COMMUNICATING WITH THE FARMERS IMPACT OF TRAINING AND VISIT SYSTEM ON AGRICULTURAL PRACTICES IN TWO DISTRICTS OF NORTH BENGAL

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DEDICATED

TO

MY PARENTS AND GRAND PARENTS

FATHER WHO WARNED ME TO BEWARE

OF THE BAD IN THE BEST OF US

MOTHER WHO TAUGHT ME TO WORK

FOR THE GOOD IN THE WORST OF US

GRAND FATHER WHO ADVISED ME

TO BELIEVE IN EVERY EXISTENCE OF HUMINITY

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ABBREVIATIONS USED

ADO	:	Agricultural Development Officer
AO	:	Agricultural Officer
BO	:	Boron
D.F.	:	Degree of Freedom
H.Y.V.	:	High Yielding Variety
Ha.	:	Hectare
IFFCO	:	Indian Farmers Fertilizer Co-operative Ltd.
K_2O	:	Potash
KPS	:	Krishi Prajukti Sahayak
KRIBHCO	:	Krishak Baharati Co-operative Ltd.
Mb	:	Molybdenum
P.A.O.	:	Principal Agricultural Officer
P_2O_5	:	Phosphoric Acid
SMS	:	Subject Matter Specialist
SSP	:	Single Super Phosphate
VAW	:	Village Agricultural Worker
VEW	:	Village Extension Worker
VLEW	:	Village Level Extension Worker
VLW	:	Village Level Worker
ZN	:	Zinc

PREFACE

The Training and Visit system of extension in agriculture has covered several million farming families in many developing countries. It was first introduced in 1967 in Turkey by Daniel Benor for cotton and wheat crops. In India this particular system of extension has been introduceathrough the World Bank during 1974 in Rajasthan and Madhya Pradesh. In mid seventies, it was initially introduced in six Districts of West Bengal. Later on the T & V System has been adopted in all other districts of this state and as principal means of agricultural extension. An analysis of several extension approaches adopted previously shows that the extension services in India failed to satisfy the need of the farming masses.

The unique approach of Training and Visit system is that it is a systematic time bound programme of training and visits of field extension workers combined with specified working schedules and close supervisions. Through this research work an attempt has been made to examine the knowledge, attitude and response of the farmers in terms of their contact with KPS and adoption of agricultural innovations. Efforts have been made to examine the credibility of this particular system of agricultural extension in transforming traditional agricultural practices in two Districts of northern parts of West Bengal.

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Asis Bandyopadhyay 12/4/2k

Asis Bandyopadhyay

CHAPTER ONE

INTRODUCTION

Development of agriculture is an integral part of overall economic development. Very few countries have attained economic development without growth in the agriculture sector. To put it in other way, the countries, which have attained significant growth in agriculture have also a better development in their overall economy. The government, the private sector, and the farmers all have a key role in bringing about agriculture development. It is firmly believed that a break-through in agricultural development in general and production in particular cannot be made unless the results of research reach the farmers in an appropriate form.

The adoption of improved farm technology depends not only on the personal characteristics of the farmers but also on the effectiveness of various extension agencies and agents involved in the transfer of technology. As a matter of fact, in the present context of India's rural economy, credit and extension work are the two important components of technological change. The central challenge to the agricultural extension service is to help farmers to adopt innovations for increasing the production of crops and live stock and thereby improving their over-all socio-economic condition. Agricultural extension service is that form of education, which goes into farmer's lobby and sets an environment conducive to strengthening of their faith in the things, which they have seen.

Agricultural development in terms of better production and income is not possible without an effective extension service supported by agricultural research relevant to the farmer's need. Therefore, for desired agricultural development there is a consistent need for proper extension work. The Training

& Visit (T &V) system is one of the many ways in which extension services are organized along effective professional lines. This system is now in operation in nineteen major states of India. T & V approach is the latest outcome of several reforms made over years on earlier agricultural extension system in India.

The overall agricultural extension system in India may be chronologically arranged into three stages as follows:

Stage-I : Pre-independence era (1866-1947)

Stage-II : Community development and extension service era (1953-1960)

Stage-III : Intensive agricultural development era (1960 to till date)

In the Pre-independence era, the department of Agriculture failed to exercise any real influence on the problems of agricultural development, except the collection of simple agricultural statistics, due to lack of extension machinery. The 'grow more food' movement initiated by colonial government during war time (1939-45) also not succeeded in attaining its objective precisely because it did not relate the need for food production with a farmer's other concerns.

In the post-independence period, particularly during 1947-1951 there was no organized effort to increase agricultural production through extension. However, as per constitutional directives (Article 48) India has been experimenting with many strategies and approaches to organize agriculture and animal husbandry on modern and scientific lines. But a concrete and comprehensive programme of rural and agricultural development was not there until the government of India launched her Community Development Programme (CDP) in 1952. Under CD Programme, the extension efforts were directed especially towards improvement of agriculture. However, after working of CDP for a few years, it was realized that the programme has failed to register any appreciable increase in agricultural production. The National Extension Service (NES) introduced in India in 1953 also failed to bring any

significant change in agricultural practices and particularly in enhancing agricultural output. In early sixties, the grave food situation in the country compelled the government to formulate a new development strategy putting greater emphasis to agricultural improvement. As a follow up, Intensive Agricultural District Programme (1960), Intensive Agricultural Area Programme (1961), High-yielding Variety Programme (1967), Multiple Cropping Programme (1970), and Integrated Rural Development Programme (1976) were introduced in succession. Currently, the National Extension Project (1985) is in operation.

Some of the above noted programmes unfortunately alienated the rural poor from the main stream of national development because the programmes were designed to accelerate agricultural production only in selected regions endowed with good natural and human resources. Higher inputs coupled with greater intensity of extension efforts resulted in faster growth in agricultural production in these areas. The efforts to augment production were helped by the availability of Mexican high yielding variety seeds of wheat. But all these production-oriented programmes led to generate a wide socio-economic gap in the rural areas due to the fact that the maximum benefits were reaped by those who had better natural resources and were well responsive to these programmes.

In the seventies, the policy emphasis shifted to the target group approach in order to overcome the shortcomings of the previous programmes. Productivity movement of this time was sought to be balanced by an egalitarian concern. A number of clientele specific programmes were launched to improve the economic condition of small farmers, marginal farmers and the landless agricultural labourers. During this time certain special programmes like Drought Prone Area Programme (DPAP), Small Farmers Development Agency (SFDA), Marginal Farmer and Agricultural Labour Agency (MFALA), Hill Area

Development Programme (HADP), Command Area Development Programme (CADP), and Tribal Development Scheme (TDS) were introduced.

The foregoing description clearly reveals that most of the earlier extension approaches and techniques evolved in improving India's agriculture and its productivity was suffering from certain shortcomings both in structural and functional terms. For instance, the National Extension Service (NES) was the main agency for extending the research findings to the field. It was found that there was information gap between scientists and farmers. As a result, in the later stages of extension approach village level workers and agricultural extension officers were employed to make a key role in transmitting messages from laboratory to the farmers' field. An analysis of several extension approaches adopted previously shows that the extension services in India are often suffered from

a) lack of staff training and incentives and channels for updating agent's knowledge,
b) inefficient organizational structures that prevent adequate supervision of field workers,
c) requirements for staff to perform tasks other than spreading information such as collecting data,
d) staff shortages, and
e) absence of organized feed back about farmer's problems from field workers to researchers.

The World Bank, the Governments of India and West Bengal all recorded similar weaknesses of the extension programme. One major organizational weakness as identified is that a village extension worker, the key-man in extension services was required to work for at least three masters: the Department of Agriculture, the Development Department and the Panchayat Samiti but the field worker failed to satisfy the need of the farming masses. In

order to overcome the aforesaid constraint in the extension system, Benor (1977) suggested a new model of extension system known as "Training and Visit" (T & V) system. This system has been introduced in projects financed by the World Bank in the state of West Bengal covering all its 352 Blocks with the prime objective of improving and expanding agricultural extension services or educational knowledge directly to the farmers faster and at relatively low cost[1].

The Training and Visit system of extension has already covered several million farming families in many developing countries. It was first introduced in 1967 in the Seyian Irrigation Project in Turkey by Daniel Benor for cotton and wheat crops. This system has also been accepted in several other countries including Bangladesh, Pakistan and Sri Lanka.

In India this particular system of extension has been introduced through the World Bank during 1974 as a component of command area development projects in Rajasthan and Madhya Pradesh. In mid seventies, it was initially introduced in six districts of West Bengal. Later on the T & V system has been adopted in all other districts of this state and as the principal means of agricultural extension. The unique approach of Training and Visit system is that it is a systematic time bound programme of training and visits of field extension workers combined with clearly specified working schedules and close supervisions. The operation of the T & V system as suggested by Daniel Benor (1977) and subsequently adopted by our State Government has been carried out on the following lines.

i. A single line of command between full-time village extension workers (VEWs) and extension head quarters.
ii. Regular in service training of the extension staff.
iii. Fixed schedule of visits by VEWs to farmer's fields.

1. For details of earlier proposal of Benor on new model of extension system known as "Training and Visit " see Benor and Baxter 1984.

iv. Improving in the working linkage between extension operations and agricultural research activities.

v. Regular monitoring and evaluation of the working programme of the state.

The administrative set up of agricultural development work in India consists of several tiers. The Department of Agriculture has its offices located throughout the state and is responsible for implementation of various agricultural programmes. The district level offices are headed by Principal Agricultural Officer / Joint Director of Agriculture. There are Subdivisonal units, and Agricultural Developmental Units at Subdivision and Block Level. In this set-up, the agricultural information flows in the direction as shown in the following diagram.

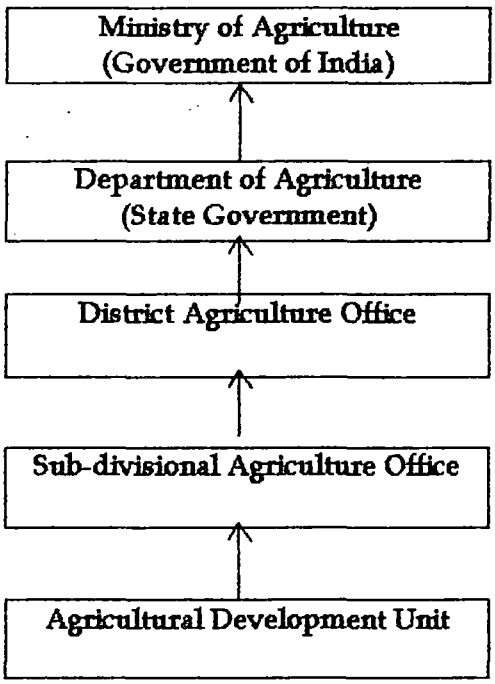
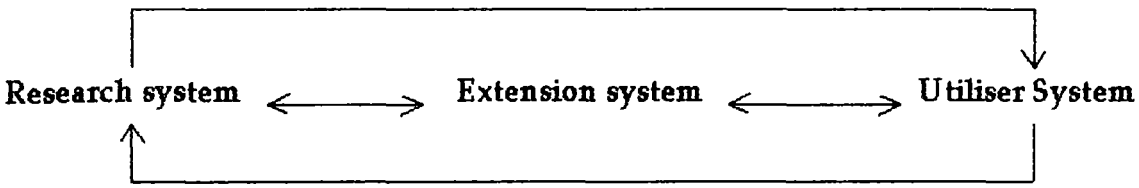


Figure 1.1: Information flow in Agriculture Sector

Under Training and Visit system of each Agricultural Development Unit the extension personnel are expected to devote their time exclusively to professional agricultural extension work. Trainings as well as visits are undertaken every fortnight according to a fixed schedule. Training provides the transfer of know-how from research scientists to village level extension workers (VEWs). The training is followed by visit of VEWs to eight sub-groups (800-1200 farm families) on a fixed day of the fortnight. Ten farmers from each sub-group are selected by VEWs as "contact farmers" representing all categories of farms on the basis of their receptivity and leadership qualities. Contact farmer is the key person of the agricultural information network who makes a bridge between village extension workers and common farmers. An effective linkage is established through subject matter specialist in sub divisional office who are expected to spend one-third of their time at the research stations and thus transmits the knowledge of research to the contact farmers through village extension workers. The present model of agricultural information flow in this system is shown in the diagram below.



The Present Study

India with 2.4 per cent of global geographical area, supports more than 16 per cent of the world's population and of whom 75 per cent depend on agriculture. It also supports nearly 15 per cent of total livestock population of the world. One third of the gross national product (GNP) comes from agricultural sector. By the turn of the century, 240 million tones of food, 17.2 million tones of vegetable oil and 64.4 million cubic meter of industrial wood shall be needed for

approximately 1,000 million people. The Indian population is expected to be stabilised at approximately 1,500 million by the middle of the next century. By that time, the food and feed requirements will be nearly doubled than that of current estimate at the end of the present century. To meet up that need, an appropriate agricultural extension system would be required compatible to the agrarian structure of the country.

The training and visit system comes as a latest model in transforming agriculture not only because of its extension efficiency but also its adaptability to a wide range of agricultural and administrative environments in developing countries. It was considered highly suitable in Indian situation. The Training and Visit System of extension focuses on the improvement of low cost basic agricultural practices (such as better seed, seed bed preparation, weeding etc.) that requires more work but little investment. So the system is an instrument that may help to change agro-ecological and socio-cultural conditions of the farmer. In this system *Krishi Prajukti Sahayak* (KPS) is the key person of the agricultural information network who makes a bridge between extension system and farmers.

Despite considerable development in technological innovations during the recent past, the common farmers have not been able to satisfactorily reap the benefit of it due to their poor knowledgeability about many of those innovations. In many areas, technology was available but it could not be effectively transferred to farmers. There were wide gap between production potential and actual field harvest in the case of most crops. For these gaps, many factors were found responsible, and among them an important one was the weak extension service. The present study attempts to understand the level of knowledge of the farmers about new agricultural technology and its adoption rate in terms of their nature of exposure to the information disseminated

through T & V system of extension in particular and other means of communication in general.

The Objectives

The principal objective of present study is to assess the effect of Training and Visit system of extension on agricultural practices in the districts of Cooch-Behar and Jalpaiguri of West Bengal State. An attempt has been made to examine the knowledge, attitude and response of the farmers in terms of their contact with KPS and adoption of agricultural innovations. The study will try to identify the socio-economic and cultural constraints of the farmers in building their contact with KPS and subsequently adopting new agricultural practices and thus ultimately impede the very aim of the Training and Visit system. More specifically, efforts have been taken to examine the credibility of the T & V system of agricultural extension in transforming traditional agricultural practices. Present findings may help to comprehend the progress and shortcomings of extension ~~and~~ services through the latest model of T & V system and advice the project management to adopt appropriate corrective measures wherever necessary for the improvement of the extension system concerned.

Research Questions

i. What kind of knowledge, attitude and perception is there among the farmers about T & V system of extension and about improved farm technology?

ii. To what extent the farmers are contacted by and are benefited from extension personnel with regard to agricultural information?

iii. What is the present state of agriculture and the condition of the farmers in two northern districts of West Bengal?

iv. What is the role of the KPS in functioning of the ongoing extension services?

v. What is the uniqueness and special utility of the T & V system of extension in diffusion of agricultural innovations?

vi. What are the major weaknesses of Training and Visit system of extension and what types of corrective measures could be taken by the project management to make the extension services more effective and useful to the farmers?

vii. What is the knowledgeability of the farmers about scientific cultivation and their particular adoption behaviour towards recommended practices of the principal crop?

viii. Whether there is any association between the status of land holding, age, income and education of farmers and the attitude towards T & V system, and level of adoption of recommended farm practices?

Some Limitations of the Study

The present study was carried out with certain limitations of time and resources. A survey of all the Blocks from two selected northern districts was not possible because the researcher had to depend entirely on his own limited personal resources and time. The researcher had to find some spare time to do the field survey outside his specific and routinized official duties in his service organization. Even then, utmost care and thought were given in making the study as objective and systematic as possible.

The study involved collection of considerable amount of data from the farmers at village level. So the official organizational personnel involved in agricultural administration were kept outside interview. It was also not possible to collect data from training centers. Despite aforesaid limitations, it is expected that the findings of this study would be of some use to the social scientist, agricultural extension workers, planners and policy makers concerned with agrarian economy and its development in India.

CHAPTER TWO

DIFFUSION OF AGRICULTURAL INNOVATION THROUGH TRAINING AND VISIT SYSTEM: SOME FINDINGS FROM EARLIER STUDIES

This chapter provides an account of findings of some earlier studies in diffusion of agricultural innovations through T & V system. At the outset it is to be noted that there are not much empirical studies on this particular topic. However on the basis of their approach of enquiry they may be broadly classified into following four types:

i. Identification of field problem and their communication,

ii. Constraints in the T & V system,

iii. Status reports of the T & V project,

iv. Extension contact and extent of knowledge and adoption.

(i) Identification of Field Problem and their Communication

The main aim of T & V system is to raise crop production through transfer of technology. Technology transfer relates to communication of crucial inputs to farmers for effective utilization of the available resources. Rogers (1960) in a study on communication behaviour of county extension agents found that three elements are involved in communication process viz, (i) Agricultural scientist, (ii) County extension agents, and (iii) Farm people. Ambastha (1977) in the context communication pattern of farm scientists in Bihar state noticed that researcher in general had comparatively higher contact with farmers and farmers visiting *Kishan Mela.*

Rajgopal (1978) observed that the farmers firstly used to discuss their problems related to agricultural technology among themselves and later approached the village extension workers and Agricultural Extension Officers

(AEO) for getting necessary advice to redress their agricultural problems. The majority of AEOs were found advising the farmers to follow the recommended practices of improved agricultural technology. The village extension workers were also found involved in educating the farmers in the matter of cultivation of crops.

According to Sridhar (1978) the farm and home visit discussion and group meeting were the most important communication links of the farmer for identification of problems of the client system and communication of the same to the extension personnel. Rao (1983) noted that the organized system of extension was designed not only to deliver the messages to the farming population but also to identify the farm level problems and feed back the same to senior extension officers and researchers.

Mathur (1985) described that a diagnostic team consisting of the research scientists and agriculture officials having considerable field experience and knowledge about the field problems, their views were found quite useful and subsequently incorporated in the subject matters discussed during the workshop. Kher and Bapna (1988) reported that with regard to research support the farmer's problems that were identified during the monthly workshops training had been communicated to the research scientist for inclusion in the further research. Mehrotra (1989) observed that research -extension linkages were promoted through training of extension staff by research staff, by their collaboration in farm trials and through visits of research staff to farmer's field and extension staff to research facilities.

(ii) Constraints in the T and V system

This section briefly reviews the problems associated with agricultural extension in general and T and V system in particular.

Dwarkinath and Channeyoda (1974) identified three deficiencies in the T and V system of extension. Firstly not all the available technologies were

transmitted in the field. It was selective and only those elements which had direct impact on application were taken care of. Secondly not all the potential adopters got exposed to the new information to the same degree. Thirdly, even among the adopters of new technology all the elements of technology were not adopted.

Jaiswal et al (1978) reported that under the new extension system (T and V) all the recommendations that were given in the training session were found not profitable and practicable in the farmers' field. Pandey (1979) stated that Village Agricultural Workers (VAWs) cited inadequate vehicular facilities, lack of required and up to date information and undefined jurisdiction of District Agricultural Officer (DAO) as major hindrances for effective implementation of the extension work through T and V system.

Dudhani (1980) in a study conducted in Karnataka found that none of linking roles formulated according to job chart of Assistant Director of Agriculture with clients were perceived in a highly satisfactory way, even when the Deputy Director of Agriculture recognized the importance of various specific linking role functions in an adequate way.

Jaiswal and Arya (1981) have identified certain no effective link between the research and extension system that are detrimental to the effectiveness of both. Referring a study conducted by National Institute of Rural Development (NIRD) in Rajasthan and Madhya Pradesh they pointed out that the lack of effective linkage between the research stations and the subject matter specialists (SMSs) is one of the greatest weaknesses of T and V system of agricultural extension. Bharali (1982) observed that input supply position was not taken into serious consideration in the discussing of most of the training sessions.

Epstein (1983) talked about a major difficulty faced by the T & V system. According to Epstein, the village level workers (VLWs) were men and so were their contact farmers as well as the whole extension structure. The female contact

farmers constituted not more than one or two per cent of all contact farmers. The male VLWs fail to convey their messages properly to the women folk engaged in farming.

Jaiswal et al (1986) reported that the basic problems faced by the village level extension worker are (i) non availability of farmers in their field, (ii) untimely supply of input, (iii) greater number of farmers under their jurisdiction and lack of transport facilities to contact them properly. Sharma (1986) has identified the following major problems faced by the T and V system in eastern states: i) technological, (ii) supply and infrastructural development, (iii) budget and finance, and (iv) administration.

According to Mehrotra (1988) the non-adoption of some farm practices was, to some extent, due to certain gap in the ideal condition under which demonstration were carried out by the functionaries of the programme and the actual conditions under which the farmers do their operations. The extension programme had other shortcomings like irregular visit by VLWs to farmers. Mehrotra (1989) further said that there was mutual lack of appreciation on each others role on the part of departmental and the university personnel resulting in waste of resources, lack of cooperation and orientation to a common goal. It had also been pointed out that research is still oriented to solve only basic research problems and the extension agency is not coming forth continuously with the feedback to research.

Joshi et al (1991) found that even after five years of operation of T and V system in an area, 10 per cent of the contact farmers and 35 per cent of fellow farmers were not even make out their VLWs. Hardly 37 per cent of the contact farmers were found contacted regularly by VLWs. The diffusion of technology thus took place at a slow space and dissemination of information among fellow farmers was poor.

Rao's study (1991) indicates that in Orissa the VLWs evaluate the existing T and V system as more effective than previous extension services. However, the major constraints of present T and V system were lack of residential accommodation to the extension personnel, and limited mobility due to improper support system.

Neog and Bezbora (1993) have suggested that for desirable implementation of the T and V system in Assam, there is (a) need to gear up quantity and quality of extension contacts, and (b) input supply system has to be undertaken into serious consideration so that unavailability of input does not remain as major problem of technology adoption in the state.

iii) Status Reports of the Training and Visit Project

In India, re-organised agricultural extension network i.e. Training and Visit system was introduced during 1974 as a component of three command area development projects in Rajasthan and Madhya Pradesh. In mid 1975, it was introduced in six districts of West-Bengal. Since then the system has been in operation in almost all major states in India. This section briefly reviews how the re-organised T & V extension system is functioning in the major states from the findings of selected evaluation studies.

From a study of the attitude of the farmers towards T and V system in the command area of Rajasthan, Kulhari (1980) pointed out that the attitude scores of the 'contact farmers' were higher than that of the 'non-contact farmers'.

Benor and Baxter (1984) observed that in India where the Training and Visit system has been well established it continues to bring about significant changes in agricultural practices and production, be it the introduction of new crops (Soya bean in Madhya Pradesh, summer pulse in Orissa) or the adoption of new practices. Where previously wheat was scarcely known, paddy was cultivated haphazardly or large areas were entirely left as fallow fields, are now well tended and highly productive. Farmers were proud of their achievements

and were continuously asking the extension services for more assistants. Extension workers who previously had poor morale were regarded by many farmers as useless, were now proud of their work and were respected by the farmers they assisted. In many of areas a more general prosperity was evident as farmers used their high income to construct better houses and to purchase a variety of goods and services. To understand the potential of Training and visit system of extension one has to visit areas where it operates, see the fields and talk with the farmers and extension personnel.

A survey report from Gujrat, (Kharif, 1988 - 89) indicates that majority of contact and non-contact farmers knew their VEWs. However the exact day of VEW's visit among aforesaid categories of farmers was not satisfactory. So it was suggested to pay proper attention to this aspect by extension management.

Mishra's (1990) study does not lend support to the low performance image of village level extension workers. On the contrary, it reveals that the majority of village extension workers were performing their role well. The study further shows that the performance of VEWs could be further enhanced if they are allowed to concentrate mainly on work relating to T and V system of extension.

Thakkar and others (1990) observed that about two thirds of the farmers had favourable attitude towards the Training and Visit programme. And the attitude of the contact farmers towards the training and visit programme was dependent on size of the land holding, social participation, socio-economic status and extension contact. Chaudhury and others (1991) study reveals that contact farmers with better media exposure had highest information utilization. The utilization of information was considerably affected by economic motivation of the farmers. It was further suggested that the contact farmers who ulitised information substantially should always be kept in touch by the T and V

personnel. They can also be involved in transfer of technology as key communicator.

A report on impact of T and V project in the state of Andhra Pradesh and Maharastra (1991) shows positive influence of T and V system with regard to introduction of new varieties of crops, changes in cropping pattern compatible to agro-economic conditions and systematizing of research - extension linkages. Impact of T and V projects was quite effective in Rajasthan, and Karnataka (1991) where extension is well established. Here the presence and role of the VEWs were much appreciated by most of the farmers. Through T and V system notable advance had been made in seed planning which was previously one of the major agricultural constraints in the State. The overall impact of extension was encouraging.

Bhople and others (1992) are in opinion that the training of extension workers is an inbuilt mechanism in Training and Visit system. So through regular training the professional competency of the extension workers should be enhanced. An overwhelming majority of the Agricultural Officers (AOs) who attended the training felt that communication through audio-visual aids and other trainings had definitely enhanced their knowledge, improved their skill and made them more confident about the use of various audio-visual aids in extension programme.

Jain (1992) reported about the effect of Training and Visit system of extension in the five districts of Madhya Pradesh. The project was launched mainly to establish better contacts of agricultural scientists with extension field workers and farmers to provide them with latest technology for agricultural development. Jain's study reveals that there was a definite increase in the yield level of wheat and gram showing the positive impact of T and V programme. Here about 76 per cent of sampled farmers reported about the usefulness of T and V system. Reviewing the situation he further recommended that the T and V

programme should be concentrated in a specific area instead of the scattered approach, which resulted in the dilution of efforts and low performance.

Kopper and Shah (1992) observed that VLWs and AEOs were required to transfer technology through extension in various fronts for the overall agricultural development. They could be treated as general extension agents for agriculture. Survey method and performance appraisal were recommended by them to assess the training needs of VLWs and AEOs, SMSs at subdivisional level.

Report of Interdisciplinary Team on T and V extension services and Agriculture Development Project in Tamil Nadu (1992) indicates that the T and V extension services were operating in the state with full tempo. The staff strength under T and V extension was full, monthly workshops of scientist and extension personnel were being regularly held and field visits were also taking place. Frequency and fortnightly training of VEWs and AEOs had however been made monthly which does not appear to have had any adverse impact on the extension services. The extension services in the state had remarkably well in promoting adoption of improved agricultural practices.

Rao and Reddy (1993) have pointed out that with the introduction of Training and Visit system of agricultural extension in Andhra Pradesh, the coordination and linkages between the state department and the university has changed significantly from mere coordination committees and meetings to several functional linkages and which has been developed right from the state to the operational level.

Singh and Sandhu (1993) stated that impact of the T and V system could be measured in terms of changes in human behaviour, improvement in the quality of living of the people or increase in productivity, etc. However, in the referred study, it had been measured in terms of increase in the use of fertilizer for crop production.

Dwarakinath's (1997) study shows that the T and V system has emerged out of an improvement of the extension approaches practised before the green revolution. The T and V system, which is serving the larger segment of small farmers, constitutes a part of social service and a public funded general extension system. This particular extension service may help farmers move slowly from one level of efficiency to another by achieving incremental improvements in technology adoption and managerial practices.

(iv) Extension Contact and Extent of Knowledge and Adoption

Training and Visit system aims at providing overall guidance including development of knowledge of farmers and extension contact of field level functionaries with farmers in respect of the improved technology. Knowledge, skills and extension contact are the crucial attributes that lead the farmers to adoption. The level of adoption of farmers is supposed to reflect the recommendation transferred through the re-organised agricultural extension network i.e. Training and Visit system. It has been observed that the new farm techniques have been adopted by the progressive farmers to a great extent but the common farmers could not do so because of the limited resources at their command, which stood in the way for perfect adoption. In some earlier studies attempts had been made to find out the practices that are not adopted by the farmers and the underlying reasons of such non- adoption.

Hussain (1982) and Mahanta (1989) talked about low adoption of recommended practices in the case of rice cultivation. Hussain found only 20.90 per cent of farmers who had adopted recommendations partially and that was too limited to three practices such as nursery bed preparation, chemical fertilizer use, and transplantation of high yielding variety. The study carried by Mahanta (1989) on tribal farmer indicates that 26.88 per cent of the farmers had adopted recommendations on seed selection, followed by nursery bed preparation (22.50

per cent), plant protection measures (21.90 per cent), and transplantation of H.Y.V. seedlings (9.40 per cent).

The studies by Borpujari (1987), Boruah (1989), Gogoi (1989), Phookan (1990), and Bora (1990) reveal the adoption levels of improved farm practices as medium or low to medium. Borpujari (1987) for example reported about medium to high level of adoption in the techniques of weed control, harvesting, threshing, and storage practices of wheat crop. While in respect of seed selection and fertilizer application he observed low level of adoption.

Bora's (1990) study reveals low to middle level of adoption in the matter of five selected recommended practices of rice cultivation. He has observed medium level of adoption relating to selection of H.Y.V., preliminary agronomic practices and fertilizer application, and low level of adoption in case of pesticide application and post-harvest technology. The extent of knowledge regarding the practices was found to be similar to that of extent of adoption. Highly significant association was there between extent of adoption and extent of knowledge.

Phookan (1990) reported that out of 100 non-contact farmers 82 farmers adopted H.Y.V. and 56 farmers adopted gap-filling practices. Non-contact farmers were not adopting root dip treatment, fertilizer application, disease control, and weed control measures. More than 70 per cent of the farmers did not adopt seed treatment, pest control measures, nursery bed, husbandry practices and intercultural operations. He however recorded a slightly better score of adoption of recommended practices among the contact farmers. The overall adoption rate of both the groups of farmers was found to be at medium level. He also identified significant difference between knowledge level of contact and non-contact farmers.

Hussain (1982) and Mahanta (1989) found low level of extension contact of the farmers they studied. Gogoi (1989), Phookan (1990), Bora (1990) have identified medium level of extension contact. Phookans' study was on quality of

VLEW's visits in which he determined that VLEW was known to 100 per cent contact farmers followed by 71 per cent non-contact farmers. He also depicted that none of the contact and non-contact farmers was paid 100 per cent visits by VLEWs. In one fortnight VLEWs paid four visits to 22 per cent farmers, three visits to 26 per cent and two visits to 46 per cent farmers.

From above review some of the salient issues, which have been emerged, need further and careful examination. From some studies it appears that re-organized agricultural extension system was designed to provide information about farm problems and feed back the same to extension officers and researchers. However, in some cases there were lack of effective linkage between the research station and extension. In most of the cases, research-extension linkages were promoted through training of extension functionaries and extension workers were provided with up-to-date information on latest technology. With the introduction of T and V system of agricultural extension farmers were delivered selected and updated technology. All the potential adopters including small and marginal farmers thus got exposed to the new information. The extension services have been able to motivate the farmers in favour of improved farming though all the recommended practices were not adopted. Before the initiation of the T & V system, the common farmers were using only nitrogenous fertilizer but now they are somewhat aware about the balance use of fertilizer. The re-organized extension system gives more emphasis on the spread of low cost technology and to meet the need based requirement of the farmers. However the programme is not free from certain shortcomings, of which the most vivid one is the irregular visits by VLWs to farmers. Inadequate mobility of extension worker often leads to poor extension contact between functionaries and farmers.

CHAPTER THREE

AREA AND METHOD ADOPTED

The area under study

The Northern part of West Bengal is an area which covers the districts of Jalpaiguri, Cooch-Behar, Malda, Uttar Dinajpur, Dakhin Dinajpur and Darjeeling. This particular area of the state is popularly known as North Bengal. The present study was conducted in the districts of Jalpaiguri and Cooch-Behar. Geographically, North Bengal is bordered by Bhutan and the state of Sikim in the North, by the state of Assam in the East, by Nepal in the West and by Bangladesh and the state of Bihar in the South.

The productivity situation

In West Bengal improved extension services i.e. T and V system of extension was introduced in 1974 and in North Bengal it was in 1977. Prior to introduction of different extension programmes in North Bengal, agriculture was just a means of passing livelihood and the common farmers did not even knew the proper use of chemical fertilizer, plant protection materials, farm implements, and improved seed. The traditional farmer used to cultivate local variety of paddy during *Kharif* season (Information on Agriculture, P.A.O. Jalpaiguri,1985).

Like India and other parts of West Bengal, agricultural in North Bengal is also faced with several odds and serious challenges: Those are the spirally demand for food, declining cultivated area due to population pressure, declining agricultural productivity due to natural resource degradation, and improper information network. The overall rate of growth of agricultural production in North Bengal has changed time to time. Variations in food grain production justify the need for greater concern and responsibility on the part of agricultural extension.

The state of agriculture in the districts of West Bengal has been elaborately discussed particularly with reference to production of some major crops. A district-wise picture on yield level of rice in the year 1950-53 and 1977-80, and rate of growth in their yield over the three decades (1950-80) is given in the following Tables.

Table 3.1: Classification of Districts by 1950-53 Yield Level of Rice and Rate of Growth of Rice over Three Decades

Yield Level (1950-53) Kg/Ha	Yield Growth Rate (1950-1980)				
	2%	1-2%	0-1%	Negative	Total
>1300					0
1100-1300	Bardhaman	Birbhum	Bankura	Drajeeling	4
900-1100		Hoogli	Midnapur Howrah Jalpaiguri		4
<900	Nadia Murshidabad	Malda 24-Parganas	Cooch-Behar W.Dinajpur		6
	3	4	6	1	14

Table 3.2: Classification of Districts by 1977-80 Yield Level of Rice and Rate of Growth of Rice over Three Decades

Yield Level (1977-80) Kg/Ha	Yield Growth Rate (1950-1980)				
	2%	1-2%	0-1%	Negative	Total
>1300	Bardhaman Nadia Murshidabad	Birbhum Hooghly 24-Parganas	Bankura		7
1100-1300		Malda	Midnapur Howrah		3
900-1100			W.Dinajpur Jalpaiguri	Darjeeling	3
<900			Cooch-Behar		1
	3	4	6	1	14

Source: Agricultural growth and potential in West Bengal by Sudhin K.Mukhopadhyay, 1982

Tables 3.1 and 3.2 depict that while no district had the yield level of 1300 kg. per Ha.(in fact, the highest figure was 1213 kg. in Darjeeling) at the beginning of the fifties, as many as seven districts crossed the mark at the end of the seventies. The highest figure was 1996kg. in Bardhaman and the state average yield rose from 965 kg. to 1328 kg. The conclusion seems to emerge that during the thirty years under review, district wise disparity in rice yield has tended to diminish with average yield moving upward. A factor of some importance contributing to the emergence of the high yield in rice was the introduction of H.Y.V.s and remarkable ability of farmers to adopt new varieties of crops. Improved information network helped the farmers of both North Bengal and South-Bengal to increase the yield of rice crop.

As compared to rice, the situation in the case of wheat was somewhat encouraging. The adoption of H.Y.V. wheat cultivation caught the imagination of farmers because of its relative advantage in production and its economic return. During the period 1950 - 1980, the total output of wheat in the state has gone upto 39.73 thousand tones and it's area has increased from 48.73 thousand hectares to 530.77 thousand hectares. The yield of wheat registered an increase from 815 Kg. to 1854 Kg. per hectare. At the district level, Murshidabad, Birbhum, Cooch-Behar, Nadia, and West-Dinajpur together accounted for about 52% of the total increase in state wheat production. In case of North Bengal, the yield of wheat both in the Jalpaiguri and Cooch-behar districts during 1960-61 was more than 700 kg. per hectare. However, during 1979-80 the yield rose more than 1700 kg. per Ha. in both these districts (Mukhopadhyay,1982).

Let us consider the case of potato and for which the area under cultivation was only 58,600 ha in 1960-61. The same has increased to 115,000 ha in 1976-77 and further to 161,400 ha in 1978-79. The production of potato in the state has also gone up from 579,100 tones to 1,657,200 tones respectively. In the seventies the highest potato growing districts in this state by their proportion of share to

total potato production were Nadia (35.25%), Malda (25.34%), Jalpaiguri (25.00%), Cooch-Behar (22.98%). It is interesting to note that the North Bengal districts were fast becoming potato growing districts (Ibid).

It has been observed that during 1950-80 West Bengal exhibited its remarkable ability to adopt new techniques in cultivation of above stated major crops. The increase of cultivated area and higher productivity of crops recorded the shift from traditional to modern cultivation. During the period from mid 80's to mid 90's there was a sharp increase in crop productivity in the Jalpaiguri and Cooch-Behar districts. It is well evident from Table 3.1 and Table 3.2 that two northern districts namely Jalpaiguri and Cooch-Behar are not lagging behind in food-grain production, and their contribution to state crop production is quite significant.

Table 3.3 gives a comparative picture of yield of major crops between two different periods in two districts of North Bengal under study. Table 3.3 indicates substantial increase within a decade in the average yield of all the major crops in the two northern districts under study. There has been a significant increase in the average yield of crops like Jute H.Y.V., Aus H.Y.V., Potato, and Mustard within a period of about ten years. The increase in productivity may be due to farmers well receptivity and high adoptability of new agricultural technology and availability of improved extension services.

The Districts Under Study

Jalpaiguri district

The district of Jalpaiguri extends over an area of 6245 Sq.km. in the shape of an irregular rectangle. A greater part of this district is covered by forest and tea plantations. The district is bounded by Darjeeling and Bhutan in the North, Cooch-Behar district and Bangladesh in the South, Assam in the East, and Darjeeling and Bangladesh in the West. The main rivers of the district are the Teesta, the Jaldhaka, the Torsha, the Raidak, the Kaljani, the Sankose.

Table 3.3 : Comparison Of Yield Of Major Crops in Study Districts in Two Different Periods

Name of the Crop	1984-85 (a) (Average yield tones/Ha)	1995-96 (b) (Average yield tones/Ha)
Jute H.Y.V.	1.26	1.60
Aus H.Y.V.	2.10	3.98
Aus local	1.15	1.47
Aman H.Y.V.	2.40	2.41
Aman local	1.51	1.74
Wheat	1.49	1.57
Potato	8.21	22.47
Mustard	0.77	0.95

Note: Yield denotes collective yield

Source:

(a) Choudhury et.al, 1986

(b) Survey by the researcher during 1995-96

The soils of the districts is mainly sandy loam type having poor water retaining capacity and low fertility status. The soils are deficient in micro-nutrients such as Bo, Zn, Mo, etc. The soils are also medium to high acidic in nature. The average annual rainfall is more than 3000 m.m. 90% of which is received between April to September. Annual maximum temperature is 30.9°c and minimum temperature is 10.8°c. The ground water and surface water resources are fairly high in the district.

The population of the district is 27,92.724 (1991 census) of which scheduled castes and tribes constitute more than fifty eight per cent . The overall literacy rate is 37.30 per cent. The number of Blocks is 13 and under their jurisdiction there are in total 754 villages.

Table 3.4: Salient Agricultural Characteristics of the Jalpaiguri District

Land use pattern

Area under Tea:	1,18,707 Ha
Area under Forest:	1,48,656 Ha
Area under cultivation:	2,28,339 Ha
Area under pasture and orchard:	13,188 Ha
Cultivated Waste land:	2,000 Ha
Double cropped area:	1,90,750 Ha
Cropping intensity per cent:	200

Agrarian structure

No. of Small farmers:	41,848
No. of Marginal farmers:	94,036
No. of Agril. labourers:	1,14,519
No. of Cultivators:	2,34,226

Institutional Facilities

No. of Block seed Farm:	7
No. of Adaptive Research Farm:	2
No. of State Farm:	1
District Seed Farm:	1
No. of central plantation crop Research Station:	1
No. of Cold storage:	1
No. of Fertilizer & Pesticide sale point:	550
No. of Agricultural Sub-division:	2
No. of Block Agricultural office:	13
No. of Gram Panchayat office:	125

Area Under Major Crops And Its Productivity

Crop	Area (in Ha)	Productivity
Aman paddy	200887	1748.00 kg/Ha
Aus paddy	67810	1422.00 kg/Ha
Boro paddy	1860	3128.00 kg/Ha
Wheat	27540	2025.00 kg/Ha
Potato	17780	27.00 M.T./Ha
Oilseeds	15280	650.00 kg/Ha
Pulses	5987	620.00 kg/Ha
Jute	38500	8.50 Bales/Ha
Total vegetables	29220	15.00 M.T./Ha

Source: Informations on Agriculture, 1995 published by P.A.O., Jalpaiguri.

Cooch Behar district

By size it is a smaller district than the Jalpaiguri. Its total geographical area is 3387 Sq. km. The topography of the district is near to plain with gentle sloping towards south-east. Being the district near to foot hills, the rivers generally attain strong current and sudden overflow of the banks destroying crops and houses causes lot of problems in land's productivity as well as hydrology. The main rivers of the district are: the Teesta, the Jaldhaka, the Kaljoni, the Raidak, and the Gadadhar.

The soil of the district is alluvial. It is mainly sandy loam and loam type. Soil depth ranges from .15 meter to 1.00 meter and is super-imposed on deep bed of sand. The irrigation so for developed is around 20 per cent of the cultivated area. But due to pre-monsoon showers from February onwards, the cropping

intensity has been extended up to 209 per cent with the cropping sequences of Aus paddy followed by *Aman* paddy and Jute.

Agriculturally, a special feature of the district is the dominance of Jute and Tobacco. The good performing plantation crops are Arecanut and coconut as well as Black -pepper as spice. Vegetable production has attained a peak rise. The district is characterised by abundant rains. The average rainfall is 3201-30 mm.

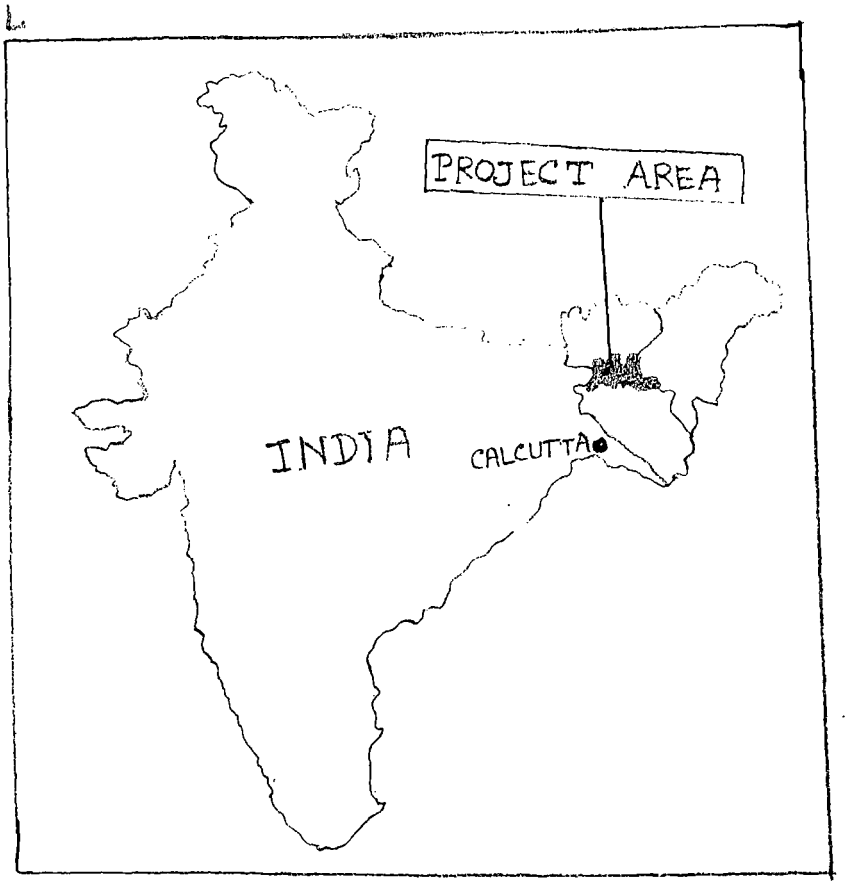
The total population of the district is 21,58,169 (1991 census) of which scheduled castes and scheduled tribes constitute near to fifty per cent. The literacy rate is 37 per cent. The number of administrative Blocks is 12. There are 1269 villages in this district. The district is relatively more populated than the Jalpaiguri district.

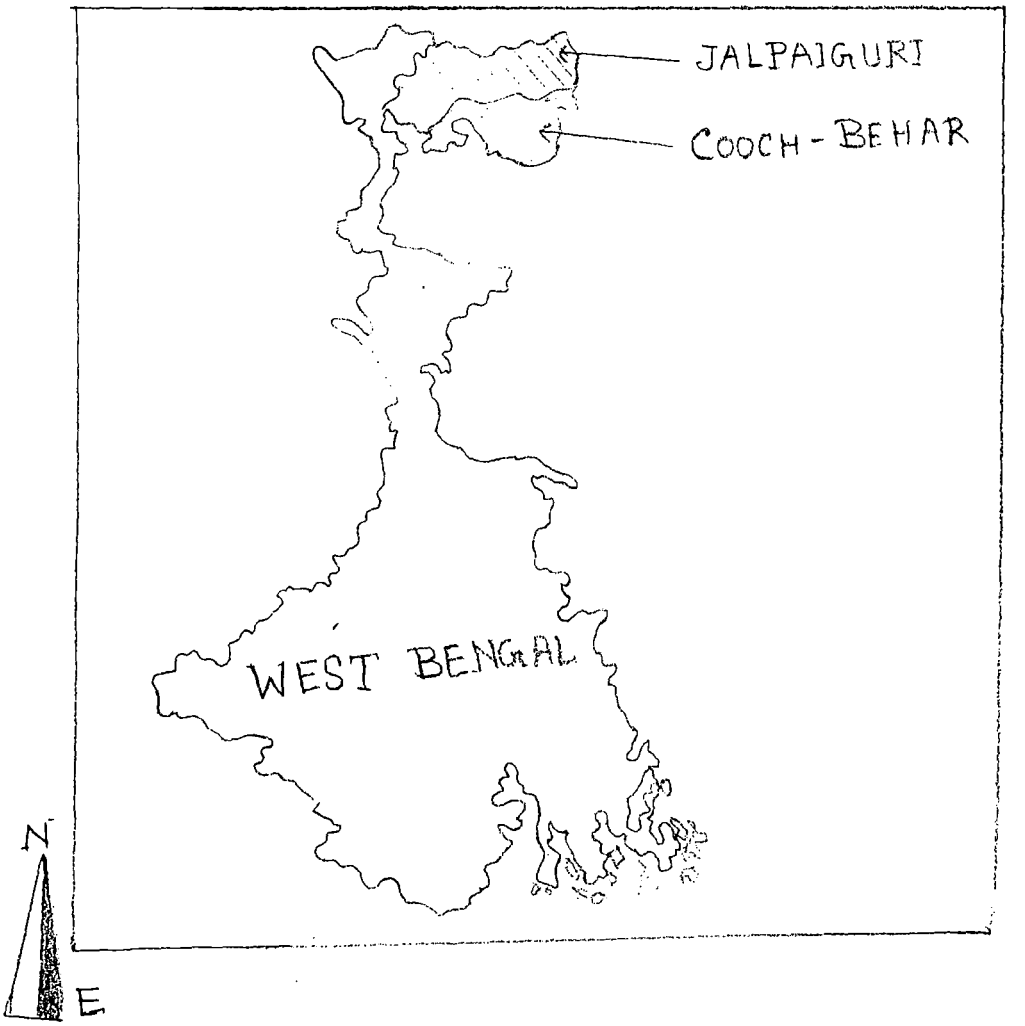
Table 3.5 : Salient Agricultural Characteristics Of the Cooch-Behar District

Land Use Pattern	
Area Under Forests:	5,268 Ha
Area Under Pastures and Other grazing land:	181 Ha
Area Under orchard, plantation and miscellaneous:	10,340 Ha
Net area available for cultivation:	230,391 Ha.
Area sown more than Once:	228,793 Ha
Agrarian Structure	
No. of small farmers:	86,388
No. of Marginal farmers:	1,97,910
No. of Agril. labourer:	1,38,015
Institutional Facilities	
No. of Block seed Farm :	4
No. of Adaptive Research Farm :	4
No. of District Seed Farm :	1
No. of Cold Storage :	2

[MAP-1]

MAP SHOWING THE LOCATION OF TWO STUDY DISTRICTS IN THE STATE OF WEST BENGAL





[MAP - 2]

MAP SHOWING THE LOCATION OF FOUR STUDY BLOCKS IN TWO DISTRICTS OF NORTH BENGAL

No. of Fertilizer and Pesticide Sale Point :	718
No. of Agricultural Subdivision :	4
No. of Block Agricultural Office :	11
No. of Gram-Panchayat Office :	128
No. of Agricultural University :	1

Area Under Major Crops and Productivity

Crop	Area (in Ha)	Productivity
Aman paddy	157529	2835.28 kg/Ha
Aus paddy	114370	1420.11 kg/Ha
Boro paddy	10465	3749.90 kg/Ha
Wheat	44400	2000.00 kg/Ha
Potato	16785	12.00 M.T./Ha
Oilseeds	24857	760.00 kg/Ha
Rabi Pulses	11487	620.00 kg/Ha
Jute	35086	9.00 Bales/Ha
Winter vegetables	24548	19.20 M.T./Ha

Source: Agricultural Situation in Cooch-Behar 1995-96 Published by P.A.O. Cooch-Behar.

Selection of villages

The selection of villages from different administrative tiers of the Jalpaiguri and Cooch-Behar district is shown in Chart-1.

Infra-structural facilities available in the selected villages of the two districts are shown in Table 3.6.

Table 3.6: Extent of Infra-structural Facilities Available in the selected Villages by District (Distribution of Facilities in Percentage)

Facilities	Villages in the Jalpaiguri District (N = 14)	Villages in the Cooch-Behar District (N = 11)
Primary school	100.00	100.00
High school	42.85	36.36
Panchayat office	28.57	27.27
Cooperative society	21.42	36.36
Health Centre	28.57	27.27
Electricity	42.85	54.54
Bank	14.28	18.18
Deep Tube Well	35.71	18.18
River Lift-Irrigation	7.14	27.27
Kachha Road (Within the village)	85.71	81.81

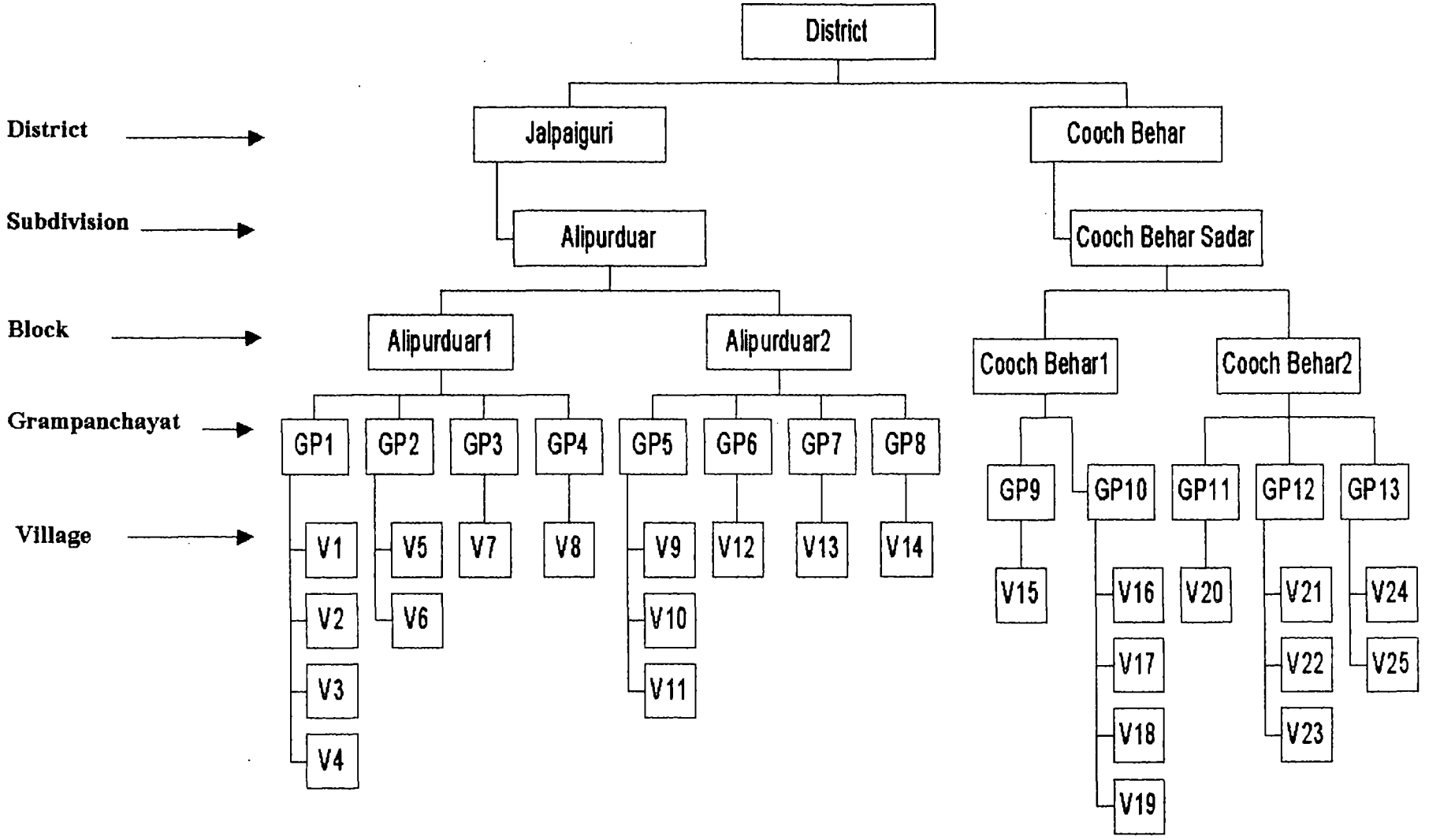
N = No. of Villages surveyed.

The above Table reveals that the institutional agencies for extending credits and inputs in agriculture development are not appreciably available in the villages under study. The prevailing road condition and irrigation facilities in the villages are not all that good. The availability of artificial irrigation for agriculture is somewhat lower than the state average. The other development inputs like high school education, electricity, and health services are available at the doorstep but are quite meagre in terms of actual requirement.

Methodology

The present study was designed to assess the impact of Training and Visit system of extension on agricultural practices in two districts of northern Bengal. For this purpose, a three-stage sampling was done. It involved selection of Blocks

Chart 1: Location of selected villages in Different Administrative Tiers of Chosen Districts



GP1: Patlakhawa GP2: Pararpar GP3: Majherdabri GP4: Banchukumari GP5: Tatpara GP6: Mahakalguri GP7: Bhatibari
GP8: Parokata GP9: Daoguri GP10: Panisala GP11: Khagrabari GP12: Gopalpur GP13 : Ambari
V1: Paschim-simlabari V2 : Purba-simlabari V3 : Patlakhawa V4 : Silbarihat V5 : Pararpar V6 : Pakuritala V7:Purba Bholardabri
V8 : Gaghra V9 : Taleswarguri V10 : Uttar Majidkhana V11 : Jashodanga V12 : Paschim Chepani V13 : Kumarijan V14 : Paschim Chikliguri
V15 : Daoguri V16 : Natuarpar V17 : Dhaluabari V18 : Purba Panisala V19 : Ghoramara V20 : Dodaerhat V21 : Kharija Kakribari
V22 : Sonari Kakribari V23 : Gopalpur V24 : Dholaguri V25 : Bhatlaguri

particularly from the districts, selection of villages from the sample Blocks, and finally farmers (the ultimate respondents) from sampled villages.

Selection of sample

The study was conducted in northern Bengal because of the familiarity of the investigator with the area and its agricultural situation. The fieldwork was carried out in the villages of Sadar-Subdivision of the Cooch-Behar district and Alipurduar Subdivision of the Jalpaiguri district. From the said two Subdivisions, four Blocks namely Alipurduar I, Alipurduar II, Cooch-Behar I, Cooch-Behar II were selected purposively.

Regarding the selection of villages, the probability proportionate to size (PPS) sampling criterion was followed. In the case of selection of villages from each Block by PPS procedure, the total number of farmers in each village and the distance of the villages from subdivisional head quarters were taken into consideration. On the basis of which 14 villages were selected from Alipurduar subdivision of the Jalpaiguri district and 11 villages from Sadar subdivision of the Cooch-Behar district. The average condition of sample villages in terms of their infra-structural facilities could be well understood from Table 3.6.

Finally, in each selected village, a list of farmers i.e., the Ultimate Sampling Unit (U.S.U.) was prepared and from which twenty farmers were picked up as respondents by simple random sampling method. In many villages agricultural extension workers were not known to their clients and the farmers were not even knew that some of them belong to the category of contact farmers in official terms. So it was decided not to classify farmers into contact and non contact categories. For present study, in total five hundred farmers were interviewed, of which 279 were from the Jalpaiguri district and 221 from the Cooch-Behar district.

Collection of data

In present study, the following methods in combination and/or independently were adopted for obtaining data.

(a) The data from the farmers were collected through personal contact and interview with the help of interview schedule. A draft interview schedule was initially administered to some respondents and according to their nature of response necessary changes were made in the schedule. After said pretesting, the final schedule was prepared for the survey. It was a structured interview schedule and used to elicit basic information on socio-economic background of the respondents, their agricultural knowledge, adoption of modern agricultural practices, yield of various crops, attitude towards K.P.S., T & V system, and other methods related to agriculture.

(b) Relevant secondary data were collected from official records and reports available at districts, blocks, and panchayat levels. Agricultural year 1995-96 has been considered as the reference period of the present study.

The quantitative findings have been presented in tabular forms. For data analysis conventional statistical methods were used. General statistical test like chi-square was applied in selected cases for testing and identifying the association of different factors with the adoption pattern of new agricultural technology. However, in certain cases where application of chi-square test was not possible due to its large sample concept, it was proposed to compute correlation coefficient and subsequently to conduct test for that parameter with the null hypothesis H_o: ($\rho = 0$).

CHAPTER FOUR

SOCIAL PROFILE OF THE RESPONDENTS

This chapter gives a brief account of socio-economic background of the respondents in this study. The characteristics which were taken into consideration are respondent's

- Age
- Religion
- Sex
- Marital status
- Caste
- Education
- Household composition
- Occupation
- Income
- Social participation
- Material possession and
- Mass media exposure etc.

The findings are given below:

Age

Out of the total respondents in the villages 54.40 per cent were in the age group of 30-45 years followed by the age group above 45 years (35 per cent) only. About 11 per cent of respondents were found belonging in the age below 30 years. The percentage distribution of respondents by age groups and district has been presented in Table 4.1. It can be seen from the Table 4.1 that in Cooch Behar district 55.66 per cent of the respondents were of middle aged farmers whereas 31.67 per cent were in above 45 years and only 12.66 per cent were young in age

(i.e. below 30 yrs). In the Jalpaiguri district the proportion of respondents in the age group between 30 and 45 years was 53.40 per cent and for the age group above 45 years, it was 37.63 per cent. Therefore, as far as and for the age is concerned the majority of the respondents in the surveyed villages were of middle-aged farmers.

Sex

Out of total 500 respondents under study 499 were males and only one was female. The lone female respondent was from Cooch-Behar district. Therefore, 99.80 per cent of the respondents in present study were males. It was so because female-headed households were rare in the surveyed villages.

Marital Status

About 96 per cent of the respondents were married and only 4.20 per cent were found bachelor. The proportion of married and unmarried respondents in two districts was almost similar.

Religion

About 83 per cent of respondents were Hindus. The percentages of Muslim and Christian respondents were 15.80 and 1.60 respectively. So, majority of the respondents under present study were Hindus by religion.

Caste

It will be seen from Table 4.1 that about 41 per cent of the respondents were belonging to the category of scheduled castes (SC) and 45.80 per cent to the category of Other Backward Classes (OBC). Scheduled tribes and other (non SC) castes constituted a small proportion by covering only 3.40 per cent and 9.80 per cent of the total population respectively. So, by social status the majority of the respondents in the villages were of lower castes.

In the Jalpaiguri district, scheduled caste respondents constituted 41.93 per cent of the total respondents. The corresponding proportion was 39.81 per cent in the case of district of Cooch-Behar. The proportion of scheduled tribe

respondents in the Jalpaiguri district was 6.09 per cent. In contrast, in the Cooch-Behar district there was no scheduled tribe among the selected respondents. The proportion of OBC respondents in the districts of Jalpaiguri and Cooch-Behar was 43.36 per cent and 48.86 per cent respectively. The Percentage of non SC/General castes in the districts of Cooch-Behar and Jalpaiguri was 11.31 and 8.60 respectively.

Out of 205 scheduled caste respondents 68.78 per cent were Rajbansis, 26.34 per cent were Namasudras and 4.87 per cent were the other scheduled castes. Among the total scheduled caste respondents in the district, the proportion of Rajbansis in the districts of Cooch-Behar and Jalpaiguri was 63.63 per cent and 72.64 per cent respectively. The proportion of the Namasudra respondents in the districts of Cooch-Behar and Jalpaiguri were almost similar (28.40 per cent and 24.78 per cent respectively). Out of 10 farmers from 'Other' scheduled caste category 7.95 per cent and 2.56 per cent were from the Jalpaiguri and Cooch-Behar districts respectively. Thus the two districts had almost equal proportion of S.C. population among the respondents and where numerically the Rajbansi represented as dominant community. The proportion of the Rajbansi respondents in both the districts was much higher than that of the Namasudras and 'Other' scheduled castes.

Education

Among the respondents only 19.60 per cent of them were found illiterate. The proportion of illiterate respondents was 11.31 per cent in the Cooch-Behar and 26.16 per cent in the Jalpaiguri district. Thus compared to the Cooch-Behar district the percentage of illiterate respondents was relatively high in the Jalpaiguri district. It can be seen from Table 4.1 that among the literate respondents, majority of them (49.80 per cent) were educated up to secondary (class V to class X) level followed by the literates having education only up to primary level (22.20 per cent). The proportion of literate respondents with

education above secondary standard (i.e. College or University education) was 8.40 per cent. By district their proportion in the Cooch-Behar and the Jalpaiguri was 6.78 per cent and 9.67 per cent respectively. So there were marginally much better educated respondents in the Jalpaiguri district than in the Cooch-Behar district. However, in respect of secondary education the status of respondents in the Cooch-Behar district was slightly better (54.75 per cent) than the Jalpaiguri district (45.87 per cent). Moreover the overall literacy status of the farmers of Cooch-Behar district was somewhat better than that of the Jalpaiguri district. But so far as the higher levels of education is concerned the respondents of the Jalpaiguri district recorded a better position that the respondents of the Cooch-Behar district.

Length of stay in the village

Respondents were asked how long or since when they are residing in the village under study. They are categorised into three following groups on the basis of their length of stay in the village: (a) 1-25 years, (b) 26-50 years, (c) more than 50 years. Table 4.2 depicts that majority (77.60%) of the respondents was immigrants but by their length of stay they were somewhat early settlers of the villages and residing over here for 26-50 years.

Household Size

Table 4.3 shows that majority (65.20 per cent) of the respondents were living in medium sized households. For Cooch-behar and Jalpaiguri district the percentage of medium sized households was 66.06 and 64.51 respectively. About 20 per cent respondents had small sized households. In both the districts, proportion of small sized households was almost similar. When only 15 per cent of the respondents were found living in large sized households, their proportion in the Cooch-Behar and Jalpaiguri district was also almost equal.

Table 4.1: Selected Social and Economic Characters of the Respondents by Districts (Distribution in Percentage)

Characteristics	Districts		Total
	Cooch-Behar	Jalpaiguri	
Age			
Below 30 years	12.66	08.96	10.60
Upto 30-45 years	55.66	53.40	54.40
More than 45 years	31.67	37.63	35.00
Caste			
Scheduled Caste	39.81	41.93	41.00
Scheduled Tribe	00.00	06.09	03.40
General Caste(non-SC)	11.31	08.60	09.80
Other Backward classes	48.86	43.36	45.80
Education			
Illiterate	11.31	26.16	19.60
Primary	27.14	18.27	22.20
Secondary	54.75	45.87	49.80
Above Secondary	06.78	09.67	08.40
Occupation			
Cultivation			
Principal	96.38	97.84	97.20
Subsidiary	07.69	02.15	04.60
Service			
Principal	02.71	02.15	02.40
Subsidiary	02.26	02.15	02.20
Business			
Principal	00.90	00.00	00.40
Subsidiary	18.55	17.56	18.00
Agricultural Labour			
Principal	00.00	00.00	00.00
Subsidiary	07.69	07.16	07.40
No subsidiary occupation	63.80	70.96	67.80
Annual Income			
Upto Rs. 15,000	45.24	56.98	51.80
Rs. 15,000-40,000	43.89	33.33	38.00
Above Rs. 40,000	10.85	09.67	10.20

Table 4.2: Distribution of the Respondents by their Length of stay in the village (In Percentage)

Length of Stay	District		Total
	Cooch-Behar	Jalpaiguri	
1-25 years	14.93	12.90	13.80
26-50 years	79.63	75.98	77.60
Above 50 years	05.42	11.11	08.60

Table 4.3: Percentage Distribution of the Respondents by their Household Size

Household Size	District		Total
	Cooch-Behar	Jalpaiguri	
Small (Below 5)	19.00	20.47	19.80
Medium (5-8)	66.06	64.51	65.20
Large (Above 8)	14.93	15.05	15.00

Occupation

Table 4.1 shows the occupational background of the respondents by district. Agriculture was the principal occupation of about 97 per cent of the respondents. However, to 4.60 per cent of the respondents cultivation was their subsidiary occupation. The proportion of respondents principally engaged in service, and trade and business was 2.40 per cent and 0.40 per cent respectively. By district, the percentage of respondents principally engaged in cultivation in the Jalpaiguri district was slightly more than that of Cooch-Behar district. The proportion of respondents to whom cultivation was a subsidiary occupation was 2.15 per cent in the Jalpaiguri and 7.69 per cent in the Cooch-Behar district. Cultivation was not principal occupation to artisan and trading castes. It was

their subsidiary source of income. On the other hand, even for the farmers who were partly 'self-cultivators' and leased out a part of their land for share cropping, cultivation was their principal occupation and main source of income. Such types of farmers were found in the Cooch-Behar district only. About one per cent of the respondents were principally engaged in business and for another 18.55 per cent trade and petty business was their subsidiary occupation. Little more than 7 per cent of the respondents augmented their income by working as agricultural labourers. It was their subsidiary source of income. Another noteworthy fact is that among the respondents 67.80 per cent had no subsidiary occupation. The proportion of respondents without any subsidiary occupation was 70.96 per cent in the Jalpaiguri and 63.80 per cent in the Cooch-Behar districts.

Table 4.4: Distribution of Households by their Average Participation of Members in Agricultural & Non-agricultural Activities. (Distribution in Percentage)

Nature of Economic Activities	Number of Household Members Engaged	District		Total
		Cooch-Behar	Jalpaiguri	
In Agricultural Activities	1	55.20	46.95	50.60
	2-3	39.36	48.02	44.20
	More than 3	05.42	05.01	05.20
In Non-Agricultural Activities	Not at all engaged in off-farm employment	56.56	71.68	65.00
	Engaged in off-farm employment (one or more)	43.43	28.31	35.00

Extent of participation of household members in economic activities

The agriculturally dependent households were categorised according to the number of their household members engaged in actual field operations/ works as their principal activities. The overall participation of household members in essential agricultural works was dismally low. Table 4.4 shows that in the case of 50 per cent of the households only one member was directly engaged in essential agricultural operations. In this regard certain interesting differences had been noticed at district level. In the Cooch-Behar district for 55 per cent of the households there were only one member involved in agricultural activities. The corresponding proportion in the Jalpaiguri district was 46.95 per cent.

Members of about 65 per cent of the households were not at all associated with off-farm activities. Among the agriculturally dependent households, 35 per cent of them had members who were also engaged in some kind of non-agricultural pursuits. In the Cooch-Behar district, in 43.43 per cent of the respondents' households their members were engaged in non-agricultural activities. The corresponding proportion was 28.31 per cent in the case of the Jalpaiguri district.

Income

Income is the most important indicator to judge the economic status of a farmer. Adoption of agricultural practices has obvious bearing on income and economic status. Lionberger (1960) suggested that economic status and adoption behaviour of farmers have a two-way relationship. Table 4.1 shows that majority (51.80 per cent) of the respondents had the annual income below Rs. 15.000. A sizeable section of them (38 per cent) however fall in the income bracket of Rs.15,000 to 40,000; and only 10.20 per cent had annual income above Rs. 40,000. Another important feature of income situation is that 47.60 per cent of respondent farmers had annual income between Rs.6401 and Rs15,000 and

another 3.80 per cent between Rs. 4801 and Rs. 6400. The respondents belonging below subsistence level (in terms of annual income) were found only in the Jalpaiguri district . On the whole, a majority of the farmers were in the lower income group (below Rs. 15,000) and a small section in the higher one i.e. with an annual income of Rs. 40,000 and above . The economically better-off and wealthy farmers are generally supposed courageous enough to take the risk of new technology and building effective contact with diverse institution involved in agricultural development.

Social participation

The social participation of a farmer is often measured in terms of his membership, holding of office and attendance in meetings of formal and informal organizations in the village. Dasgupta (1963) in his study of West Bengal villages found, farmers participated in a wide variety of formal organization like cooperative society, village panchayat, Block development committee, agricultural marketing society etc. The informal organization with which the farmers associated were namely *Jatra, Kirtan, Harisabha* committee etc.

Social participation in organizational and cultural activities is expected to have an indirect influence on the adoption behaviour of farmers. Based on the data collected from West Bengal villages, Bose (1961) concluded that social participation had a positive impact on the adoption behaviour of farmers. Table 4.5 depicts the social participation of the farmers to development institutions and their status in several formal organizations.

Table 4.5 depicts that the farmers of the Jalpaiguri and the Cooch-Behar districts had been participating only in two types of development institutions namely (a) Agricultural Development Cooperative Society (i.e. KUSS: *Krishi Unnayan Samabaya Samiti*) and (b) Panchayat. Out of total (500) farmers surveyed in two districts only 18.20 per cent of them were in official capacity involved in the activities of K.U.S.S.. The proportion of such farmers was 22.62 per cent in the

Cooch-Behar and 14.69 per cent in the Jalpaiguri districts. It is a matter of surprise that nearly 92 per cent of the total respondents not at all enrolled themselves as members of K.U.S.S. On the other hand among the members of K.U.S.S. only about 8 per cent of them were office-bearers.

Table 4.5 : Distribution of Respondents by their Social Participation to Development Institutions (Distribution in Percentage)

Development Institution		District		Total
		Cooch Behar	Jalpaiguri	
Krishi Unnayan Samabay Samiti	Number of respondents participated	50	41	91
	Percentage of respondents out of total respondents in the district	22.62	14.69	18.20
	Percentage of office-bearers out of participant respondents	06.00	09.79	07.96
	Percentage of members out of participant respondents	94.00	90.24	92.30
Gram Panchayat	Number of respondents participated	5	9	14
	Percentage of respondents out of total respondents in the district	02.26	03.22	02.80
	Percentage of office-bearers out of participant respondents	20.00	11.11	14.29
	Percentage of members out of participant respondents	80.00	88.88	85.71

Table 4.5 also shows that about 3 per cent of respondent farmers had participation in the development activities of the panchayat, and about 14 per cent of them were office-bearers. Thus it has been observed that nearly 86 per cent of the respondents were not at all involved in the activities of panchayat.

The wide gap between the number of respondents and the actual number of participants in the organizational activities is perhaps due to the fact the farmers are not yet educated and conscious enough regarding the need and importance of their participation in those development institutions.

Material condition and household asset

The type of house where the respondents live and their possession of household durables like furniture, electricity, radio, bicycle etc. help to judge their socio-economic status and standard of living. Possession of more such asset items is normally believed as an indicator of better socio-economic status.

A few studies have examined the relationship between the material level of living of farmers and their adoption behaviour. Reddy and Kivlin (1968) in their study measured the level of living of farmers with the help of scale based on the possession of such material items such as torch, bicycle, time-piece as well as a house, land and so forth. The level of living scores were found to be positively related to the adoption behaviour of farmers.

From Table 4.6 it appears that the most useable household assets for the respondents were bicycle and chair. More them 75 per cent respondents had the said durables. The farmers frequently use bicycle as the principal mode of local transportation.

A significant proportion respondents (30 per cent) were owning durables like radio and clock. Those are now a days found as essential household items in the life of the villagers. It has been further observed in the Table 4.6 that less than 15 per cent of the respondents had the assets like scooter, tape-recorder, television, stove and almirah costly goods like scooter, tape-recorder and television were mostly possessed by the economically better-off farmers.

House type of the respondents

Majority (91 per cent) of the respondents were found living in *kachha* huts followed by 7.40 per cent premises which were of mixed type. Only 1.60 per cent farmers had *pacca* houses. Majority of the farmers used to stay in the house of having three to five rooms, and only 8.20 per cent were fortunate enough to have the facility of more than five rooms. Nine per cent of the respondents had considerable shortage of space as they live in small huts with only one or two rooms.

Table 4.6: Distribution of Households by Possession of Modern Household Durables

Durables	Number of Households Possessed	Percentage
Stove	018	03.60
Bi-cycle	387	77.40
Scooter/Motorcycle	010	02.00
Radio	149	29.80
Television	042	08.40
Tape recorder	013	02.60
Clock	190	38.00
Almirah	069	13.80
Chair	385	77.00

Electricity

Domestic electric facility was being enjoyed only by 10 per cent of the respondents and they were mostly economically well-off farmers.

Source of drinking water

Shallow Tube Well (STW) has been found as the principal source of drinking water for the village people. About 98 per cent households were depended on public STW ~~publicly~~ for drinking water where as only 1.60 per cent still used dug wells for the same purpose.

Latrine Use

Majority (57.80 per cent) of the households had privy and only 5.40 per cent were with the facility of sanitary latrine. A sizeable proportion of households (36.80 per cent) had neither privy nor sanitary latrine of their own. This obviously reflects a kind of poor consciousness about health and sanitation among the respondents under study.

CHAPTER FIVE

LAND HOLDING PATTERN AND THE STATE OF AGRICULTURE

Many things may be regarded as resources when it comes to agricultural development-people, land, animals, machinery, or even education. Farm size has constantly been shown to be related positively and highly to adoption behaviour. Because of the importance of this factor we initially enquired about the landholding pattern and landownership system of the respondents. Then we have gone for general discussion on their state of agriculture.

Table 5.1 reveals that by landownership status majority (84.80 per cent) of the respondents were small and marginal farmers. The proportion of medium and big landowners was relatively less (15.20 per cent). By size -class little less than half of the respondents had 'marginal' land holdings (48.20 per cent) and about one third (36.60 per cent) had 'small' sized land. The proportion of respondents with 'medium' and 'large' sized land holdings was 12.80 per cent and 2.40 per cent respectively. Thus it is seen that in the two districts under study, the cultivating community was mainly belonging to the categories of small and marginal landowners. It is therefore apparent that the land area available for cultivation is going to be limited.

The aforesaid situation reminds us that with an expanding agricultural population, the farm holdings are increasing in number, while shrinking in size. Small and marginal farmers are now growing relentlessly. As there is an emergence of larger segment of small and marginal farmers they would be generally 'resources poor'. They would remain to be information receivers rather than 'information seekers' and would be largely incapable of higher investment in farming. Most of the studies which have examined the relationship between

Table 5.1: Distribution of Respondents by Landownership Status

Nature of land ownership	Distribution in percentage
A. Land ownership status	
Marginal farmer (Less than 1 Ha)	48.20
Small farmer (1-2 Ha)	36.60
Medium farmer (Greater than 2 Ha but less than 4 ha)	12.80
Large farmer (Greater than equal to 4 Ha)	02.40
B. Irrigated Area	
Upto 1 ha	76.34
1 to 2 Ha	20.33
Above 2 Ha	03.31
C. Source of Irrigation	
Shallow Tube well	70.53
Deep Tube well	04.97
River Lift Irrigation	07.88
Pond and others	16.59
D. Land Quality	
i) Fertile land	
Less than 1 Ha	66.80
1 to 2 Ha	27.60
More than 2 Ha	05.60
ii) Ordinary land	
Less than 1 Ha	91.20
1 to 2 Ha	06.60
More than 2 Ha	02.20
E. Type of cultivator	
Supervisory	04.20
Self cultivator	94.80
Share cropper	01.00
Lessor	00.00

the two variables founds that the size of holding owned or operated by a farmer was positively related to his adoption behaviour.

Kitchen garden

Only 35.40 per cent of the total respondents had kitchen garden. The average annual income from the kitchen garden was Rs.1627. Like agricultural land there was also a variation in the area and size of kitchen garden. Majority (70 per cent) of the kitchen garden owners had kitchen garden area upto 1 Bigha, 24.29 per cent had 1 to 2 Bighas and only 5.64 per cent above 2 Bighas.

Irrigated area and sources of irrigation

Irrigation is an important per-requisite of the adoption of new technology. Most of the earlier studies have examined the relationship between the availability of irrigation and adoption of new agricultural technology, and which was found positively related. In present study, 51.80 per cent of the respondents had agricultural land without any irrigation facility. Having no source of assured artificial water supply they had to depend on vagaries of nature. Only 48.20 per cent farmers were fortunate enough to enjoying irrigation facilities. Table 5.1 shows that among those fortunate farmers majority (76.34 per cent) of them had irrigated land up to 1 hectare and they were mostly small and marginal farmers. Only about 20 per cent farmers had irrigated land within the range of one to two hectares. About 24 per cent of the medium and large farmers had irrigation facilities in their land. On the whole, a better proportion of cultivated area owned by the marginal and small farmers was under irrigation.

Table 5.1 reveals that there are several sources of irrigation in the study village, namely Shallow Tube Well (STW), Deep Tube Well (DTW), River Lift Irrigation (RLI), pond etc. STW was found as the main source of irrigation. Majority (70.53 per cent) of the respondents used STW for irrigating their lands

followed by ponds (16.59 per cent). River Lift Irrigation facility was available only to 7.88 per cent of the farmers and for another 4.97 per cent Deep Tube Well which was their principal source of irrigation.

Quality of land

The quality of land has and important bearing upon cropping pattern and agricultural production. Fertility of land depends on the type of soil. In general, loam, sandy loam and clay loam are considered good for crops and suitable for rice cultivation because of its nutrient base and water retaining capacity. Soil with high percentage of sand is considered as 'ordinary land' and on an average it provides poor yield.

Table 5.1 depicts that 66.80 per cent and 91.20 per cent farmers had fertile and ordinary land respectively, with a mean size of less than one hectare. Similarly, 27.60 per cent and 6.60 per cent farmers had fertile and ordinary land respectively with the size between one to two hectares. Fertile and ordinary lands with the size above two hectares are owned only by 5.60 per cent and 2.20 per cent farmers respectively.

Tenurial status

Distribution of landowners by their tenurial status is shown in Table 5.1. Majority (94.80 per cent) of the landowners were self-cultivators who used to operate their land with their family labour taking the help of hired labourers in needs. The supervisory cultivators do not participate directly in agricultural field operations. They cultivate their land by deploying hired labourers. About four per cent respondents were 'supervisory cultivators'. On the other hand, only one per cent of the respondents were sharecroppers. Among the respondents there was no non-cultivating landowner or lessor.

Table 5.2 : Cultivation of Major Crops by Type of Input used, Yield and Income

Season	Crop	Average Cultivated Area in hectare	Type of Input (In Percentage)				Yield (ton/ Ha)	Average Net Income in Rs.
			0	1	2	3		
Pre *Kharif*	Jute H.Y.V.	0.32	03.14	31.01	26.29	39.55	01.60	2744.10
	Jute Local	0.25	25.00	45.00	20.00	10.00	01.30	1600.00
	Aus paddy H.Y.V	0.54	04.30	08.60	05.37	81.72	03.98	4779.56
	Aus paddy Local	0.35	34.89	32.88	15.43	16.77	01.47	1077.44
Kharif	Aman H.Y.V.	0.82	66.34	11.29	10.33	12.01	02.41	5199.25
	Aman Local	0.70	83.04	06.22	07.61	03.11	01.74	2877.26
Rabi	Wheat	0.20	01.33	19.64	04.90	74.10	01.57	0836.83
	Potato	0.34	00.00	09.95	00.00	90.05	22.47	5574.70
	Mustard	0.24	05.45	70.90	00.00	23.63	00.95	0741.81
	Vegetable and others	0.22	07.58	27.58	03.44	61.37	Not found	3470.68

Type of input used :
0 = applied no fertilizer
1 = only farm manure (FM)
2 = Farm manure with nitrogenous source of fertilizer
3 = Balanced dose of fertilizer i.e. FM and NPK (Nitrogenous Phosphatic Potassic)

Crop husbandry and agricultural implements

In this section an attempt has been made to see the pattern of use of agricultural land by the types of crops grown in three agricultural seasons. The data showing the types of crop cultivated, their yield, nature of input used, mean cropped area and average net income from the cultivation of specific crop are presented in Table 5.2. Owing to humid environment and availability of irrigation a greater proportion of land was under cultivation.

During per-*kharif* season, the major crops cultivated by the farmers of the two districts were Jute and Aus paddy. A typical system of cultivation of delayed Boro paddy which is locally called as 'China Boro' was the major crop in Rabi-summer season. Like southern Bengal, agriculture in North Bengal is also primarily based on cultivation of paddy and that too is *rainfed kharif.* Gradual replacement of local varieties by H.Y.V. has enhanced the productivity of Aman paddy. Among the other crops grown in *Kharif*-season in a limited scale, mention may be made to pulses and vegetables.

As far as the Rabi season is concerned, wheat, potato, mustard were the major crops. Along with the artificial irrigation, the vegetable cultivation in the upland areas has increased to a considerable extent. Tobacco is an important cash crop of this region and which has been included under 'other crops' in the Table 5.2.

Cultivation of pre-*kharif* crops

Jute is an important crop of this season. This fiber crop thrives well in moist heat. Out of total 500 respondents, 89 per cent and four per cent of them cultivated H.Y.V and local varieties of jute respectively. Average cultivated area under H.Y.V. and local jute was 0.32 Ha and 0.25 Ha respectively. It is to be noted that jute is pre-dominantly a marginal and small farmers choice crop. However the jute growers were in dire need of good market price. The average

net income from the cultivation of just was only Rs. 2744.10 for H.Y.V and Rs. 1600 for local variety. Input plays a commendable role for getting good yield of crops. It has been observed that only 39.55 per cent and 10 per cent H.Y.V and local variety of jute growers respectively used balanced dose of fertilizer i.e. farm manure and Nitrogenous-Phosphatic-Potassic (NPK) fertilizer. On the other hand about three per cent of H.Y.V. and 25 per cent of local variety jute growers did not apply any fertilizer at all. Thus from the point of view of fertilizer application in jute cultivation, the farmers were not very serious and well concerned.

With the advent of irrigation, the farmers of the two districts under study have started cultivating H.Y.V Aus paddy. Aus paddy of local variety is cultivated both under rainfed and irrigated condition. It has been observed that 18.60 per cent and 29.80 per cent of the farmers cultivated H.Y.V Aus paddy and Aus paddy of local variety respectively. The average yield of H.Y.V and local variety of Aus paddy was respectively 3.98 tones and 1.47 tones per hectare. The farmers were found quite aware about recommended practices of Aus paddy cultivation. Majority (81.72 per cent) of the growers of H.Y.V Aus paddy and 16.77 per cent growers of local Aus paddy applied balanced doses of fertilizer. The net average income from the cultivation of H.Y.V Aus paddy was also high i.e. Rs. 4779.56. On the other hand, yield of local Aus paddy was low and the average net return from the cultivation of the crop was somewhat poor i.e. Rs. 1077.44. Possibly, in order to reap the high return from H.Y.V Aus paddy the majority of its growers showed interest to apply balance dose of fertilizer in this cultivation.

Cultivation in *Kharif* season

Like other parts of the state, North Bengal's agriculture is also pre-dominated by rice culture and that too is rainfed *Kharif* paddy. Therefore any

attempt to uplift agricultural production needs to be directed to *kharif* paddy. Continuous replacement of old indigenous varieties by suitable H.Y.V could be the only adoptable technology for rainfed cultivation as other management oriented efforts may face limitation due to rain dependent situation of *Kharif* paddy.

Like *pre-kharif* season, in the *Kharif* season also a sizeable portion of land was under cultivation of H.Y.V. Aman paddy. The average cultivated area of H.Y.V. Aman paddy was 0.82 Ha and it was marginally higher than the local variety (0.70 Ha). In the agricultural session under survey about 83 per cent of the respondents grew H.Y.V and 57.80 per cent grew local variety of *Aman paddy*. Thus due to their better out turn potentiality, the H.Y.V paddy has replaced the local or indigenous variety to a considerable extent. The average yield of H.Y.V paddy was 2.41 tones per Ha. In contrast, it was 1.74 tones per Ha in the case of local varieties. Here one may note that India's productivity in Aman paddy was 1.75 tones/Ha in the year of 1995-96. Thus as compared to the national average, the situation of North-Bengal was fairly good. The average net return from the cultivation of H.Y.V and local paddy was Rs. 5199 and Rs. 2877 respectively. As far as the fertilizer application is concerned, 66.34 per cent of the farmers who cultivated H.Y.V paddy did not use any fertilizer. For local paddy growers the corresponding proportion was 83.04 per cent. There was poor application of fertilizer to Aman paddy because most of the land under *kharif* paddy suffered from water logging due to prolonged monsoon in this season. Basically the economy of the two districts under study was agriculture based and in which rice occupies the prime importance.

Among the other crops which are cultivated in *kharif* season in a limited scale, mention may be made to pulses and vegetables. On the whole the farmers of these two districts are still rely mainly on the cultivation of Aman paddy as their principal *kharif* crop.

Cultivation of Rabi crops

In Rabi season the average cultivated area under wheat was the lowest i.e. 0.20 Ha. only (see Table 5.2). Average yield of wheat was 1.57 tones / Ha and the average net return was only Rs. 836.83. It is seen that only 44.80 per cent of the farmers were involved in growing wheat. One underlying reason behind limited cultivation of wheat is that it can only grow properly under assured irrigation and appropriate application of certain inputs. It is well evident from Table 5.2 that among the farmers who cultivated wheat, 74.10 per cent of them however applied balanced fertilizer. It is important to note that despite various encouragements from the Department of Agriculture, the wheat cultivation in the state has decreased from 10 lakh hectares in 1990-91 to around 3 lakh hectares in 1994-95. Here one cannot simply ignore the question of monetary return from cultivation of certain cash crops in Rabi season and which ultimately influences the choice of crops in Rabi season. It has been observed that as compared to typical Rabi-summer paddy i.e. Aus H.Y.V, return from wheat was far below. The farmers even without taking into serious consideration the availability factor of assured irrigation supply during active growth period preferred to cultivate Rabi-summer paddy i.e. delayed Boro paddy.

Cultivation of certain cash crop particularly potato is much more capital intensive than other crops. Only 44.20 per cent farmers grew potato with an average highest net return of Rs. 5574.70. Majority of the potato growers followed scientific cultivation techniques. More than 90 per cent of them used balanced fertilizer. All the farmers applied fertilizer in cultivation of potato. The yield of potato was high (22.47 tones / Ha). However, a section of marginal and small farmers were less inclined to cultivate potato. To them, apart from irrigation, the unavailability of complementary inputs including credit was the major constraint in potato cultivation.

An important oilseed crop of Rabi season is mustard. It is grown in ordinary land and with minimum input. The out turn (productivity) of mustard was low i.e. 0.95 tone / Ha and the net average return was equally low i.e. Rs. 741.81. Among the respondents only 11 per cent grew mustard, of whom only 23.63 per cent applied balanced dose of fertilizer. Majority (70.90 per cent) of the mustard seed growers applied only nitrogenous source of fertilizer.

In terms of vegetable production West Bengal holds the highest position among the states in India. Sometimes it exceeds the state requirements as almost all types of vegetables are grown throughout the year. In some period of season, the supply exceeds the demand, leaving the farmers in a bewildering situation, as there is no appreciable return due to sudden fall of market price. In the two districts under study, irrigation facility has enhanced the area under vegetable cultivation. Over the years the farmers have increased their area under vegetable cultivation in a significant way. The mean cultivated area under 'vegetable and other crops' was 0.22 Ha and average net return from vegetable cultivation was quite high i.e. Rs. 3470.68. Majority (61.37 per cent) of the farmers applied balance dose of fertilizer in vegetable cultivation and only a few farmers (7.58 per cent) used no fertilizer. That indicates the farmers growing vegetables were well conscious for getting a good yield by application of recommended doses of fertilizer.

Ownership of agricultural tools

Farmers of the surveyed districts in general were lagging behind in the ownership and use of modern agricultural tools. Leaving aside the question of ownership of tractor or power tiller, majority of the farmers even had no plant protection sprayer machine and much needed pumpset for irrigation. The percentage distribution of farmers possessing agricultural tools has been shown in Table 5.3. The Table however presents a rather bleak picture indicating poor

Table 5.3: Distribution of Cattle and Agricultural Equipment

Equipment	Distribution in percentage
A. Bullock	
Upto 1 pair	73.80
Above 1 pair but upto 2 pair	14.40
Above 2 pairs	01.60
None	10.20
B. Milch Cattle	
Upto 1 pair	53.20
Above 1 pair but upto 2 pair	12.80
Above 2 pairs	04.00
None	30.00
C. Sprayer	
Only 1	36.80
More than 1	01.20
None	62.00
D. Thresher	
Only 1	00.60
More than 1	00.00
None	99.40
E. Pumpset	
Only 1	17.20
More than 1	00.20
None	82.00
F. Power tiller	
Only 1	01.60
More than 1	00.20
None	98.20
G. Tractor	
Only 1	00.20
None	99.80

ownership of a few modern agricultural implements like pumpset, sprayer, thresher, tractor, and power-tiller. Among the respondents, only 38 per cent had personal spray machine and 17.40 per cent pumpsets for irrigation. The possession of power-tiller, tractor and thresher was dismally low.

Bullock and other draught animals were the major animal power of agricultural sector. Farmers of the surveyed districts had to depend on it heavily for farming activity. Although the mechanisation in agriculture is in full swing, the role of bullock and other draught animals like oxen, calves etc; will continue to contribute a major share of power in farming business. For majority of farmers, bullock will remain the sole source of power without which it is very difficult to cultivate the land. Table 5.3 depicts that about 90 per cent of farmers had bullocks. Majority (73.80 per cent) of the farmers were having one pair of bullock and 16 per cent had more than that. Interestingly milch cattle were used in the North-Bengal villages both for milk and draught purposes. About 70 per cent farmers had milch cattle. Among cattle owners 53.20 per cent had one pair of cattle and 16.80 per cent owned more. It is thus observed that even in this age of new agricultural technology and mechanisation draught animals still serve as the main source of farm power for majority of the farmers. In this respect only an insignificant proportion (about one per cent) of farmers has gone for mechanisation.

CHAPTER SIX

EXPOSURE TO AGRICULTURAL INFORMATION: THE UTILITY OF TRAINING AND VISIT SYSTEM

The re-organized Agricultural Extension System, popularly known as Training and Visit (T and V) system, is expected to serve as an important tool for providing adequate and up to date information on agricultural practices to the farming community in optimizing productivity of selected crops in a particular season. The extent of functioning of the system has been examined here with reference to some key indicators.

Exposure to mass media

Exposure to mass media is an important source of knowledge and information. Most of the impersonal communications take place through print and audio-visual mass media. The printed mass media include newspaper, bulletins, magazines, leaflets and pamphlets etc. The audio-visual media include radio, television, film etc. Demonstration and exhibition are also another sets of impersonal means of communication.

Table 6.1 depicts that about 43 per cent of the respondents were exposed to non-print mass media viz. to radio. The corresponding percentages for television and film were 10 and 14 respectively. Out of total radio listeners only 1.80 per cent farmers listened to it regularly and 0.60 per cent farmers were regular T.V. viewers. About 18 per cent farmers had the habit of reading newspaper, of which 3.20 per cent read newspaper regularly. With regard to the habit of reading magazine only one per cent got the opportunity to go through it. It is observed that the overall use of print and non-print media by the respondents was extremely limited. Low literacy and poor accessibility were found as the two most important contributing factors to the negligible use of

print and non print mass media as their sources of information by the farmers. Demonstration is another source of information to the farmers. About 11 per cent farmers had been exposed to agricultural demonstration programmes.

Table 6.1: Distribution of Respondents according to their Exposure to Mass Media.

Media	Nature of Exposure (In percentage)			Total Respondents Exposed	
	Never	Sometimes	Regularly	No.	Per cent
Radio	57.40	40.80	01.80	213	42.60
Newspaper	82.20	14.60	03.20	89	17.80
Film	86.00	14.00	--	70	14.00
Magazine	99.00	01.00	--	05	01.00
Demonstration	88.80	11.00	00.20	56	11.20
Television	90.00	09.40	00.60	50	10.00

Exposure to Specific Programme

It has been observed from Table 6.1 that 42.60 per cent farmers were exposed to radio programme. Out of total radio listeners 26.60 per cent listened to news programme, 35.60 per cent to *Krishi Kathar Asar* (Agricultural programme) and only 8 per cent to music and other entertainment programmes.

Radio is an important and effective source of agricultural information to the farmers. Radio disseminates information relating to new technology through a special programme meant exclusively for the farmers called *Krishi Kathar Asar* (discussion on agricultural matters). Out of 178 farmers listening to the *Krishi Kathar Asar,* 70.22 per cent of them have learnt from it about certain cultivation techniques of the major crops like paddy, wheat, potato and vegetables; 14.04 about plant protection measures, and 6.74 per cent have acquired some knowledge about fertilizer application techniques . Thus *Krishi Kathar Asar* has appeared to be a popular and helpful programme of radio for the farmers. However, among the radio listeners only 8.98 per cent have failed to learn

anything from the programmes, as they could not follow the technical content of the information broadcasted.

Television with its vision culture reaches people with its new ideas. It may be recalled from Table 6.1 that only 10 per cent farmers were exposed to television programmes. Out of which 9.40 per cent were casual viewers and 0.60 per cent used to enjoy it regularly. Regarding exposure to specific programmes 39 (7.80 per cent) and 22 (4.40 per cent) respondents were exposed to T.V. news and feature films respectively. Surprisingly, only 9 respondents (1.80 per cent) were interested to see *chasbas* (agricultural) programme. Among the viewers of *chasbas* programme of TV, 33.30 per cent respondents got some knowledge about cultivation techniques of the major crops and 11.11 per cent about fertilizer application. However, even when 55.55 per cent respondents had certain exposure to specific agricultural programmes of T.V. they were unable to learn anything from the said telecasts because of high technical content of the message. There is higher exposure to the radio programme than television because of farmers' better access to radio. Lower exposure to agricultural information disseminated through radio and television indicates their poor credibility as impersonal sources of technical information. Agricultural information available from newspaper was often used mostly by educated, wealthy and innovative farmers.

Regarding documentary films screened by the publicity department of information and culture, Govt. of West Bengal, 14 per cent farmers had some exposure to such programmes. Among the documentary viewers, 12.60 per cent watched agriculture related programme, 2.60 per cent literacy programme and 1.20 per cent health and family welfare related films. Of the total viewers of agriculture related documentaries, 46 farmers (73 per cent) acquired some knowledge about cultivation technique of paddy and wheat, three farmers (4.76 per cent) about fertilizer application technique, and one farmer (1.58 per cent)

about procedures of plant protection measures. On the other hand even when 13 viewers (20.63 per cent) failed to internalize the subject matter projected they enjoyed the documentary film show. Internalization of the messages of documentaries often becomes difficult because of language problem, low level of literacy of the spectators, technical terms used in programme, and infrequent exposure to such show which is held irregularly.

On agricultural matters, the printed media like newspaper, magazine, etc., have a limited impact on the farmers. Out of the total respondents 14.60 per cent had the habit of reading newspaper 'sometimes' and only 3.20 per cent used to read newspaper 'regularly'. Daily events and *chasbas* (agriculture) column were the major subjects of interest to the farmers who were literate and used to read newspaper more or less regularly. Regarding preferred news items in the newspaper, 15.40 per cent farmers were interested to read daily events and only 6.20 per cent were to agricultural column. From the agricultural column 80.64 per cent farmers learnt about the cultivation procedures of paddy, potato and vegetables, 12.90 per cent got some idea about plant protection measures, and only 6.45 per cent learnt some techniques of fertilizer application(see Table 6.2). Very insignificant proportion of farmers (about one per cent) used to read magazines and other books. But to them such magazines and books were not the sources of any agricultural information.

The use of mass media by farmers of the two northern districts is not as extensive as those of the developed countries. Their use as a source of information is mostly confined to a small group of educated, affluent and innovative farmers. The majority of farmers of the two districts were least depended on impersonal sources of communication in obtaining agricultural information. But as far as the media like radio, television and films are concerned the farmers who have access to those, certain proportion of them had been able

to learn some new ~~the~~ methods of cultivation, the technology of fertilizer application and plant protection measures from those mass media.

For agricultural extension, demonstration is often considered as a powerful medium of communication. It provides the farmers an opportunity to have a direct and first hand familiarity with the nature, form, use and results of agricultural innovations. But among the respondents of two North Bengal districts only 11.20 per cent of them actually got the opportunity to witness the result of demonstration programme. From their first contact with the demonstration programme, 76.78 per cent of the farmers learnt about cultivation procedure of paddy, wheat and jute; 12.50 per cent about plant protection measures and only 8.92 per cent about scientific method of fertilizer application. However, only about 2 per cent of the respondents did not find agricultural demonstration programme as useful at all(see Table 6.2). But on the whole, the demonstration of an agricultural innovation appeared somewhat reliable and useful source of information to the majority of the farmers.

Table 6.2: Distribution of Respondents by Media Exposure and Type of Agricultural Knowledge Acquired from Mass-Media (Distribution in Percentage)

Type of Media	Total Respondents Exposed to Particular Media	Type of Lessons Received from Mass Media			
		Plant Protection Measures	Cultivation Technique	Fertilizer Application Technique	No Lesson
Radio	178	14.02	70.22	06.74	08.98
Newspaper	31	12.90	80.64	06.45	—
Film	63	01.58	73.01	04.76	20.63
Book	---	---	---	---	—
Television	09	---	33.33	11.11	55.55
Demonstration	56	12.50	76.78	08.92	01.78

Exposure to training programmes

The prime objective of training to farmers is to motivate them in adopting technologies conducive for higher production, more income and better living. Farmers are trained to upgrade their knowledge and skill. The Department of Agriculture organises training camps in every year at the district, block and village levels for imparting latest farm technology to the farmers especially in *Rabi* and *Kharif* seasons. In addition to special training camps, various crop production camps are also organised by the state agricultural university, leading pesticide companies and development agencies such as IFFCO, KRIBHCO etc.; to disseminate new agricultural technology among the farmers.

In the two districts under study about 75 per cent of cultivators had knowledge about farmers training camps. Even then only 19 per cent of farmers had actually undergone through such training. Farmers training camps had been organised at the office of the Agricultural Farms, Gram Panchayat Office and at Agricultural University (North Bengal campus at Pundibari, Cooch Behar). Maximum number of farmers were trained at Gram Panchayat Office. The technical knowledges acquired from such training camps were pertaining to irrigation and water management necessary for major food crops, specific cultivation techniques and inter-cultural practices involved in different stages of agricultural operations, and pest control devices. Agricultural farm office has been identified as the best demonstration camp site where the majority of the trainees had acquired knowledge about the scientific techniques of cultivation. At Gram Panchayat level, in total 86 farmers were trained of whom 49 (56.97%) learnt about pest control method and 33(38.37%) about cultivation technique of food crops. Farmers training camps are organised by the extension wing of Agricultural University at Pundibari. This university has its own research farm where on-farm testing of new technology was conducted. Eleven respondents attended the said training camp and from where majority of them learnt about

Table 6.3 : Distribution of Respondents by their Training Places and Topics they Learnt

Place of Training	Number of Respondent Attended	Type of Training Attended					
		Irrigation and water Management		Cultivation Technique		Plant Protection Measures	
		No.	Percentage	No.	Percentage	No.	Percentage
Agricultural Farm office	11	01	0.20	10	2.00	00	0.00
Gram Panchayat office	86	04	0.80	33	6.60	49	9.80
Agricultural University	11	01	0.20	09	1.80	01	0.20

several new cultivation techniques. It can be seen from Table 6.3 that a bulk of respondent farmers were still remain untrained and there is a need to organize more training camps to upgrade the knowledge of those farmers. However, it is important to note that a good number of participant farmers had not been properly trained. Their post-training follow-up measures and rate of adoption were not all that satisfactory because they were unable to internalize the lessons offered in the training camps. It warrants for sustained efforts to improve the training forms of communication for diffusion of agricultural innovations more effectively.

Participation to minikit programme

In every year a number of new varieties of seeds in cereals, pulses, vegetables and oilseeds are released by the agricultural department of the governments. These varieties seldom reach the farmers quickly. It is very difficult for the department of agriculture and the agricultural universities to produce large quantity of seeds and supply them to needy farmers within a short time. The main objective of minikit programme is to distribute small quantity of new varieties of seeds to farmers at different localities so that they can multiply and later redistribute the same to other farmers in their area.

The success of the minikit programme depends upon the actual knowledge of the farmers about this particular programme. When the respondents were asked whether they know about the programme of minikit distribution by the department of agriculture or not, 99 per cent of them were found quite aware about the said programme whereas 34 per cent of farmers had actually got the minikit.

It is evident from Table 6.4 that in the year 1994, a small proportion of farmers had received minikit for different crops. However, in the year 1995, the proportion of recipients of minikit had increased marginally.

Table 6.4: Percentage Distribution of Recipients of Inputs (Distribution out of Total Respondents)

Year	Type of Minikit Seeds Received					
	Jute	Paddy	Wheat	Pulse	Mustard	Vegetable
1994	1.00	1.40	4.00	0.60	2.00	1.00
1995	7.00	4.80	10.00	2.40	6.20	3.60

The minikit recipients were asked to record their general opinion about the said programme. Among them 46.47 per cent opined that the seeds (minikits) supplied to them were timely. However, majority (95.88 per cent) of the farmers were in view that the amount of seeds they received as minikit was inadequate. They also suggested that for achieving success in minikit programme, good quality seeds and other supportive inputs like fertilizer etc., need to reach the farmers in sufficient quantities before the commencement of the cropping season. Owing to better extension services, almost all the farmers have some knowledge about government sponsored minikit programme and there is a consistent and high demand for minikits among the farmers in augmenting their agricultural production.

Participation to agricultural fairs and demonstrations

Participation to agricultural fairs and demonstration programmes indicates the farmers' nature of interest and mind set in farm activities. Various types of meeting through fairs and demonstrations are held in order to facilitate and enhance the knowledgeability about new technology. These are held periodically at different levels.

Agricultural demonstration often helps identifying and countering certain technological constraints that adversely affect the productivity. By observing, doing and hearing from such a demonstration, the farmers learnt about the use

of certain new technologies. Despite the educative potentiality of demonstration as a powerful medium of communication, only 11.20 per cent of farmers had attended such demonstration programme. Thus as far as the demonstration is concerned the prevailing situation is not encouraging and call for further efforts to improve.

With reference to participation in the agricultural fair and exhibition, only 11.60 per cent farmers had such an exposure. However, it is true that village level agricultural fairs and exhibitions are not held quite frequently or regularly. Shah and Patel, (1970) in their study in Gujarat villages found agricultural fairs as an important source of information. They observed that those farmers who were found to visit agricultural fairs and exhibitions more frequently were not average farmers but mostly progressive cultivators and opinion leaders.

The farmers were asked that to what extent they found printed materials like pamphlets, leaflets, and folders distributed in agricultural fairs and exhibitions as useful source of information in acquiring knowledge on agricultural technology. About 16 per cent of the respondents reported that from such printed materials they have learnt some thing new about the technology of cultivation of paddy and potato and thus enjoyed better yield.

Agricultural problems and use of certain sources of information

The respondents were asked to identify specific problems, which have hampered their agricultural production. All the respondents had encountered with several problems either in their own family farm including kitchen garden or that of others.

Table 6.5 shows that for maximum (35.40 per cent) farmers, attack of pest and disease was the major problem in cultivation of crops. It was followed by inadequate irrigation (29 per cent), land reclamation (15.80 per cent), non availability of inputs (14.20 per cent), and high input cost (5.20 per cent).

Financial problems were mentioned by only 0.40 per cent of the farmers. It has been observed that the extension agents, agricultural development officer, and Krishi Prajukti Sahayak (KPS) had most direct contact with the farmers. So, for redressing the technical problems the farmer had to depend on them. They are the official extension agents for agriculture.

Table 6.5: Percentage Distribution of Respondents by the Principal Problems they Faced in their Agriculture

Type of Problem	Distribution		
	No	Percentage	Rank
1. Pest and disease problem	177	35.40	I
2. Inadequate irrigation	145	29.00	II
3. Problem of land reclamation	079	15.80	III
4. Non-availability of input	071	14.20	IV
5. High input cost	026	05.20	V
6. Financial problem	002	00.40	VI

In the districts under study, along with the formal institutional sources of information, another important and immediate source of knowledge to the farmers was fertilizer dealers. To 59 per cent farmers fertilizer dealers were their main source of information in agricultural matters. Among the respondents 41.40 per cent used to consult with other knowledgeable/ progressive farmers of the village to redress their specific agricultural problems. The progressive farmers had been the important linkmen between the extension workers and the general farmers for mitigating certain agricultural problems and dissemination of new technology. It is therefore necessary for the project management to provide the knowledge of new agricultural technologies to both fertilizer dealers and

progressive farmers through frequent contact with them so that they may further pass on the information to the other farmers.

Some respondents found the messages received from other information sources quite useful in the context of their agriculture. For instance, 28.80 per cent of the farmers competently used the knowledge received from mass media like radio, printed media, farm demonstration etc.; to palliate their certain farm problem.

Access to Krishi Prajukti Sahayak (KPS)

Under the Training and Visit {T&V) system of extension, linkage between the K.P.S. and the farmers has been emphasized to promote and strengthen the diffusion process by means of fortnightly visit of KPS to farmers at their field situation. But in reality that linkage has not achieved the desired pattern as originally envisaged by the extension experts. Field data show that even after several years of operation of T and V system, 48.40 per cent farmers had no clear-cut idea/knowledge about this particular extension system. They even did not know who is the working KPS in their area and what for he has been deputed?

Regarding the frequency of visit by KPS during last one month, it is found that the proportion of farmers who were contacted twice by the KPS was only 3.20 per cent. In the case of single visit the corresponding proportion was 5.40 per cent. This is clear indication of extremely limited access of farmers to KPS. Moreover, when 91.40 per cent of the respondents were identified as totally non-contacted farmers by the KPS during 1995-96, the frequency of visit of KPS to farmers' field was also not at all encouraging. This particular problem needs to be examined seriously and associated organizational and other hindrances against its effective functioning are to be removed.

Table 6.6 : Nature and Extent of contact of KPS with the Farmers according to Frequency, Source, and Place

	Percentage
Frequency of contact	
One to three (Rare)	18.20
Often	13.40
No contact	68.40
Who contacted	
Farmer	72.70
Krishi Prajukti Sahayak	27.20
Place of contact	
Gram Panchayat Office	44.30
Field	33.54
Others Viz. (Agril. Office and village market)	21.15
Purpose of contact	
For technical discussion/advice	90.50
Minikit information	09.49

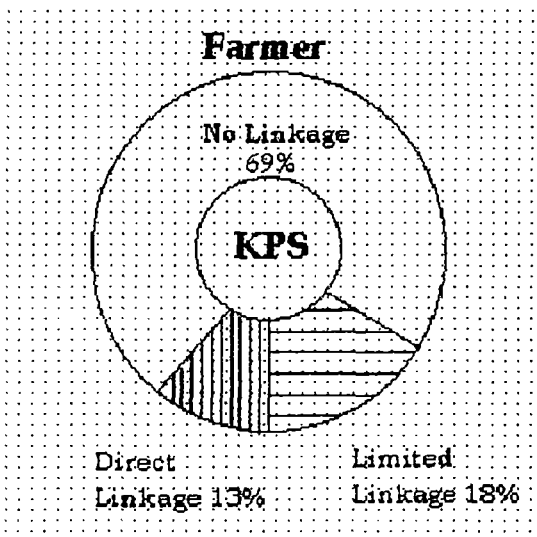
Nature and extent of contact

Radhukar (1962) in his adoption and diffusion study of farm Practices opined that those farmers who had used mass media and institutional sources more frequently and had high contact with extension agents were progressive farmers and opinion leaders who spread innovation to average farmers.

It is clear from Table 6.6 and Fig -2 that the farmers who were contacted fresquently by the KPS in the last one year their proportion was only 13.40 per cent. Due to their nature of contact with the extension agents and agencies those farmers were identified by others as knowledgeable source of information.

During 1995-96, about 18 per cent of farmers were found 'rarely' contacted by the KPS. On the other hand, 68.40 per cent farmers had not been contacted at all by the KPS. That was one of the major weaknesses in the functioning of the ongoing T and V system of extension.

Fig-2. Linkage of contact between KPS and Farmers



On frequency of visit by KPS, about 27 per cent of farmers reported that the KPS had visited them at least once or little more during last one year. While 72.70 per cent farmers said that they on their own personally contacted the KPS for getting necessary information. This indicates that the farmers were somewhat serious and keen to sought the suggestions and advices of KPS on their personal needs.

Table 6.6 shows that for 33.54 per cent of the farmers it is the KPS who contacted them in their agricultural field. Other 44.30 per cent of the farmers reported that KPS met them in the Gram Panchayat Office, and for another 21.15 per cent it was in other public places like agricultural office, and village market etc.

For about 91 per cent of the farmers, their main reason of contacting the KPS was to discuss with him about some technical problems related to

cultivation of certain crops, while another 9.49 per cent contacted KPS only for getting information about allotment of minikit.

Table 6.7: Distribution of Respondents by Nature of Benefits Received from KPS

Nature of Benefit	Percentage of Farmers Received the Benefit
Knowledge about plant protection measures	46.83
Fertilizer and irrigation management	18.35
No benefit from contact	17.08
Minikit information and soil testing	12.02

Table 6.7 depicts that 46.83 per cent of the farmers learnt about the plant protection measures from KPS. Another 18.35 per cent acquired from KPS some technical knowledge pertaining to fertilizer application and irrigation management. About 12 per cent farmers said that they first got the information of soil testing and distribution of minikit from their KPS. However, according to the estimation of 17.08 per cent of farmers their contact with the KPS was not beneficial at all.

Fulfillment of information needs

About the utility of advice and information which is given by KPS, 75.20 per cent of the farmers reported that the technical and other advices offered by the KPS were not adequate enough to fulfil their information need. The remaining 24.80 per cent farmers were however became benefited from various suggestions of the KPS. Among those benefited farmers, for 21.20 per cent of them the extent of benefit was partial where as only 3.60 per cent said that in different agricultural matters and information the KPS helped them a lot.

Utility of Training and Visit System

The farmers were asked to assess the utility of T and V system of extension. In this regard 25.20 per cent farmers claimed that this particular programme appeared to them quite useful and it really helped to improve their farm out put. However, majority (74.80 per cent) of the respondents had a negative opinion about the utility of the T and V programme in its present form. It has been admitted by agricultural development personnel that the administrative set-up in which extension agents work keep them away from making frequent close contact with the farmers. The extension agents are expected to spend a lot of hours on paper works and other official activities not immediately related to actual extension services. What were the underlying reasons against negative estimation of T and V system? The respondents were asked to identify the prime reasons that why they are apathetic to the T and V system and do not found it as an effective programme. Table 6.8 records some of such specific reasons put forward by the farmers.

Table 6.8: Reasons for Developing Negative Attitude towards T & V System

Reason	Score in percentage
Poor contact	40.90
No advice from KPS	30.74
Lack of training facility	14.43
Poor competency of village level extension worker	06.14
No response	07.75

About 41 per cent of the respondents felt poor or irregular contact of village level extension functionaries called KPS with the farmers was the main weakness of the programme. About 31 per cent complained that farmers did not get necessary advice from KPS in times of any crisis or need. Another six per cent of respondents directly questioned the very competence of KPS i.e. village level

extension workers. On the other hand 14.43 per cent of the farmers alleged the lack of training facilities available to the cultivators.

Against the backdrop of the feed back received from the farmers and to make the Training and Visit system as an effective means of extension, the functioning of grass root level extension workers (KPS) needs to be streamlined in terms of their frequency of contact, competence to furnish up to date information and timely delivery of needed services to the farmers. It is believed by many respondents that if proper attention is paid to remove the existing shortcomings of the T and V system, the programme can yield better results.

Attitude, Knowledge and adoption behaviour

Attitude has been defined by Allport (1935) as a mental and / or natural state of readiness, organized through experiences exerting a directive and dynamic influence upon the individual's response to all objects and situations with which he is related. From a study of the attitude towards T and V system in the command area of Rajasthan, Kulhari (1980) pointed out that the attitude scores of the progressive farmers were higher than those of non-progressive farmers. Several studies conducted in India and abroad have established the relationship between attitude of farmers and the adoption of improved practices.

Attitude towards Training and Visit System

The Training and Visit system is the latest and largest extension programme. It has been implemented throughout the country to boost up agricultural production. The attitude of the farmers towards this extension system is a reflection of the intimacy and understanding between the so-called communicator and the target population. Thus the attitude of the respondents towards the T and V programme is necessary to examine.

In the present enquiry majority (69.80 per cent) of the farmers showed some kind of favourable attitude towards this particular system of extension. That is a positive sign to make the T and V system of extension as an effective

and well accepted programme. A sizeable proportion (28.40 per cent) of the respondents was however somewhat skeptic or indifferent towards this particular system of agricultural extension.

Knowledge of farmers about agricultural innovations

The knowledge about scientific cultivation is a prerequisite for its adoption. In order to assess the knowledge level of farmers with regard to modern agricultural technology involved in cultivation, a standardized knowledge test based on the 'teacher made style' was developed. The items included in the questionnaire are given in Table 6.9. Each question carries single score.

Table 6.9: Technological Items Selected for Knowledge test by Recording Right Choice

Serial No.	Specific question
1.	Sonalika is a variety of a) Wheat b) Paddy c) Jute d) Maize
2.	Dhaincha is a a) green manuring crop b) Pulse crop c) oilseed crop
3.	Pulse crop adds mainly --- in the soil a) N_2 b) P_2O_5 c) K_2O
4.	S.S.P. Should be used in paddy during a) Flowering b) Final land preparation c) Tillering
5.	N_2 percentage in Urea is a) 56% b) 36% c) 46%
6.	Dithane M-45 is a) Insecticide b) Fungicide c) Micro-nutrient
7.	*Bhepu-poka* is a pest of a) Rice b) Wheat C) Tomato
8.	IET-1444 (Rasi) is variety of a) Rice b) Wheat c) Tomato d) Brinjal

Several items selected for the knowledge test in cultivation were considered as per their importance and contribution towards productivity in consultation with senior personnel of agriculture department. It was ensured

that there was no imbalance in selection of items. On a possible range of knowledge score from 0 to 8, 227 (45.40%) received a low score of 1 - 4, 240 (48.00%) a medium score of 4 - 6, and 33 (6.60%) received a high score of above 6. The average knowledge score of the respondent farmers was 4.2, that is, in the medium range.

Table 6.10: Distribution of Farmers by their Knowledge Score

Knowledge Score	Distribution	
	No.	Per cent
Upto 30 per cent (Low)	227	45.40
40-60 per cent (Average)	240	48.00
Above 60 per cent (High)	033	06.60

Table 6.10 shows that the knowledge score of farmers ranges between 30 per cent or below and up to 60 per cent and above. Greater proportion (48 per cent) of the farmers had average and 45.40 per cent had lower level of knowledge. On the other hand 6.60 per cent of the farmers recorded a high level of knowledge on scientific agricultural practices. Thus it is evident that despite economic backwardness and poor literacy situation in the villages under study about 55 per cent of the respondents had high and medium level of knowledge about certain new agricultural technologies.

Adoption behaviour towards recommended practices: The case of paddy

Almost all the farmers of the Jalpaiguri and Cooch-Behar districts cultivate paddy which is also a principal crop in North Bengal region. Adoption behaviour with particular reference to paddy has therefore been taken into prime consideration.

Table 6.11 : Knowledge and Adoption Scores of Certain Technologies by Source of Knowledge (Distribution in percentage)

Sl No.	Type of Technology	Knowledge	Adoption	Source of Knowledge			
				Farmer	Fertilizer dealer	K.P.S.	Other Sources
1.	Improved seed	100.00	100.00	83.80	13.60	01.60	01.00
2.	Application of plant nutrient	97.20	97.20	65.84	30.45	01.23	02.46
3.	Time Schedule of N.P.K	86.00	86.00	20.60	67.28	06.49	05.56
4.	P.P. measures	70.40	69.80	09.09	67.32	18.75	04.82
5.	Farm implements	52.40	47.20	84.35	12.97	00.76	01.90
6.	Seed treatment	23.40	22.22	22.22	49.50	17.90	10.25
7.	Preparatory tillage	99.40	99.40	96.78	03.01	00	00.20
8.	Irrigation management	27.80	27.80	85.61	00.71	06.47	07.19
9.	Better storing method	00.20	00.20	00	00	100.00	00
10.	Soil reclamation	19.20	07.80	13.54	32.29	41.66	12.50
11.	Improved cattle	04.60	04.20	95.65	00	00	04.34

Table 6.12: Adoption Profile of Recommended Practices for Paddy

Number of Recommended Technology	No of Farmers Adopted
Farmers adopting One recommended technology	002
Farmers adopting Two recommended technology	012
Farmers adopting Three recommended technology	046
Farmers adopting Four recommended technology	065
Farmers adopting Five recommended technology	117
Farmers adopting Six recommended technology	119
Farmers adopting Seven recommended technology	063
Farmers adopting Eight recommended technology	046
Farmers adopting Nine recommended technology	025
Farmers adopting Ten recommended technology	005
Farmers adopting more than Ten recommended technology	000

In order to get a good outturn of paddy the farmers have adopted several recommended practices at varying scales. Details of the practices recommended for paddy cultivation in the study districts are given in Table 6.11. Here the practices and types of technology recommended refer to good quality of seed, timely application of balanced dose of plant nutrients, application of water at different growth stages. The control of pest and disease, seed treatment and application of pesticides are identified as another set of recommendation .Use of modern implements and improved cattle as farm power are required for ensuring better agricultural operations. Soil reclamation is also essential for improving soil condition and better storing method is required to maintain the viability of seed. The aforesaid practices involved in the cultivation of paddy were taken into consideration owing to their importance and contribution towards better productivity in consultation with senior agricultural personnel of

the concerned department. Let us look into the actual situation of adoption of recommended practices as observed in the case of paddy.

Table 6.12 shows the number of recommended practices adopted by the farmers in a range of one to ten. It has been observed that the farmers who have used one to four practices their proportion was 25 per cent and thus belong to the category of 'low adopters'. Another 60 per cent of the respondents who have adopted 5 to 7 recommended practices may be called as 'medium adopters'. And there were 15 per cent of farmers in the category of ' better adopters' who have found embraced more than seven practices.

Adoption behaviour

Some farmers often avoid adopting certain recommended practices for paddy. So there was an attempt in the study to find out the practices which were not or poorly adopted by the farmers as well as the underlying reasons against such non adoption. The data on the aspect of knowledge and adoption have been presented in Table 6.11. It has been observed that out of 11 recommended practices for cultivation of paddy, six were poorly adopted by the farmers. So about 55 per cent of the recommended items were either non adopted or scarcely adopted. By item those specific practices were, use of improved farm implements, seed treatment, irrigation management, better storing method, soil reclamation and use of improved cattle. The main reason behind low or non-adoption of those practices was farmer's incomplete and improper knowledge about the same. This apart, the cost involved in adopting certain practices was another hindrance. The extension and other associated institutional strategies therefore need to be re-oriented to remove those hindrances. Table 6.11 reveals that H.Y.V. paddy seed was used by all the farmers. Awareness score of participant farmers about application of plant nutrient was quite high (97.20 per cent) and equal to the adoption score. More than 97 per cent of the farmers knew

about the preparatory tillage like deep and increased number of ploughing and adopted the same to a great extent.

Irrespective of their socio-economic status, 86 per cent of the farmers had the knowledge about the time schedule for applying Nitrogenous-Phosphatic and Potassic (NPK) fertilizer. They also found adhere to follow such a schedule. More than 70 per cent farmers knew and applied various pest and disease control measures in their agriculture. The reason for non-adoption of plant protection measures as identified in some cases was the high costs of pesticides and fungicides. The knowledge score about the use of improved farm implements in paddy cultivation was 52.40 per cent whereas its adoption score was 47.20 per cent only. The farmers were unable to use many improved tools in their agriculture due to their inability to afford such costly implements personally.

The extent of knowledge and rate of adoption of other recommendations or practices such as seed treatment, irrigation management, better storing method, soil reclamation, and use of improved cattle was not at all satisfactory. The adoption scores against seed treatment, irrigation management and soil reclamation were 22.22 per cent, 27.80 per cent and 7.80 per cent respectively. Poor knowledgeability about those practices may be accounted for their low adoption. That deserves special attention for further improvement. It is evident from Table 6.11 that 19.20 per cent of the farmers were aware about the merit of soil reclamation whereas only 7.80 per cent actually took the advantage of the report of soil testing and adopted follow-up measures. Amongst the farmers, who denied soil testing more than 65 per cent of them told that there was no soil testing arrangement in their reach, and another 35 per cent alleged that even when they opted for the same the soil testing report was not available to them.

Adoption score of the recommended practices related to better storing methods and the use of improved cattle was very low. It was only 0.20 per cent

and 4.20 per cent respectively. Here also the insufficient knowledge about scientific storing methods and high cost involvement in purchasing improved cattle were the major constraints against responding favourably towards recommended practices. The overall awareness and adoption score of the farmers in paddy cultivation was 52.60 per cent and 51.07 per cent respectively (see Table 6.11). The findings therefore suggest to take appropriate measures in improving the rate of adoption.

New technology and the Sources of information used

Details of the practices recommended for paddy cultivation along with the sources of information of respondent farmers in the two study districts are given in Table 6.11. In respect of adoption of different recommended practices the farmers availed necessary information from different sources. To mention in particular, those sources of information were the knowledgeable and progressive farmers within and outside the village, fertilizer dealers, KPSs and other sources like mass media, sales men of fertilizer and pesticide companies. For instance, in the case of scientific treatment of paddy the rate of use of specific information sources in terms of percentage was as follows: progressive farmer 52.49; Fertilizer dealer25.18; Krishi Prajukti Sahayak [KPS] 17.71; and other sources 4.56.

Progressive farmers were the most important source of information and knowledge to 52.49 per cent of the respondents. On the other hand, 13.40 per cent farmers claimed that they had frequent contact with the extension agency. It was also a good source of information to the general farmers. Information often flows at inter personal level from contact farmers to others living in the same areas . Thus the common farmers obtained most of their information from progressive, and/or contact farmers through face-to-face and word-of-mouth communication.

Fertilizer dealers were another important source of information to the farmers. In paddy cultivation, 25.18 per cent of them relied on fertilizer dealers for necessary knowledge and information. It is interesting to note that for knowledge about complex farming methods and techniques like plant protection measures, time schedule of NPK and seed treatment, the farmers were more dependent on fertilizer dealers. For certain specific practices like scheduling of fertilizer application and for diagnosis of pest and disease about 50 per cent and more farmers identified fertilizer dealers as their first hand source of knowledge and information. This is to note that the fertilizer and pesticide sellers and dealers used to update their knowledge and had direct contact with extension agents for the interest of their business. The farmers had easy access to those dealers and the latter being the supplier of farm inputs and knowledge were quite conscious to achieve certain trust and confidence among the farmers.

The present personal contact agent between the extension system and the farmer is the Krishi Prajukti Sahayak (KPS). It is important to note that only about 18 per cent farmers relied on the advice of KPS in various matters of their agriculture. Needless to say, KPS was hardly easily available to them in their needs. The findings of earlier discussion also reveal that some farmers were somewhat serious and keen to get the suggestions and advices from the KPS as and when necessary. The general farmers had an expectation to regularly receive information from the KPS. But in reality it was not feasible for a KPS to provide regular visit to the field of every farmer as he was liable to cover large number of farm families periodically in addition to his routine office works. Therefore on the part of the project management there is a need to evolve appropriate strategies which may facilitate and ensure regular visit of KPS to a large number of farmers as possible.

The use of 'other sources' of information like mass media, etc., by the farmers was found to be less significant. Only 4.56 per cent of farmers received

and utilised the relevant messages of the same in their paddy cultivation. The use of the mass media as a source of agricultural information was negligible because of low level of literacy, one way of communication and hard technical presentation of messages.

As a source of information the personal channels received much importance and preference from the cultivators than the impersonal channels. Among the personal sources, so-called knowledgeable farmers were ranked high by the farmers as their immediate source of information. The extension agents like KPS had more or less regular contact with those knowledgeable farmers and vice-versa. The role of those knowledgeable farmers as local communicator in disseminating new agricultural messages thus become important.

Association between selected characteristics of farmers and their adoption behaviour

Some important personal variables are likely to influence the farmer's adoption behaviour relating to new technology. To put it in other way, it was assumed that a farmer's adoption behaviour will be dependent on some of his personal background like age, education, land holding, social status, attitude, knowledge and exposure to extension. The findings on association between adoption level of farmers and their personal background have been presented in Table 6.13. In explaining the situation there was a need to apply the chi-square test and where we used χ^2 test for the necessary statistical inference. But in the cases where the validity of the application of χ^2 did not exist, we calculated co-efficient of correlation from the bivariate table and then went for t-test. The actual results are discussed below.

Age

Table 6.13 indicates that Chi-Square value of 4.11 was not significant at 1 per cent and 5 per cent level. Thus it can be said that there was no relation

between the age and adoption of farmers, and the two attributes were quite independent.

Table 6.13 further shows that 325 (65 per cent) respondents were in the age group of 45 years and below, of which 54.40 per cent were in the category of 30 to 45 years and who had different adoption level. Out of 272 respondents belonging to the age group of 30 - 45 years, 59.21 per cent had higher and 52.84 per cent had medium level of adoption of recommended practices of paddy. Out of the 175 respondents belonging to the age group above 45 years, 28.94 per cent and 35.11 per cent had higher and medium level of adoption respectively. Only 38.40 per cent respondents of that particular age group showed lower level of adoption .

Education

Table 6.13 reveals that 19.60 per cent farmers were illiterate, 22.20 per cent were educated upto primary level and 49.80 per cent and 8.40 per cent had education upto secondary and above secondary levels respectively. It also appears from Table 6.13 that in respect of adoption of improved practices for paddy cultivation the value of correlation coefficient was 0.36(see Table 6.14), so there was a significant correlation between adoption behaviour and education. Educated farmers were more inclined to apply/ use better technologies than the farmers with low level of education.

Positive correlation between the adoption of various crop technologies and level of education of the farmers as observed in the case of present study (see Table 6.14) comes similar to the findings of Saini (1983), Wilson and Gallup (1953), and Tyagi and Sohal (1984). It is perhaps education, which enables farmers to use the print media for information on agricultural innovations, store them for future use and retrieve them when needed. The second most important reason is perhaps, education helps expanding the horizon of knowledge, awareness, outlook and consciousness that enable farmers to judge pragmatically the merits or demerits of technological innovations.

Landholding

By landownership status 48.20 per cent of the farmers were in the category of 'marginal farmers' and who had cultivated land less than one Hectare. The proportion of 'medium' (above 2 Hectares but less than 4 Hectares) and 'small' farmers (1 to 2 Ha.) was 12.80 per cent and 36.60 per cent respectively. Only 2.40 per cent farmers were 'large' farmers and owning land above 4 Hectares. The correlation between landholding and level of adoption is found positive both at 5 per cent and 1 per cent probability level(see Table 6.15). It strongly confirms the association between farmers land holding status and their adoption behaviour. In the case of adoption of recommended or new technologies in paddy cultivation size of farm i.e. landholding had the r-value of 0.33. The results further confirm the validity of the fact that big/large farmers normally make greater use of better seeds, fertilizers, pesticides and insecticides than the other classes of farmers. As compared to the big farmers the marginal and small landowners cannot often invest much on plant protection measures, machines and other costly inputs because of certain financial limitations. Many of them thus keep them selves away from modern practices or adopt those partially.

Attitude towards Training and Visit System

Table 6.13 depicts that on the whole 69.80 per cent farmers had favourable and 1.80 per cent strongly favourable attitude towards T and V system of extension. On the other hand, 28.40 per cent farmers were found somewhat indifferent and had no opinion about this particular extension system. But the association between attitude towards T and V system and level of adoption was positive and significant at 5 per cent and 1 per cent level. The degree of said correlation in the case of adoption of improved paddy cultivation was 0.50 (see Table 6.16). The two variables were thus strongly related. It also corroborates with the findings of Kulhari (1980), and Tyagi and Sohal (1984). That implies, those who had a favourable attitude towards the T and V system of extension

had a better adoption level. It shows the positive impact of the T and V system on diffusion and adoption of technological innovations.

Socio-economic status

In the districts under study 51.80 per cent respondents were belonging to the category of lower socio-economic status and about 38 per cent and 10.20 per cent in the medium and high socio-economic status groups respectively. The correlation coefficient between socio-economic status and level of adoption of new technology is found to be positively significant both at 5 per cent and 1 per cent level. Correlation between adoption of improved practices for paddy and socio-economic status shows that the farmers with better living and economic conditions normally used better technologies in respect to choice of seeds, use of fertilizer, pesticides etc. In the case of paddy, the value of correlation coefficient was fairly high (0.51), which denotes farmers of better socio-economic status utilised more recommended practices and had better adoption potentialities than the others(see Table 6.17).

Extension contact

It is clear from Table 6.13 that 68.40 per cent of the farmers had no contact with the village level extension agents. However, 18.20 per cent and 13.40 per cent farmers had 'rare' and 'often' contact respectively with such agents. The association between farmers' extension contact and their adoption behaviour is found highly intimate. That positive correlation (Table 6.18) perhaps indicates, the farmers who were contacted regularly by the extension workers had adopted the improved cultivation practices to a great extent. Thus it is needless to say, the T and V system has certainly helped in improving the level of adoption of the farmers in varying degrees.

Knowledge about agricultural technology

Table 6.13 shows that 48 per cent and 45 per cent farmers had 'medium' and 'lower' level of knowledge about agricultural technology respectively. The

Table 6.13 Association of Selected Characteristics of the Farmers with the Levels of Adpotion

Characteristics	Adoption			Total	Value of Chi-square
	High	Medium	Low		
Age					
i) Young (below 30 Years)	09 (11.84)	36 (12.04)	08(06.40)	53 (10.60)	04.11
ii) Adult (32 to 45 Years)	45 (59.21)	158 (52.84)	69(55.20)	272 (54.40)	(Non –significant)
iii) Old (above 45 Years)	22 (28.94)	105 (35.11)	48(38.40)	175 (35.00)	
Education					
i) Illiterate	03 (03.94)	49 (16.38)	46 (36.80)	98 (19.60)	
ii) Primary	09 (11.84)	64 (21.40)	38 (30.40)	111(22.20)	
iii) Secondary	49 (64.47)	163 (54.51)	37 (29.60)	249 (49.80)	
iv) Above Secondary	15 (19.73)	23 (07.69)	04 (03.20)	42 (08.40)	
Land Holding					
i) Marginal (less than 1 Ha)	16 (21.05)	137 (45.81)	88 (70.40)	241 (48.20)	
ii) Small (1-2 Ha)	34 (44.73)	123 (41.13)	26 (20.80)	183 (36.60)	
iii) Medium (greater than 2 Ha & less than 4 Ha)	18 (23.68)	37 (12.37)	09 (07.20)	64 (12.80)	
iv) Large (greater than 4 Ha)	08 (10.52)	02 (00.66)	02 (01.60)	12 (02.40)	
Attitude					
i) Strongly favourable	05 (06.57)	04 (01.33)	00 (00.00)	09 (01.80)	
ii) Favourable	66 (86.84)	242 (80.93)	41 (32.80)	349 (69.80)	
iii) No response	05 (06.57)	53 (17.72)	84 (67.20)	142 (28.40)	
Socio-economic Status					
i) Low (upto Rs. 15,000)	09 (11.84)	144 (48.16)	106(84.80)	259 (51.80)	
ii) Medium (Rs. 15-40,000)	39 (51.31)	133 (44.40)	18(14.40)	190 (38.00)	
iii) High (above 40,000)	28 (36.84)	22 (07.35)	01(00.80)	051 (10.20)	
Extension Contact					
i) No contact	06 (07.80)	220 (73.57)	116(92.80)	342 (68.40)	
ii) Rare	29 (38.15)	55 (18.39)	07(05.60)	91 (18.20)	
iii) Often	41 (53.90)	24 (08.02)	02(01.60)	67 (13.40)	

Contd.....

Characteristics	Adoption			Total	Value of Chi-square
	High	Medium	Low		
Knowledge about agril. technology					
i) Low	03 (03.94)	116 (38.79)	108 (86.40)	227 (45.40)	
ii) Medium	46 (60.52)	177 (59.19)	17 (13.60)	240 (48.00)	
iii) High	27 (35.52)	06 (2.006)	00 (00.00)	33 (06.60)	

(Figures in parenthesis indicate percentage to the total)

Where d.f. = 4 Value of $\chi^2 = 9.49$ at 5% level and Value of $\chi^2 = 13.28$ at 1% level (Tabulated)

farmers who had higher level of such knowledge their proportion was only 6.60 per cent. The correlation coefficient between knowledge and level of adoption was highly significant (r = 0.59) and there was positive association between the two (Table 6.19). Thus it appears the farmers with high level of knowledge were more receptive to the new ideas and practices, and in a better way adopted those relatively earlier than the others.

It is evident from the preceding discussion that current Training and Visit system has been able to influence the farmers to a limited scale by providing them information about farm problems and also offering feed backs to the extension workers. The T & V system intends to deliver the knowledge of updated technology to the target population. Some of the potential adopters (including small and marginal farmers) of new technologies were exposed to this new information system. In the arena of new agricultural technology the impact of the T&V extension system is slow but progressive. Majority of the respondents in two study districts farmers had a favourable attitude towards this extension system and felt that farmers could acquire up to date and necessary scientific knowledge of cultivation from it. They thus asked to remove all the existing shortcomings in the functioning of this system.

Table 6.14 : Table showing Relationship between Education of the Farmers and their Level of Adoption

Adoption u / Education v		High	Medium	Low	Total f(v)	vf(v)	$v^2f(v)$	$\Sigma uvf(uv)$
		3	2	1				
		Code Score						
Illiterate	0	0 3	0 49	0 46	98	0	0	0
Primary	1	3 9	2 64	1 38	111	111	111	193
Secondary	2	6 49	4 163	2 37	249	498	996	1020
Above Secondary	3	9 15	6 23	3 4	42	126	378	285
Total f(u)		76	299	125	500	735	1485	1498
uf(u)		228	598	125	951			
$u^2f(u)$		684	1196	125	2005			
$\Sigma uvf(uv)$		456	918	124	1498			

r = 0.36 Significant at 0.01 level and .05 level of probability**

Computation of co-efficient of correlation from the bivariate Table 6.14

Here, u denotes attribute 'Adoption'

v denotes attribute 'Education'

$$\bar{u} = \frac{\sum uf(u)}{N} = \frac{951}{500} = 1.90$$

$$\bar{v} = \frac{\sum vf(v)}{N} = \frac{735}{500} = 1.47$$

$$\sigma\bar{u}^2 = \frac{\sum u^2 f(u)}{N} - \bar{u}^2 = \frac{2005}{500} - (1.90)^2 = (0.63)^2$$

$$\sigma\bar{v}^2 = \frac{\sum v^2 f(v)}{N} - \bar{v}^2 = \frac{1485}{500} - (1.47)^2 = (0.89)^2$$

$$\text{cov(u,v)} = \frac{1498}{500} - 1.90 \, x 1.47 = 0.203$$

$$r = \frac{0.203}{0.63 \, x \, 0.89} = 0.36$$

By using student's *t-test* where $H_0(\rho = 0)$ against

$$H_1(\rho \neq 0)$$

$$t = \frac{r - 0}{\sqrt{1 - r^2}} x \sqrt{N - 2}$$

= 8.63** (Significant)

Table $t_{498,0.05} = 1.96$

$t_{498,0.01} = 2.58$

Table 6.15 : Table showing Relationship between Land holding of the Farmers and their Level of Adoption

Adoption u / Land holding v		High	Med-ium	Low	Total f(v)	vf(v)	$v^2f(v)$	$\Sigma uvf(uv)$
		3	2	1				
		Code Score						
Marginal	1	3 16	2 137	1 88	241	241	241	410
Small	2	6 34	4 123	2 26	183	366	732	748
Medium	3	9 18	6 37	3 9	64	192	576	411
Large	4	12 8	8 2	4 2	12	48	192	120
Total f(u)		76	299	125	500	847	1741	1689
uf(u)		228	598	125	951			
$u^2f(u)$		684	1196	125	2005			
$\Sigma uvf(uv)$		510	1004	175	1689			

r = 0.33 ** Significant at 0.01 level and .05 level of Probability

Computation of co-efficient of correlation from the bivariate Table 6.15

Here, u denotes attribute 'Adoption'

v denotes attribute 'Land holding'

$$\bar{u} = \frac{\sum uf(u)}{N} = \frac{951}{500} = 1.90$$

$$\bar{v} = \frac{\sum vf(v)}{N} = \frac{847}{500} = 1.69$$

$$\sigma\bar{u}^2 = \frac{\sum u^2 f(u)}{N} - \bar{u}^2 = \frac{2005}{500} - (1.90)^2 = (0.63)^2$$

$$\sigma\bar{v}^2 = \frac{\sum v^2 f(v)}{N} - \bar{v}^2 = \frac{1741}{500} - (1.69)^2 = 0.62 = (0.79)^2$$

$$\text{cov}(u,v) = \frac{\sum uvf(u,v)}{N} - \bar{u}\bar{v} = \frac{1689}{500} - 1.90 \times 1.69 = 0.167$$

$$r = \frac{\text{cov}(u,v)}{\rho u \rho v} = \frac{0.167}{0.63 \times 0.79} = 0.33$$

By using student's *t-test* for test of Significance where $H_0(\rho = 0)$ against $H_1(\rho \neq 0)$

$$t = \frac{r - 0}{\sqrt{1 - r^2}} \times \sqrt{N - 2}$$

= 7.83** (Significant)

Table $t_{498,0.05} = 1.96$

$t_{498,0.01} = 2.58$

Table 6.16 : Table showing Relationship between Attitude of the Farmers towards T and V system and their Level of Adoption

Adoption u / Attitude v		High	Med-ium	Low	Total f(v)	vf(v)	$v^2f(v)$	$\Sigma uvf(uv)$
		3	2	1				
		Code Score						
Strongly Favourable	2	6 5	4 4	2 0	9	18	36	46
Favourable	1	3 66	2 242	1 41	349	349	349	723
Noresponse	0	0 05	2 53	0 84	142	0	0	0
Total f(u)		76	299	125	500	367	385	769
uf(u)		228	598	125	1049			
$u^2f(u)$		684	1196	125	2005			
$\Sigma uvf(uv)$		228	500	41	769			

r = 0.50 ** Significant at 0.01 level and .05 level of probability

Computation of co-efficient of correlation from the bivariate Table 6.16

Here, u denotes attribute 'Adoption'

v denotes attribute 'Attitude'

$$\bar{u} = \frac{\sum uf(u)}{N} = 1.90$$

$$\bar{v} = \frac{\sum vf(v)}{N} = 0.73$$

$$\sigma\bar{u}^2 = \frac{\sum u^2 f(u)}{N} - \bar{u}^2 = \frac{2005}{500} - (1.90)^2 = (0.63)^2$$

$$\sigma\bar{v}^2 = \frac{\sum v^2 f(v)}{N} - \bar{v}^2 = \frac{385}{500} - (0.73)^2 = (0.48)^2$$

$$\text{cov}(u,v) = \frac{\sum uvf(u,v)}{N} - \bar{u}\bar{v} = 0.15$$

$$r = \frac{\text{cov}(u,v)}{\rho u \rho v} = 0.50$$

By using student's *t-test* for test of Significance where

Null hypothesis H_0: (there is no relationship between adoption and attitude)

against

Alternative hypothesis H_1: (there exists relationship between adoption and attitude)

$$t = \frac{r - 0}{\sqrt{1 - r^2}} x \sqrt{N - 2}$$

= 12.97** (Significant)

Table $t_{498,0.05} = 1.96$

$t_{498,0.01} = 2.58$

Table 6.17 : Table showing Relationship between Socio-economic status of the Farmers and their Level of Adoption

Adoption u / Socio economic status v		High	Med-ium	Low	Total f(v)	vf(v)	$v^2f(v)$	$\Sigma uvf(uv)$
		3	2	1				
		Code Score						
Low	1	3 9	2 144	1 106	259	259	259	421
Medium	2	6 39	4 133	2 18	190	380	760	802
High	3	9 28	6 22	3 1	51	153	459	387
Total f(u)		76	299	125	500	792	1478	1610
uf(u)		228	598	125	951			
$u^2f(u)$		684	1196	125	2005			
$\Sigma uvf(uv)$		513	952	145	1610			

r = 0.51 ** Significant at 0.01 level and .05 level of probability

Computation of co-efficient of correlation from the bivariate Table 6.17

Here, u denotes attribute 'Adoption'

v denotes attribute 'Socio-economic status'

$$\bar{u} = \frac{\sum uf(u)}{N} = \frac{951}{500} = 1.90$$

$$\bar{v} = \frac{\sum vf(v)}{N} = \frac{792}{500} = 1.58$$

$$\sigma\bar{u}^2 = \frac{\sum u^2 f(u)}{N} - \bar{u}^2 = \frac{2005}{500} - (1.90)^2 = (0.63)^2$$

$$\sigma\bar{v}^2 = \frac{\sum v^2 f(v)}{N} - \bar{v}^2 = \frac{1478}{500} - (1.58)^2 = (0.67)^2$$

$$\text{cov(u,v)} = \frac{\sum uvf(u,v)}{N} - \bar{u}\bar{v} = \frac{1610}{500} - 1.90 \, x 1.58 = 0.218$$

$$r = \frac{\text{cov}(u,v)}{\rho u \rho v} = \frac{0.218}{0.63 \, x \, 0.67} = 0.51$$

By using student's *t-test* where $H_0(\rho = 0)$ against

$$H_1(\rho \neq 0)$$

$$t = \frac{r - 0}{\sqrt{1 - r^2}} x \sqrt{N - 2}$$

=13.54** (Significant)

Table $t_{498,0.05} = 1.96$

$t_{498,0.01} = 2.58$

Table 6.18 : Table showing Relationship between Extension Contact of the Farmers and their Level of Adoption

Adoption u / Extension Contact v		High	Medium	Low	Total f(v)	vf(v)	$v^2f(v)$	$\Sigma uvf(uv)$
		3	2	1				
		Code Score						
Often	2	6	4	2	67	134	268	346
		41	24	2				
Rare	1	3	2	1	91	91	91	204
		29	55	7				
No contact	0	0	0	0	342	0	0	0
		6	220	116				
Total f(u)		76	299	125	500	225	359	550
uf(u)		228	598	125	951			
$u^2f(u)$		684	1196	125	2005			
$\Sigma uvf(uv)$		333	206	11	550			

r = 0.56 ** Significant at 0.01 level and .05 level of probability

Computation of co-efficient of correlation from the bivariate Table 6.18

Here, u denotes attribute 'Adoption'

v denotes attribute 'Extension Contact'

$$\bar{u} = \frac{\sum uf(u)}{N} = \frac{951}{500} = 1.90$$

$$\bar{v} = \frac{\sum vf(v)}{N} = \frac{225}{500} = 0.45$$

$$\sigma\bar{u}^2 = \frac{\sum u^2 f(u)}{N} - \bar{u}^2 = \frac{2005}{500} - (1.90)^2 = (0.63)^2$$

$$\sigma\bar{v}^2 = \frac{\sum v^2 f(v)}{N} - \bar{v}^2 = \frac{359}{500} - (0.45)^2 = (0.71)^2$$

$$\text{cov(u,v)} = \frac{\sum uvf(u,v)}{N} - \bar{u}\bar{v} = 0.25$$

$$r = \frac{\text{cov}(u,v)}{\rho u \rho v} = 0.56$$

By using student's *t-test* where $H_0(\rho = 0)$ against

$$H_1(\rho \neq 0)$$

$$t = \frac{r - 0}{\sqrt{1 - r^2}} x \sqrt{N - 2}$$

= 15.05** (Significant)

Table $t_{498,0.05} = 1.96$

$t_{498,0.01} = 2.58$

Table 6.19 : Table showing Relationship between Knowledge of the Farmers about Agricultural Technology and their Level of Adoption

Adoption u / Knowledge v		High	Med-ium	Low	Total f(v)	vf(v)	$v^2f(v)$	Σuvf(uv)
		3	2	1				
		Code Score						
High	3	9 27	6 6	3 0	33	99	297	279
Medium	2	6 46	4 177	2 17	240	480	960	1018
Lower	1	3 3	2 116	1 108	227	227	227	349
Total f(u)		76	299	125	500	806	1484	1646
uf(u)		228	598	125	951			
$u^2f(u)$		684	1196	125	2005			
Σuvf(uv)		528	976	142	1646			

r = 0.59 ** Significant at 0.01 level and 0.05 level of probability

Computation of co-efficient of correlation from the bivariate Table 6.19

Here, u denotes attribute 'Adoption'

v denotes attribute Knowledge'

$$\bar{u} = \frac{\sum uf(u)}{N} = \frac{951}{500} = 1.90$$

$$\bar{v} = \frac{\sum vf(v)}{N} = \frac{806}{500} = 1.61$$

$$\sigma\bar{u}^2 = \frac{\sum u^2 f(u)}{N} - \bar{u}^2 = \frac{2005}{500} - (1.90)^2 = (0.63)^2$$

$$\sigma\bar{v}^2 = \frac{\sum v^2 f(v)}{N} - \bar{v}^2 = \frac{1484}{500} - (1.61)^2 = (0.61)^2$$

$$\text{cov(u,v)} = \frac{\sum uvf(u,v)}{N} - \bar{u}\bar{v} = \frac{1646}{500} - 1.90 \, x 1.61 = 0.23$$

$$r = \frac{\text{cov}(u,v)}{\rho u \rho v} = 0.59$$

By using student's *t-test* where $H_0(\rho = 0)$ against

$$H_1(\rho \neq 0)$$

$$t = \frac{r - 0}{\sqrt{1 - r^2}} x \sqrt{N - 2}$$

= 16.45** (Significant)

Table $t_{498,0.05} = 1.96$

$t_{498,0.01} = 2.58$

CHAPTER SEVEN

SUMMARY AND CONCLUSION

Training and Visit system of extension is the latest and largest extension network. It spreads over almost in all the States of India. The present study was an attempt to assess the impact and performance of that particular extension (T and V) system introduced in North Bengal in late seventies. An analysis has been made on the exposure of the farmers to information and extension, their present level of knowledge about improved cultivation practices of certain crops and overall attitude towards the T and V system. The study attempts to evaluate the credibility of the T and V system in terms of its efficiency in making linkage between extension and farming system. It also traces the impediments which affect the very objectives of the T and V system of agricultural extension.

The present study was conducted in two northern districts of West Bengal namely Jalpaiguri and Cooch-Behar. Two Blocks from each district Viz. Alipurduar I and Alipurduar II from Jalpaiguri, and Cooch-Behar I and Cooch-Behar II from Cooch-Behar district were selected purposively. Fourteen villages from Alipurduar sub-division of the Jalpaiguri district and eleven villages from Cooch Behar sub-division of the Cooch Behar district were selected randomly. In total 500 sample farmers (279 from the Jalpaiguri district and 221 from the Cooch Behar district) were selected randomly as the respondents of present enquiry. The selection of sample was based on multi-stage stratified random sampling with village as the primary unit and farmer as the ultimate unit of observation. Field data were collected through personal interview with the help of a structured interview schedule. Agricultural year 1995 - 96 was taken into consideration as the reference period of the study. The fieldwork was carried out

during late 1995 to early 1997. In the following sections some salient findings of the study have been presented.

Since early fifties, like in other States, several agricultural extension systems were introduced in West Bengal in succession. But none of them succeeded in eliciting desired result. In 1977, the Training and Visit system, a particular form of extension originally developed by Daniel Benor, was introduced. Under this system, a Village Extension Worker (VEW) is required to work intensively with a group of 800-1200 farm families. A Village Extension Worker functions under the control of Agricultural Development Officer. Extension functionaries have exclusive responsibility in rendering agricultural extension services to the farmers. A special feature of the system is, there is an arrangement of systematic training of extension functionaries by Subject Matter Specialists (SMS) fortnightly and on a fixed day. Monitoring and concurred evaluation of extension programmes, linkage with research and coordination with supporting agencies are some other unique features of the T and V system.

For administrative control, there is a single line of command from the Director of Agriculture to the VEW .In each district at Sub-division and Block levels Agricultural Development Officer is suppose to supervise the activities of village level extension functionaries viz. *Krishi Prajukti Sahayak* (KPS). The Director of Agricultural is the overall in charge of the extension system as well as of the department concerned.

The present study was designed to enquire about the efficiency of the T and V system of extension in influencing (i) the level of adoption of improved farm practices, (ii) the level of knowledge about latest and new technologies, and farm management and (iii) information need of the farmers. The attitude of the farmers towards this extension system was also examined in order to assess the role of KPS in diffusion of agricultural innovations. The socio-economic and cultural background of the farmers facilitating or obstructing the very aim of the

Training and Visit system was also studied. More specifically, efforts were made to examine the credibility of the T and V system of agricultural extension in transforming traditional agricultural practices in two districts of North Bengal.

Chapter two gives an account of findings of some earlier studies related to diffusion of agricultural innovations through T and V system of extension. From the review of earlier studies it appears that re-organized agricultural extension system was designed to provide adequate information and advice to farmers in adopting new technologies, mitigating personal agricultural problems, and feed back to extension officers and researchers. However, in some cases lack of effective linkage between the research station and extension had been noticed. The research-extension linkages were promoted through training of extension workers where they were provided with up to-date information on latest technologies.

It has been observed that the resource position of the common farmers often stood in the way for better / appropriate adoption of new technologies. The extension services were rendered in order to motivate them in adopting all the recommended practices so far kept aside. The re-organized extension system there fore gives more emphasis to the spread of low cost technologies. The T and V system is currently serving to the larger segment of small and marginal farmers, and who are now well exposed to various new agricultural information. The programme is however not free from certain shortcomings. The most serious one of which is the irregular visits to farmers by VLWs. Inadequate mobility of extension workers leads to poor extension contact between functionaries and farmers.

Chapter three provides a preliminary idea about the overall agricultural situation of two districts under study and the infrastructure facilities available to the sample villages. The methodology used in this study was also discussed in this chapter.

The cultivable area in the study districts was covered principally by agricultural crops. In addition, there were forests and tea plantations. Numerically there were proportionally more small and marginal farmers among the farming communities. An important ecological character of the area was its high rainfall and which was annually more than 3000 mm. The cropping intensity was more than 200 per cent. The special cropping feature was the dominance of jute cultivation as a cash crop. The artificial irrigation was available only in about 20 per cent of the cultivated area. The Scheduled Castes and Scheduled Tribes constituted more than fifty per cent of total population and the overall literacy rate was about 37 per cent.

For making a significant linkage between extension services and research station, there are seven agricultural research institutions/ centres in the area. This apart the farmers also enjoy the agricultural marketing facilities and the services of three cold storages. Agricultural extension network is available in all the Blocks of the area and there are more than 500 fertilizer and pesticide sales corners. The Agricultural University located at Cooch-Behar district has made a significant dent in improving agricultural education, research and extension in North Bengal.

The economy of the study area is largely dependent on agriculture. In improving the agriculture of the region, the facility of irrigation and electricity is not available as per need of the farmers. To meet the credit requirements of the farmers, Banks and Co-operatives are not appreciably available in the villages. Health and education services are there at the doorstep but are quite meagre in terms of actual requirement. Development of metalled roads is essential for transporting farm produces. But more than 80 per cent of the villages are connected with *Kachha* (unmetalled) roads. On the whole, the requisite infra-structural facilities are not available in the villages of the study area.

Despite limited facilities available to them, the farmers of North Bengal have grown all the major crops. During 1984-85 to 1995-96, there has been substantial increase in the average yield of the main crops like HYV jute, Aus paddy, HYV Potato and Mustard. Along with the introduction of intensive agricultural extension, the productivity of HYV Aus paddy has gone up to 3.98 tones per hectare in 1995-96 from 2.10 tones in 1984-85. The corresponding increase in the case of wheat was from 1.49 tones to 1.56 tones. The yield of potato has also increased from 8.21 tones to 22.47 tones. Such an increase in productivity of certain important crops has taken place may be due to farmers favourable attitude towards new agricultural technologies and their adoption.

As far as the socio-economic background of the respondents is concerned the majority of the respondents were young and belonging to the age group of 30 to 45 years. Of the total sample about 20 per cent were illiterate and only about eight per cent were graduates. About 85 per cent of the respondents used to live in small and medium sized families, and only 15 per cent had large family. Majority (51.80%) of the respondents had the annual income below Rs. 15000/-, of which 47.60 per cent were belonging to the income bracket of Rs. 6401 to 15000/-. Only a small section (10.20%) had earning above Rs. 40,000. In the sphere of social participation about 18 per cent of the farmers had some kind of participation to *Krishi Unnayan Samabaya Samiti* (agricultural development co-operative society) and about three per cent were directly associated with Gram-Panchayat. The principal occupation of 97 per cent of the respondents was cultivation and for another 4.60 per cent it was their subsidiary occupation. The cultivators were mostly (85%) marginal and small landholders. They used to participate in all essential agricultural field works directly. The proportion of households principally and / or subsidiarily depended upon non-agricultural pursuits was considerably low. The most (91 per cent) of the respondents were found to live in *Kachha* huts.

Irrigation is an important pre-requisite for cultivation. However, 51.80 per cent of the respondents had no irrigated land. So they had to depend on vagaries of nature. Among the owners of irrigated land the medium and large farmers were better represented. Irrigation sources available to the farmers were Shallow Tube-well (S.T.W.), Deep Tube Well (D.T.W.), River Life Irrigation (R.L.I.), and Ponds etc. The S.T.W was found to be the main source of agricultural irrigation in the regions under study.

Little more than one-third (35.40 per cent) of the respondents had kitchen garden in the parts of their homestead land. It helped fetching them an average income of Rs. 1627 annually. All the major crops like jute, Aus and *Aman* paddy, wheat, potato, mustard etc., and varieties of vegetable were grown by the cultivators. Jute and HYV Aus paddy was the main crop in pre-*kharif* season. Majority of the respondents were inclined to cultivate jute. But due to low monetory return from it they were not paying much attention to fertilizer application in jute cultivation. The average yield of HYV Aus paddy was high and thus help augmenting income to the farm families. The farmers were quite aware of recommended practices involved in the cultivation of Aus paddy. Majority (81.72 per cent) of the growers of HYV Aus paddy applied balance dose of fertilizer in this cultivation. The high return from Aus paddy motivated the growers to adopt better and scientific cultural practices.

Rain fed *Aman* paddy was the dominant crop in *kharif* season. Due to its better outturn capacity the HYV paddy has replaced the local variety to a great extent. Though the average net return from the HYV paddy was high, the majority of the growers were not accustomed to apply any fertilizer in this cultivation. They thought such an application might go waste due to prolonged monsoon in the season. In the agrarian economy of the two districts under study the cultivation of *Aman* paddy occupies considerable importance.

During Rabi season the farmers used to grow wheat, potato, mustard, vegetables etc. Due to poor economic return from wheat, its average area under cultivation was dismally low. The farmers who grew potato reaped the highest net return on an average of Rs. 5574.70. The majority of potato growers had adopted scientific cultivation techniques. A section of marginal and small farmers were however less inclined to cultivate potato, as it was more capital intensive. Artificial irrigation has enhanced the area under vegetable cultivation in a big way. The farmers growing vegetables were conscious in applying recommended doses of fertilizer for their better yield.

Farmers of the study area presented a bleak picture as far as the ownership of modern agricultural implements like pumpset, thresher, tractor, power tiller etc. are concerned. An insignificant proportion of the farmers had quite a few improved agricultural implements and had gone for mechanization. In this age of mechanization in agriculture, draught animals remained the only source of farm power for majority of the farmers.

Chapter six deals with the nature of exposure of the respondents to agricultural information and their use in mitigating certain problems in family farming. In redressing the problems of agriculture and inculcating new practices the utility and effectiveness of Training and Visit system of extension has been examined here .The Training and Visit system is expected to function as an important medium of extension communication in providing up-to-date information on agricultural practices to the cultivators. The attitude, knowledge and adoption behaviour of the farmers towards new agricultural technology have also been reviewed in this chapter.

The respondents were in varying degrees exposed to farm broadcasting of radio and television, various agricultural messages appeared in print media like newspaper, leaflets, pamphlets; farm demonstration and other sources of information. In the study area about 43 per cent of the respondents were exposed

to radio. The corresponding percentage for television and film were 10 and 14 respectively. Nearly 18 per cent farmers had the habit of reading newspaper and only one per cent got the opportunity of reading magazine occasionally. The use of print and electronic mass media was often impaired by low levels of literacy and poor accessibility. Out of total radio listeners, 35.60 over cent used to listen to agricultural programmes of AIR and majority of them acquired some knowledges particularly about cultivation techniques and plant protections from those broad casting.

Among the viewers of *chasbas* programme telecasted by regional (Calcutta) television centre a few of them got some idea from it about fertilizer application and new cultivation techniques of certain crops like paddy, wheat and vegetables. To redress certain technical problems associated to their personal cultivation, about 29 per cent farmers became benefited from the information received from radio, printed materials and farm demonstration. Only 16.20 per cent respondents specifically found printed materials like leaflets and pamphlets as useful source of information and those helped enriching their knowledge in paddy and potato cultivation and thus enjoying better out turn.

Agricultural demonstration could be a powerful mass medium to disseminate new ideas and knowledge about certain agricultural practices. But only 11.20 per cent of the farmers got the opportunity to participate in demonstration camp or programme. So the situation was not at all encouraging. Only 11.60 per cent farmers had some exposure to agricultural fairs and exhibitions. Needless to say village level agricultural fairs and exhibitions are not held quite frequently or regularly.

The Department of Agriculture officially organizes training camp in every year with a view to motivate the farmers towards scientific cultivation practices that could lead to higher productivity. But ironically even when 75 per cent of the cultivators know about such training programme, only 19 per cent of them

actually attended the same. Technical knowledge acquired by the participants from training camps was mainly pertaining to irrigation and water management, scientific techniques involved in cultivation of different crops, and pest control method. However the post training follow-up measures adopted by the participant farmers were not all that satisfactory. So it warrants sustained efforts to improve the training component of the current extension programme.

Under minikit programme the State department of agriculture distributes small quantity of good quality of testified seeds to some farmers at different localities so that they can multiply and later distribute the same to others. Almost all the farmers were quite aware about the minikit programme, whereas only 34 per cent actually got the said inputs. The recipients of minikits suggested that to make it a more effective programme there is a need to supply better quality of seeds in time and in well advance before the commencement of the cropping season.

The farmers often encountered with certain operational problems in their agriculture. Problems of pest and disease, and inadequate irrigation were identified some of the major hazards faced by the farmers. Others were land reclamation, availability of inputs in time, exorbitant price of certain input etc.

To mitigate the technical problems of their agriculture, the farmers had to depend on formal and informal sources of knowledge and information. Leaving aside the formal or institutional sources of information, for about 59 per cent of the farmers, it was the fertilizer dealer who was their permanent as well as reliable source of information. About 41 per cent of the respondents used to seek advice from progressive and knowledgeable farmers of the village. There fore on the part of the project management there is a need to provide up-to-date knowledge of new agricultural technologies to both fertilizer dealers and progressive farmers by making frequent contact with them.

Under the Training and Visit (T&V) system of extension, direct linkage between KPS and the farmers has been prompted to promote and strengthen the diffusion process by fostering fortnightly visits of the KPS to farmers at their field situation. However, it has been observed that the linkage between the extension and farming system has failed to achieve the desired pattern as originally envisaged by the experts.

Present study reveals that even after two decades of operation of the T and V project in North Bengal, 48.40 per cent of farmers not even personally knew the KPS in their area. With reference to regularity of visit by the KPS, only nine per cent farmers were found contacted by the KPS[2]. Thus the majority (91 per cent) of the farmers left uncontacted during the reference period. That indicates the basic weakness in the very functioning of the ongoing T and V system of extension. In terms of nature of contact between KPS and farmers it was about 71 per cent of the farmers who on their own personally contacted the KPS for securing required information and advice. Thus the farmers were serious and keen enough to obtain suggestion and advice from the KPS. On the question of kind of benefits received from KPS, for about 83 per cent of the farmers it was the KPS who helped them enrich knowledge about plant protection measures, fertilizer application, irrigation management, and in getting intimation of distribution of minikit. In contrast, about 17 per cent farmers found that as far as the knowledge and services are concerned, their contact with the KPS was not all that useful. On the question of fulfillment of information need the bulk (75.20 per cent) of the farmers reported that the advices offered by the KPS during their visits were not adequate enough to fulfil their information needs. The remaining

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2. It is to be noted that according to the philosophy of T & V system at least 10 per cent of the farmers to be directly contacted by KPS for dissemination of agricultural information (Yadav, 1991: p74-75) who may further act as local contact farmers for the average and general cultivators.

28.40 per cent however gave some credit to KPS for offering them quite useful suggestions. They were also fortunate to exchange their views with KPS during his official field visit. The non-contact farmers were unable to enjoy the services offered by the KPS.

On the very utility of Training and Visit programme 25 per cent farmers felt that the programme is quite useful and it helped them in multiple ways to increase their farm output. However, majority (75 per cent) of the farmers were somewhat pessimistic about the merits of the programme. The main weakness of the programme, as identified by them, was the farmers' poor contact with the village level extension functionaries. They further suggested that to make the Training and Visit system much more effective, the activities of grass root level extension functionaries (KPS) need to be boosted in terms of frequency of their contact, concern about up-to-date information and its timely delivery to the clients.

It is interesting to note that despite several inadequacies of the existing T&V system of extension, the productivity of all the major crops has increased considerably. In fact, the two districts under study have improved enough in their yield of major crops. The farmers who were in close contact with extension workers used to enjoy certain services rendered by those village level functionaries. Another few farmers who had undergone training and acquired some technical knowledge about new agricultural practices often apply those in personal cultivation and also disseminate them to others. A small group of educated farmers found mass media like radio, television, leaflets, pamphlets etc., as important sources of agricultural information and that helped them acquiring knowledge about certain agricultural innovations. They are often approached by the common farmers for information and advice in agricultural matters. The commercial agents like fertilizer dealers of the area played an important role in providing certain information like fertilizer application, pest

control etc., to the consultant farmers. Thus, the agricultural information and extension system available and suited to the local condition serves in different ways in informing, educating and motivating the farmers.

The Training and Visit system has been introduced as the latest model of extension to boost up the agricultural production. In the present study, majority (71.60 per cent) of the respondents had some kind of favourable attitude towards this system. Better exposure and contact to training and village level functionaries has obviously helped some farmers to adopt new agricultural practices. Table 6.10 depicts that greater proportion (54.60 per cent) of the farmers had average to high level of scientific knowledge in cultivation and 45.40 per cent respondent farmers received a low score of knowledge in scientific cultivation. That is a slow but positive impact of T&V programme in the districts under study.

It is however quite surprising that out of 11 scientific practices recommended for paddy (a major crop) cultivation, seven were poorly adopted by the farmers. More than 80 per cent of farmers were found non-adopters of said practices. Those specific practices were plant protection measures, use of improved farm implements, seed treatment, irrigation management, better storing procedure, soil reclamation and use of improved cattle. The prime reasons behind non-adoption of such practices were inadequate knowledge of farmers about the recommendations and the cost involved in their use.

As far as the source of information is concerned the majority (about 52 per cent) of the farmers got necessary information about certain scientific treatments involved in paddy cultivation from the progressive / knowledgeable farmers of the locality. For another 31 per cent it was the fertilizer dealers. On the other hand only 18 per cent farmers received the requisite information from KPS. That certainly indicates the weakness of village level functionaries in dissemination required knowledges to the deserving farmers.

Adoption of certain recommended practices in paddy cultivation was influenced by nature of extension contact with the farmers. The association between the two was positive and significant. Adoption of some improved practices in paddy cultivation was strongly correlated with the level of knowledge of the farmers about new technologies and their attitude towards T and V system. It has been observed that farmers with favourable attitude towards T and V system adopted scientific procedures in a better way in cultivation of paddy than the others. Some of those potential adopters were well exposed to the training and visit system of extension and information. And for all practical purposes, ~~that agricultural extension~~ the said extension system appeared to them quite useful and progressive. One may further believe that if the existing shortcomings of the system are removed it could be an effective device of extension and communication in disseminating modern agricultural knowledge and information to the farmers.

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