and their application, soil sampling, use of plant protection chemicals and appliances, identification of pests and diseases, and soil control. The study also indicated that the farmers needed specific training in all the package of practices of high-yielding varieties except land preparation, drainage and harvesting operations.

(ii) Majority of adult farmers and young farmers indicated preference for non-institutional (peripatetic) training within or near their village itself, while farm women preferred training in the village itself. More number of young farmers expressed their willingness to institutional training than adult farmers.

(iii) Adult farmers preferred 1-2 days' training while young farmers indicated 7-10 days as optimum for institutional training. While in case of non-institutional training majority of adult farmers, young farmers and farm women preferred one to three days duration as optimum.

Singh and Haque (1972) analysed the information needs of farmers as perceived by them and extension personnel. The study was conducted in all the five Community Development Blocks of Delhi territory. Three categories of respondents, namely, Block Level Officers, Village Level Workers and farmers were interviewed with the help of an interview schedule. The sizes

of the samples for the three categories of respondents were 25, 80 and 165 respectively. Some of the salient findings are as follows:

(i) The information requirements of the two crops were different for the same group of farmers. The most important items of information need for cultivation of the wheat crops were fertilizers, irrigation, intercultural operations and control of diseases, whereas for cultivation of the bajra crop these were improved seeds, storage, control of insect pests and marketing of the produce.

(ii) There was great dissimilarity in the order of importance of items of information need between farmers and Village Level Workers and also between farmers and the block personnel in case of wheat. The most important items on which farmers needed information as indicated by Village Level Workers and block level personnel, with slight differences, were soil test, water test, fertilizer and sowing. But the actual farmers' information requirements in order of importance were fertilizers, irrigation, intercultural operations and disease control.

(iii) It was also observed that in both the cases, namely, of wheat and bajra, the perception of farmers' information needs by the Village Level Workers and block level personnel was altogether different and dissimilar and also in opposite direction.

After presenting a brief review of research studies in training needs of farmers, now a few selected general studies in farmers' training programme will be discussed.

General Studies in Farmers' Training - Programme Evaluation
Organisation (1961) conducted a study about the working of the

Gram Sahayaks' training programme. The data were collected from 22 Community Development Blocks from nine States and one Union Territory.

The salient findings of the study were as follows:

- (i) No strict criteria were followed for selecting the participants.
- (ii) As regards the content of training, it was of general type dealing with all aspects of agriculture than with any crop in particular.
- (iii) The most frequently used training methods were lectures, demonstration, group discussion and visual aids in that orders.
- (iv) As follow-up activities, projects were assigned to the trained farmers, Block staffs conducted meetings in the villages and literatures about improved agricultural practices were distributed to trained farmers.

A non-participant observation of a Gram Sahayak training camp was done by Programme Evaluation Organisation (1961) in Madhya Pradesh and the following findings were reported.

The training camps were of three days duration. Five extension officers of the block acted as trainers. The content of the training was general, not specific. Lecture was the most popular method of training and posters, charts and black boards were used as visual aids. Out of 37 trainees only three participated in discussion.

Another non-participant observation of Gram Sahayak training camp was done in Himachal Pradesh by Programme Evaluation Organisation (1961). The training camp was of three days duration but the attendance was reduced to 50 per cent on second day and third day. There were twelve trainees, six from block level and the other six were specialists from district level.

Lecture was the most popular method followed by practical demonstrations. Many times the content of the presentation was not relevant to the local problems. It was observed that the general arrangement for the training was good, but the method of training needed considerable improvement.

Singh (1967) made a study to analyse the farmers' training programme in Bihar. The study was confined to three agricultural schools and the data were collected from three categories of respondents, namely, trainees, instructors and Agricultural Extension Supervisors, with the help of interview schedule and mailed questionnaire. Some of the important findings were as follows:

(i) Majority of the trainees felt that the duration for 10 days of training was insufficient. They favoured fifteen days to one month period for the training. They also held the opinion that training should be organised during slack season of the year.

(ii) Majority of instructors had the feeling that even though the duration of training was short, the farmers could learn many things about improved methods of agriculture. They, however, felt the need for some changes in the content and the duration of training to make it more effective. They suggested that the duration of training should be increased by 5-10 days. They realised that the training imparted to farmers was more theory-oriented.

Rao (1969) analysed farmer's training programme in Intensive Agriculture District Programme and Intensive Agriculture Area Programme districts in relation to High Yielding Varieties Programme. The study

was conducted in two phases involving 15 Intensive Agriculture District Programme and Intensive Agriculture Area Programme districts and the respondents were Agricultural Extension Officers, Block Development Officers, Project Executive Officers, district level specialists, trained farmers and specialists in the area of training. Altogether 286 respondents were involved in the study. Simple random sampling, systematic random sampling and purposive sampling were used to select different categories of respondents. Data were collected with the help of a mailed questionnaire and an interview schedule. Some of the salient findings in different areas of farmers' training were as follows:

(i) The most popular type of training to farmers in relation to cultivation of high-yielding varieties was of short duration type varying from one to three days.

(ii) Majority of the respondents indicated that the training to farmers was offered before the onset of the sowing season, generally, in the months of April, May, June, September, October and November.

(iii) The usual size of the farmers' training group was 50-100 and the optimum size preferred was 30 to 50.

(iv) Both the farmers and experts accorded higher preference to combination of field trips or demonstration with discussion than combination of lecture with discussion or teaching aids or visit to demonstration plots. There was complete agreement in assigning the first three ranks to combination of more than two methods with greater emphasis to combinations of discussion, demonstration, field trip and lectures.

(v) Majority of the respondents indicated that the most common types of follow-up activities of the training programmes were trainers' regular contact with the trained farmers followed by discussion with them and visits to their fields. Supply of literature and periodical correspondence with the trained farmers were mentioned by 35.57 and 28.07 percentages of respondents respectively. 18.26 per cent of respondents also indicated that special radio programmes were arranged for the benefit of the trained farmers.

Khuspe (1970) analysed the differential impact of the selection criteria and training methods on knowledge, attitude and adoption behaviour of farmers in relation to high-yielding varieties of paddy. The basic experimental design used in this action research project was of before-and-after type. It consisted of four treatment groups and one control group of farmers. The sample size in the experimental group was 120 and that of in control group was 30. Farmers were selected and trained by conventional selection criteria and training methods, and proposed selection criteria and proposed training methods. Data were collected by personal interview method. Some of the salient findings were as follows:

(i) The farmers selected by proposed selection criteria and trained by proposed methods were more benefitted in gaining the knowledge about majority of the practices connected with high-yielding varieties of paddy than the farmers selected by conventional selection criteria and trained by conventional training methods.

(ii) The proposed combination of training methods proved to be superior for many practices of high-yielding varieties of paddy.

(iii) The proposed selection criteria, in general, were not superior to the conventional selection criteria.

(iv) The findings on attitude of farmers indicated that there was no significant effect of proposed selection criteria and training methods in bringing the favourable change in attitudes of farmers towards high-yielding varieties of paddy.

(v) Proposed training methods were not found to be superior to conventional training methods in adoption study.

Pal (1970) analysed the Farmers' Training and Education Programme in relation to changes in farmers' behavioural components and also compared institutional and non-institutional training programme to determine their effectiveness. The study involved an experimental design. Two groups of farmers were selected for the study. One group of farmers called the control group was selected and trained according to existing methods and procedures of Farmers' Training Centre, Bichpuri, Agra. The other group of farmers called the experimental group was selected and trained according to the selection criteria and training methods as reported by Rao (1969). Forty farmers attended the experimental group and forty farmers attended the treatment group. Some of the salient findings were as follows:

(i) The farmers of the treatment group gained more knowledge and attitude than those of the control group.

(ii) The institutional training was found to be superior to non-institutional training. There were significant differences in knowledge, attitude and adoption behaviour of farmers trained in the institutional

training and non-institutional training programmes.

After discussing the general studies in farmers' training programmes, new recommendations of workshop will be presented.

Recommendation of Workshop on Farmers' Training

The Workshop on Farmers' Training and Education (1967) recommended that the optimum size of the training group at the village level should be of 30-40 members. The method and result demonstrations, group discussions, samples and specimens, and field trips should be used for training the farmers. It also recommended that two days' training programmes for the farmers should be organised and such programmes should be organised 2-3 times during a crop season. The content of the training programme should include: technical content, economics and risks in using the package of practices, credits and supply. The emphasis of the training programme should be more on practical application. Rough distribution of the weightage should be 25 per cent for theory, 25 per cent for discussion and 50 per cent for practical. As regards follow-up, it emphasised to have an organised plan for follow-up and inform the farmers before they return home. There should be at least one visit by Agricultural Extension Officers and four to five visits by the Village Level Workers to each new grower for the following season.

The Evaluation Committee (1969) conducted a study to evaluate the functioning and progress of the Farmers' Training and Education Programme. The data were collected from four Farmers' Training Centres, namely,

Ludhiana, Bakshi-Ka-Talab, Bhavanisagar and Bangalore. Some of the salient findings were as follows:

- (i) The general impact of the Farmers' Training and Education Programme has been satisfactory.
 - (ii) The production-cuo-demonstrations camp held on farmers' fields have proved both popular and useful.
 - (iii) There is little or no emphasis on training of farm women in some of the States.
 - (iv) Farmers' discussion groups have remained, in several States, somewhat inactive and in some cases even non-existent.
 - (v) The institutional training had a mixed response. The short term training was more popular with the participants than the three months' training course.
- Some of the recommendations of the Committee were as follows:
- (i) The farm management aspect deserves more and more concentration. It stressed the need to organise a series of short duration courses focussed on farm management aspects and optimal use of inputs.
 - (ii) The small farmers must have a special place in the training programme.
 - (iii) There is need to step up the training of farm women.
 - (iv) The conducted tours of farmers should be undertaken to agriculture research stations, agricultural universities and farms of the progressive farmers.
 - (v) The national demonstration should be the main instrument for farmers' training.

(vi) The Farmers' Training and Education Programme should be extended to the other districts of the States also.

Conclusion

Majority of the studies reviewed indicated that farmers needed training in the package of practices of high-yielding varieties of cereal crops. The priority on subject matter areas in the training programme should be in order of plant protection measures, fertilizers, high-yielding varieties of seeds, irrigation and improved implements. There was also need to train farmers in farm management techniques. The non-institutional training of 1-2 days' duration was more effective than institutional training. But these studies were of general type.

The above review revealed the lack of systematic and objective studies on training needs of farmers in relation to high-yielding varieties of paddy as perceived by farmers themselves and trainers. The studies reviewed also did not indicate the preferences of farmers and trainers for various components of the farmers' training programme for organising farmers' training in relation to high-yielding varieties of paddy. The present study is a systematic attempt in this direction.

4. Derivation of Hypotheses

The over-all assumption of the study is that there are important identifiable areas of training in relation to high-yielding varieties of paddy and these areas differ in their importance and need for training. Within the framework of this over-all assumption and keeping in view the specific objectives, the following null hypotheses were formulated and tested in order to accept or reject them.

- L
NH:1 There will be no agreement among the large, medium and small farmers in assigning ranks to 12 main areas of training in view of the need for training.
- NH:2 There will be no agreement between the farmers and trainers in assigning ranks to 12 main areas of training in order of need for training.
- NH:3 There will be no agreement between the farmers and trainers in assigning ranks to the sub-areas of eight main areas of training in order of importance.
- NH:4 There will be no agreement among the large, medium and small farmers in assigning ranks to the sub-areas of 10 main areas of training in view of the need for training.
- NH:5 There will be no agreement between farmers and trainers in assigning ranks to the sub-areas of eight main areas of training in view of the need for training.

- NH:6 There will be no association between the socio-personal and economic characteristics of farmers and their training needs.
- NH:7 There will be no agreement between the farmers and trainers in ranking the specific items of the seven components of the farmers' training in order of preference.

In this chapter a brief review of literature related to the problem was presented. In the next chapter the research methods and techniques followed in the study will be discussed.

CHAPTER III

RESEARCH METHODS AND TECHNIQUES

In the previous chapter, a brief review of literature related with the problem was presented. This chapter deals with the research methods and techniques used in the present study. For the convenience of presentation they have been discussed under four different sections. The first section describes the locale of the study, selection of blocks and villages, categories of respondents and their selection. The second section deals with the delineation of the main areas of training in relation to high-yielding varieties of paddy, construction of the tools for empirical measures of variables and the methods and techniques of data collection. The third section deals with the statistical tools and techniques used for analysis of data. The last section deals with the physical and social setting of the district.

SECTION - I

Study Locale and the Selection of Blocks

Keeping in view the objectives of the study, the Intensive Agriculture Area Programme district, Purnea was selected. Purnea is one of the major rice growing district of Bihar. On the basis of adoption index for high-yielding varieties of paddy, all the blocks of Purnea district were classified into three adoption categories - high, medium and low. The adoption index for each block was calculated as follows:

$$\text{Adoption Index} = \frac{\text{Area under high-yielding varieties of paddy}}{\text{Total area under paddy cultivation}} \times 100$$

The adoption indices were arranged in ascending order and the values of the first (Q_1), second (Q_2) and third (Q_3) quartiles were calculated. These values were: Q_1 (3.87), Q_2 (5.10) and Q_3 (6.63). The blocks whose adoption index ranged above the value of the third quartile were categorized as high adoption blocks and those whose adoption indices were up to the value of the first quartile were categorized as low adoption blocks. The blocks whose adoption indices fell in between the values of the first and third quartiles were categorized as medium adoption blocks. One block from each of the three adoption categories was selected randomly for the detailed study. The operational area of research is shown in Figure - 1. The basic idea here was to select blocks which would represent the district in terms of the various adoption categories of high-yielding varieties of paddy. The area under high-yielding varieties of paddy, total area under paddy cultivation and adoption index for each block are given in Appendix I. After the selection of the blocks the next step was to select villages.

Selection of Villages

It was proposed to select high and low adoption villages from each of the three selected blocks in order to insure proper representation of various adoption categories of farmers. Therefore, in each block all the villages were classified into two adoption categories - high and low adoption villages on the basis of their adoption index for high-yielding varieties of paddy calculated in the similar fashion as for blocks. Villages having adoption indices than the value of third quartile were categorized as high adoption villages and villages having adoption indices upto the value of the first quartile were categorized as low adoption villages. Two villages, one each

from high and low adoption villages were selected randomly from each block. Thus, six villages were selected for the final field investigation. The selected blocks and villages were as follows:

<u>Names of Blocks</u>	<u>Names of Villages</u>
1. Ranijanj	1. Kala Balua 2. Narayanpur
2. Krityanand Nagar	1. Krityanand Nagar 2. Champa Nagar
3. Kadwa	1. Kamalpur 2. Kajra

Categories of Respondents and their Selection

Two categories of respondents, namely, farmers and trainers of the Farmers' Training Centres of Bihar were selected for the present study. A list of farmers growing high-yielding varieties of paddy for each village was prepared. Farmers of each village were classified into three groups, namely, large, medium and small farmers on the basis of land owned. The criteria adopted by the Expert Committee on Assessment and Evaluation (1969) of the Ministry of Food and Agriculture for classifying farmers into large, medium and small were used in the present study. The Expert Committee on Assessment and Evaluation (1969), while reviewing the progress of Intensive District Agriculture Programme categorized very small farmers as those having land below 1 hectare, small farmers as those having between 1-2 hectares, medium farmers as those having between 2-4 hectares and large farmers as those having more than 4 hectares of land. In the present investigation farmers having land up to 5.0 acres were

FIG.1. MAP OF PURNEA DISTRICT



categorized as small farmers, those having land between 5.10 to 10.0 acres were categorized as medium farmers and those having land more than 10.0 acres were categorized as large farmers. After stratification into three categories, 40 per cent of the farmers from each stratum was selected randomly. The size of the farmer sample was 187. The distribution of the selected farmers by size of holding is given in Table 1.

Table 1

The Distribution of Selected Respondents by Size of Holding.

Blocks	Raniganj		Krityanand Nagar		Kadwa		
Villages	Kala Balua	Narayampur	Krityanand Nagar	Champa Nagar	Kamalpur	Kajra	Total
Upto 5.0 acres	15(38)	12(30)	17(43)	11(28)	11(27)	14(34)	80(202)
5.10 to 10.0 acres	12(31)	10(24)	12(29)	9(22)	8(20)	19(26)	61(149)
Above 10.0 acres	8(19)	8(19)	9(22)	7(18)	6(16)	8(20)	46(114)
Total	35(88)	30(73)	36(94)	27(68)	25(62)	32(80)	187(465)

Figures in parentheses indicate the total number of farmers in a particular size of holding group in the selected villages.

✓ Selection of trainers - There are eleven Farmers' Training Centres in Bihar which impart training to farmers in agricultural technology. The total number of trainers in all the Farmers' Training Centres was 55. All the trainers were included in the second category of respondents.

SECTION - II

Delineation of the Main Areas of Training

To determine the main areas of training in relation to high-yielding varieties of paddy, both primary and secondary sources of information were used. The primary sources included field observations and the consultations whereas the publications, reports, books and journals served as the secondary sources of information. The specific steps taken in this direction were as follows:

Content analysis - The various types of literature including reports, journals and books dealing with the training needs of farmers were studied at the outset for collection of main areas of training.

Interview with trainers, field extension workers and farmers - Trainers of the Farmers' Training Centre, Purnea and the field extension workers of Ramiganj Block were interviewed and requested to point out areas of training in relation to high-yielding varieties of paddy. Thirty farmers belonging to different villages of Purnea district were also interviewed in this connection. With the help of information gathered from the above mentioned sources, a list of 15 main areas of training in relation to high-yielding varieties of paddy was prepared.

Final selection of the main areas of training - The list containing main areas of training was given to a panel of judges requesting them for scrutiny with a view to:

- (i) point out vague and ambiguous areas of training,
- (ii) to point out areas which overlap others, and
- (iii) to suggest rephrasing of areas wherever necessary.

After examining the suggestions of the judges, three areas were dropped. Finally, 12 main areas of training in relation to high-yielding varieties of paddy were selected (See Table 2).

Delineation of Sub-areas of Training

After delineation of the main areas of training, an attempt was made to identify sub-areas of training under each main area. On the basis of review of literature, discussion with subject matter specialists, trainers of the Farmers' Training Centre and farmers of the Purnea district, a list of 108 sub-areas of training was prepared.

Pilot study - A pilot study was undertaken in two villages. A random sample of 30 farmers was interviewed. They were asked to indicate whether they needed training in the sub-areas of training being read before them. The responses of the farmers were ^{or} elicited in the form of 'yes' or 'no' for each sub-area of training. After analysis of the response, only those sub-areas of training were retained on which there were common agreement (80 per cent and above) for further investigation. Finally, 77 sub-areas of training were selected. The main areas of training and the number of sub-areas under each main area are presented in Table 2.

Training Need Scale

A training need scale consisting of 12 sub-scales (See Table 2) was prepared to measure the training needs of farmers in relation to high-yielding varieties of paddy. The reliability and validity of the training need scale were tested as follows:

Test-retest method - This method of finding out the reliability of the scale was used to measure the stability of the responses. The scale was administered twice to 20 farmers randomly selected at an interval of 15 days. The scores for each respondent were calculated and the coefficient of correlation between two sets of scores was calculated which was 0.77. This coefficient of reliability was significant at .05 level of probability. So, it was concluded that the scale was reliable.

Content validity - The main criterion for content validity is how well the contents of the scale represent the subject matter under study. All possible items within the universe of the content were selected by discussion with specialists, trainers, extension workers and farmers. The present scale had the content validity.

Table 2

Main Areas of Training and the Number of Sub-areas of Training under each Main Area of Training.

Sl. No.	Main areas of training	Number of sub-areas of training
1	High-yielding varieties of paddy	7
2	Seed treatment	3
3	Nursery raising	10
4	Transplanting	6
5	Fertilizers	8
6	Plant protection measures	11
7	Irrigation	4
8	Improved agricultural implements	8
9	Chemical weed control	8
10	Storage	3
11	Credit	5
12	Marketing	4
Total		77

Training Needs of the Farmers in the Main Areas of Training

The training needs of farmers in the main areas of training in relation to high-yielding varieties of paddy as perceived by them and trainers were measured with the help of a five-point rating scale. The five points of the rating scale with their scores given in the parentheses were: Most Needed (5), Needed (4), Somewhat Needed (3), Less Needed (2), and Not Needed (1).

Training Needs of the Farmers in the Sub-areas of Training

The training needs of the farmers in the sub-areas of training as perceived by them and trainers were measured with the help of a five-point rating scale. The points of the rating scale with their scores given in the parentheses were: Most Needed (5), Needed (4), Somewhat Needed (3), Less Needed (2), and Not Needed (1).

Analysis of Data from Rating

The frequencies in each response category were found out and the respective frequencies were multiplied by the score allotted for it. Then they were added together and divided by the number of respondents which gave the mean score for each main area and sub-area of training. The mean scores thus obtained separately for main areas and sub-areas of training were used to rank them in order of need for training.

Selection of Main Areas and Sub-areas of Training in Order of Training Need

The final selection of the main areas and sub-areas of training under each main area in order of training need was done on the basis of the

following classification.

<u>Class interval of mean scores</u>	<u>Ratings</u>
4.5 - 5.5	Most Needed
3.5 - 4.5	Needed
2.5 - 3.5	Somewhat Needed
1.5 - 2.5	Less Needed
.5 - 1.5	Not Needed

Relative Importance of the Sub-areas of Training

The relative importance of the sub-areas of training as perceived by farmers and trainers was measured with the help of a five-point rating scale. The points of the rating scale with their scores given in the parentheses were as follows: Most Important (5), Important (4), Somewhat Important (3), Less Important (2), and Not Important (1). The mean scores for each sub-area of training were calculated. The sub-areas of training were ranked in order of importance on the basis of their mean scores.

Selection of the Sub-areas of Training in Order of Importance

The final selection of the sub-areas of training in order of importance was done on the basis of the following classification:

<u>Class interval of mean scores</u>	<u>Ratings</u>
4.5 - 5.5	Most Important
3.5 - 4.5	Important
2.5 - 3.5	Somewhat Important
1.5 - 2.5	Less Important
.5 - 1.5	Not Important

' Knowledge of Farmers in the Main Areas of Training

Knowledge was defined in the present study in the words of Bloom et al (1956) as "those behaviours and test situations which emphasised the remembering either by recognition or recall of ideas, materials or phenomena."

A standardized knowledge test, based on the procedure described by Lindquist (1951) was developed to measure the knowledge of farmers about the package of practices of high-yielding varieties of paddy, storage, credit and marketing. The following steps were followed in developing the knowledge test for this study.

' Item collection - The content of a knowledge test is composed of questions called items. A large number of items with respect to package of practices of high-yielding varieties of paddy, credit, storage and marketing were collected in consultation with the specialists, trainers, extension workers and farmers of the area of research. In all 81 items were collected.

' Item selection - The selection of items was done on the basis of the following two criteria:

- (i) It should promote thinking rather than memorization, and
- (ii) It should differentiate the well informed farmers from the poorly informed farmers and hence should have certain difficulty value. '

' Item analysis - Item analysis of a test yields two kinds of information, that is, an index of item difficulty and an index of item

validity. The selected 81 statements were administered to 100 farmers randomly selected who were different from the main sample of farmers selected for the study. Responses were dichotomized as 'correct' and 'incorrect' or 'don't know'. If a farmer gave a correct answer to an item he was given a score of one and those who gave incorrect answers or said 'don't know' got zero score for the item. The total score for each farmer was thus calculated. Afterwards, the farmers were arranged in descending order of scores from highest to the lowest. As suggested by Harper (Jr.) et al (1964) twenty seven per cent of the farmers with highest scores and 27 per cent with lowest scores were selected for calculation of item difficulty and item validity.

Item difficulty - The percentage of farmers giving the correct answers for each item was taken as the index of item difficulty.

Discrimination index - The discrimination index of each item was calculated by the following formula:

$$E^{1/3} = \frac{S_1 - S_2}{N/3}$$

Where,
E = discrimination index

S_1 and S_2 = the frequencies of correct answers in the high and low groups respectively

N = total number of farmers in the item analysis sample

Item validity - The validity power of the item - its consistency with total scores in the test is gauged by the correlation of the item score and the whole test score. Since the items were scored simply as 1

if correct and 0 if incorrect, point biserial correlation coefficient as suggested by Carret (1966) was calculated to measure the validity of the item. The point biserial coefficient of correlation was calculated for each item by using the following formula:

$$r_{bis} = \frac{M_p - M_q}{s} \sqrt{pq}$$

Where,

- r_{bis} = point biserial coefficient of correlation
- M_p = the mean of the total scores of farmers who gave correct answers to the item
- M_q = mean of the total scores of the farmers who gave incorrect answers to the item
- s = standard deviation of the entire sample
- p = proportion of farmers giving correct answers to the items.
- q = proportion of farmers giving incorrect answers to the items

Significance of the calculated point biserial coefficient of correlation was tested with the help of the table value of r for $(N-2)$ degrees of freedom. The calculated values of difficulty index, discrimination index and point biserial coefficient of correlation for all the items are given in Appendix II.

Final selection of the items - Items which had difficulty index ranging from 21-75 and discrimination index above 0.20 and with significant point biserial coefficient of correlation were selected as the items for the knowledge test. Keeping these two criteria in mind, 44 items were finally selected given in Appendix II.

'Representativeness of the test' - It was taken care that the test items finally selected should cover the entire universe of the relevant behavioural aspects of the farmers' knowledge of the package of practices, credit, storage, and marketing.

'Reliability of the knowledge test' - The reliability of the knowledge test was tested by 'split half' and 'test-retest' methods.

'Split half reliability' - This reliability measures the internal consistency of a scale. In this method, the test was first divided into two equal halves and it was administered to a group of 25 farmers randomly selected and coefficient of correlation was found out for these two halves. From the reliability of the half-test, the reliability coefficient of the whole test was found out by using the Spearman-Brown prophecy formula given below:

$$r_{11} = \frac{2r_{\frac{1}{2}} \frac{1}{11}}{1+r_{\frac{1}{2}} \frac{1}{11}}$$

Where,

r_{11} = reliability coefficient of the whole test

$r_{\frac{1}{2}} \frac{1}{11}$ = reliability coefficient of the half test formed experimentally

In the present study $r_{\frac{1}{2}} \frac{1}{11}$ was found to be 0.75 by applying the above formula the reliability coefficient of the whole test was calculated which was 0.86. This value of reliability coefficient was significant at .05 level of probability.

'Test-retest method' - This method of finding out the reliability of the scale was used to measure the stability of the responses. In this

method, the scale was administered to 25 farmers selected randomly twice at an interval of 15 days. The simple coefficient of correlation between the two repetitions was calculated which was 0.83. This coefficient of reliability was significant at .05 level of probability. As both types of reliability coefficients were significant, so it was concluded that the scale was reliable.

Method of scoring - Each farmer was given a score of one for correct answer and zero for incorrect answer to an item. The total knowledge score of each farmer was calculated by the total number of items in the test answered correctly by him.

Measurement of Socio-personal Characteristics

The socio-personal and economic characteristics, namely, age, education, size of holding, social participation and socio-economic status of farmers were studied in the present investigation. These variables for the purpose of the present study are operationally defined as follows:

Age - Age of the farmers was measured in terms of their chronological age. Approximate age in years on the date of interview was recorded.

Farmers were classified into three age groups namely, young (below 35 years), middle-aged (35-50 years) and old (above 50 years) farmers.

Education - The term education refers to the extent of formal education successfully undergone by the farmers. Farmers were classified into five groups on the basis of their level of education. These were: illiterate, can read and write, primary, middle, and high school and above.

Size of holding - This refers to the total area owned by a farmer.

The farmers were classified into three size of holding groups, namely, large, medium and small on the basis of land owned as explained in the preceding section.

Social participation - The term social participation in this study refers to the degree of involvement of head of the family in formal organisation either as a member or its office bearer. The farmers were classified into two groups, namely, members and non-members.

Socio-economic status - The socio-economic status of the farmers was measured with the help of "Socio-economic Status Scale" developed by Trivedi (1963). Farmers were classified into three socio-economic status groups on the basis of quartile deviation. The ranges of scores of the three socio-economic status groups were low (upto 21.45), medium (21.45 - 35.08) and high (above 35.08).

Training need - The total training need score for each farmer was computed by summing the scores obtained by him on each sub-area of training. Farmers were classified into three training need groups on the basis of quartile deviation. The ranges of the scores of the three training need groups were : low (up to 136.34), medium (136.35 to 269.45) and high (above 269.45).

Relative Preferences for the Various Components of Training

The relative preferences for the various components of the farmers' training, namely, venue, timing, months, duration, size of the training group, training methods and follow-up activities were analysed. A list of specific items under each component was prepared on the basis of review

of literature, discussion with trainers, trained farmers and farmers of the area of research.

A four-point rating scale was used to study the relative preferences of the specific items of the various components of farmers' training. The points of the rating scale with their scores given in the parentheses were: Most Preferred (4), Preferred (3), Less Preferred (2), and Not Preferred (1).

Analysis of data from rating - The frequencies in each response category were multiplied by the weightage allotted for it. They were added together and divided by the number of respondents which gave the mean scores for each item of the various components of farmers' training. The mean scores thus obtained for each item were used to rank them in order of preferences.

Selection of items under each component of training in order of preferences - The final selection of the specific items under each component was done on the basis of following classification:

<u>Class interval of mean scores</u>	<u>Ratings</u>
3.5 - 4.5	Most Preferred
2.5 - 3.5	Preferred
1.5 - 2.5	Less Preferred
.5 - 1.5	Not Preferred

'Instruments of Data Collection'

Two types of schedules were prepared, one for collecting data from the farmers and the other for collecting data from the trainers of the

Farmers' Training Centres of Bihar (See Appendices IV and V).

'Pre-testing the schedule' - After the draft preparation of schedules for farmers and trainers, these were pretested. The draft schedule for farmers was pretested in three randomly selected villages, one from each high, medium and low adoption villages respectively with a view to find out if farmers understood the questions rightly and to locate points of possible ambiguity either in questioning the respondents or in obtaining their responses, to improve the sequences as also in phrasing of the questions, etc. The schedule for trainers was pre-tested with the trainers of the Farmers' Training Centre, Purnea. On the basis of experiences gained in pre-testing, necessary modifications were made and the final drafts of the schedules were prepared.

Method of Data Collection

Data were collected from farmers with the help of an interview schedule. For this purpose the researcher stayed right in the villages during the period of interviewing the farmers. Some open end questions were asked before the interview proper to condition the respondents to give free responses and establish rapport. Respondents were always interviewed individually. Care was taken to hold interviews only with those persons who were actually doing farming or who were in any way contributing in farming operations and not necessarily with the heads of the family if they were not themselves doing farming. Responses were directly recorded on the interview schedule. On an average, an interview took two and half hours to three hours. /

Data from 20 trainers of the Farmers' Training Centres, Purnea, Pusa, Patna, Mushehari and Hajipur were collected by personally interviewing them. However, in case of six Farmers' Training Centres the schedules were sent by mail with a covering letter and an instruction sheet to the trainers requesting them to fill in the schedules and send back the same at an early date as it was difficult to contact them personally. Twenty-two questionnaires duly filled in were returned by the trainers. In all responses from 42 trainers were obtained.

SECTION - III

Statistical Analysis

The statistical tests which have been used for analysis of data in this study include: Spearman Rank correlation coefficient, Kendall coefficient of concordance, analysis of variance and Chi-square test. The percentages and arithmetic mean were the other statistics used in the study. /

Spearman rank correlation coefficient - In order to test the agreement between farmers and trainers in ranking the main areas and sub-areas of training in order of need for training and importance Spearman rank correlation coefficient was calculated. The formula for computing Spearman rank correlation coefficient for untied observations was as follows:

$$r_s = 1 - \frac{\sum_{i=1}^N d_i^2}{N^3 - N}$$

Where

r_s = Spearman's rank correlation coefficient

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N = number of entities or objects ranked

$\sum_{i=1}^N d_i^2$ = the sum of the differences of the two ranks squared

Testing the significance of r_s - If an observed value of r_s equals or exceeds the value tabled, that observed value is significant (for a one-tailed test) at the level indicated.

The Kendall coefficient of concordance (W) - The use of Spearman rank correlation coefficient is limited to testing the agreement in between two judges only. Therefore, to know the degree of agreement among the K ranks assigned by more than two judges at a time, the Kendall coefficient of concordance was used. In order to test the significance of the value of W , the Chi-square values were computed for the respective W values. The formula for computing Kendall's coefficient of concordance for united observations was as follows:

$$W = \frac{s}{\frac{1}{12}k^2 (N^3 - N)}$$

Where

- s = sum of squares of the observed deviations from the mean of R_j , that is, $\sum_{j=1}^k \left(R_j - \frac{\sum R_j}{N} \right)^2$
- k = number of sets of rankings, e.g., the number of judges
- N = Number of entities (objects or individuals) ranked
- $\frac{1}{12}k^2 (N^3 - N)$ = maximum possible sum of the squared deviations, i.e., the sum s which would occur with perfect agreement among k rankings

Testing the significance of W - The significance of W values when N was less than 7 was tested with the help of S value. When N was larger

than 7, the Chi-square value was calculated with the help of the following formula for testing the significance of W.

$$\chi^2 = K (N-1) W.$$

If the calculated value of Chi-square equals or exceeds that shown in Table for a particular level of significance and a particular value of degree of freedom = N-1, then the null hypothesis that the K rankings are unrelated may be rejected at that level of significance.

Chi-square test - Chi-square test was done to test the association between the socio-personal and economic characteristics of the farmers and their needs. The formula used for calculating Chi-square was as follows:

$$\chi^2 = \frac{(O - E)^2}{E}$$

Where df = (m-1)(n-1)
 O = observed frequency of farmers in a particular cell
 E = expected frequency of farmers in that particular cell
 m = number of columns
 n = number of rows
 directs one to sum over all cells

SECTION - IV

Setting

Till the other day, Purnea was a backward district of Bihar. But with the taming of the wayward daughter of the Himalayas, the Kosi, and the completion of the Eastern Kosi Canal system, Purnea is fast developing

as the nerve centre of agricultural development in eastern India. With the onset of green revolution in Bihar and elsewhere, Purnea has assumed the shape of a pilgrimage. The vast agricultural potentiality spreading over an area of 4,259 square miles together with the ceaseless effort of the people to explore that potentiality has placed Purnea on the map of the world. The visit of Macnamara, Schnitzer and the world famous authority on land reforms Mr. Wolf Lede Jinsky speaks well the growing importance of the district.

Location - Purnea is situated at the junction of three countries, namely, India, Nepal and Bangla Desh. It is the most easternly district in the State of Bihar.

The Kosi - Past and Present

The Kosi is one of the most ancient rivers of India. The Kosi was notorious for its vagaries and remarkable for the rapidity of the stream, the dangerous and uncertain nature of its banks and the desolation which its floods causes. During the last two hundred years the river has been gradually changing its course in a westwardly direction. In these movements it has laid waste large tracts of agricultural land, variously estimated between 2,000 to 3,000 square miles. For this reason and the reason that during floods the river used to overflow its banks and inundate wide areas, it is often called the "River of Sorrow of North Bihar."

Kosi Project was sanctioned in 1954. The main features of the scheme are construction of embankments for taming the river, canal system for irrigating about 14 lakh acres of land in the districts of Saharsa and

Purnea, and hydel station for generation of 20,000 kilowatt of electricity. The bulk of the work has been completed. The gross command area of the Eastern Kosi Canal is 18.34 lakh acres spread over the districts of Purnea and Saharsa. The cultivable command area is 12.23 lakh acres, out of which 8.12 lakh acres lie in the district of Purnea and 4.11 lakh acres lie in the district of Saharsa. Annual irrigation to the extent of 14.05 lakh acres can be done from this canal system.

Vital Statistics of the District -

The vital statistics of Purnea district is presented in Table 3.

Table 3

Vital Statistics of Purnea District*

Total geographical area	4,259 square miles
Total population	39,42,915
a) Male	20,53,801
b) Female	18,89,114
Rural population	94 per cent
Urban population	6 per cent
Number of cultivating families	4 lakhs
Number of sub-divisions	4
Anchor-cum-Blocks	39
Total number of villages	4,364

* Office of the Special Deputy Director of Agriculture, Purnea.

Social Organisation

Village schools, cooperatives and village panchayats are the three basic institutions found in rural areas. In villages mostly primary and middle schools are present but the highest educational facilities available in some of the villages are up to high school level. The village panchayat is found almost in every village which has a population of 1500-2000. In almost all the villages, cooperative societies have been organised. Except for minor differences, social structure of all the villages resemble very closely to each other in matters of village institutions, caste, religion and occupational patterns.

Agriculture in the District

Purnea is the major rice, jute and wheat growing area of Bihar. With the introduction of canal irrigation, the cropping pattern has completely changed. Cultivators are now growing two to three crops in areas where one crop grew before. The most remarkable feature of Purnea's recent agricultural breakthrough is its diversification in new directions. Farmers who have gained by growing the high-yielding varieties are now turning their attention towards fruit cultivation, poultry, bee-keeping and dairying. The land utilization pattern of the district is given in Table 4.

Agricultural Development Programmes

The district came under Intensive Agriculture Area Programme in 1964-65. The programme was started in 17 out of 38 blocks. In the year 1966-67, High Yielding Varieties Programme was also introduced in the

district. The area under some of the important crops is given in Table 5.

Table 4
Land Utilization Statistics*

Particulars	(in thousand acres)
Total geographical area	2,703
Total cultivated area	2,083
Unculturable waste land	413
Orchards	51
Culturable waste land	40
Pasture land	16
Forest	7

* Office of the Special Deputy Director of Agriculture, Purnea.

Farmers' Training Programme

The Farmers' Training Programme was started in December 1968 with a view to imparting necessary knowledge and skills to the farmers for adopting new agricultural technology. Under the non-institutional training programme, one day production-cum-demonstration training camps are organised in the villages. The institutional training consists of specialised courses of three days' duration for conveners of the farmers' discussion groups and of five days' duration for farmers and farm women. The progress of the farmers' training programme in the district is presented in Table 6.

Table 5

Area under Different Crops in 1971-72.*

Names of crops	(Area in thousand acres)
Total area under paddy cultivation	844.15
Area under improved varieties of paddy	171.48
Area under high-yielding varieties of paddy	49.52
Area under local paddy	623.15
Area under high-yielding varieties of wheat	261.00
Area under improved varieties of wheat	46.30
Area under local maize	55.60
Area under hybrid maize	1.90
Area under other rabi crops	553.80

* Office of the Special Deputy Director of Agriculture, Purnea.

Table 6

Progress of Farmers' Training Programme.*

Types of training programmes	Number of farmers trained
Production-cum-demonstration camps	1,884
Specialised institutional training courses for farmers	841
Specialised institutional training courses for convenors of <u>charcha mandals</u>	129
Specialised institutional training courses for farm women	95

* Office of the District Training Officer, Purnea.

In this chapter, the research methods and techniques used in the data collection were discussed. In the next chapter, the analysis of data and discussion will be presented.

CHAPTER IV

ANALYSIS OF DATA AND DISCUSSION

In the previous chapter, the methods and techniques of data collection were discussed. In the present chapter the analysis of data and discussion will be presented. For the convenience of presentation the findings of the study have been grouped under six sections. The first section deals with the training needs of the farmers in main areas of training. The second section deals with knowledge of farmers in the main areas of training. The relative importance of the sub-areas of training as perceived by farmers and trainers has been discussed in the third section. The fourth section deals with the training needs of farmers in the sub-areas of training as perceived by them and trainers. The fifth section deals with association between socio-personal and economic characteristics of farmers and their training needs. The relative preferences of farmers and trainers for the various components of the farmers' training programme have been presented in the last section.

1. Training Needs of Farmers in the Main Areas of Training

The training needs of farmers in the main areas of training as perceived by farmers themselves and trainers are presented in this section.

Farmers' Perceptions of Training Needs: The relative need for training in the main areas of training as perceived by ^{the} three categories of farmers is presented in Table 7. The data have been graphically represented in Figure 2.

Table 7.

Relative Need for Training in the Main Areas of Training as Perceived by Three Categories of Farmers

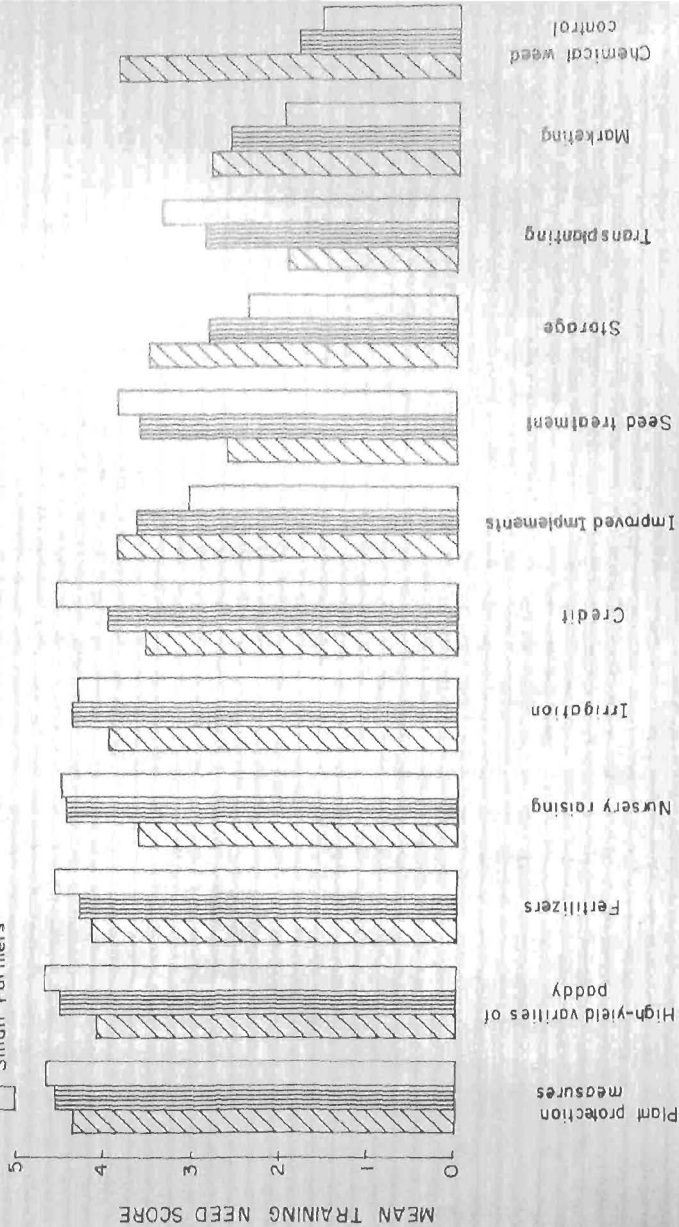
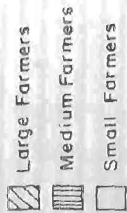
Main Areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Plant protection measures	4.34	(1)	4.54	(1)	4.66	(1)	4.51	(1)
High-yielding varieties of paddy	4.08	(3)	4.51	(2)	4.69	(1)	4.43	(2)
Fertilizer	4.18	(2)	4.42	(3)	4.58	(3)	4.39	(3)
Irrigation	3.98	(4)	4.38	(5)	4.29	(6)	4.22	(4)
Nursery raising	3.62	(7)	4.40	(4)	4.50	(5)	4.17	(5)
Credit	3.54	(8)	3.98	(6)	4.53	(4)	4.02	(6)
Improved implements	3.88	(5)	3.65	(7)	3.02	(9)	3.52	(7)
Seed treatment	2.53	(11)	3.62	(8)	3.87	(7)	3.34	(8)
Storage	3.50	(9)	2.80	(10)	2.36	(10)	2.89	(9)
Transplanting	1.59	(12)	2.85	(9)	3.35	(8)	2.59	(10)
Marketing	2.80	(10)	2.52	(11)	1.98	(11)	2.43	(11)
Chemical weed control	3.85	(6)	1.80	(12)	1.54	(12)	2.39	(12)

W = 0.78**

** Significant at .01 level of probability

Table 7 shows that the large farmers did not perceive training in any main area as most needed. Training in plant protection measures, fertilizers, high-yielding varieties of paddy, irrigation, chemical weed control, nursery

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raising and credit was perceived as needed by them in descending order. Training in the remaining main areas was perceived as somewhat needed and less needed by them.

The medium farmers perceived training in plant protection measures and high-yielding varieties of paddy as most needed in descending order. The main areas of training perceived as needed by them in descending order were: fertilizers, nursery raising, irrigation, credit, improved implements and seed treatment. The remaining areas of training were perceived as somewhat needed and less needed by them.

The small farmers perceived training in high-yielding varieties of paddy, plant protection measures, fertilizers and credit as most needed in descending order. The main areas of training perceived as needed by them in descending order were: nursery raising, irrigation, seed treatment and transplanting. The remaining main areas of training were perceived as somewhat needed and less needed by them.

The analysis of ranks assigned to the main areas by individual categories of farmers revealed that the small and medium farmers assigned same ranks to 5 out of 12 main areas of training. The large farmers ranked the main areas of training a bit differently than the medium and small farmers. The large and medium farmers assigned same rank to only one area, namely, plant protection measures. All the three categories of farmers assigned first three ranks with slight variations to plant protection measures, high-yielding varieties of paddy and fertilizers. Besides these, there were differences in ranking the main areas of training by them. Training in nursery raising was given fifth rank by small farmers and fourth rank by medium farmers whereas it was given

seventh rank by the large farmers. Credit was ranked fourth by the small farmers whereas it was given eighth rank by the large farmers. Chemical weed control was given sixth rank by the large farmers whereas it was given last rank by the small and medium farmers.

The computed W value (0.78) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the main areas of training, was rejected. Thus, the inference could be drawn that there was highly significant agreement among the three categories of farmers in assigning ranks to the main areas of training in order of need for training.

According to pooled judgement training in plant protection measures was perceived as most needed by farmers. Training in high-yielding varieties of paddy, fertilizers, irrigation, nursery raising, credit and improved implements were perceived as needed in descending order. The main areas, namely, seed treatment, storage and transplanting were perceived as somewhat needed. Training in marketing and chemical weed control was perceived as less needed.

Discussion: The pooled analysis supports the findings of Sidhu and Patel (1968), Extension Education Institute (1971) and Satyanarayana and Bhaskaram (1971) in general. The high-yielding varieties of paddy are very susceptible to pests and diseases. During the last few years a number of high-yielding varieties of paddy have been released. This, sometimes, causes confusion in the mind of the farmers as to which variety should be grown. At the same time, they are also in search of best

varieties suited to their farm conditions. As the farmers were still not having adequate knowledge of the technical details of the package of practices as is evident from Table 9, all the three categories of farmers felt more need for training in plant protection measures, high-yielding varieties of paddy and fertilizers. The small farmers assigned higher rank to credit for training than medium and large farmers. This may be due to the fact that the cost of cultivation of high-yielding varieties of paddy is very high and they are not in a position to meet the entire cultivation expenses from their own pocket. Therefore, the small farmers felt more need for training in credit than the medium and large farmers.

Trainers' Perception of Farmers' Training Needs: Table 8 shows that trainers perceived training in fertilizers, plant protection measures and high-yielding varieties of paddy as most needed for farmers in descending order. They also perceived training in seed treatment, transplanting, irrigation, credit, nursery raising and storage as needed for farmers in descending order. Training in chemical weed control, improved implements and marketing was perceived as somewhat needed by them for farmers in descending order.

Comparative Perception: In the preceding paragraphs, the training needs of farmers as perceived by farmers themselves and trainers were presented separately. An attempt was made to compare the training needs of farmers as perceived by them and trainers. The data are presented in Table 8. The data have been graphically represented in Figure 3.

Table 8.

Training Needs of Farmers in the Main Areas of Training as Perceived by them and Trainers

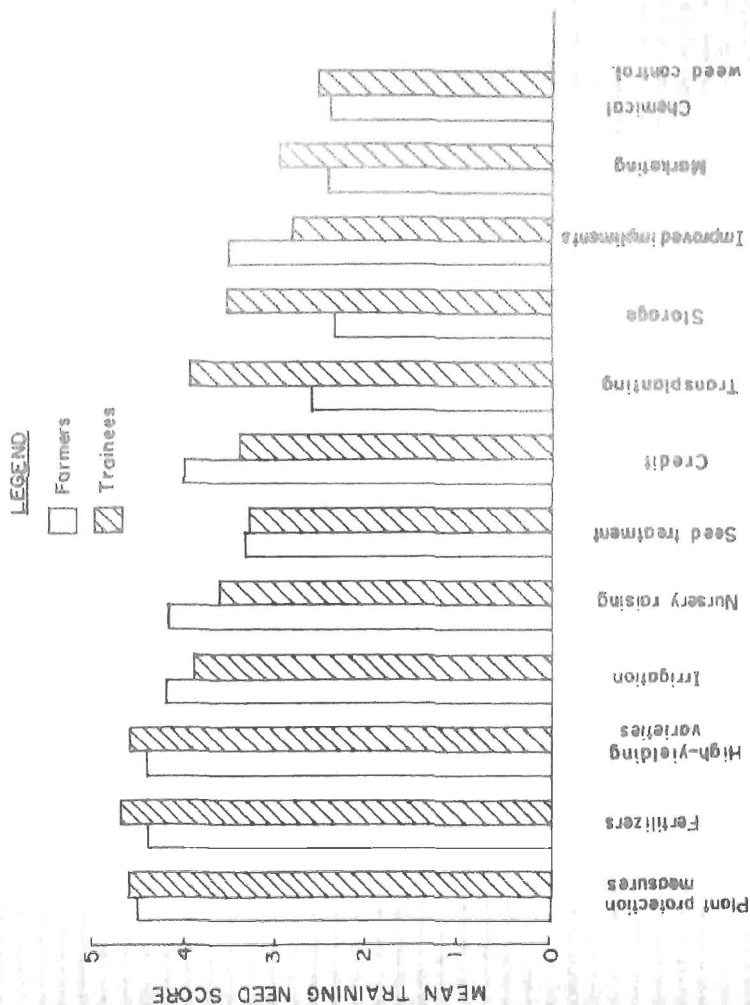
Main Areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Plant protection measures	4.51	(1)	4.68	(2)
Fertilizer	4.39	(3)	4.74	(1)
High-yielding varieties of paddy	4.43	(2)	4.64	(3)
Irrigation	4.22	(4)	3.90	(6)
Nursery raising	4.17	(5)	3.62	(7)
Seed treatment	3.54	(8)	4.32	(4)
Credit	4.02	(6)	3.40	(9)
Improved implements	3.52	(7)	3.08	(11)
Transplanting	2.59	(10)	3.98	(5)
Storage	2.89	(9)	3.54	(3)
Chemical weed control	2.39	(12)	3.15	(10)
Marketing	2.43	(11)	2.95	(12)

rs = 0.70*

* = Significant at .05 level of probability

Table 8 shows that farmers perceived training in plant protection measures as most needed only. But the trainers perceived that training in fertilizer, plant protection measures and high-yielding varieties of paddy was most needed for farmers. Besides these, there were slight

FIG. 3. TRAINING NEEDS OF FARMERS IN THE MAIN AREAS OF TRAINING AS PERCEIVED BY FARMERS AND TRAINERS.



variations in training needs of farmers as perceived by them and trainers. Farmers perceived training in credit as needed whereas the trainers felt that farmers needed somewhat training in credit. It is also evident from the table that trainers' perception of farmers' training needs in the main areas of training varied from most needed to somewhat needed.

The computed r_s value (0.70) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between the farmers and trainers in ranking the main areas of training, was rejected. Thus, the inference could be drawn that there was significant agreement between the farmers and trainers in assigning ranks to the main areas of training in order of need for training.

Discussion: This finding is in conformity with the findings of Sidhu and Patel (1968) who also reported that there was similarity in the relative ordering of the subject matter areas of training by farmers and trainers. The findings revealed that trainers assigned higher ranks to the package of practices of high-yielding varieties of paddy than improved implements, credit, storage and marketing. P.E.O. (1968; 1969a) and Nair (1969) in their studies on high-yielding varieties of paddy pointed out that not only the farmers did not adopt all the recommended package of practices but also the extent of adoption of the recommended practices was far below the recommended level. Therefore, the trainers placed more emphasis on training in package of practices than credit, storage and marketing. Bjt adoption of the package of practices is not only enough. For maximum benefit from

new technology it is necessary that the farmers must have knowledge of institutional credit facilities and techniques of improved marketing. This view is being supported by the Workshop on Farmers' Training and Education (1967). Therefore, farmers should be trained not only in package of practices of high-yielding varieties of paddy but also in credit, storage and marketing.

2. Knowledge of Farmers in the Main Areas of Training

The frequency distribution of knowledge score is presented in Table 9. The data have been graphically presented in Figure 4.

The theoretical range of knowledge score was from 0 to 44. It is evident from Table 9 that as against 15 per cent of small farmers and 11.5 per cent of medium farmers, only 4.3 per cent of large farmers had knowledge score below 10. As against 19.8 per cent of large farmers, 24.6 per cent and 31.1 per cent of medium and small farmers had knowledge score from 15 to 20. A very small percentage of small farmers (5.0 per cent) had knowledge score from 30 to 35 whereas the percentages of such medium and large farmers were 9.8 and 13.1 respectively.

It is also evident from the table that 11.2 per cent of farmers had knowledge score below 10 and a relatively small percentage (8.5 per cent) of the farmers had knowledge score above 30. Majority (60 per cent) of the farmers had knowledge score below 20. It can be said that, in general, larger percentages of small and medium farmers had relatively low knowledge score than the large farmers. The mean knowledge scores of the three categories of farmers and the calculated values of critical difference are presented in Table 10. The mean knowledge scores of all the three categories

Table 9.

Frequency Distribution of Knowledge Scores

Knowledge Score	Large Farmers (N = 46)				Medium Farmers (N = 51)				Small Farmers (N = 80)				Pooled (N = 187)			
	Raw frequency	percentage	Raw frequency	percentage	Raw frequency	percentage	Raw frequency	percentage	Raw frequency	percentage	Raw frequency	percentage	Raw frequency	percentage	Raw frequency	percentage
5 - 10	2	4.3	4.3		7	11.5	11.5		12	15.0	15.0		21	11.2	11.2	
10 - 15	7	15.2	19.5		13	21.3	33.8		22	27.5	42.5		42	22.4	33.6	
15 - 20	9	19.6	39.1		15	24.6	58.4		25	31.2	73.7		49	26.4	60.0	
20 - 25	12	26.1	65.2		11	18.1	76.5		10	12.5	86.2		33	17.4	77.6	
25 - 30	10	21.7	86.9		9	14.7	91.2		7	8.8	95.0		26	13.9	91.5	
30 - 35	6	13.1	100.0		6	9.8	100.0		4	5.0	100.0		16	8.5	100.0	

of respondents have been also presented graphically in Figure 3. The summary table of analysis of variance has been given in Appendix - III.

Table 10.

Mean Knowledge Scores of the Three Categories of Farmers and Calculated Values of 'F' and Critical Difference

Respondent Category	Large Farmers	Medium Farmers	Small Farmers
Mean knowledge scores	20.82	18.37	16.55
F ratio	6.43**		

** Significant at .01 level of probability

	At 5 per cent level	At 1 per cent level
Critical difference for large and small farmers	2.49	3.27
Critical difference for large and medium farmers	2.62	3.45
Critical difference for medium and small farmers	2.29	3.01

Result	Large Farmers	Medium Farmers	Small Farmers
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It is evident from Table 10 that the F - value for knowledge score was significant at .01 level of probability. It can also be seen from the table that the small farmers had significantly lower mean knowledge score than the large farmers. There were no significant differences in the mean knowledge scores of small and medium farmers, and medium and large farmers.

FIG. 4. FREQUENCY DISTRIBUTION OF KNOWLEDGE SCORE

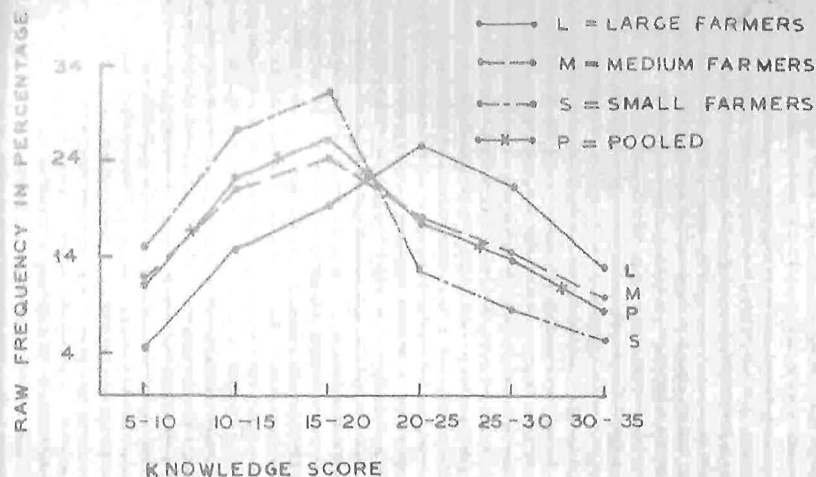
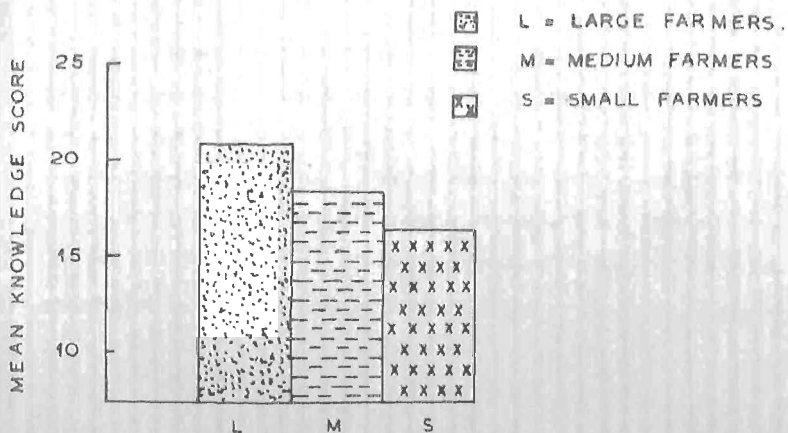


FIG. 5. MEAN KNOWLEDGE SCORES OF THE THREE CATEGORIES OF FARMERS.



Discussion: The finding is in conformity with the findings of Singh (1971) who also reported that the small farmers had significantly lower mean knowledge score than the large farmers. The possible reasons for low level of knowledge of small farmers may be their low level of adoption of high-yielding varieties of paddy (P.E.O. 1968). Another reason may be that the small farmers have low educational status and limited exposure to modern media of communication and low extension contact than the large farmers as reported by Singh (1971).

3. Relative Importance of the Sub-Areas of Training

The relative importance of the sub-areas of training as perceived by farmers and trainers is presented in this section. As indicated in Chapter III, there were 12 main areas of training in relation to high-yielding varieties of paddy and each main area was having a number of sub-areas of training. For the convenience of presentation, each main area of training will be discussed separately.

High-yielding Varieties of Paddy: Table 11 shows that the farmers perceived recommended high-yielding varieties of paddy, and sources of availability and prices of seeds as most important in descending order. The cost-benefit ratio, advantages and limitations and maintenance of purity of high-yielding varieties of paddy were perceived as important by them in descending order. The other sub-areas of training were perceived as somewhat important and less important.

Table 11.

Relative Importance of the Sub-areas of Training of High-yielding Varieties of Paddy as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Recommended high-yielding varieties of paddy	4.60	(1)	4.69	(1)
Sources of availability and prices of seeds	4.54	(2)	4.34	(3)
Cost-benefit ratio of high-yielding varieties of paddy	4.03	(3)	3.89	(5)
Advantages and limitations of high-yielding varieties of paddy	3.95	(4)	4.57	(2)
Maintenance of purity of high-yielding varieties of paddy	3.67	(5)	4.28	(4)
Characteristics of high-yielding varieties of paddy	3.21	(6)	3.37	(6)
Storage of seeds	1.82	(7)	1.87	(7)

rs = 0.82*

* Significant at .05 level of probability

The trainers perceived recommended high-yielding varieties of paddy, and advantages and limitations of high-yielding varieties of paddy as most important in descending order. Sources of availability and prices of seeds, maintenance of purity and cost-benefit ratio of high-yielding varieties of paddy were perceived as important by them in descending order. The other sub-areas of training were perceived as somewhat important and less important by them.

The computed r_s value (0.82) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between the farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was significant agreement between the farmers and trainers in ranking the sub-areas of training in order of importance.

Table 12.

Relative Importance of the Sub-areas of Training in Seed Treatment as Perceived by Farmers and Trainers.

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
Names and doses of pesticides	4.23	(1)	4.34	(2)
Method of seed treatment	3.82	(2)	4.52	(1)
Selection of healthy seeds	3.52	(3)	3.92	(3)

Table 12 shows that the farmers perceived all the three sub-areas of training as important in descending order of names and doses of pesticides, method of seed treatment and selection of healthy seeds.

The trainers perceived method of seed treatment as most important. Names and doses of pesticides, and selection of healthy seeds were perceived as important by them in descending order.

Nursery Raising: Table 13 shows that the farmers perceived time of nursery sowing and method of fertilizer application as most important in descending order. Plant protection measures, seed rate, irrigation, selection

Table 13.

Relative Importance of the Sub-areas of Training of Nursery Raising as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Time of nursery sowing for kharif and summer crops	4.56	(1)	4.51	(4)
Method of fertilizer application	4.52	(2)	3.97	(5)
Plant protection measures	4.36	(3)	4.69	(1)
Seed rate for transplanting one acre of main crop	4.30	(4)	4.54	(3)
Number and interval of irrigation	4.11	(5)	3.87	(7)
Selection of the field for nursery raising	3.91	(6)	1.47	(9)
Doses of fertilizers	3.63	(7)	4.62	(2)
Depth of sowing	1.57	(8)	1.13	(10)
Method of sowing	1.35	(9)	2.44	(8)
Seed bed preparation	1.22	(10)	3.96	(6)

$r_s = 0.55$ (Non-significant)

of the field for nursery raising and doses of fertilizers were perceived as important by them in descending order. The remaining three sub-areas were perceived as less important by them.

The trainers perceived plant protection measures, doses of fertilizers, seed rate and time of nursery sowing as most important in descending order.

Method of fertilizer application, seed bed preparation and irrigation were perceived as important by them in descending order. The remaining three sub-areas were perceived as less important by them.

The computed r_s value (0.53) was non-significant. Therefore, the null hypothesis that there is no agreement between the trainers and the farmers in ranking the sub-areas of training, was not rejected. Thus, the inference could be drawn that there was no significant agreement between the farmers and trainers in ranking the sub-areas of training in order of importance.

Transplanting: Table 14 shows that the farmers perceived time of transplanting, techniques of growing direct seeded rice and age of seedlings at the time of transplanting as important in descending order. Number of seedlings per hill was perceived as somewhat important by them. The rest two sub-areas were perceived as less important.

Table 14.

Relative Importance of the Sub-areas of Training in Transplanting as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Time of transplanting for kharif and summer crops	4.29	(1)	4.52	(1)
Techniques of growing direct seeded rice	4.10	(2)	3.97	(3)
Age of seedling at the time of transplanting	3.66	(3)	4.21	(2)
Number of seedlings per hill	3.13	(4)	2.42	(5)
Row to row and plant to plant distance	1.92	(5)	2.52	(4)
Preparation of the field for transplanting	1.73	(6)	2.30	(6)

$r_s = 0.89^*$

* Significant at .05 level of probability

The trainers perceived time of transplanting as most important. Age of seedlings at the time of transplanting and techniques of growing direct seeded rice were perceived as important by them in descending order. Row to row and plant to plant distance, and preparation of the field were perceived as somewhat important and less important respectively.

The computed r_s value (0.89) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between the farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was significant agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance.

Fertilizer: Table 15 shows that the farmers perceived recommended dose of fertilizers, method of fertilizer application and top dressing as most important in descending order. Foliar spray of urea, time and interval of

Table 15.

Relative Importance of the Sub-areas of Training of Fertilizer as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Recommended dose of fertilizers per acre	4.62	(1)	4.73	(1)
Method of fertilizer application	4.57	(2.5)	4.61	(3)
Top dressing	4.57	(2.5)	4.34	(5)
Foliar spray of urea	4.12	(4)	3.54	(7)
Time and interval of fertilizer application	3.88	(5)	4.67	(2)
Importance of balanced fertilization	3.61	(6)	4.53	(4)
Per acre cost of fertilizers	3.21	(7)	2.38	(8)
Identification of nutrient deficiency symptoms	2.87	(8)	4.18	(6)

$r_s = 0.61$ (Non-significant)

fertiliser application and importance of balanced fertilization were perceived as important by them in descending order. Per acre cost of fertilizer and identification of nutrient deficiency symptoms were perceived as somewhat important by them.

The trainers perceived recommended dose of fertilizers, time and interval of fertilizer application, method of fertilizer application and importance of balanced fertilization as most important in descending order. Top-dressing, identification of nutrient deficiency symptoms and foliar spray of urea were perceived as important by them in descending order. The sub-area, namely, per acre cost of fertilizers was perceived as less important by them.

The computed r_s value (0.61) was non-significant. Therefore, the null hypothesis that there is no agreement between the farmers and the trainers in ranking the sub-areas of training, was not rejected. Thus, the inference could be drawn that there was no significant agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance.

Plant Protection Measures: Table 16 shows that the farmers perceived control measures of insect pests, and names and doses of pesticides as most important in descending order. The sub-areas, namely, control measures of diseases, integrated pest control schedule, preparation of pesticide solution, precautions in spraying and handling of plant protection equipments were perceived as important by them in descending order. Time and interval of spraying, and sources of availability and price of pesticides were perceived as somewhat important. The other sub-areas were perceived as less important.

Table 16.

Relative Importance of the Sub-areas of Training of Plant Protection Measures as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Control measures of insect pests	4.60	(1.5)	4.72	(1)
Names and doses of pesticides	4.60	(1.5)	4.68	(2)
Control measures of diseases	3.98	(3)	4.56	(4)
Integrated pest control schedule	3.74	(4)	4.64	(3)
Preparation of pesticide solution	3.68	(5)	2.58	(10)
Precaution in spraying	3.60	(6)	3.38	(8)
Handling of plant protection equipments	3.52	(7)	3.22	(9)
Time and interval of spraying	3.32	(8)	3.52	(7)
Sources of availability and prices of insecticides	2.92	(9)	1.02	(11)
Identification of insect pests	2.42	(10)	3.62	(6)
Identification of diseases of paddy	2.32	(11)	3.84	(5)

$r_s = 0.53$ (Non-significant)

The trainers perceived control measures of insect pests, names and doses of pesticides, integrated pest control schedule and control measures of diseases as most important in descending order. Identification of diseases of paddy, identification of insect pests, and time and interval of spraying were perceived as important by them in descending order. The sub-areas, namely, precaution in spraying, handling of plant protection

equipments and preparation of pesticide solution were perceived as somewhat important by them in descending order.

The computed r_s value (0.53) was non-significant. Therefore, the null hypothesis that there is no agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance, was not rejected. Thus, the inference could be drawn that there was no significant agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance.

Irrigation: It is evident from Table 17 that the farmers perceived number of irrigation and time of irrigation in relation to stages of growth of paddy as most important and important respectively. The other two sub-areas, namely, depth of irrigation water and economic use of irrigation water were perceived as less important by them in descending order.

Table 17.

Relative Importance of the Sub-areas of Training of Irrigation as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
Number of irrigation for high-yielding varieties of paddy	4.59	(1)	4.62	(2)
Time of irrigation in relation to stages of growth of paddy	3.58	(2)	4.68	(1)
Economic use of irrigation water	1.87	(3)	3.43	(3)
Depth of irrigation water	1.87	(4)	1.26	(4)

The trainers perceived time of irrigation in relation to stages of growth of paddy and number of irrigation for high-yielding varieties of paddy as most important in descending order. Economic use of irrigation water and depth of irrigation water were perceived as somewhat important and not important by them respectively. The trainers and the farmers had ranked differently the first two sub-areas of training.

Improved Agricultural Implements: Table 18 shows that the farmers perceived handling of puddler, hoe, thresher and sources of availability and prices of improved agricultural implements as important in descending order. Minor repairing of implements was perceived as somewhat important by them. The remaining three sub-areas of training were perceived as not important.

Table 18*

Relative Importance of the Sub-areas of Training of Improved Agricultural Implements as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Handling of puddler	4.04	(1)	4.16	(1)
Handling of thresher	3.61	(3)	4.02	(2)
Handling of hoe	3.71	(2)	3.83	(3)
Sources of availability and prices of improved agricultural implements	3.53	(4)	3.19	(4)
Minor repairing of improved implements	2.62	(5)	2.29	(5)
Efficiency of hoe	1.55	(6)	1.29	(6)
Efficiency of thresher	1.46	(7)	1.40	(7)
Efficiency of puddler	1.48	(8)	1.42	(8)

rs = 0.88**

** Significant at .01 level of probability

The trainers perceived handling of puddler, thresher and hoe as important in descending order. Sources of availability and prices of improved implements and minor repairing of implements were perceived as somewhat important and less important by them respectively. The other sub-areas were perceived as not important by them.

The computed r_s value (0.88) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement between the farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was highly significant agreement between the farmers and trainers in ranking the sub-areas of training in order of importance.

Chemical Weed Control: Table 19 shows that the farmers perceived names and doses of weedicides, time of weedicide spraying, precaution in weedicide spraying and preparation of weedicide solution as important in descending order. The control measures of weeds was perceived as somewhat important by them. The rest two sub-areas were perceived as less important by them.

The trainers perceived names and doses of weedicides and number of spraying as most important in descending order. Time of weedicide spraying and precautions in spraying were perceived as important by them. The sub-areas, namely, identification of weeds, preparation of weedicide solution, control measures of weeds and sources of availability of weedicides were perceived as somewhat important in descending order.

Table 19.

Relative Importance of the Sub-areas of Training of Chemical Weed Control as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=167)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Names and doses of weedicides	3.95	(1)	4.58	(1)
Time of weedicide spraying	3.80	(2)	4.14	(3)
Precautions in spraying weedicides	3.72	(3)	3.98	(4)
Preparation of weedicide solution	3.58	(4)	3.20	(6)
Control measures of weeds	2.62	(5)	3.18	(7)
Number of spraying	2.54	(6)	4.54	(2)
Sources of availability and prices of weedicides	2.07	(7)	2.52	(8)
Identification of weeds	1.64	(8)	3.25	(5)

rs = 0.57(Non-significant)

The computed rs value (0.57) was non-significant. Therefore, the null hypothesis that there is no agreement between the farmers and the trainers in ranking the sub-areas, was not rejected. Thus the inference could be drawn that there was no significant agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance.

Credit: Table 20 shows that the farmers perceived different types of credits available for agricultural purposes as most important. Rules and regulation of getting credit, different agencies of agricultural credit, and nature and purposes of credit available from different credit

institutions were perceived as important by them in descending order.

Table 20.

Relative Importance of the Sub-areas of Training of Credit
as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=167)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
Different types of credit available for agricultural purposes	4.54	(1)	4.12	(1)
Rules and regulations regarding getting loans from different credit institutions	4.42	(2)	3.84	(3)
Different agencies of agricultural credit	4.12	(3)	3.84	(2)
Nature and purposes of credit available from different credit institutions	3.76	(4)	2.85	(4)
Cost of credit	2.48	(5)	2.12	(5)

$r_s = 0.90^*$

* Significant at .05 level of probability

The trainers did not perceive any sub-areas of training as most important. They perceived different types of credit available for agricultural purposes and different agencies of agricultural credit as important in descending order. Nature and purposes of credit available from different credit institutions and cost of credit were perceived as somewhat important and less important by them respectively.

The computed r_s value (0.90) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between the farmers and the trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was significant agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance.

Storage: Table 21 shows that improved methods of storage was perceived as most important by both the categories of respondents. Method of Fusa bin construction and control measures of stored grain pests were perceived as important and somewhat important by both the categories of respondents respectively. There was complete agreement between the farmers and the trainers in ranking the sub-areas of training in order of importance.

Table 21.

Relative Importance of the Sub-areas of Training of Storage as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Improved methods of storage	4.52	(1)	4.62	(1)
Method of Fusa bin construction	3.82	(2)	4.18	(2)
Control measures of stored grain pests	2.85	(3)	2.52	(3)

Marketing: Table 22 shows that both the categories of respondents perceived preparation of the produce for market as most important. The farmers perceived advantages of selling produce in regulated markets and government price policy for agricultural produce as important and somewhat important respectively. Knowledge of marketing charges and processes was perceived as less important by them.

Table 22.

Relative Importance of the Sub-areas of Training of Marketing as Perceived by Farmers and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Preparation of the produce for market	4.54	(1)	4.58	(1)
Advantages of selling produce in regulated markets	4.13	(2)	3.67	(3)
Government price policy for agricultural produce	2.73	(3)	3.84	(2)
Knowledge of marketing charges and processes in regulated markets	2.14	(4)	2.89	(4)

The trainers perceived government price policy for agricultural produce and advantages of selling produce in regulated markets as important in descending order. Knowledge of marketing charges and processes was perceived as somewhat important by them. The farmers and trainers had assigned same ranks to preparation of the produce for market

and knowledge of marketing charges and processes. Both of them had ranked differently the remaining two sub-areas.

Discussion: It is evident from the findings presented in the preceding paragraphs that there were significant agreements between the farmers and the trainers in ranking the sub-areas of five main areas in order of importance. Some of the sub-areas which have been assigned, by and large, the same ranks by the farmers and the trainers were: recommended high-yielding varieties of paddy, names and doses of pesticides used for seed treatment, plant protection measures in nursery, fertilizer schedule for high-yielding varieties of paddy and control measures of insect pests, different types of credit available for agricultural purposes, improved methods of storage and preparation of the produce for market.

The findings also revealed that the farmers and the trainers perceived the relative importance of the sub-areas of seven main areas differently. The differential perceptions of relative importance of the sub-areas of training by the farmers and the trainers have direct implications in the farmers' training programme. The trainers will emphasize only those sub-areas in training programme which they think to be important and may ignore the other sub-areas. Some of the sub-areas which have been assigned higher ranks by farmers than trainers were: method of fertilizer application, preparation of pesticide solution, handling of plant protection equipments, sources of availability and prices of various inputs, time of nursery sowing, top-dressing etc. This points out that in the training programme emphasis should not be given only on imparting technical details of the package of

practices but also opportunities should be provided to the farmers to practise these skills and information should be also given about sources of availability and prices of inputs. The farmers have assigned lower ranks than the trainers to the sub-areas, namely, manuring of nursery, age of seedlings at the time of transplanting, importance of balanced fertilization, integrated pest control schedule, time of irrigation in relation to stages of growth of paddy and economic use of irrigation water. Since the farmers have assigned lower ranks to these sub-areas than the trainers does not mean that these sub-areas are of less importance. The package of practices of high-yielding varieties of paddy are related to each other in such a way that the neglect of even a few practices will considerably affect the total yield of paddy. Unless the farmers realise the importance of these sub-areas on yield of high-yielding varieties of paddy, they may not adopt them. Therefore, the farmers need to be educated about the importance of these sub-areas also in relation to cultivation of high-yielding varieties of paddy.

4. Training Needs of Farmers in the Sub-areas of Training

The training needs of the farmers in the sub-areas of training as perceived by the farmers themselves and the trainers have been analysed in this section. As mentioned in Chapter III, there were 12 main areas of training in relation to high-yielding varieties of paddy and each area had a number of sub-areas of training. The training needs of the farmers in each main area will be analysed separately.

Farmers' Perception of Training Needs: The relative need for training in the sub-areas as perceived by the large, medium and small farmers is presented according to main area of training.

High-yielding Varieties of Paddy: Table 23 shows that training in recommended high-yielding varieties of paddy was perceived as most needed by all the three categories of farmers. The large farmers perceived training in advantages and limitations of high-yielding varieties of paddy and sources of availability and prices of seeds as needed in descending order. Maintenance of purity of high-yielding varieties of paddy and cost-benefit ratio of

Table 23.

Relative Need for Training in the Sub-areas of Training of High-yielding Varieties of Paddy as Perceived by the Three Categories of Farmers

Sub-areas of Training	' Large ' Farmers ' (N=46)		' Medium ' Farmers ' (N=61)		' Small ' Farmers ' (N=80)		' Pooled ' Analysis	
	' Mean ' Score	' Rank	' Mean ' Score	' Rank	' Mean ' Score	' Rank	' Mean ' Score	' Rank
Recommended high-yielding varieties of paddy	4.52	(1)	4.59	(1)	4.64	(1)	4.58	(1)
Sources of availability and prices of seeds	3.61	(3)	4.10	(2)	4.24	(2)	3.98	(2)
Advantages and limitations of high-yielding varieties of paddy	3.72	(2)	3.54	(3)	3.42	(4)	3.56	(3)
Cost-benefit ratio of high-yielding varieties of paddy	2.48	(5)	2.78	(4)	3.85	(3)	3.03	(4)
Maintenance of purity of high-yielding varieties of paddy seeds	2.85	(4)	2.45	(6)	2.71	(5)	2.67	(5)
Characteristics of high-yielding varieties of paddy	2.14	(6)	2.62	(5)	2.42	(6)	2.39	(6)
Storage of seeds	1.12	(7)	1.34	(7)	1.47	(7)	1.31	(7)

W = 0.78**

** Significant at .01 level of probability

high-yielding varieties of paddy were perceived as somewhat needed by them.

The medium farmers perceived training in sources of availability and prices of seeds and advantages and limitations of high-yielding varieties of paddy as needed in descending order. Training in the rest three sub-areas was perceived as somewhat needed and less needed by them.

The small farmers perceived training in sources of availability and prices of seeds, cost-benefit ratio and advantages and limitations of high-yielding varieties of paddy as needed in descending order. Maintenance of purity and characteristics of high-yielding varieties of paddy were perceived as somewhat needed and less needed by them respectively.

The computed W value (0.78) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in assigning ranks to the sub-areas of training, was rejected. Thus, the inference could be drawn that there was highly significant agreement among the three categories of farmers in assigning ranks to the sub-areas in order of need for training.

The pooled analysis revealed that training in recommended high-yielding varieties of paddy was perceived as most needed. The sub-areas of training perceived as needed in descending order were: sources of availability and prices of seed and advantages and limitations of high-yielding varieties of paddy. Training in the rest sub-areas were perceived as somewhat needed and less needed.

Seed Treatment: Table 24 shows that the medium and the small farmers perceived training in names and doses of pesticides as most needed. The large farmers perceived training in it as needed. Training in method of seed treatment was perceived as most needed by medium farmers, and needed by the large and the small farmers. The selection of healthy seeds was perceived as less needed by all the three categories of farmers. The large and small farmers were in complete agreement with each other in ranking the sub-areas. The medium farmers ranked the sub-areas a bit differently than the large and the small farmers.

Table 24

Relative Need for Training in the Sub-areas Training of Seed Treatment as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=8)		Pooled Analysis
	Mean	Rank	Mean	Rank	Mean	Rank	Mean
	Score		Score		Score		Score
Names and doses of pesticides	4.38	(1)	4.54	(2)	4.63	(1)	4.52 (1)
Method of seed treatment	3.22	(2)	4.60	(1)	3.95	(2)	3.92 (2)
Selection of healthy seeds	2.02	(3)	1.82	(3)	2.32	(3)	2.05 (3)

The pooled analysis revealed that training in names and doses of pesticides was perceived as most needed. The sub-areas, namely, method of seed treatment and selection of healthy seeds were perceived as needed and less needed respectively.

Nursery Raising: Table 25 shows that the large farmers did not perceive training in any sub-area as most needed. They perceived training in plant protection measures, irrigation and time of nursery sowing as needed in descending order. The sub-areas, namely, seed bed preparation,

Table 25.

Relative Need for Training in the Sub-areas of Training of Nursery Raising as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large	Medium	Small	Pooled
	Farmers	Farmers	Farmers	Analysis
	(N=46)	(N=61)	(N=80)	
	Mean Rank	Mean Rank	Mean Rank	Mean Rank
	Score	Score	Score	Score
Time of nursery sowing for kharif and summer crops	3.52 (3)	4.11 (2)	4.08 (4)	3.90 (1.5)
Plant protection measures	3.85 (1)	3.62 (4)	4.24 (2)	3.90 (1.5)
Number and interval of irrigation	3.62 (2)	3.52 (6)	4.12 (3)	3.75 (5)
Seed rate	2.63 (7)	4.02 (3)	4.44 (1)	3.69 (1)
Recommended dose of fertilizers	2.72 (6)	4.42 (1)	3.85 (5)	3.66 (5)
Method of fertilizer application	2.52 (8)	3.57 (5)	3.72 (6)	3.27 (6)
Seedbed preparation	3.12 (4)	2.15 (8)	2.95 (8)	2.74 (7)
Selection of the field for nursery raising	2.86 (5)	2.02 (9)	3.05 (7)	2.64 (8)
Method of sowing	1.04 (10)	2.20 (7)	1.20 (10)	1.48 (9)
Depth of sowing	1.32 (9)	1.42 (10)	1.48 (9)	1.41 (10)

W = 0.51 (Non-significant)

selection of the field for nursery raising, doses of fertilizers, seed rate and method of fertilizer application were perceived as somewhat needed by them in descending order.

The medium farmers perceived training in recommended dose of fertilizers, time of nursery sowing, seed rate, plant protection measures, method of fertilizer application and irrigation as needed. The remaining sub-areas, namely, method of sowing, seed bed preparation and selection of the field for nursery raising were perceived as less needed by them.

The small farmers perceived training in seed rate, plant protection measures, irrigation, time of nursery sowing and recommended dose of fertilizers as needed. Training in method of fertilizer application was perceived as somewhat needed by them. They did not feel need for training in the rest four sub-areas.

The computed W value (0.51) was non-significant. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the sub-areas of training, was not rejected. Thus, the inference could be drawn that there was no significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in time of nursery sowing, plant protection measures, irrigation, seed rate and doses of fertilizers was perceived as needed in descending order. Method of fertilizer application, seed bed preparation and selection of the field for nursery sowing were perceived as somewhat needed. The rest sub-areas were perceived as less needed.

Transplanting: Table 26 shows that the medium and small farmers perceived training in time of transplanting for kharif and summer crops and age of seedlings at the time of transplanting as needed in descending order. But the large farmers perceived somewhat training needed in these sub-areas. Technique of growing direct seeded rice was perceived as somewhat needed by all the three categories of farmers. The sub-areas, namely, preparation of the field for transplanting and number of seedlings per hill were perceived as somewhat needed by the medium and the small farmers. The large farmers perceived less training needed in these sub-areas.

Table 26.

Relative Need for Training in the Sub-areas of Training of Transplanting as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
Time of transplanting for kharif and summer crops	3.32	(1)	3.68	(1)	4.14	(1)	3.71	(1)
Age of seedlings at the time of transplanting	3.10	(3)	3.65	(2)	3.85	(2)	3.53	(2)
Techniques of growing direct seeded rice	3.18	(2)	2.52	(5)	2.67	(4)	3.17	(3)
Preparation of the field for transplanting	2.14	(5)	3.19	(3)	3.13	(3)	3.15	(4)
Number of seedlings per hill	2.20	(4)	2.72	(4)	1.92	(6)	2.28	(5)
Row to row and plant to plant distance	1.45	(6)	1.47	(6)	2.34	(5)	1.75	(6)

W = 0.79**

** Significant at .01 level of probability

The computed W value (0.79) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in assigning ranks to the sub-areas, was rejected. Thus, the inference could be drawn that there was highly significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in time of transplanting for kharif and summer crops and age of seedlings at the time of transplanting was perceived as needed. The sub-areas, namely, techniques of growing direct seeded rice and preparation of the field for transplanting were perceived as somewhat needed. The last two sub-areas were perceived as less needed.

Fertilizers: Table 27 shows that all the three categories of farmers perceived training in recommended dose of fertilizers for paddy as most needed, though there were slight differences in ranking it among them. The medium farmers perceived training in time of fertilizer application and method of fertilizer application as most needed whereas these sub-areas were perceived as needed by the large and the small farmers. The large farmers perceived training in top dressing, identification of nutrient-deficiency symptoms and importance of balanced fertilization as somewhat needed in descending order.

The medium farmers perceived training in foliar spray of urea as needed. The sub-areas perceived as somewhat needed by them in descending order were: per acre cost of fertilizers, top dressing, importance of balanced fertilization and identification of nutrient deficiency symptoms.

Table 27.

Relative Need for Training in the Sub-areas of Training of Fertilizer as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Recommended dose of fertilizers	4.51	(1)	4.54	(3)	4.62	(1)	4.56	(1)
Time of fertilizer application	4.13	(2)	4.67	(1)	4.40	(4)	4.40	(2)
Method of fertilizer application	3.68	(3)	4.58	(2)	4.48	(2)	4.25	(3)
Foliar spray of urea	2.62	(7)	3.65	(4)	3.90	(5)	3.39	(4)
Top-dressing	3.02	(4)	3.27	(6)	3.62	(6)	3.37	(5)
Per acre cost of fertilizers	2.12	(8)	3.34	(5)	4.45	(3)	3.30	(6)
Identification of nutrient deficiency symptoms	2.72	(5)	3.19	(7)	3.35	(7)	3.09	(7)
Importance of balanced fertilization	2.68	(6)	3.12	(8)	3.15	(8)	2.98	(8)

W = 0.56 (Non-significant)

The small farmers perceived training in per acre cost of fertilizers, foliar spray of urea and top-dressing as needed in descending order. Identification of nutrient deficiency symptoms and importance of balanced fertilization were perceived as somewhat needed by them.

The calculated W value (0.56) was non-significant. Therefore, the null hypothesis that there is no agreement among the three categories

of farmers in ranking the sub-areas of training, was not rejected. Thus, the inference could be drawn that there is no significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in recommended dose of fertilizers was perceived as most needed. Time of fertilizer application and method of fertilizer application were perceived as needed in descending order. The sub-areas of training, namely, foliar spray of urea, top-dressing, per acre cost of fertilizers, identification of nutrient deficiency symptoms and importance of balanced fertilization were perceived as somewhat needed in descending order.

Plant Protection Measures: Table 28 shows that all the three categories of farmers perceived training in control measures of insect pests, names and doses of pesticides and control measure of diseases as most needed. However, there were differences in ranking these sub-areas by them. The large and medium farmers assigned same ranks to these three sub-areas. The small farmers had ranked them slightly different than the large and the medium farmers. Training in integrated pest control schedule was perceived as needed by the large farmers. The rest sub-areas were perceived as somewhat needed by them.

The medium farmers perceived training in handling of plant protection equipments, time and interval of spraying, preparation of pesticide solution and integrated pest control schedule as needed in descending order. All the remaining sub-areas except identification of diseases of paddy were perceived as somewhat needed by them.

Table 28

Relative Need for Training in the Sub-areas of Training of Plant Protection Measures as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Control measures of insect pests	4.57	(1)	4.71	(1)	4.69	(1)	4.66	(1)
Names and doses of insecticides	4.55	(2)	4.64	(2)	4.44	(3)	4.54	(2)
Control measures of diseases of paddy	4.51	(3)	4.53	(3)	4.54	(2)	4.53	(3)
Preparation of pesticide solution	3.46	(5)	4.17	(6)	4.19	(6)	3.94	(4)
Handling of plant protection equipments	2.85	(7)	4.33	(4)	4.42	(5)	3.87	(5)
Integrated pest control schedule	3.59	(4)	3.85	(7)	3.75	(7)	3.73	(6)
Time and interval of spraying	2.14	(9)	4.27	(5)	4.36	(4)	3.59	(7)
Precaution in spraying	3.28	(6)	2.45	(10)	3.13	(8)	2.95	(8)
Sources of availability and prices of insecticides	2.69	(8)	2.94	(8)	2.84	(9)	2.82	(9)
Identification of insect pests of paddy	1.87	(10)	2.78	(9)	2.85	(10)	2.49	(10)
Identification of diseases of paddy	1.32	(11)	1.61	(11)	1.65	(11)	1.59	(11)

W = 0.88 **

** Significant at .01 level of probability

The small farmers perceived training in time and interval of spraying, handling of plant protection equipments, preparation of pesticides solution and integrated pest control schedule as needed in descending order. The sub-areas, namely, precaution in spraying, sources of availability and prices of insecticides, and identification of insect pests were perceived as somewhat needed by them in descending order.

The computed W value (0.88) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in assigning ranks the sub-areas of training, was rejected. Thus, the inference could be drawn that there was highly significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that the sub-areas, namely, control measures of insect pests, names and doses of insecticides and control measures of diseases were perceived as most needed. The sub-areas, namely, preparation of pesticide solution, handling of plant protection equipments, integrated pest control schedule and time and interval of spraying were perceived as needed in descending order. The rest sub-areas were perceived as somewhat needed.

Irrigation: Table 29 shows that number of irrigation and time of irrigation were perceived as most needed by all the three categories of farmers. Economic use of irrigation water was perceived as less needed by all the three categories of farmers though there were differences in ranking this sub-area among them. The large and the medium farmers

Table 29.

Relative Need for Training in the Sub-areas of Training of
Irrigation as Perceived by the Three Categories of Farmers

Sub-areas of Training	' Large ' Farmers ' (N=46)		' Medium ' Farmers ' (N=61)		' Small ' Farmers ' (N=80)		' Pooled ' Analysis	
	' Mean	' Rank	' Mean	' Rank	' Mean	' Rank	' Mean	' Rank
	' Score		' Score		' Score		' Score	
Number of irrigation	4.52	(1)	4.61	(1)	4.63	(1)	4.59	(1)
Time of irrigation in relation to stages of growth of paddy	4.52	(2)	4.54	(2)	4.57	(2)	4.54	(2)
Economic use of irrig- ation water	1.65	(3)	1.90	(3)	1.95	(4)	1.83	(3)
Depth of irrigation water	1.12	(4)	1.23	(4)	1.97	(3)	1.44	(4)

$W = 0.91^{**}$

** Significant at .01 level of probability

assigned it third rank whereas the small farmers assigned it fourth rank.

Depth of irrigation water was perceived as less needed by the small farmers whereas the large and the medium farmers did not perceive training in it.

The computed W value (0.91) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was highly significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in number of irrigation and time of irrigation in relation to stages of growth of paddy was perceived as most needed. The other sub-areas were perceived as less needed.

Improved Agricultural Implements: Table 30 shows that the large farmers perceived training in sources of availability and prices of improved implements, and handling of puddler as needed in descending order. Handling of thresher and handling of hoe were perceived as somewhat needed by them.

Table 30.

Relative Need for Training in the Sub-areas of Training of Improved Agricultural Implements as Perceived by the Three Categories of Farmers

Sub-areas of Training	' Large ' Farmers ' (N=46)		' Medium ' Farmers ' (N=61)		' Small ' Farmers ' (N=80)		' Pooled ' Analysis	
	' Mean ' Score	' Rank	' Mean ' Score	' Rank	' Mean ' Score	' Rank	' Mean ' Score	' Rank
Handling of puddler	3.58	(2)	3.88	(1)	3.70	(1)	3.71	(1)
Sources of availability and prices of improved implements	4.34	(1)	3.65	(3)	2.68	(5)	3.56	(2)
Handling of hoe	2.75	(3)	3.75	(2)	3.52	(2)	3.34	(3)
Handling of thresher	2.67	(4)	3.37	(5)	3.42	(4)	3.15	(4)
Minor repairing of improved implements	1.85	(5)	3.49	(4)	3.47	(3)	2.94	(5)
Efficiency of puddler	1.62	(6)	1.48	(6)	1.45	(6)	1.52	(6)
Efficiency of hoe	1.54	(7)	1.32	(8)	1.42	(7)	1.42	(7)
Efficiency of thresher	1.32	(8)	1.38	(7)	1.36	(8)	1.36	(8)

W = 0.89**

** Significant at .01 level of probability

The medium farmers perceived training in handling of puddler, handling of hoe and sources of availability and prices of improved implements as needed in descending order. Minor repairing of improved implements and handling of thresher were perceived as somewhat needed by them.

The small farmers perceived training in handling of puddler and handling of hoe as needed in descending order. The sub-areas, namely, minor repairing of improved implements, handling of thresher and sources of availability and prices of improved implements were perceived as somewhat needed by them in descending order. The efficiencies of puddler, thresher and hoe were perceived as less needed by all the three categories of farmers.

The computed W value (0.89) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was highly significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in handling of puddler and sources of availability and prices of improved implements were perceived as needed. The sub-areas perceived as somewhat needed in descending order were: handling of hoe, handling of thresher and minor repairing of implements.

Chemical Weed Control: Table 31 shows that the large farmers perceived training in names and doses of weedicides as needed. The sub-areas of training, namely, precaution in weedicide spraying, time of spraying, control measures of weeds and number of spraying were perceived as somewhat needed

by them in descending order.

Table 31.

Relative Need for Training in the Sub-areas of Training of Chemical Weed Control as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Names and doses of weedicides	3.62	(1)	3.23	(1)	2.32	(2)	3.06	(1)
Time of weedicide spraying	2.95	(3)	2.78	(2)	1.86	(5)	2.55	(2.5)
Precaution in weedicide spraying	3.40	(2)	2.15	(5)	2.04	(4)	2.53	(2.5)
Preparation of weedicide solution	2.42	(6)	2.24	(4)	2.42	(1)	2.36	(4)
Control measures of weeds	2.75	(4)	2.64	(5)	1.82	(6)	2.34	(5)
Number of spraying	2.62	(5)	1.82	(7)	2.22	(3)	2.15	(6)
Sources of availability and prices of weedicides	2.01	(7)	1.95	(6)	1.32	(7)	1.76	(7)
Identification of weeds	1.23	(8)	1.33	(8)	1.12	(8)	1.23	(8)

W = 0.57 (Non-significant)

The medium farmers perceived training in names and doses of weedicides, time of spraying and control measures of weeds as somewhat needed in descending order. The remaining sub-areas were perceived as less needed by them. On the other hand, the small farmers perceived training in most of the sub-areas as less needed.

The computed W value (0.57) was non-significant. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in names and doses of weedicides, time of spraying and precautions in spraying were perceived as somewhat needed. The rest sub-areas were perceived as less needed and not needed.

Credit: Table 32 shows that training in different types of credit available for agricultural purposes was perceived as most needed by all the three categories of farmers. The large farmers perceived training in nature and purposes of credit available from different credit institutions and different agencies of agricultural credit as needed in descending order. The other two sub-areas were perceived as somewhat needed and less needed respectively.

The medium farmers perceived training in different agencies of agricultural credit as most needed. Rules and regulations of getting credit and nature and purposes of credit available from different institutions were perceived as needed by them in descending order. Cost of credit was perceived as less needed by them.

The small farmers perceived training in rules and regulations of getting credit from different credit institutions as most needed. The sub-areas, namely, cost of credit, nature and purposes of credit and

different agencies of agricultural credit were perceived as needed by them in descending order.

Table 32.

Relative Need for Training in the Sub-areas of Training of Credit as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Different types of credit available for agricultural purposes	4.52	(1)	4.60	(1)	4.71	(1)	4.61	(1)
Different agencies of agricultural credit	3.54	(3)	4.52	(2)	4.30	(5)	4.12	(2)
Nature and purposes of credit available from different credit institutions	3.72	(2)	3.52	(4)	4.32	(4)	3.85	(3)
Rules and regulations of getting credit from different credit institutions	2.85	(4)	3.83	(3)	4.62	(2)	3.77	(4)
Cost of credit	1.82	(5)	2.15	(5)	4.48	(3)	2.82	(5)

W = 0.60 (Non-significant)

The computed W value (0.60) was non-significant. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement among the three categories

of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in different types of credit available for agricultural purposes was perceived as most needed. The sub-areas, namely, different agencies of agricultural credit, nature and purposes of credit available from different credit institutions and rules and regulations of getting credit were perceived as needed in descending order. Cost of credit was perceived as somewhat needed.

Storage: Table 33 shows that training in improved methods of storage was perceived as most needed by the large and the medium farmers whereas it was perceived as needed by the small farmers. Control measures of stored grain pests and method of constructing Pusa bins were perceived as needed by all the three categories of farmers.

Table 33.

Relative Need for Training in the Sub-areas of Training of Storage as Perceived by the Three Categories of Farmers

Sub-areas of Training	'Large ' Farmers ' (N=46)		'Medium ' Farmers ' (N=61)		'Small ' Farmers ' (N=80)		'Pooled ' Analysis	
	'Mean ' Score	'Rank'	'Mean ' Score	'Rank'	'Mean ' Score	'Rank'	'Mean ' Score	'Rank'
Improved methods of storage	4.66	(1)	4.54	(1)	4.25	(1)	4.45	(1)
Control measures of stored grain pests	2.85	(2)	3.05	(2)	3.15	(2)	3.02	(2)
Method of constructing Pusa bins	2.75	(3)	3.02	(3)	2.52	(3)	2.77	(3)

It can be also seen from the table that there was complete agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

Marketing: Table 34 shows that training in preparation of produce for the market was perceived as most needed by the large and the medium farmers whereas it was perceived as needed by the small farmers. The rest three sub-areas, namely, marketing processes and charges, government price policy for agricultural produce and advantages of selling produce in regulated markets were perceived as less needed by all the three categories of farmers. But there were differences in ranking these sub-areas by them.

Table 34

Relative Need for Training in the Sub-areas of Training of Marketing as Perceived by the Three Categories of Farmers

Sub-areas of Training	Large Farmers (N=46)		Medium Farmers (N=61)		Small Farmers (N=80)		Pooled Analysis	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
	Score		Score		Score		Score	
Preparation of the produce for the market	4.58	(1)	4.54	(1)	4.37	(1)	4.49	(1)
Knowledge of marketing processes and charges in regulated markets	2.10	(3)	2.36	(2)	2.12	(3)	2.19	(2)
Government price policy for agricultural produce	2.30	(2)	2.21	(3)	2.00	(4)	2.18	(3)
Advantages of selling produce in regulated markets	2.03	(4)	1.93	(4)	2.17	(2)	2.04	(4)

The computed W value (0.55) was non-significant. Therefore, the null hypothesis that there is no agreement among the three categories of farmers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement among the three categories of farmers in ranking the sub-areas in order of need for training.

The pooled analysis revealed that training in preparation of the produce for the market was perceived as needed. The remaining three sub-areas, namely, marketing processes and charges, government price policy for agricultural produce and advantages of selling produce in regulated markets were perceived as less needed in descending order.

Table 35 shows that there were significant agreements between the large and the medium farmers in ranking the sub-areas of high-yielding varieties of paddy, transplanting and chemical weed control. It can be also seen from the table that there were highly significant agreements between them in ranking the sub-areas of plant protection measures, and improved implements.

Table 35 also shows that there were significant agreements between the large and the small farmers in ranking the sub-areas of high-yielding varieties of paddy and improved agricultural implements. There were significant agreements between them in ranking the sub-areas of transplanting and plant protection measures.

It is also evident from Table 35 that there were significant agreement between the medium and the small farmers in ranking the sub-areas of high-yielding varieties of paddy, nursery raising and fertilizer.

Table 35.

Computed 'rs' Values to test the Agreement between any Two Categories of Farmers in Ranking the Sub-areas of Training of Eight Main Areas

Main Areas of Training	' Large ' Farmers ' and ' Medium ' Farmers	' Large ' Farmers ' and ' Small ' Farmers	' Medium ' Farmers ' and ' Small ' Farmers
High-yielding varieties of paddy	0.86 [*]	0.75 [*]	0.86 [*]
Nursery raising	0.29	0.45	0.66 [*]
Transplanting	0.89 [*]	0.94 ^{**}	0.94 ^{**}
Fertilizer	0.57	0.55	0.79 [*]
Plant protection measures	0.76 ^{**}	0.79 ^{**}	0.95 ^{**}
Improved agricultural implements	0.93 ^{**}	0.69 [*]	0.83 ^{**}
Chemical weed control	0.76 [*]	0.50	0.48
Credit	0.70	0.20	0.20

* Significant at .05 level of probability

** Significant at .01 level of probability

It can also be seen from the table that there were highly significant agreements between the medium farmers and the small farmers in ranking the sub-areas of transplanting, improved agricultural implements and plant protection measures in order of need for training.

Discussion: The findings presented in the preceding section indicate that the farmers need training not only in package of practices of high-yielding varieties of paddy but also in credit, storage and marketing. Table 36 shows that the medium and the small farmers needed more training than the large farmers in most of the sub-areas. However, all the three categories of farmers perceived training in some of the sub-areas as most needed. These sub-areas were: recommended high-yielding varieties of paddy, recommended dose of fertilizers, control measures of insect pests, control measures of diseases, number of irrigation, time of irrigation in relation to stages of growth of paddy and different types of credit available for agricultural purposes. These sub-areas must be discussed in the farmers' training programme as they are the common needs of all the three categories of farmers. Besides these common sub-areas, all the three categories of farmers perceived training in some of the other sub-areas as most needed. The large and the medium farmers perceived training in names and doses of pesticides, improved methods of storage and preparation of produce for the market as most needed. The small farmers perceived training in names and doses of pesticides used for seed treatment and, ^{rules and} regulations of getting credit from different credit institutions as most needed.

The analysis of ranks assigned by the large, medium and small farmers revealed that there were no significant agreements among them in ranking the sub-areas of five main areas. These main areas were: nursery raising, fertilizers, chemical weed control, credit and marketing. This indicated that all the three categories of farmers were not having the same need in these main areas.

1	2	3	4	5	6	7
Plant protection measures	Control measures of insect pests (1), insects and diseases of insecticides (2) control measures of diseases of paddy (3)	Control measures of insect pests (1), insects and diseases of insecticides (2), control measures of diseases of paddy (3)	Control measures of insect pests (1), control measures of diseases of paddy (2)	Integrated pest control schedule (4)	Handling of plant protection equipments (4) time and interval of spraying (5) preparation of plant protection equipments (6) preparation of pesticide solution (8) integrated pest control schedule (7)	Uses and doses of insecticides (5), time and interval of spraying (4), handling of plant protection equipments (6) preparation of pesticide solution (8) integrated pest control schedule (7)
Irrigation	Number of irrigation (1), time of irrigation (2)	Number of irrigation (1), time of irrigation (2)	Number of irrigation (1), time of irrigation (2)	ML	ML	ML
Improved agricultural implements	ML	ML	ML	Sources of availability and prices of improved agricultural implements (1), handling of puddler (2)	Handling of puddler (1), sources of availability and prices of improved implements (3)	Handling of puddler (1), handling of hoe (2)
Chemical weed control	ML	ML	ML	Names and doses of insecticides (1)	ML	ML
Credit	Different types of credit available for agricultural purposes (1), different agencies of agricultural credit (2)	Different types of credit available for agricultural purposes (1), different agencies of agricultural credit (2)	Different types of credit available for agricultural purposes (1), rules and regulations of getting credit from different credit institutions (4)	Nature and purposes of credit available from different credit institutions (5) different agencies of agricultural credit (4)	Rules and regulations of getting credit from different credit institutions (5), nature and purposes of credit available from different credit institutions (4)	Cost of credit (5), nature and purposes of credit available from different credit institutions (4) different agencies of agricultural credit (5)
Storage	Improved methods of storage (1)	Improved methods of storage (1)	ML	ML	ML	Improved methods of storage (1)
Marketing	Preparation of the produce for market (1)	Preparation of the produce for market (1)	ML	ML	ML	Preparation of the produce for market (1)

Figures in parentheses indicate ranks

* Training in sub-areas perceived as most needed and needed only. Training in sub-areas perceived as somewhat needed, less needed and not needed are not included in this table. For these sub-areas, see the Tables 23-54.

Trainers' Perceptions of Farmers' Training Needs: In the preceding sub-section the training needs of the farmers in the sub-areas as perceived by the farmers themselves were analysed. In this sub-section, the training needs of the farmers in the sub-areas as perceived by the trainers of the Farmers' Training Centres have been analysed. The data have been analysed main areas-wise.

High-yielding Varieties of Paddy: Table 37 shows that the trainers perceived training in recommended high-yielding varieties of paddy as most needed for farmers. Maintenance of purity of high-yielding varieties of paddy was perceived as needed by them. The sub-areas, namely, sources of availability and prices of seeds, cost-benefit ratio and characteristics of high-yielding varieties of paddy were perceived as somewhat needed by them in descending order.

Seed Treatment: It is evident from Table 38 that method of seed treatment was perceived as most needed by trainers for farmers. Names and doses of pesticides and selection of healthy seeds were perceived as needed and somewhat needed respectively.

Nursery Raising: A perusal of data presented in Table 39 reveals that recommended dose of fertilizers, seed rate, plant protection measures and irrigation were perceived as most needed by trainers for farmers in descending order. The sub-areas, namely, seed bed preparation and time of nursery sowing were perceived as needed by them. The remaining sub-areas were perceived as less needed by them.

Transplanting: It is evident from Table 40 that age of seedlings at the time of transplanting and time of transplanting were perceived as most needed by trainers for farmers in descending order. The remaining sub-areas were perceived as somewhat needed and less needed by them.

Fertilizer: It is evident from Table 41 that recommended dose of fertilizers, time of fertilizer application and identification of nutrient deficiency symptoms were perceived as most needed by trainers for farmers in descending order. The sub-areas, namely, top-dressing, method of fertilizer application and importance of balanced fertilization were perceived as needed by them in descending order. Foliar spray of urea was perceived as somewhat needed and per acre cost of fertilizer was perceived as less needed.

Plant Protection Measures: It is evident from Table 42 that integrated pest control schedule, control measures of insect pests, control measures of diseases and names and doses of pesticides were perceived as most needed by trainers for farmers in descending order. The sub-areas, namely, time and interval of spraying, identification of insect pests and identification of diseases were perceived as needed by them in descending order. Handling of plant protection equipments and precaution in spraying were perceived as somewhat needed. The remaining sub-areas were perceived as less needed.

Irrigation: A perusal of data presented in Table 43 reveals that time of irrigation in relation to stages of growth of paddy and number of irrigation were perceived as most needed by trainers for farmers in descending order. Economic use of irrigation water and depth of irrigation water were perceived as needed and somewhat needed by them respectively.

Improved Agricultural Implements: It is evident from Table 44 that handling of puddler was perceived as needed by trainers for farmers. The sub-areas, namely, sources of availability and prices of improved implements, minor repairing of improved implements, handling of thresher and handling of hoe were perceived as somewhat needed by them in descending order. The remaining sub-areas were perceived as not needed.

Chemical Weed Control: An examination of data presented in Table 45 reveals that names and doses of weedicides, number of spraying, time of spraying and precaution in weedicide spraying were perceived as needed by trainers for farmers in descending order. Identification of weeds and preparation of weedicide solution were perceived as somewhat needed by them. The remaining sub-areas were perceived as less needed.

Credit: A perusal of data presented in Table 46 reveals that different types of credit available for agricultural purposes, nature and purposes of credit available from different credit institutions and, different agencies of agricultural credit were perceived as needed by trainers for farmers in descending order. Rules and regulations of

getting credit were perceived as somewhat needed by them.

Storage: It is evident from Table 47 that improved methods of storage were perceived as most needed by trainers for farmers. Method of constructing Fusa bins and control measures of stored grain pests were perceived as needed by them in descending order.

Marketing: It is evident from Table 48 that preparation of produce for market was perceived as most needed by trainers for farmers. Knowledge of marketing processes and charges was perceived as needed by them. The sub-areas, namely, advantages of selling produce in regulated markets and government price policy were perceived as somewhat needed by them in descending order.

Comparative Perceptions: In the preceding sub-sections, the training needs of the farmers in the sub-areas as perceived by the farmers themselves and the trainers were analysed separately. Now a comparative analysis of the farmers' perceptions of their own training needs and the trainers' perception of the farmers' training needs in the sub-areas will be presented. The data have been analysed main areas-wise.

High-yielding Varieties of Paddy: Table 37 shows that training in recommended high-yielding varieties of paddy and storage of seeds were perceived as most needed and less needed by the farmers as well as the trainers. Advantages and limitations of high-yielding varieties of paddy were perceived as most needed by the trainers whereas it was perceived as needed by the farmers. Sources of availability and prices

Table 37.

Training Needs of Farmers in the Sub-areas of Training of High-yielding Varieties of Paddy as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
Recommended high-yielding varieties of paddy	4.58	(1)	4.68	(1)
Sources of availability and prices of seeds	3.98	(2)	3.42	(4)
Advantages and limitations of high-yielding varieties of paddy	3.56	(3)	4.52	(2)
Cost-benefit ratio of high-yielding varieties of paddy	3.05	(4)	3.25	(5)
Maintenance of purity of high-yielding varieties of paddy	2.67	(5)	4.01	(3)
Characteristics of high-yielding varieties of paddy	2.39	(6)	3.02	(6)
Storage of seeds	1.51	(7)	1.84	(7)

$$r_s = 0.82^{**}$$

* Significant at .05 level of probability

of seeds were perceived as needed by farmers and somewhat needed by trainers. There were slight variations in perceiving the need for training in the remaining sub-areas by farmers and trainers. A comparison of ranks assigned by farmers and trainers revealed that both of them had assigned same ranks to three sub-areas, namely,

recommended high-yielding varieties of paddy, maintenance of purity and storage of seeds. Besides these areas, there were slight variations in ranking the other four sub-areas by them.

The computed rs value (0.82) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was significant agreement between farmers and trainers in ranking the sub-areas in view of the need for training.

Seed Treatment: It is evident from Table 38 that names and doses of pesticides were perceived as most needed by farmers and needed by trainers. Method of seed treatment was perceived as most needed by trainers whereas it was perceived as needed by farmers. It can be also seen from the table that there were slight differences in ranking the sub-areas by farmers and trainers.

Table 38

Training Needs of Farmers in the Sub-areas of Training of Seed Treatment as perceived by the Farmers themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Names and doses of pesticides	4.52	(1)	4.34	(2)
Method of seed treatment	3.92	(2)	4.58	(1)
Selection of healthy seeds	2.05	(3)	2.63	(3)

Nursery Raising: Table 39 shows that the farmers did not perceive training in any sub-areas as most needed. The sub-areas, namely, time of nursery sowing, plant protection measures, irrigation and recommended dose of fertilizers were perceived as needed by them whereas the trainer's perceptions of farmers' training needs in these sub-areas varied from most needed to needed. The rest sub-areas were perceived as needed and somewhat needed by the farmers as well as the trainers. The analysis of ranks assigned by farmers and trainers revealed that there were variations in ranking the sub-areas by them. Recommended dose of fertilizers was given first rank by trainers whereas it was given sixth rank by farmers. Time of nursery sowing was given first rank by farmers whereas it was given sixth rank by trainers.

The computed r_s value (0.54) was non-significant. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement between farmers and trainers in ranking the sub-areas in order of need for training.

Transplanting: It is evident from Table 40 that time of transplanting for kharif and summer paddy and, age of seedlings at the time of transplanting were perceived as most needed by trainers whereas these sub-areas were perceived as needed by farmers. The rest sub-areas were perceived as somewhat needed and less needed by both categories of respondents. The analysis of ranks assigned by farmers and trainers

Table 39.

Training Needs of Farmers in the Sub-areas of Training of
Nursery Raising as Perceived by Farmers Themselves and
Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Plant protection measures	3.90	(1.5)	4.56	(5)
Time of nursery sowing for kharif and summer crops	3.90	(1.5)	3.62	(6)
Number and interval of irrigation	3.75	(3)	4.54	(4)
Seed rate	3.69	(4)	4.62	(2)
Recommended dose of fertilizers	3.66	(5)	4.66	(1)
Method of fertilizer application	3.27	(6)	2.54	(8)
Seed bed preparation	2.74	(7)	3.82	(9)
Selection of the field for nursery raising	2.64	(8)	2.45	(9)
Method of sowing	1.41	(9)	1.48	(10)
Depth of sowing	1.48	(10)	2.61	(7)

$r_s = 0.54$ (Non-significant)

revealed that, by and large, there were similarities in ranking the sub-areas by them.

Table 40.

Training Needs of Farmers in the Sub-areas of Training of Transplanting as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Time of transplanting for <u>kharif</u> and summer paddy	5.71	(1)	4.61	(2)
Age of the seedlings at the time of transplanting	5.53	(2)	4.55	(1)
Techniques of growing direct seeded rice	5.17	(3)	5.45	(3)
Preparation of the field for transplanting	5.15	(4)	2.76	(5)
Number of seedlings for hill	2.28	(5)	2.85	(4)
Row to row and plant to plant distance	1.75	(6)	2.46	(6)

$r_s = 0.89^*$

* Significant at .05 level of probability

The computed r_s value (0.89) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement

between farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was significant agreement between farmers and trainers in ranking the sub-areas in view of the need for training.

Fertilizer: It is evident from Table 41 that training in recommended dose of fertilizers was perceived as most needed by the farmers as well as the trainers. The sub-areas, namely, time of fertilizer application and identification of nutrient deficiency symptoms were perceived as most needed by trainers whereas these sub-areas were perceived as needed and less needed by farmers respectively.

Table 41.

Training Needs of Farmers in the Sub-areas of Training of Fertilizer as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Recommended dose of fertilizers	4.56	(1)	4.69	(1)
Time of fertilizer application	4.40	(2)	4.64	(2)
Method of fertilizer application	4.25	(3)	3.63	(5)
Foliar spray of urea	3.59	(4)	3.42	(7)
Top-dressing	3.57	(5)	3.85	(4)
Per acre cost of fertilizer	3.30	(6)	2.42	(8)
Identification of nutrient deficiency symptoms	3.09	(7)	4.54	(3)
Importance of balanced fertilization	2.98	(8)	3.52	(6)

$r_s = 0.55$ (Non-significant)

The analysis of ranks assigned by farmers and trainers revealed that both of them had assigned the same ranks to the first two sub-areas. Besides these sub-areas, there were differences in ranking the sub-areas by them. Method of fertilizers application was given third rank by farmers whereas it was given fifth rank by trainers. Identification of nutrient deficiency symptoms was given third rank by trainers whereas it was given seventh rank by farmers.

The computed r_s value (0.55) was non-significant. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement between farmers and trainers in ranking the sub-areas in order of need for training.

Plant Protection Measures: Table 42 shows that control measures of insect pests, control measures of diseases and, names and doses of insecticides were perceived as most need by the farmers as well as the trainers. Training in integrated pest control schedule was perceived as most needed by trainers whereas the farmers perceived training in this sub-area as needed. The farmers perceived training in handling of plant protection equipments and preparation of pesticide solution as needed whereas the trainers perceived training in these sub-areas for farmers as somewhat needed. The analysis of ranks assigned by farmers and trainers revealed that there were slight differences in ranking the first three sub-areas, namely, control measures of insects pests, names and doses of insecticides and control measures of diseases. Besides these sub-areas, there were variations in ranking the sub-areas

Table 42.

Training Needs of Farmers in the Sub-areas of Training of Plant Protection Measures as Perceived by Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Control measures of insect pests	4.66	(1)	4.60	(2)
Names and doses of insecticides	4.54	(2)	4.54	(4)
Control measures of diseases	4.53	(3)	4.57	(3)
Preparation of insecticide solution	3.94	(4)	2.45	(10)
Handling of plant protection equipments	3.87	(5)	2.84	(8)
Integrated pest control schedule	3.73	(6)	4.69	(1)
Time and interval of spraying	3.59	(7)	4.13	(5)
Precaution in spraying	2.95	(8)	2.78	(9)
Sources of availability and prices of insecticides	2.82	(9)	2.12	(11)
Identification of plant diseases	1.59	(11)	3.73	(7)

$r_s = 0.47$ (Non-significant)

by them. Integrated pest control schedule was given first rank by trainers whereas it was given sixth rank by farmers. Preparation of pesticide solution was given fourth rank by farmers and last rank by trainers.

The computed rs value (0.47) was non-significant. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement between farmers and trainers in ranking the sub-areas in order of need for training.

Irrigation: It is evident from Table 43 that number of irrigation and time of irrigation in relation to stages of growth of paddy were perceived as most needed by the farmers as well as the trainers.

Table 43.

Training Needs of Farmers in the Sub-areas of Training of Irrigation as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Number of irrigation	4.59	(1)	4.65	(2)
Time of irrigation in relation to stages of growth of paddy	4.54	(2)	4.68	(1)
Economic use of irrigation water	1.83	(3)	3.12	(3)
Depth of irrigation water	1.44	(4)	2.97	(4)

The last two sub-areas were perceived as somewhat needed by trainers whereas these sub-areas were perceived as less needed and not needed by farmers. A comparison of the ranks assigned by farmers and trainers revealed that number of irrigation was given first rank by farmers whereas it was given second rank by trainers. Time of irrigation in relation stages of growth of paddy was given first rank by farmers and second rank by trainers. Both of them had assigned same ranks to the rest two sub-areas.

Improved Agricultural Implements: A perusal of data presented in Table 44 reveals that handling of puddler was perceived as needed by the farmers as well as the trainers. Sources of availability and prices of improved agricultural implements were perceived as needed by farmers and somewhat needed by trainers. The analysis of ranks assigned by farmers and trainers to the sub-areas revealed that there were, by and large, similarities in ranking the sub-areas by them.

The computed r_s value (0.89) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was highly significant agreement between farmers and trainers in ranking the sub-areas in order of need for training.

Table 44.

Training Needs of Farmers in the Sub-areas of Training of Improved Agricultural Implements as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Handling of puddler	3.71	(1)	4.56	(1)
Sources of availability and prices of improved implements	3.56	(2)	3.14	(2)
Handling of hoe	3.54	(3)	2.68	(5)
Handling of thresher	3.15	(4)	2.63	(4)
Minor repairing of improved implements	2.94	(5)	2.89	(3)
Efficiency of puddler	1.52	(6)	2.52	(6)
Efficiency of hoe	1.42	(7)	1.44	(8)
Efficiency of thresher	1.36	(8)	1.48	(7)

$r_s = 0.89^{**}$

** Significant at .01 level of probability

Chemical Weed Control: Table 45 shows that the farmers did not perceive training in any sub-area as needed. Most of the sub-areas were perceived as somewhat needed and less needed by them. The trainers perceived training in names and doses of weedicides as needed for farmers. Except this sub-area, the trainers also perceived training in most of the sub-areas as somewhat needed and less needed for farmers. The analysis of ranks assigned by farmers and trainers to the sub-areas

Table 45.

Training Needs of Farmers in the Sub-areas of Training in Chemical Weed Control as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Names and doses of weedicides	3.08	(1)	3.57	(1)
Time of weedicide spraying	2.55	(2.5)	3.23	(3)
Precaution in weedicide spraying	2.55	(2.5)	2.85	(4)
Preparation of weedicide solution	2.36	(4)	2.62	(6)
Control measures of weeds	2.34	(5)	2.42	(7)
Number of weedicide spraying	2.34	(6)	3.42	(2)
Sources of availability and prices of weedicides		(7)	1.85	(8)
Identification of weeds	1.23	(8)	2.76	(5)

$r_s = 0.57$ (Non-significant)

revealed that there were considerable variations in ranking the sub-areas by them. The number of weedicide spraying was given second rank by trainers whereas it was given sixth rank by farmers.

The computed r_s value (0.57) was non-significant. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was not rejected. Thus, the inference could be drawn that there was no significant agreement between farmers and trainers in ranking the sub-areas in view of the need for training.

Credit: Table 46 shows that different types of credit available for agricultural purposes were perceived as most needed by farmers and needed by trainers. Different agencies of agricultural credit and nature and purposes of credit available from different credit institutions were perceived as needed by them. There were slight differences in perceiving the need for training in the last two sub-areas by them. The analysis of ranks assigned by farmers and trainers revealed that both of them had assigned same ranks to three sub-areas. There were slight variations in assigning ranks to the other two sub-areas by them.

Table 46.

Training Needs of Farmers in Sub-areas of Training of Credit as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Different types of credit available for agricultural purposes	4.61	(1)	4.12	(1)
Different agencies of agricultural credit	4.12	(2)	3.59	(3)
Nature and purposes of credit available from different credit institutions	3.85	(3)	3.62	(2)
Rules and regulations of getting loan from various credit institutions	3.77	(4)	2.85	(4)
Cost of credit	2.82	(5)	1.53	(5)

$$r_s = 0.90^*$$

* Significant at .05 level of probability

The computed rs value (0.90) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the sub-areas, was rejected. Thus, the inference could be drawn that there was significant agreement between farmers and trainers in ranking the sub-areas in order of need for training.

Storage: Table 47 shows that improved methods of storage were perceived as most needed by the farmers as well as the trainers. The method of constructing Pusa bin was perceived as needed by trainers whereas it was perceived as somewhat needed by farmers. The control measures of stored grain pests were perceived as somewhat needed by both of them. The analysis of ranks assigned by farmers and trainers revealed that both of them gave the same rank to improved method of storage. The other two sub-areas were ranked a bit differently by them.

Table 47.

Training Needs of Farmers in the Sub-areas of Training of Storage as Perceived by the Farmers Themselves and Trainers.

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Improved methods of storage	4.45	(1)	4.59	(1)
Method of constructing pusa bin	2.77	(3)	3.58	(2)
Control measures of stored grain pests	3.02	(2)	3.47	(3)

Marketing: An examination of data presented in Table 48 reveals that preparation of produce for the market was perceived as most needed by trainers whereas it was perceived as needed by farmers. Knowledge of marketing processes and charges of regulated markets was perceived as needed by trainers whereas it was perceived as less needed by farmers.

Table 48.

Training Needs of Farmers in the Sub-areas of Training of Marketing as Perceived by the Farmers Themselves and Trainers

Sub-areas of Training	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Preparation of produce for the market	4.49	(1)	4.57	(1)
Knowledge of marketing processes and charges of regulated markets	2.19	(2)	3.61	(2)
Advantages of selling produce in regulated markets	2.04	(4)	3.71	(3)
Government price policy for agricultural produce	2.18	(3)	2.68	(4)

Advantages of selling produce in regulated markets and government price policy for agricultural produce were perceived as somewhat needed by trainers and less needed by farmers. The analysis of ranks assigned by farmers and trainers revealed that the first two sub-areas were assigned same ranks by both of them. In the case of last two sub-areas there were slight differences in ranking by them.

Discussion: It is evident from the findings presented in the preceding section that the farmers perceived training in sub-areas of six main areas only as most needed. These main areas were: high-yielding varieties of paddy, seed treatment, fertilizers, plant protection measures, irrigation and credit. On the other hand, the trainers perceived training in sub-areas of nine main areas as most needed for farmers (See Table 49). Some of the sub-areas in which training have been perceived as most needed by the farmers themselves and the trainers for the farmers were: recommended high-yielding varieties of paddy, recommended dose of fertilizers, control measures of insect pests and diseases, names and doses of insecticides, number of irrigation and time of irrigation in relation to stages of growth of paddy. Besides these common sub-areas, the farmers perceived training in names and doses of pesticides used for seed treatment and different types of credit available for agricultural purposes as most needed. The other sub-areas perceived by trainers as most needed for farmers were: advantages and limitations of high-yielding varieties of paddy, method of seed treatment, plant protection measures in nursery, age of seedlings at the time of transplanting, time of fertilizer application, integrated pest control schedule, improved methods of storage and preparation of the produce for the market. These sub-areas were perceived by farmers as needed.

The analysis of ranks assigned by farmers and trainers revealed that there were significant agreements between farmers and trainers in ranking the sub-areas of four main areas. These main areas were: high-yielding varieties of paddy, transplanting, improved agricultural

Table 49.

Summary Table Showing Training Needs of Farmers in the Sub-area of Training as Perceived by the Farmers themselves and Trainers

Main Area of Training	Degree of					Training					Needed					Farmers' Perceptions for Farmers				
	P	U	S	T		F	E	E	D	D	F	E	E	D	D	F	E	E	D	D
	Farmers					Trainers' Perceptions for Farmers					Farmers F									
	2					3					4					5				
High-yielding variation of paddy	Recommended high-yielding variation of paddy (1)					Sources of availability and prices of seeds (2), advantages and limitations of high-yielding varieties of paddy (3)					Maintenance of purity of high-yielding varieties of paddy (5)									
Seed treatment	Names and doses of pesticides (1)					Method of seed treatment (2)					Names of doses of pesticides (2)									
Nursery raising	ML					Recommended doses of fertilizers (1), seed rate (2), plant protection measures (3), number and interval of irrigation (4)					Plant protection measures (1,5), time of nursery sowing (1,5), number and interval of irrigation (3), seed rate (4), recommended dose of fertilizers (5)					Seed bed preparation (5), time of nursery sowing (6)				
Transplanting	ML					Age of seedlings at the time of transplanting (1), time of transplanting (2)					Time of transplanting (1), age of seedlings at the time of transplanting (2)					ML				
Fertilizers	Recommended dose of fertilizers (1)					Recommended dose of fertilizers (1), time of fertilizer application (2), identification of nutrient deficiency symptoms (3)					Time of fertilizer application (2), method of fertilizer application (3)					Top dressing (4), method of fertilizer application (5), importance of balanced fertilization (6)				
Plant protection measures	Central measures of insect pests (1), names and doses of insecticides (2), control measures of diseases (3)					Integrated pest control schedule (1), control measures of insect pests (2), control measures of diseases (3), names and doses of insecticides (4)					Preparation of insecticides solution (4), handling of plant protection equipments (5), integrated pest control schedule (6), time and interval of spraying (7)					Time and interval of spraying (5), identification of insect pests (6), identification of diseases of paddy (7)				

Irrigation	Number of irrigation (1), time of irrigation (2)	Time of irrigation (1), number of irrigation (2)	M2.	M11
Improved agricultural implements	M11	M11	Handling of puddler (1), sources of availability and prices of implements (2)	Handling of puddler (1)
Chemical weed control	M11	M11		Uses and doses of weedicides (1)
Storage	M11	Improved methods of storage (1)	Improved methods of storage (1)	Method of constructing pusa bin
Credit	Different types of credit available for agricultural purposes (1)	M11	Different agencies of agricul- tural credit (2), nature and purposes of credit available from different credit institutions (3), rules and regulations of getting credit from different credit institutions (4)	Different types of credit available for agricultural purposes (1), nature and purposes of credit available from different credit institutions (2), different agencies of agricultural credit (3)
Marketing	M11	Preparation of the produce for market (1)	Preparation of the produce for market (1)	Knowledge of marketing changes and processes of regulated markets (2)

Figures in parentheses indicate ranks.

* Training in sub-areas perceived as Most Needed and Needed only. Training in sub-areas perceived as somewhat Needed, Less Needed and Not Needed are not included in this table. For these sub-areas, see Tables 37 - 48.

implements and credit. There were no significant agreement between them in ranking the sub-areas of four main areas. These main areas were: nursery raising, fertilizer, plant protection measures, ^{and} chemical weed control. This indicated that both of them (Farmers and Trainers) differed in ranking the sub-areas of these main areas. Some of the sub-areas which have been assigned higher ranks by farmers than trainers in view of the need for training were: sources of availability and prices of seeds, plant protection measures in nursery, time of nursery sowing, method of fertilizer application, foliar spray of urea, names and doses of insecticides, handling of plant protection equipments and preparation of insecticide solution. In these sub-areas the farmers perceived more need for training than the trainers' perception of farmers' training needs. Therefore, in the training programme emphasis should not be given only on imparting knowledge about the package of practices but also on skills relating to method of fertilizer application, preparation of pesticide solution and handling of plant protection equipments.

Some of the sub-areas which have been assigned higher ranks by trainers than farmers in view of training needs were: Maintenance of purity of high-yielding varieties of paddy, age of seedlings at the time of transplanting, importance of balanced fertilization and integrated pest control schedule. In these sub-areas, the farmers' perceptions of their own training needs were less than the trainers' perceptions of the farmers' training needs.

5. Association Between Socio-personal and Economic Characteristics and Training Needs

In the preceding section, the training needs of farmers in relation to high-yielding varieties of paddy as perceived by the farmers themselves and trainers were analysed. In this section, the association between socio-personal and economic characteristics of the farmers and their training needs will be analysed.

Age: The frequency distribution of farmers by age and training need is presented in Table 50.

Table 50

Frequency Distribution of Farmers by Age and Training Need

Age Group	Training Need Group		
	High	Medium	Low
Young farmers (N=47)	15 (31.9)	23 (48.9)	9 (19.2)
Middle-aged farmers (N=75)	37 (49.3)	26 (34.7)	12 (16.0)
Old farmers (N=65)	43 (66.1)	16 (24.6)	6 (9.3)

Figures in parentheses indicate percentage

$$\chi^2 = 13.04^*$$

* Significant at .05 level of probability

Table 50 shows that as against 31.0 per cent of young farmers, 49.3 per cent of middle-aged farmers and 66.1 per cent of old farmers

were in high training need group. It can be also seen from the table that as against 24.6 per cent of old farmers, 48.9 per cent of young farmers and 34.7 per cent of middle-aged farmers were in medium training need group. A relatively low percentage (9.5 per cent) of old farmers in comparison to middle-aged and young farmers were in low training need group. It can also be seen from the table that, in general, larger percentage of old farmers needed more training than middle-aged and young farmers.

The computed chi-square value (13.04) was significant at .05 level of probability. Therefore, the null hypothesis that there is no association between age and training needs of the farmers, was rejected. Thus, the inference could be drawn that there was significant association between age and training needs of the farmers.

Education: The frequency distribution of farmers by level of education and training need is presented in Table 51.

Table 51.

Frequency Distribution of Farmers by Education and Training Need

Education Groups	Training Need Groups		
	High	Medium	Low
Illiterate (N=52)	34(65.4)	10(19.2)	8(15.4)
Can read and write (N=45)	27(60.0)	12(26.7)	6(13.3)
Primary (N=38)	14(36.8)	17(44.7)	7(18.4)
Middle (N=30)	10(33.3)	12(40.0)	8(26.4)
High school and above (N=22)	6(27.3)	7(31.8)	9(40.9)

$$\chi^2 = 21.48^{**}$$

Figures in parentheses indicate percentage

** Significant at .01 level of probability

A perusal of data presented in Table 51 reveals that illiterate farmers and farmers who can read and write only were closer to each other in their training needs than any other category of farmers. Table 51 shows that as against 27.3 per cent of farmers who had read up to high school and above, 65.4 per cent of illiterate farmers, 60.0 per cent of farmers who can read and write, 36.8 per cent of farmers read up to primary, and 33.3 per cent of farmers read up to middle were in high training need group. It can be also seen from the table that in general farmers with low level of education needed more training than those who had higher level of education.

The computed chi-square value (21.48) was significant at .01 level of probability. Therefore, the null hypothesis that there is no association between level of education and training needs of the farmers, was rejected. Thus, the inference could be drawn that there was highly significant association between level of education and training needs of the farmers

Size of Holding: The frequency distribution of farmers by size of holding and training needs is presented in Table 52. Table 52 shows that as against 28.3 per cent of large farmers, 60 per cent of small farmers and 42.6 per cent of medium farmers were in high training group. It can be also seen from the table that as against 30 per cent of small farmers, 36.2 and 45.6 percentages of medium and large farmers were in medium training need group. In general, it can be said that small farmers needed more training than medium and large farmers.

Table 52

Frequency Distribution of Farmers by Size of Holding and Training Need

Size of Holding Groups		Training Need Groups		
		High	Medium	Low
Small farmers	(N=80)	48(60.0)	24(30.0)	8(10.0)
Medium farmers	(N=61)	28(42.6)	22(36.2)	12(21.2)
Large farmers	(N=46)	15(28.3)	21(45.6)	12(26.1)

Figures in parentheses indicate percentage

$$\chi^2 = 13.66^{**}$$

** Significant at .01 level of probability

The computed chi-square value (13.66) was significant at .01 level of probability. Therefore, the null hypothesis that there is no association between size of holdings and training needs of the farmers, was rejected. Thus, the inference could be drawn that there was highly significant association between size of holding and training needs of the farmers.

Social Participation: The frequency distribution of farmers by social participation and their training need is presented in Table 53. It is evident from Table 53 that as against 34.1 per cent of members, 47.6 per cent of non-members were in high training need group. As against 51.2 per cent of members, 36.2 per cent of non-members were in medium training need group.

Table 53

Frequency Distribution of Farmers by Social Participation and Training Need

Social Participation Group		Training Need Group		
		High	Medium	Low
Members	(N=82)	28(34.1)	42(51.2)	12(14.7)
Non-members	(N=105)	50(47.6)	38(36.2)	17(16.9)

Figures in parentheses indicate percentage

$$\chi^2 = 4.51 \text{ (Non-significant)}$$

The computed chi-square value (4.51) was non-significant. Therefore, the null hypothesis that there is no association between social participation and training needs of farmers, was not rejected. Thus, the inference could be drawn that there was no significant association between social participation and training needs of the farmers.

Socio-economic Status: The frequency distribution of farmers by socio-economic status and training need is presented in Table 54. Table 54 shows that as against 30.7 per cent of farmers of high socio-economic status, 53.2 and 60.2 percentages of medium and low socio-economic status farmers were in high training need group respectively. It can be also seen from the table that as against 26.9 per cent of farmers of high socio-economic status, only 17.7 and 12.3 percentages of farmers of medium and low socio-economic status were in low training

group. In general, it can be said that relatively larger percentages of farmers of low socio-economic status needed more training than the farmers of medium and high socio-economic status groups.

Table 54

Frequency Distribution of Farmers by Socio-economic Status and Training Need

Socio-economic Status Groups	Training Need Groups		
	High	Medium	Low
High Socio-economic Status (N=52)	16(30.7)	22(42.4)	14(26.9)
Medium Socio-economic Status (N=62)	33(53.2)	18(29.1)	11(17.7)
Low Socio-economic Status (N=73)	44(60.2)	20(27.4)	9(12.3)

Figures in parentheses indicate percentage

$$\chi^2 = 11.47^*$$

* Significant at .05 level of probability

The computed chi-square value (11.47) was significant at .05 level of probability. Therefore, the null hypothesis that there is no association between the socio-economic status and training needs of farmers, was rejected. Thus, the inference could be drawn that there was significant association between socio-economic status and training needs of the farmers.

Discussion: The findings presented in the preceding section are discussed characteristics-wise.

Age: The percentage distribution of farmers revealed that young farmers needed less training than middle-aged and old farmers. This may be possibly due to the fact that young farmers are more prone to change and accept and adopt new ideas and practices more quickly than the middle-aged and old farmers. Therefore, the young farmers needed less training than middle-aged and old farmers.

Education: The percentage distribution of farmers revealed that farmers with higher level of education needed less training than the illiterate farmers. Education opens mental faculty of an individual, as a result of which ability to grasp, analyse and interpret the facts considerably increases. The more educated farmers can make use of printed matters also. The level of education has been found to be significantly associated with level of adoption of improved farm practices (Jaiswal 1965; Singh 1969; and Nair 1969). Therefore, farmers with higher level of education needed less training than those with low level of education.

Size of Holding: The percentage distribution of farmers revealed that large farmers needed less training than medium and small farmers. Training needs also depends upon one's level of adoption of improved farm practices. Past studies by (Jaiswal 1965; Nair 1969; P.E.O. 1969; Singh 1969) indicate that size of holding is significantly associated with adoption of improved farm practices. Besides, the large farmers have more contact with extension agency, are more educated and make

more use of personal cosmopolite sources of information and mass media (Singh 1971). Therefore, the large farmers needed less training than medium and small farmers.

Socio-economic Status: The percentage distribution of farmers revealed that farmers of low and medium socio-economic statuses needed more training than the farmers of high socio-economic status. This may be possibly due to the facts that farmers of low socio-economic status have low level of education, less contact with extension agency and make mostly use of personal localite sources of information. Therefore, the farmers of low socio-economic status needed more training.

Social Participation: There was no association between social participation and training needs of the farmers. Social participation of the farmers in the present investigation was studied with respect to membership in formal organisation only. These formal organisations were: village panchayat, cooperative society and village school. Except cooperative society the other two village institutions are not concerned with High Yielding Varieties Programme. Therefore, social participation was not found to have any association with training needs of the farmers.

6. Relative Preferences for the Various Components of Training Programme

After analysing the training needs of the farmers in relation to high-yielding varieties of paddy, it is necessary to organize a suitable training programme for them so that they may acquire necessary knowledge

and skill relating to high-yielding varieties of paddy. In this section, the preferences of the farmers and the trainers for the various components of farmers training programme would be analysed. Seven components of the farmers training programme, namely, venue, timing, months, duration, size of the training group, training methods and follow-up activities have been analysed. For the convenience of presentation each component would be discussed separately.

Venues of Training: Table 55 shows that organisation of training camps at the village level was given first rank by farmers in order of preference whereas national demonstrations and other demonstrations sites were given first rank by trainers. Organisation of training camps at the block headquarters and Farmers' Training Centre were given third and last ranks by both farmers and trainers.

Table 55

Venues of Training as Preferred by Farmers and Trainers

Venues of Training	Farmers (N=187)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
Villages	3.56	(1)	3.32	(2)
National demonstrations and other demonstration sites	3.28	(2)	3.68	(1)
Block headquarters	2.15	(3)	2.84	(3)
Farmers' training centre	1.68	(4)	2.45	(4)

Timing of Training: It is evident from Table 56 that organisation of training programme before the onset of sowing season was given first rank by the farmers whereas trainers assigned it second rank. The organisation of training camp during the crop season was given first rank by the trainers. The other two timings of training programme were given third and last ranks by both categories of respondents. There were slight differences in ranking the first two timings of training programme by them. Both of them assigned the same ranks to the last two timings of training.

Table 56.

Timing of Training as Preferred by Farmers and Trainers

Timing of Training	Farmers (N=187)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
Before the onset of sowing	3.62	(1)	3.42	(2)
During the crop season	3.14	(2)	3.57	(1)
During the slack season	2.60	(3)	1.78	(3)
After the cropping season	1.35	(4)	1.64	(4)

Months of Training:

A perusal of data presented in Table 57 reveals that the farmers as well as the trainers assigned first three ranks to May, June and February. May was given first rank by farmers whereas it was given

Table 57.

Months for Training as Preferred by Farmers and Trainers

Months	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
May	3.60	(1)	3.65	(2)
June	3.54	(2)	3.68	(1)
February	3.31	(8)	3.26	(3)
March	2.99	(4)	2.95	(4)
April	2.60	(5)	2.09	(7)
July	2.27	(6)	2.26	(8)
August	1.61	(7)	1.86	(8)
December	1.33	(8)	1.04	(12)
January	1.28	(9)	2.31	(5)
September	1.26	(10)	1.14	(10)
November	1.21	(11)	1.31	(9)
October	1.18	(12)	1.09	(11)

rs = 0.87***

*** Significant at .01 level of probability

second rank by trainers. June was assigned first rank by trainers whereas it was assigned second rank by farmers. There were, by and large, similarities in ranking the rest months by them.

The computed rs value (0.87) was significant at .01 level of probability. Therefore, the null hypothesis that there is no agreement

between farmers and trainers in ranking the months, was rejected. Thus, the inference could be drawn that there was highly significant agreement between farmers and trainers in ranking the months in order of preferences for organising training programme.

Duration of Training: A perusal of data presented in Table 58 reveals that one day training camp was given first rank by farmers. Two days' training camp was given first rank by trainers. Three days' training camp was given last rank by both categories of respondents.

Table 58

Duration of Training as Preferred by Farmers and Trainers

Duration of Training	Farmers (N=187)		Trainers (N=42)	
	Mean	Rank	Mean	Rank
	Score		Score	
One day training camp	5.56	(1)	2.14	(2)
Two days' training camp	3.14	(2)	3.44	(1)
Three days' training camp	1.34	(3)	1.42	(3)

Size of the Training Group: An examination of data presented in Table 59 reveals that size of the training group below 25 farmers was given first rank by farmers whereas the size of the training group (25-50 farmers) was given first rank by the trainers. Both categories of respondents assigned same ranks to the remaining two sizes of training group.

Table 59

Size of Training Groups as Preferred by Farmers and Trainers

Size of the Training Group	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Below 25	3.54	(1)	3.57	(2)
25 - 50 farmers	3.18	(2)	3.68	(1)
50 - 75 farmers	2.15	(3)	2.50	(3)
75 - 100 farmers	1.42	(4)	1.55	(4)

Training Methods: A perusal of data presented in Table 60 reveals that under single methods farmers as well as trainers assigned first and second ranks to demonstration and field trip. Lecture was assigned last rank by both of them. There were slight differences in ranking discussion and teaching aids by them.

The computed r_s value (0.90) was significant at .05 level of probability. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the training methods, was rejected. Thus, the inference could be drawn that there was significant agreement between farmers and trainers in ranking the training methods in order of preferences.

Table 60

Training Methods as Preferred by Farmers and Trainers

Training Methods	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
A. Single Methods				
Demonstration	3.14	(1)	3.48	(1)
Field trips	3.02	(2)	3.14	(2)
Discussion	2.89	(3)	2.88	(4)
Teaching aids	2.63	(4)	2.45	(3)
Lecture	1.84	(5)	2.18	(5)
B. Combination of Two Methods				
Discussion + Demonstration	3.38	(1)	3.64	(1)
Visit to Demonstration plot + Teaching aids	3.16	(2)	3.47	(3)
Discussion + Field trip	2.98	(3)	3.54	(2)
Lecture + Discussion	2.42	(4)	2.67	(4)

A. $r_s = 0.90^*$

* Significant at .05 level of probability

Combinations of Two Methods: A perusal of data presented in Table 60 reveals that discussion plus demonstration and, lecture plus discussion were assigned first and last ranks by farmers as well as trainers. The other two combinations of training methods were ranked a bit differently by them.

Follow-up Activities: A perusal of data presented in Table 61 reveals that follow-up activities, namely, discussing the problems of the cultivation of high-yielding varieties of paddy at the farms and

Table 61

Follow-up Activities as Preferred by Farmers and Trainers

Follow-up Activities	Farmers (N=187)		Trainers (N=42)	
	Mean Score	Rank	Mean Score	Rank
Discussing the problems of the cultivation of high-yielding varieties of paddy at the farms with the farmers	3.42	(1)	3.61	(1)
Contacting farmers at regular intervals	3.23	(2)	3.51	(2)
Trainers' visits to fields during and after the sowing seasons	3.12	(3)	2.95	(4)
Meeting and discussion with farmers before sowing	2.95	(4)	2.48	(7)
Maintaining a mailing list of trained farmers for periodical correspondences	2.65	(5)	2.38	(8)
Supply of printed literature	2.10	(6)	2.83	(5)
Rural radio programmes for farmers	1.75	(7)	3.04	(3)
Inviting trained farmers to block office for discussion	1.58	(8)	2.76	(6)

rs = 0.52 (Non-significant)

contacting farmers at regular intervals were given first and second ranks both by farmers and trainers. Besides these, there were differences in ranking the follow-up activities by them. Radio programmes for farmers was given third rank by trainers whereas it was given seventh rank by farmers.

The computed r_s value (0.52) was non-significant. Therefore, the null hypothesis that there is no agreement between farmers and trainers in ranking the follow-up activities, was not rejected. Thus the inference could be drawn that there was no significant agreement between farmers and trainers in ranking the follow-up activities in order of preferences.

Discussion: It is evident from the findings that short duration training programme for high-yielding varieties of paddy should be organised before the onset of sowing time most preferably in the months of May and June at the village level. The optimum size of the training group at the village level should be upto 25 farmers. These findings are in conformity with the findings of Sidhu and Patel (1968), Rao (1969) and, Satyanarana and Bhaskaram (1971). The recommendations of Workshop on Farmers' Training and Education (1967) and Mathur's (n.d.) views on organisation of farmers training programme are also in line with the findings of the present study.

The farmers' preference's for training at the village level and of short duration training might be due to the fact that the farmers may not be included to leave their farms and homes for longer period, as it may affect many farming operations. Their preferences for, training

session just before the sowing season might be due to the fact that it would make greater impact on them when they would prepare the fields for nursery sowing and would carry out the other farm operations. The reasons for farmers' as well as trainers' preferences of small size of the training group are quite obvious. Participants in a farmers' training situation might bring varied experience and may belong to different age groups with uneven education level. It would be difficult to arrange training programme with heterogenous and unmanageable size of the group.

Training methods form the key to effective communication with the participants in any training situation. The reasons for greater preferences to demonstration, field trip, discussion and demonstration and, visit to demonstration plots by both the farmers as well as the trainers might be due to greater opportunities that could be provided for individual involvement in training events by these methods than lecture, discussion or teaching aids alone.

In this chapter, the analysis of data and discussion were presented. In the next chapter a brief summary and implications of the present study will be presented.

CHAPTER V

SUMMARY AND IMPLICATIONS

In the previous chapter, the analysis of data and discussion were presented. In this chapter, a brief summary and implications of the present study will be presented.

One of the most significant advances in the agricultural technology in recent years has been the introduction of high-yielding varieties of food crops and the concept of multiple and relay cropping. While in the case of wheat, the impact of high-yielding varieties and the new technology on the extension of acreage and yields has been dramatic, in the case of rice it has not been so. However, improvements in this crop have been made in recent years and a major breakthrough in rice production can be expected in near future. The technology of high-yielding varieties of paddy is highly complex and sophisticated. It requires a thorough understanding and repeated practice of different skills on the part of farmers to reap rich harvests. With the wider use of high-yielding varieties, agriculture has ceased to be a source of subsistence alone; the new agriculture has attained the status of a modern business. Therefore, the farmers should be trained in specific operational and technical know-how and skills embracing all phases of production for maximising their economic returns. The specific objectives of the study were:

1. To identify and determine the main areas of training in relation to high-yielding varieties of paddy for farmers as perceived by the farmers themselves and the trainers.

2. To analyse the knowledge of farmers in the main areas of training in relation to high-yielding varieties of paddy.
3. To determine the relative importance of the sub-areas of training as perceived by farmers and trainers.
4. To determine the training needs of the farmers in the sub-areas as perceived by the farmers themselves and trainers.
5. To study the association between the selected socio-personal and economic characteristics of the farmers and their training needs.
6. To study the preferences of farmers and trainers for venues, months, timing, duration, size of the training group, training methods and follow-up activities of farmers' training.

The present study was undertaken in Purnea district of Bihar. All the blocks of Purnea district were classified into three adopter categories on the basis of their adoption index for high-yielding varieties of paddy. One block from each of the three adoption categories, namely, high, medium and low was selected randomly. Thus, finally three blocks were selected. All the villages in each block were classified into two adoption categories - high and low on the basis of their adoption indices for high-yielding varieties of paddy. Two villages-one each from high and low adoption villages were selected randomly from each block. Thus, six villages were selected for field investigation.

Two categories of respondents, namely, farmers and trainers were selected. All the farmers in each village were classified into three categories, namely, large, medium and small farmers on the basis of

their size of holding. After stratification, 40 per cent of the farmers from each category was selected randomly. The size of the farmer sample was 187. The another category of respondents was the trainers of the Farmers' Training Centres of Bihar. Responses from 42 trainers were obtained by personal interview and mailed questionnaires.

A list of main areas of training in relation to high-yielding varieties of paddy for farmers was prepared. There were 12 main areas of training. These were: high-yielding varieties of paddy, seed treatment, nursery raising, transplanting, fertilizers, plant protection measures, irrigation, improved agricultural implements, chemical weed control, storage, credit and marketing. After delineation of the main areas, sub-areas were identified under each main area of training. Finally, 77 sub-areas of training were selected under the 12 main areas of training.

A knowledge test was prepared to measure the knowledge of farmers in the main areas of training in relation to high-yielding varieties of paddy. A five-point rating scale was used to measure the training needs of farmers in the main areas as well as the sub-areas as perceived by the farmers themselves and trainers. The mean scores for each main area and each sub-area were calculated. On the basis of mean scores, the main areas and sub-areas of training were ranked in order of need for training.

A five-point rating scale was used to measure the relative importance of the sub-areas of training as perceived by the farmers and the trainers. The mean score for each sub-area was calculated. The sub-areas were ranked in order of importance on the basis of mean score.

The association between socio-personal and economic characteristics of farmers, namely, age, education, size of holding, social-participation and socio-economic status and their training needs was studied. The socio-economic status of the farmers was measured with the help of "Socio-economic Status Scale" developed by Trivedi (1965). The preferences of farmers and trainers for the various components of farmers' training were measured with the help of a four-point rating scale. The mean scores of the specific items under each component was computed. On the basis of mean scores, the specific items under each component were ranked in order of preference.

Keeping in view the objectives of the study, null hypotheses were formulated and tested with the help of appropriate statistical tests. The statistical tests used for the analysis of data and testing the hypotheses were: Spearman's Rank Correlation Coefficient, Kendall's Coefficient Concordance, analysis of variance and Chi-square test.

The major findings of the present study are summarised under six major heads as given below.

1. Training Needs of Farmers in the Main Areas

The large farmers did not perceive training in any main area as most needed. The medium farmers perceived training in plant protection measures and high-yielding varieties of paddy as most needed in descending order. The small farmers perceived training in high-yielding varieties of paddy, plant protection measures, fertilizer and credit as most needed in descending order. The pooled analysis revealed that training in plant

protection measures was perceived as most needed by the farmers. The main areas of training perceived as needed by them in descending order were: high-yielding varieties of paddy, fertilizers, irrigation, nursery raising, credit and improved implements. There was highly significant agreement among the three categories of farmers in ranking the 12 main areas in order of need for training.

The trainers perceived training in fertilizers, plant protection measures and high-yielding varieties of paddy as most needed for farmers in descending order. There was significant agreement between farmers and trainers (for farmers) in ranking the 12 main areas in view of the need for training.

2. Knowledge of Farmers in the Main Areas of Training

The small farmers had significantly lower mean knowledge score than large farmers. There was no significant difference in the mean knowledge score of large and medium farmers and, medium and small farmers.

3. Relative Importance of the Sub-areas

Out of 12 main areas, the farmers perceived the sub-areas of eight main areas only as most important. On the other hand, the trainers perceived the sub-areas of 10 main areas as most important. The sub-areas of training perceived as most important by the farmers as well as the trainers were: recommended high-yielding varieties of paddy, time of nursery sowing, recommended dose of fertilizers, method of fertilizer application, control measures of insect pests, names and doses of insecticides, number of irrigation, improved methods of storage and

preparation of the produce for the market. Besides these common sub-areas, the farmers as well as the trainers perceived some other sub-areas also as most important separately. The sub-areas perceived by farmers as most important were: sources of availability and prices of seeds, method of fertilizer application, top-dressing and different types of credit available for agricultural purposes.

The trainers perceived the sub-areas, namely, advantages and limitations of high-yielding varieties of paddy, plant protection measures in nursery, doses of fertilizers for nursery, seed rate, time of transplanting, time and interval of fertilizer application, control measures of diseases, integrated pest control schedule, time of irrigation in relation to stages of growth of paddy, names and doses of weedicides and number of weedicide spraying as most important.

There were significant agreement between farmers and trainers in ranking the sub-areas of four main areas in order of importance. These main areas were: high-yielding varieties of paddy, transplanting, improved agricultural implements and credit.

4. Training Needs of Farmers in the Sub-areas

The findings pertaining to relative need for training in the sub-areas as perceived by the three categories of farmers, namely, large, medium and small farmers are summarized below:

The farmers need training not only in package of practices of high-yielding varieties of paddy but also in credit, storage and marketing. All the three categories of farmers perceived training in some of the sub-areas as most needed. These sub-areas were: recommended high-yielding

varieties of paddy, recommended dose of fertilizers, control measures of insect pests and diseases, number of irrigation, time of irrigation in relation to stages of growth of paddy and different types of credit available for agricultural purposes. Besides these common sub-areas all the three categories of farmers perceived training in some of the other sub-areas as most needed also. The large and the medium farmers perceived training in names and doses of pesticides, improved methods of storage and preparation of the produce for the market as most needed. The small farmers perceived training in names and doses of pesticides used for seed treatment and, rules and regulations of getting credit from different credit institutions as most needed.

The analysis of ranks assigned by the large, medium and small farmers revealed that there were significant agreements among them in ranking the sub-areas of five main areas only. These main areas were: high-yielding varieties of paddy, transplanting, plant protection measures, irrigation and improved agricultural implements.

The findings pertaining to training needs of the farmers in the sub-areas as perceived by the farmers themselves and trainers are summarized below:

The findings revealed that the farmers perceived training in sub-areas of six main areas only as most needed. These main areas were: high-yielding varieties of paddy, seed treatment, fertilizers, plant protection measures, irrigation and credit. On the other hand, the trainers perceived training in sub-areas of nine main areas as most needed for farmers. Some of the sub-areas in which training have been

perceived as most needed by the farmers themselves and the trainers for the farmers were: recommended high-yielding varieties of paddy, recommended dose of fertilizers, control measures of insect pests and diseases, names and doses of insecticides, number of irrigation and time of irrigation in relation to stages of growth of paddy. Besides these common sub-areas, the farmers perceived training in names and doses of pesticides used for seed treatment and different types of credit available for agricultural purposes as most needed. The other sub-areas perceived by trainers as most needed for farmers were: advantages and limitations of high-yielding varieties of paddy, method of seed treatment, plant protection measures in nursery, age of seedlings at the time of transplanting, time of fertilizer application, integrated pest control schedule, improved methods of storage and preparation of the produce for the market. These sub-areas were perceived by farmers as needed.

The analysis of ranks assigned by farmers and trainers revealed that there were significant agreements between farmers and trainers in ranking the sub-areas of four main areas. These main areas were: high-yielding varieties of paddy, transplanting, improved agricultural implements and credit.

5. Association between Socio-personal and Economic Characteristics and, Training Need

[The findings revealed that the middle-aged and the old farmers needed more training than young farmers. It was also found that the illiterate farmers and farmers with low level of education needed more training than the farmers with higher level of education. The small and

the medium farmers needed more training than large farmers. The farmers of the low socio-economic status group need more training than those of medium and socio-economic status groups.)

There were significant associations between the socio-personal and economic characteristics, namely, age, education, size of holding and socio-economic status of the farmers and their training needs.

6. Preferences for Various Components of Farmers' Training

The findings pertaining to the preferences of farmers and trainers for the various components of farmers' training are summarized below:

The farmers gave first preference to villages for the organisation of farmers' training camp whereas the trainers gave first preference to national demonstrations and other demonstrations. Before the onset of sowing time was the most preferred time for training by farmers whereas 'during the crop season' was the most preferred time by trainers. May and June were the most preferred months for training for the farmers as well as the trainers. (One day training camp was the most preferred duration of training by farmers whereas two days' training camp was the most preferred duration of training by farmers.) (The farmers gave first preference to the size of training group (below 25 farmers) whereas the trainers gave first preference to the size of the training group (25-50 farmers). Among the single training methods, demonstration and field trips were given first two ranks by the farmers as well as the trainers. Among combination of two methods, demonstration and discussion were given first preference by both of them. Among the follow-up activities, the farmers as well as the trainers^{gave} first preference to discussing the problems of the

cultivation of high-yielding varieties of paddy at the farm with the farmers.

Implications for Farmers' Training Programme

Based on the findings of the present study, some of the implications for the farmers' training programme are as follows:

1. Farmers need training not only in package of practices of high-yielding varieties of paddy but also in credit, improved methods of storage and preparation of produce for the market. Therefore, the syllabus of the Farmers' Training Programme should be changed. The subject matter content of the training programme should include package of practices of high-yielding varieties of paddy, credit, storage and marketing.
2. The priority on topics in training programme should be in order of plant protection measures, fertilizers, high-yielding varieties of paddy, irrigation, credit, nursery raising, seed treatment, improved implements, storage, marketing, transplanting and chemical weed control.
3. The non-institutional training programme should be organised at the village level and, national demonstrations and other demonstration sites for training the farmers in package of practices of high-yielding varieties of paddy. Besides this, the training programme should also be organised in relation to stages of different farm operations such as irrigation, fertilizer application, foliar spray of urea and plant protection measures.

4. Short duration specialised courses in balanced fertilization, plant protection measures, handling and repairing of improved agricultural implements, improved method of storage and farm management should be organised at the Farmers' Training Centre and other places where requisite expertise is available.
5. Training in sources of availability and prices of good seeds, insecticides and improved agricultural implements should also be given.
6. Demonstration, discussion, field trip and various combinations of these methods should be used in farmers' training programmes. The use of lecture method in farmers' training should be minimised.
7. As the small farmers needed more training than the medium and the large farmers, the extension agency and the staffs of the Farmers' Training Centre should pay greater attention to them while organising training programme at the village level and institutional training at the Farmers' Training Centre.

Suggestions for Future Research

The present investigation was confined to training needs of farmers in relation to high-yielding varieties of paddy only. However, based on the present study the following future research problems may be projected.

1. For greater generalisation of the findings, of the present study, such study should be conducted with larger sample and in different areas varying in agro-physical and socio-cultural conditions.

2. Training needs of different categories of farmers in relation to high-yielding varieties of other crops should be analysed to organise their training programme on scientific lines.
3. Training needs of young farmers also need to be studied to develop suitable specialised short duration courses for them.
4. Training needs of farm women in relation to cultivation of high-yielding varieties programme in different areas of the country need to be studied to organise their training on scientific lines.

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Appendix I

Area under high-yielding varieties of paddy, total area under paddy cultivation for the year 1971-72 adoption index of all the blocks of Purnea district

S.No.	Names of blocks	Area under high-yielding varieties of paddy (in acres)	Total area under paddy cultivation (in acres)	Adoption index
1	2	3	4	5
1.	Barari	78.00	25,371.00	0.31
2.	Baraharakothi	321.50	23,615.00	1.26
3.	Kochadhaman	315.45	14,320.84	2.20
4.	Forbesganj	581.25	24,910.00	2.33
5.	Jokihat	467.50	18,391.20	2.54
6.	Pothia	413.76	13,432.14	3.06
7.	Palasi	548.32	17,532.12	3.13
8.	Barsoi	642.80	18,952.00	3.39
9.	Kadawa	1286.00	37,371.00	3.44*
10.	Dhandaaha	1265.00	33,421.72	3.78
11.	Kursakata	647.63	21,324.35	3.97
12.	Baisi	746.32	18,312.45	4.07
13.	Amnour	1342.15	30,432.45	4.41
14.	Dighalbank	996.50	22,575.00	4.42
15.	Purnea	1785.50	32,464.00	4.52
16.	Krityanand Nagar	947.32	18,542.86	4.56*
17.	Barmankhi	1115.23	24,154.20	4.61
18.	Sikti	1152.42	24,621.00	4.68
19.	Manihari	1342.45	26,324.15	5.09

1.	2.	3.	4.	5.
20.	Balarampur	1142.12	22,342.12	5.11
21.	Narpatganj	942.50	18,347.15	5.14
22.	Frampur	1014.30	19,432.45	5.21
23.	Bhargama	1436.00	26,407.15	5.43
24.	Pupauli	2492.12	44,365.02	5.61
25.	Kisanganj	1215.02	21,342.12	5.69
26.	Thakurganj	1442.14	24,324.29	5.92
27.	Azamagar	1542.03	24,472.30	6.30
28.	Bahadurganj	917.42	14,349.23	6.39
29.	Baiga	1215.12	17,642.45	6.88
30.	Andabad	1715.45	24,325.12	7.05
31.	Katihar	1652.40	21,873.42	7.55
32.	Korha	847.50	11,334.42	7.71
33.	Terhagachh	1952.18	23,492.30	8.31
34.	Kasba	2771.00	31,103.85	8.90
35.	Bhawanipur	1250.55	10,852.45	11.52
36.	Raniganj	1517.12	7,703.06	19.69*
37.	Falka	3366.31	13,930.12	24.16
38.	Araria	4961.52	13,452.12	36.88
Total		49514.70	8,44,157.77	

* Blocks selected for field investigation

Value of the first quartile (Q ₁)	"	5.87
Value of the second quartile (Q ₂)	"	5.10
Value of the third quartile (Q ₃)	"	6.63

Appendix II

List of original items of the knowledge test and their difficulty index, discrimination index and point biserial correlation values.

Item No.	Items	Difficulty index	Discrimination index	Point biserial correlation
1.	2.	3.	4.	5.
	Can you name the recommended high-yielding varieties of paddy for your area?			
1	Padma	95	.12	.25
2***	I.R. 8	55	.48	.34**
3	Jaya	63	.55	.45***
	Characteristics of high-yielding varieties.			
4	Are they dwarf?	98	.01	.19
5	Are they erect?	72	.38	.33**
6***	Are they responsive to high doses of fertilizers?	55	.52	.28***
7	Have they got synchronized tillering?	12	.69	.16
8	Can they be cultivated in all seasons?	45	.48	.51***
9	Can the seeds of these varieties be used immediately after harvest for sowing?	56	.49	.32**
10	Are they lodging resistant?	71	.59	.26**
	What is the duration for each of these varieties?			
11	Padma	80	.10	.27***
12***	I.R. 8	56	.31	.39***
13	Jaya	88	.11	.51***

1.	2.	3.	4.	5.
14***	What is the seed rate to be used?	73	.31	.43**
15***	What is the purpose of seed treatment?	62	.32	.35
	What are the chemicals to be used for seed treatment?			
16	Agrosan G.N.	18	.09	.32**
17	Streptocyclin	12	.16	.22*
	What are the doses of the above chemicals?			
18	Agrosan G.N.	8	.04	.21*
19	Streptocyclin	5	.03	.18
	How will you treat the seed?			
20***	Wet method - quantity of water	50	.48	.43**
21***	How much time the seed is to be immersed in the solution?	42	.51	.38**
22***	Dry method	57	.49	.29**
	<u>Nursery</u>			
23***	What is the area of nursery required for raising seedlings for an acre of main crop?	65	.32	.29**
24***	What should be the type of nursery?	72	.32	.24*
	What is the recommended dose of the following fertilizers?			
25***	Ammonium sulphate	63	.59	.28**
26***	Superphosphate	58	.51	.31**
27***	Muriate of potash	59	.63	.41**
28***	Are the seeds to be sprouted before sowing?	69	.42	.35**

1.	2.	3.	4.	5.
29***	What is the method of irrigation?	74	.51	.55**
	What plant protection measures you will adopt for nursery?			
30***	Number of spraying	52	.48	.57**
31***	Time of spraying	45	.49	.29**
32	Name of chemical-pesticide	44	.61	.54**
33	Fungicide	35	.52	.35**
	What are the doses of above chemicals?			
34***	Pesticides	28	.61	.32**
35***	Fungicide	26	.62	.55**
36***	What is the method of application?	61	.35	.41**
	<u>Transplanting</u>			
37***	What should be the age of seedlings at the time of transplanting?	73	.47	.32**
38	What is the spacing between rows?	45	.41	.32**
39	What is the spacing between rows?	45	.41	.32**
40***	How many seedlings are to be sprouted per hole?	65	.32	.51**
41	At what depth the seedlings are to be planted?	4.8	.45	.35**
	<u>Main field</u>			
42	How much green leaf/farm yard manures/compost is to be applied?	75	.28	.32**

1.	2.	3.	4.	5.
43	What is the method of application?	71	.29	.41**
44***	What is the recommended dose of fertilizers?	38	.51	.36**
45	Can you name a nitrogeous fertilizers?	74	.28	.39**
46***	What is the dose to be applied?	56	.43	.26**
47***	What is the method of application?	51	.36	.27**
48***	When you will apply it?	60	.51	.31**
49	Can you name any phosphate fertilizer?	70	.29	.32**
50***	What is the dose to be applied?	52	.41	.39**
51***	What is the method of application?	48	.42	.41**
52***	When is to be applied?	38	.53	.29**
53	Name one potassic fertilizers.	56	.40	.36**
54***	What is its dose?	28	.53	.33**
55***	When is it to be applied?	31	.48	.31**
56***	How will you apply it?	41	.41	.32**
57***	How many irrigation to be given?	71	.30	.41**
58***	When you will stop irrigation?	52	.36	.34**
59	What is the method of inter-cultivation?	66	.31	.28**
60***	How many sprayings are to be given?	26	.53	.35**

1.	2.	3.	4.	5.
61***	At what interval the sprayings are to be given?	22	.61	.29**
	What are the insecticides to be used?			
62***	Endrin	69	.51	.38**
63	Parathion	12	.25	.33**
64	Blitox	15	.21	.41**
65	Fytolan	10	.17	.38**
	What is the dose of			
66***	Endrin	25	.51	.38**
67	Parathion	2	.08	.13
68	Blitox	2	.11	.17
69	Fytolan	3	.12	.19
70***	What is the method of application of insecticides?			
	What is the method of controlling rice bug?			
71	Name of the insecticide?	65	.28	.38**
72***	When it is to be applied?	51	.36	.41**
73	How will you apply it?	72	.26	.36**
74***	What is the dose?	28	.42	.41**
	<u>Credit and marketing</u>			
	What are the institutions from where you can get credit for cultivation of high-yielding varieties of paddy?			
75***	Cooperative society	84	.21	.41**
76	Commercial banks	49	.24	.21**

1.	2.	3.	4.	5.
77***	Block	54	.18	.25*
78	Government	25	.19	.24*
	What is the price per maunds of the following varieties of paddy?			
79***	I.R. 8	79	.24	.32***
80	Jaya	50	.52	.30**
81	Padma	68	.54	.24**

* Significant at .05 level of probability.

** Significant at .01 level of probability.

*** Items selected for the final knowledge test.

Appendix III

Summary table of analysis of variance

Sources of variation	Degrees of freedom	Sum of squares	Mean sum of squares	Variance ratio
Size of holding	2	612.34	306.17	6.45**
Error	184	8756.81	47.58	
Total	186	9368.65		

** Significant at .01 level of probability.

English Version of the Original Schedule for Farmers

Name of the respondent:Block: Village:

Age:Education:

1. Do you grow high-yielding varieties of Paddy? Yes/No
2. If yes,
 - (a) When did you adopt high-yielding varieties of paddy for the first time?.....19
 - (b) In how acres/bighas did you adopt it?
3. Have you attended any farmers' training programme? Yes/No

A. Knowledge Test

The items of knowledge test have been given in Appendix

B. Training Need in the Main Areas of Training

Please give your opinion about the degree of training you need in the following main areas of training in relation to high-yielding varieties of paddy.

Main areas of trainings.	Degree of training				
	Most 'needed'	'Needed'	'Somewhat 'needed'	'Less 'needed'	Not 'Needed'
	5	4	3	2	1

1. High-yielding varieties of paddy.
2. Seed treatment.
3. Nursery raising.
4. Transplanting.

Main areas of trainings

5	4	3	2	1
---	---	---	---	---

5. Fertilizers.

6. Irrigation.

7. Plant protection measures.

8. Chemical weed control.

9. Improved agricultural implements.

10. Storage.

11. Credit.

12. Marketing.

C. Relative Importance of the Sub-areas of Training

Please indicate the importance of the following sub-areas of training in relation to training programme for high-yielding varieties of paddy.

1. High-yielding varieties of Paddy

Most Important	Important	Somewhat important	Less important	Not important
5	4	3	2	1

(1) Recommended high-yielding varieties of paddy for the area.

(2) Characteristics of high-yielding varieties of paddy.

5	4	3	2	1
---	---	---	---	---

- (3) Advantages and limitations of high-yielding varieties of paddy.
- (4) Maintenance of purity of high-yielding varieties of paddy seeds.
- (5) Cost-benefit ratio of high-yielding varieties of paddy.
- (6) Sources of availability and price of seeds.
- (7) Storage of seeds.

2. Seed treatment

- (1) Selection of healthy and bold seed.
- (2) Method of seed treatment.
- (3) Names and dose of pesticides.

3. Nursery raising

- (1) Selection of field for nursery raising.
- (2) Seed bed preparation.
- (3) Seed rate for transplanting one acre of main crop.
- (4) Method of sowing.
- (5) Depth of sowing.
- (6) Time of nursery sowing for kharif and summer paddy.
- (7) Doses of manures and fertilizers.
- (8) Method of fertilizer application.

	5	4	3	2	1
(9) No and frequency of irrigation.					
(10) Plant protection measures.					
4. <u>Transplanting</u>					
(1) Preparation of the field for transplanting.					
(2) Age of seedlings.					
(3) No. of seedlings per hill.					
(4) Row to row and plant to plant distance.					
(5) Time of transplanting for kharif and summer crops.					
(6) Techniques of growing direct seeded rice.					
5. <u>Fertilizers</u>					
(1) Importance of balanced fertilization.					
(2) Recommended dose of nitrogenous, phosphatic and potassic fertilizers.					
(3) Method of fertilizer application.					
(4) Foliar application of urea.					
(5) Time and interval of fertilizer application.					
(6) Top dressing.					
(7) Per acre cost of fertilizers.					
(8) Identification of nutrient deficiency symptoms.					

	5	4	3	2	1
6. <u>Plant protection measures</u>					
(1) Identification of major pests of paddy.					
(2) Identification of major diseases of paddy.					
(3) Control measures of insect pests of paddy.					
(4) Control measure of diseases of paddy.					
(5) Integrated pest control schedule.					
(6) Preparation of pesticide solution.					
(7) Doses of pesticides for different pests.					
(8) Appropriate time for spraying dusting.					
(9) Handling of plant protection appliances.					
(10) Precautions to be taken in preparation and use of pesticide solution.					
(11) Sources of availability and prices of pesticides.					
7. <u>Weed control in Paddy</u>					
(1) Identification of major weeds of paddy.					
(2) Control measures of weeds.					
(3) Names and doses of weedicides for different weeds.					

	5	4	3	2	1
(4) Preparation and use of weedicide solution.					
(5) Time of spraying weedicide solution.					
(6) No. of spraying.					
(7) Precautions to be taken in weedicide application.					
(8) Sources of availability and prices of weedicides.					
8. <u>Irrigation and drainage</u>					
(1) No. of irrigations for paddy.					
(2) Time of irrigations in selection to stages of crop growth.					
(3) Economic use of irrigation water.					
(4) Depth of irrigation water.					
9. <u>Improved agricultural implements</u>					
(1) Handling of puddler.					
(2) Efficiency of puddler.					
(3) Handling of paddy hoe.					
(4) Efficiency of paddy hoe.					
(5) Handling of thresher.					
(6) Efficiency of thresher output.					
(7) Sources of availability and price of improved implements.					
(8) Minor repairing of improved implements.					

10. Storage

- | | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| (1) Improved methods of storage. | | | | | |
| (2) Different types of bins and drums. | | | | | |
| (3) Method of constructing Pusa bins. | | | | | |
| (4) Control measures of stored grain pests. | | | | | |
| (5) Sources of availability and prices of bins. | | | | | |

11. Credit

- | | | | | | |
|--|--|--|--|--|--|
| (1) Different types of credits available for agricultural purposes. | | | | | |
| (2) Different agencies of agricultural credit. | | | | | |
| (3) Nature and purposes of credits available from different credit institutions. | | | | | |
| (4) Rules and procedures of getting credits from different credit institutions. | | | | | |
| (5) Cost of credit. | | | | | |

12. Marketing

- | | | | | | |
|--|--|--|--|--|--|
| (1) Advantages, and cost of selling produce in different types of markets (Co-operative marketing, regulated markets). | | | | | |
|--|--|--|--|--|--|

	5	4	3	2	1
(2) Preparation of produce for marketing.					
(3) Knowledge of marketing procedures and changes.					
(4) Government price policy for agricultural produce.					

D. Training Need in the Sub-areas of Training

Please indicate the degree of training you need in the following sub-areas of each main area of training in relation to high-yielding varieties of paddy.

1. High-yielding varieties of paddy

	Degree of training				
	Most	Needed	Somewhat	Less	Not
	needed		needed	needed	needed
	5	4	3	2	1
(1) Recommended high-yielding varieties of paddy for the area.					
(2) Characteristics of high-yielding varieties of paddy.					
(3) Advantages and limitations of high-yielding varieties of paddy.					
(4) Maintenance of purity of high-yielding varieties of paddy seeds.					
(5) Cost-benefit ratio of high-yielding varieties of paddy.					

	5	4	3	2	1
(6) Sources of availability and price of seeds.					
(7) Storage of seeds.					
2. <u>Seed treatment</u>					
(1) Selection of healthy and bold seed.					
(2) Method of seed treatment.					
(3) Names and dose of pesticides.					
3. <u>Nursery raising</u>					
(1) Selection of field for nursery raising.					
(2) Seed bed preparation.					
(3) Seed rate for transplanting one acre of main crop.					
(4) Method of sowing.					
(5) Depth of sowing.					
(6) Time of nursery sowing for kharif and summer paddy.					
(7) Doses of manures and fertilizers.					
(8) Method of fertilizer application.					
(9) No. and frequency of irrigation.					
(10) Plant protection measures.					
4. <u>Transplanting</u>					
(1) Preparation of the field for transplanting.					

	5	4	3	2	1
(2) Age of seedlings.					
(3) No. of seedlings per hill.					
(4) Row to row and plant to plant distance.					
(5) Time of transplanting for kharif and summer crops.					
(6) Techniques of growing direct seeded rice.					
5. <u>Fertilizers</u>					
(1) Importance of balanced fertilization.					
(2) Recommended dose of nitrogenous, phosphatic and potassic fertilizers.					
(3) Method of fertilizer application:					
(4) Foliar application of urea.					
(5) Time and interval of fertilizer application.					
(6) Top dressing.					
(7) Per acre cost of fertilizers.					
(8) Identification of nutrient deficiency symptoms.					
6. <u>Plant protection measures</u>					
(1) Identification of major pests of paddy.					
(2) Identification of major diseases of paddy.					

			5	4	3	2	1
(3)	(3)	Control measures of insect pests of paddy.					
	(4)	Control measure of diseases of paddy.					
	(5)	Integrated pest control schedule.					
	(6)	Preparation of pesticide solution.					
	(7)	Doses of pesticides for different pests.					
	(8)	Appropriate time for spraying dusting.					
	(9)	Handling of plant protection appliances.					
	(10)	Precautions to be taken in preparation and use of pesticide solution.					
	(11)	Sources of availability and prices of pesticides.					
7.	<u>Weed control in paddy</u>						
	(1)	Identification of major weeds of paddy.					
	(2)	Control measures of weeds.					
	(3)	Names and doses of weedicides for different weeds.					
	(4)	Preparation and use of weedicide solution.					
	(5)	Time of spraying weedicide solution.					
	(6)	No. of spraying.					

	5	4	3	2	1
(7) Precautions to be taken in weedicide application.					
(8) Sources of availability and prices of weedicides.					
8. <u>Irrigation and drainage</u>					
(1) No. of irrigations for paddy.					
(2) Time of irrigations in selection to stages of crop growth.					
(3) Economic use of irrigation water.					
(4) Depth of irrigation water.					
9. <u>Improved agricultural implements</u>					
(1) Handling of puddler.					
(2) Efficiency of puddler.					
(3) Handling of paddy hoe.					
(4) Efficiency of paddy hoe.					
(5) Handling of thresher.					
(6) Efficiency of thresher output.					
(7) Sources of availability and price of improved implements.					
(8) Minor repairing of improved implements.					
10. <u>Storage</u>					
(1) Improved methods of storage.					
(2) Different types of bins and drums.					

	5	4	3	2	1
(3) Method of constructing Pusa bins.					
(4) Control measures of stored grain pests.					
(5) Sources of availability and prices of bins.					
11. <u>Credit</u>					
(1) Different types of credits available for agricultural purposes.					
(2) Different agencies of agricultural credit.					
(3) Nature and purposes of credits available from different credit institutions.					
(4) Rules and procedures of getting credits from different credit institutions.					
(5) Cost of credit.					
12. <u>Marketing</u>					
(1) Advantages, and cost of selling produce in different types of markets (Co-operative marketing, regulated markets).					
(2) Preparation of produce for marketing.					
(3) Knowledge of marketing processes and changes.					
(4) Government price policy for agricultural produce.					

E. Suggestions for Improving Farmers' Training Programme in Relation to High Yielding Varieties of Paddy

1. Please give your preferences for the following venues for organising training programme.

	Most pref- erred	Pref- erred	Less pref- erred	Not pref- erred
	4	5	2	1
(1) Farmers' training centre.				
(2) At the sites of national demonstration and other demonstration.				
(3) In the villages.				
(4) At the block head-quarters.				

2. Please give your preference for the following duration of training.

	4	3	2	1
(1) 1 day's training.				
(2) 2 day's training.				
(3) 3 days' training.				

3. Please give your preference for the following timing for organising training programme.

	4	3	2	1
(1) Before the onset of paddy cultivation.				
(2) During the crop season.				

	4	3	2	1
(3) After the cropping season.				
(4) During the stack season.				

4. Please give your preference for the following sizes of the training group.

	4	3	2	1
(1) Upto 25 farmers.				
(2) 26 to 50 farmers.				
(3) 50 to 75 farmers.				
(4) 75 to 100 farmers.				

5. Please give your preference for the following months for organising training programmes.

Month	4	3	2	1
(1) January				
(2) February				
(3) March				
(4) April				
(5) May				
(6) June				
(7) July				
(8) August				
(9) September				
(10) October				
(11) November				
(12) December				

6. Please give your preference for the following training methods for being used in training programme.

	4	3	2	1
A. <u>Single methods</u>				
(1) Lecture				
(2) Demonstration				
(3) Field trips				
(4) Discussion				
(5) Teaching aids				
B. <u>Combinations of two methods</u>				
(1) Discussion + Field trip				
(2) Discussion + Demonstration				
(3) Lecture + Discussion				
(4) Visit to demonstration plot + Teaching aids				

7. Please give your preference for the following Follow-up activities to be followed in farmers' training programme.

	4	3	2	1
(1) Contacting trainees at regular intervals.				
(2) Meeting and discussion with trained farmers just before sowing.				
(3) Trainers' visits to fields during and after the sowing season.				
(4) Inviting trained farmers to block office for discussion.				
(5) Supply of printed literature at regular intervals.				
(6) Maintaining a mailing list of trained farmers for periodical correspondence.				

		4	3	2	1
(7)	Rural radio programmes specially for trained farmers.				
(8)	Discussing the problems of cultivation of high yielding varieties of paddy at the farm itself with the trainees.				

F. Socio-Economic Status

<u>Items</u>	<u>Scores</u>	<u>Items</u>	<u>Scores</u>
1. Land		6. Farm	
No land	0	No draught animal	0
Upto 1 acre	1	Power	
Upto 5 acres	2	1-2 draught animal	2
Upto 10 acres	3	3-4 draught animal	4
Upto 15 acres	4	5-6 draught animal	6
Upto 20 acres	5	Prestige animal	4
Above 20 acres	6	(One or more)	
		Tractor	6
2. Education		7. Material	
Illiterate	0	Possession	
Can read only	1	Bullock cart	1
Can read and write	2	Cycle	1
Primary	3	Radio	1
Middle	4	Chairs	1
High School	5	Improved Agricultural	2
Graduate	6	Implements	
3. House		8. Family Type - Single	1
No home	0	Joint	2
Hut	1	Size - Upto 5	1
Katcha house	2	Above	2
Mixed house	3	Distinctive features	2
Pucca house	4		
Mansion	6	9. Social	
4. Occupation		participation	
Labourer	1	Membership of one	1
Caste occupation	2	organisation	
Business	3	Membership of more than	2
Independent Prof.	4	one organisation	
Cultivation	5	Office holder	3
Service	6	Dint. feature	6
5. Caste			
Scheduled caste	1		
Lower caste	2		
Artisan caste	3		
Agril. caste	4		
Prestige caste	5		
Dominant caste	6		

Appendix v

Dr. C. Prasad,
B.Sc.(Ag.), M.S., (Minn.), Ph.D.(Wisc.)USA,
Professor of Agricultural Extension,

INDIAN AGRICULTURAL RESEARCH INSTITUTE,
NEW DELHI-12

Dear Sir,

This is to invite your kind attention to a research project entitled, "Training Needs of Farmers in Relation to High-yielding varieties of Paddy" undertaken by Mr. N.K. Roy, a Ph.D. student of this Division.

A questionnaire on the said topic has been prepared to collect certain information regarding the training need of farmers and the farmers' training programme. The procedures and other details for filling the questionnaire are given on the overleaf. Since you are imparting training to the farmers of your locality, your valued and expert opinion on the topic will be of immense help to me.

It will be very kind of you if you fill up the enclosed questionnaire and send it to the undersigned by post for which a self addressed stamped envelope is enclosed.

With regards,

Yours sincerely,

Sd/-
(C. Prasad)

Instruction Sheet

Please read the following instructions before filling up the questionnaire.

We have identified 12 main areas of training in relation to high-yielding varieties of paddy. These areas are: (1) high-yielding varieties of paddy (2) seed treatment (3) nursery raising (4) transplanting (5) fertiliser (6) plant protection measures (7) chemical weed control (8) irrigation (9) improved agricultural implements (10) storage (11) credit and (12) marketing. Under each main area of training we have identified a number of sub-areas. For example under high-yielding varieties of paddy seeds there are 7 sub-areas.

1. Training Needs of Farmers in the Main Areas

There are five response categories against each main area of training. These are: Most Needed, Needed, Somewhat Needed, Less Needed and Not Needed. Please indicate the degree of training you think farmers need in each main by putting a tick () mark in the appropriate response category. If you think that training in plant protection measures is 'most needed' for farmers, please put a tick () mark in response category 'most needed' against plant protection measures. Similarly indicate the degree of training you think farmers need in other main areas also by putting a tick () mark in the appropriate column.

2. Training Needs of Farmers in the Sub-areas

There are five response categories against each sub-area. These are: Most Needed, Needed, Somewhat Needed, Less Needed and Not Needed. If you think that training in sub-areas, namely, recommended high-yielding varieties of paddy is most needed for farmers, please put a tick () mark in response category 'Most Needed' against the sub-area recommended high-yielding varieties of paddy. If you think that training in storage of seeds is less needed for farmers, please put a tick () mark in the column 'less needed' against storage of seeds. Similarly indicate the degree of training you think farmers need in the other sub-areas by putting a tick () mark in the appropriate response category.

3. Relative Importance of the Sub-areas

There are five response categories against each sub-area. These are: Most Important, Important, Somewhat Important, Less Important and Not Important. If you think that the sub-area, namely, recommended dose of fertilizers is most important sub-area for farmers' training, please put a tick () mark in the response category 'most important' against recommended dose of fertilizers. Similarly please judge the relative importance of the sub-areas by putting a tick () mark in the appropriate column.

4. Relative Preferences for Various Components of Farmers' Training

We have identified seven components of farmers' training programme. These are: (1) time, (2) venue, (3) duration, (4) size of the training group, (5) months for training, (6) training methods and (7) follow-up activities. Under each component there are a number of specific items. For example, there are four specific items under venue of training. There are four response categories against each specific item. These are: Most Preferred, Preferred, Less Preferred and Not Preferred.

If you think that organisation of farmers' training programme 'before the onset of sowing season' is most preferred timing, please put a tick () mark in the response category most preferred against the specific item, namely, before the onset of sowing season. Please give your preferences for each specific item under each component by putting a tick () mark in the appropriate response category.

Questionnaires for Trainers

Name of the respondent: _____ Age _____

Academic qualification: _____

Name of the Farmers' Training Centre: _____

A. Training Needs in the Main Areas of Training

Please give your opinion about the degree of training you think farmers need in the following main areas of training in relation to high-yielding varieties of paddy. Please put a tick () mark in the appropriate column against each area of training.

Main areas of trainings	Degree of training				
	Most Needed	4	Some- what Needed	Less Needed	Not Needed
	5	4	3	2	1

1. High yielding varieties of paddy.
2. Seed treatment.
3. Nursery raising.
4. Transplanting.
5. Fertilisers.
6. Irrigation.
7. Plant Protection measures.
8. Chemical weed Control.
9. Improved Agricultural Implements.
10. Storage.
11. Credit.
12. Marketing.

B. Relative Importance of the Sub-areas of Training

Please indicate the importance of the following sub-areas of training in relation to farmers' training programmes.

Most Impor- tant	Impor- tant	Some- what Impor- tant	Less Impor- tant	Not Impor- tant
5	4	3	2	1

1. High-yielding varieties of Paddy:

- (1) Recommended high yielding varieties of paddy for the area.
- (2) Characteristics of high-yielding varieties of paddy.
- (3) Advantages and limitations of high yielding varieties of paddy.
- (4) Maintenance of purity of high yielding varieties of paddy seeds.
- (5) Cost-benefit ratio of high-yielding varieties of paddy.
- (6) Sources of availability and price of seeds.
- (7) Storage of seeds

2. Seed treatment:

- (1) Selection of healthy and bold seed.
- (2) Method of seed treatment.

5	4	3	2	1
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- (5) Names and dose of pesticides.

3. Nursery raising:

- (1) Selection of field for nursery raising.
- (2) Seed bed preparation.
- (5) Seed rate for transplanting one acre of main crop.
- (4) Method of sowing.
- (5) Depth of sowing.
- (6) Time of nursery sowing for kharif and summer paddy.
- (7) Doses of manures and fertilizers.
- (8) Method of fertilizer application.
- (9) No and frequency of irrigation.
- (10) Plant protection measures.

4. Transplanting:

- (1) Preparation of the field for transplanting.
- (2) Age of seedlings.
- (3) No. of seedlings per hill.
- (4) Row to row and plant to plant distance.

	5	4	3	2	1
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(5) Time of transplanting for kharif and summer crops.

(6) Techniques of growing direct seeded rice.

5. Fertilizers:

(1) Importance of balanced fertilization.

(2) Recommended dose of nitrogenous, phosphatic and potassic fertilizers.

(3) Method of fertilizer application.

(4) Foliar application of urea.

(5) Time and interval of fertilizer application.

(6) Top dressing.

(7) Per acre cost of fertilizers.

(8) Identification of nutrient deficiency symptoms.

6. Plant protection measures:

(1) Identification of major pests of paddy.

(2) Identification of major diseases of paddy.

(3) Control measures of insect pests of paddy.

(4) Control measure of diseases of paddy.

	5	4	3	2	1
(5) Integrated pest control schedule.					
(6) Preparation of pesticide solution.					
(7) Doses of pesticides for different pests.					
(8) Appropriate time for spraying dusting.					
(9) Handling of plant protection appliances.					
(10) Precautions to be taken in preparation and use of pesticide solution.					
(11) Sources of availability and prices of pesticides.					
7. <u>Weed control in paddy:</u>					
(1) Identification of major weeds of paddy.					
(2) Control measures of weeds.					
(5) Names and doses of weedicides for different weeds.					
(4) Preparation and use of weedicide solution.					
(5) Time and interval of spraying weedicide solution.					
(6) No. of spraying.					
(7) Precautions to be taken in weedicide application.					

	5	4	3	2	1
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- (8) Sources of availability
and prices of weedicides.

8. Irrigation:

- (1) No. of irrigations for
paddy.
- (2) Time of irrigations in
season to stages of
crop growth.
- (3) Economic use of
irrigation water.
- (4) Depth of irrigation
water.

9. Improved Agricultural
Implements:

- (1) Handling of puddler.
- (2) Efficiency of puddler.
- (3) Handling of paddy hoe.
- (4) Efficiency of paddy
hoe.
- (5) Handling of thresher.
- (6) Efficiency of thresher
output.
- (7) Sources of availability
and price of improved
implements.
- (8) Minor repairing of
improved implements.

10. Storage:

- (1) Improved methods of
storage.
- (2) Different types of bins
and drums.

	5	4	3	2	1
(3) Method of constructing Pusa bins.					
(4) Control measures of stored grain pests.					
(5) Sources of availability and prices of bins.					
11. <u>Credit:</u>					
(1) Different types of credits available for agricultural purposes.					
(2) Different agencies of agricultural credit.					
(3) Nature and purposes of credit available from different credit institutions.					
(4) Rules and procedures of getting credit from different credit institutions.					
(5) Cost of credit.					
12. <u>Marketing</u>					
(1) Advantages and cost of selling produce in regulated markets.					
(2) Preparation of produce for marketing.					
(3) Knowledge of marketing processes and changes.					
(4) Government price policy for agricultural produce.					

C. Training Needs in the Sub-areas of Training

Please indicate the degree of training you think farmers need in the following sub-areas of each main area of training in relation to high-yielding varieties of paddy. Please put a tick () mark in the appropriate column against each item.

	Degree of training				
	Most		Some-	Less	Not
	Needed	Needed	what	Needed	Needed
			Needed		
	5	4	3	2	1
1. <u>High-yielding varieties of Paddy</u>					
(1) Recommended high yielding varieties of paddy for the area.					
(2) Characteristics of high-yielding varieties of paddy.					
(3) Advantages and limitations of high yielding varieties of paddy.					
(4) Maintenance of purity of high yielding varieties of paddy seeds.					
(5) Cost-benefit ratio of high-yielding varieties of paddy.					
(6) Sources of availability and price of seeds.					
(7) Storage of seeds.					
2. <u>Seed treatment</u>					
(1) Selection of healthy and bold seed.					

	5	4	3	2	1
(2) Method of seed treatment					
(3) Names and dose of pesticides.					
3. <u>Nursery raising</u>					
(1) Selection of field for nursery raising.					
(2) Seed bed preparation.					
(3) Seed rate for transplanting one acre of main crop.					
(4) Method of sowing.					
(5) Depth of sowing.					
(6) Time of nursery sowing for kharif and summer paddy.					
(7) Doses of manures and fertilizers.					
(8) Method of fertilizer application.					
(9) No. and frequency of irrigation.					
(10) Plant protection measures.					
4. <u>Transplanting</u>					
(1) Preparation of the field for transplanting.					
(2) Age of seedlings.					
(3) No. of seedlings per hill.					
(4) Row to row and plant to plant distance.					

	5	4	3	2	1
(5) Time of transplanting for kharif and summer crops.					
(6) Techniques of growing direct seeded rice.					
5. <u>Fertilizers</u>					
(1) Importance of balanced fertilization.					
(2) Recommended dose of nitrogenous, phosphatic and potassic fertilizers.					
(3) Method of fertilizer application.					
(4) Foliar application of urea.					
(5) Time and interval of fertilizer application.					
(6) Top dressing.					
(7) Per acre cost of fertilizers.					
(8) Identification of nutrient deficiency symptoms.					
6. <u>Plant protection measures</u>					
(1) Identification of major pests of paddy.					
(2) Identification of major diseases of paddy.					
(3) Control measures of insect pests of paddy.					
(4) Control measure of diseases of paddy.					

	5	4	3	2	1
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- (5) Integrated pest control schedule.
- (6) Preparation of pesticide solution.
- (7) Doses of pesticides for different pests.
- (8) Appropriate time for spraying dusting.
- (9) Handling of plant protection appliances.
- (10) Precautions to be taken in preparation and use of pesticide solution.
- (11) Sources of availability and prices of pesticides.

7. Weed control in paddy

- (1) Identification of major weeds of paddy.
- (2) Control measures of weeds.
- (3) Names and doses of weedicides for different weeds.
- (4) Preparation and use of weedicide solution.
- (5) Time and interval of spraying weedicide solution.
- (6) No. of spraying.
- (7) Precautions to be taken in weedicide application.
- (8) Sources of availability and prices of weedicides.

	5	4	3	2	1
8. <u>Irrigation</u>					
(1) No. of irrigations for paddy.					
(2) Time of irrigations in selection to stages of crop growth.					
(3) Economic use of irrigation water.					
(4) Depth of irrigation water.					
9. <u>Improved agricultural implements</u>					
(1) Handling of puddler.					
(2) Efficiency of puddler.					
(3) Handling of paddy hoe.					
(4) Efficiency of paddy hoe.					
(5) Handling of thresher.					
(6) Efficiency of thresher output.					
(7) Sources of availability and price of improved implements.					
(8) Minor repairing of improved implements.					
10. <u>Storage</u>					
(1) Improved methods of storage.					
(2) Different types of bins and drums.					
(3) Method of constructing Pusa bins.					

	5	4	3	2	1
(4)(4) Control measures of stored grain pests.					
(5) Sources of availability and prices of bins.					
11. <u>Credit</u>					
(1) Different types of credits available for agricultural purposes.					
(2) Different agencies of agricultural credit.					
(3) Nature and purposes of credit available from different credit institutions.					
(4) Rules and procedures of getting credit from different credit institutions.					
(5) Cost of credit.					
12. <u>Marketing</u>					
(1) Advantages, and cost of selling produce in regulated markets.					
(2) Preparation of produce for marketing.					
(3) Knowledge of marketing processes and changes.					
(4) Government price policy for agricultural produce.					

D. Suggestions for Improving Farmers' Training Programme
in Relation to High Yielding Varieties of Paddy.

1. Please give your preference for the following venues for organising farmers' training in relation to high-yielding varieties of paddy. Please put a tick () mark in the appropriate column against each venue of training:

<u>Venues of training</u>	<u>Most Preferred</u>	<u>Preferred</u>	<u>Less Preferred</u>	<u>Not Preferred</u>
---------------------------	-----------------------	------------------	-----------------------	----------------------

- | | | | | |
|---|--|--|--|--|
| (1) Farmers' training centre | | | | |
| (2) At the sites of national demonstration and other demonstration. | | | | |
| (3) In the villages. | | | | |
| (4) At the block head-quarters. | | | | |

2. Please give your preference for the following duration of training for farmers' training in relation to high-yielding varieties of paddy. Please put a tick (/) mark in the appropriate column against each duration of training:

<u>Venues of training</u>	<u>Most Preferred</u>	<u>Preferred</u>	<u>Less Preferred</u>	<u>Not Preferred</u>
---------------------------	-----------------------	------------------	-----------------------	----------------------

- | | | | | |
|----------------------------|--|--|--|--|
| (1) 1 day's training | | | | |
| (2) 2 day's training | | | | |
| (3) 3 day's training | | | | |
| (4) 3 to 5 day's training. | | | | |

<u>Month</u>	<u>Most Preferred</u>	<u>Preferred</u>	<u>Less Preferred</u>	<u>Not Preferred</u>
(1) January				
(2) February				
(3) March				
(4) April				
(5) May				
(6) June				
(7) July				
(8) August				
(9) September				
(10) October				
(11) November				
(12) December				

6. Please give your preference for the following training methods for being used in training in relation to high-yielding varieties of paddy. Please put a tick (/) mark in the appropriate column:

<u>Training methods</u>	<u>Most Preferred</u>	<u>Preferred</u>	<u>Less Preferred</u>	<u>Not Preferred</u>
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A. Single Methods:

- 1) Lecture
- 2) Demonstration
- 3) Field trips
- 4) Discussion
- 5) Teaching aids

<u>Training methods</u>	<u>Most Preferred</u>	<u>Preferred</u>	<u>Less Preferred</u>	<u>Not Preferred</u>
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B. Combinations of two methods:

- 1) Discussion+Field trip
- 2) Discussion+Demonstration
- 3) Lecture+Discussion
- 4) Visit+Demonstration plots+Teaching aids.

8. Please give your preference for the Follow-up activities to be followed in farmers in relation to high-yielding varieties of paddy. Please put a tick (/) mark in the appropriate column against each follow-up activity:

<u>Training methods</u>	<u>Most Preferred</u>	<u>Preferred</u>	<u>Less Preferred</u>	<u>Not Preferred</u>
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- (1) Contacting trainees at regular intervals.
- (2) Meeting and discussion with trained farmers just before sowing.
- (3) Trainers' visits to fields during and after the sowing season.
- (4) Inviting trained farmers to block office for discussion.
- (5) Supply of printed literature at regular intervals.
- (6) Maintaining a mailing list of trained farmers for periodical correspondence.
- (7) Rural radio programmes specially for trained farmers.
- (8) Discussing the problems of cultivation of h.y.v. of paddy at the farm itself with the trainees.

