Ad-hoc Study No.56

IMPACT OF

TRAINING AND VISIT SYSTEM

IN

MADHYA PRADESH

(A Study in Chhindwara and Vidisha districts)

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I N T R O D U C T I O N

1.1 Process of Agricultural Development in India

The slow growth rate of agricultural development which did not keep pace with the demands of the tillers of the soil, leave apart the demand of the country, was noted by the British Rulers and the Royal Agricultural Research Council of India was founded to improve the conditions of agriculture. This council, is now known as Indian Council of Agricultural Research. After independence agricultural development received topmost attention of the planning commission. To begin with, the Community Development Blocks were established on October 2, 1952 for all sided development of the country side specifically in the field of agriculture. This scheme was followed by National Extension Service Blocks. Later on Intensive Agricultural District Programmes (IADP), Intensive Agricultural Area Programmes (IAAP), Small Farmers Development Agency (SFDA) were carried out in the selected districts to achieve the goal of agricultural development. In 1964 a major breakthrough was achieved with the evolvement of High Yielding Varieties of different crops, particularly, wheat and paddy. With the adoption of high yielding varieties along with fertilizer application and plant protection measures the green revolution ushered in the country in 1965-66.

Green revolution created imbalances in agricultural development between the regions and between the farmers. There were regions and there were farmers within the region who reaped the cream of green revolution while others were not able to achieve even the average standards of agricultural production. This created gap between the regions and between the farmers.

It was thought that a balanced agricultural development should be achieved, which may provide benefits to all farmers, regions and the nation at large.

1.2 Adoption of Training and Visit System of Agricultural Development

The World Bank expert. Mr. Daniel Benor identified this major problem in the following manner:-

1. Lack of single line of command.
2. Dilution of efforts by assigning a multipurpose role to field extension workers.
3. Excessively large areas of operation for field extension workers.
4. Lack of regular training for up-dating knowledge of extension workers.
5. Lack of linkage with research.

A better approach to agricultural extension was contemplated by Mr. Daniel Benor through "Training and Visit" system. This T&V System was thought to provide systematic and regular upto-date advice on farm practices to the farmers in the best suited conditions having immediate impact on their income. This was to be accomplished by organising extension field staff so that they visit farmers regularly and receive systematic training and technical support from the department and research institutions.

Training is vital to build skill and professional confidence among the extension workers. Field workers at different levels need regular and systematic training. With this view, various training courses are organised for different categories of extension functionaries both outside and within the state.

The officers of the level of Joint Director of Agriculture/ Deputy Director of Agriculture/District level Subject Matter Specialist receive training outside the state at All India Institutes like Indian Agriculture Research Institute, New Delhi. Central Plant Protection Training Institute, Rajendra Nagar, Hyderabad, Extension Education Institute, Anand etc. These trainings are sponsored by the Government of India and are mainly on crop production technologies of wheat, rice, cotton, sugarcane, pulses, oilseeds, plant protection technology, water management, dryland farming, communication techniques and extension methodology etc.

Agricultural Extension and Research are mutually dependent. Extension requires the findings of research to reach the farmers. Research also requires extension guidance on problems that farmers face and on new issues that become apparent from field exposures and on which research attention should be focussed. Under the T&V system effective linkages between research and extension have been developed for conducting problem oriented research and its transfer to farmers through the extension workers.

1.3 Adoption of Training and Visit system in Madhya Pradesh

The intensive extension research project commonly known as Training and Visit system was introduced in Madhya Pradesh in the year 1977-78 with the coverage of 5 districts. Later on 10 districts were brought under this programme during 1978-79 under first phase. Second phase of this project started from 1980-81 and by the end of 1985-86 all the districts were brought under the fold of T & V system.

1.4 Main Objectives of Training and Visit System

The main objectives of the system have been as follows :-

1. A coordinated approach for increasing production where Research, Education & Training and Extension play their respective roles effectively so that their complementary nature is made best possible use of.

2. Reorganisation of the extension set-up in such a manner that the grass root functionary, the village extension worker, is able to meet farmers often, on a fixed day, to identify their problems and to solve them.

3. Decentralize and strengthen applied and adoptive research programmes to enable them to meet the needs of the farmers in a specific area.

4. Enable the Village Extension Worker to devote all his time for contacting farmers, identifying their problems, guiding and training them for wider adoption of technology.

5. Motivate the farmers to adopt technology at a faster rate so that the gap between research and extension is reduced, thus forcing research to keep pace with changing needs of farmers.

6. Attain minimum increase in yield by 25 kgs. per hectare in the case of food crops 7 years after the launching of the system.

1.5 Objectives of this study

Training and Visit system in Madhya Pradesh is in operation since 1977-78. The Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi, directed this Centre to conduct an evaluation study to assess the impact

of T & V system on the farmers with special reference to adoption of improved technology to increase the production, diffusion of farm technology through the extension techniques and workers and regular trainings and visits system. The present study was conducted with the following objectives :

1. To assess the adoption of improved farm technology among the farmers and its impact on crop productivity.
2. To study the impact of T&V system in diffusing the improved farm technology among the selected contact farmers.
3. To assess the regular fortnightly visits to solve the farmers problems and training of extension workers.
4. To study the monitoring and evaluation procedure adopted for proper implementation of T&V system in the state.
5. To study the constraints and to suggest measures to make the T&V system more effective and efficient to do better in the future.

1.6 Methodology

1.6.1 Sample

A meeting was held with the officers of Directorate of Agriculture, Madhya Pradesh, Bhopal, for the selection of districts. In the meeting it was decided that two districts should be selected and among these one district should be from among the districts of first phase and another district from the second phase. It was further stressed that one of the two districts must be a tribal district. In view of this it was suggested by the State Govt. Officials that Chhindwara district be selected as a tribal district from the first phase districts and Vidisha district from the second phase districts.

Thus Chhindwara and Vidisha districts were selected and from each district two blocks were taken up to select the contact farmers. The blocks selected from Chhindwara district were Tamia and Sausar and from Vidisha district, Vidisha and Ganj Basoda blocks were selected.

A sample of 100 farmers was taken up for field investigation and it included 60 contact farmers and 40 non-contact farmers. From each block 15 contact farmers and 10 non-contact farmers were selected.

In view of the area and production wheat, gram, soybean, jowar and groundnut appeared as major crops in Chhindwara district and that wheat, Gram, soybean, Masoor and jowar in Vidisha district. Among these crops wheat, Gram, Soybean and jowar returned as major crops in both the districts.

Thus these crops were given special care in the present study while other crops were studied in general.

1.6.2 Data Collection

Structured schedules and questionnaires were prepared to collect both primary and secondary data by survey method. The secondary data were collected from official records and the primary information was solicited from the sample farmers by convassing the schedules and questionnaires prepared for this purpose. Data were analysed by applying simple statistical tools.

1.6.3 Reference year

Collection of data was done in 1987-88 with the reference year 1986-87.

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CHAPTER-II

CONCEPT OF TRAINING AND VISIT SYSTEM*

Role of extension in agricultural development was often not recognized due to the difficulties of isolating the impact of extension activities on agricultural production from many other factors that have direct or indirect impact. Improved seeds, fertilizers, new crops, plant protection, irrigation, marketing and price structure are supporting factors of production but it is essential to provide effective agricultural extension service to achieve the required production gains. Because T&V system emphasises simplicity in organization, objectives and operation, it has a well defined organization with a clear mode of operation and it provides continuous feed back from farmers to extension and research and continuous adjustment to their needs.

The main idea of the system is to have competent well informed village level extension workers who would visit farmers frequently and regularly with relevant technical messages and bring farmers' problems to research stations. Essentially, continuous training and regular field visits by staff solely occupied with agricultural extension, built-in supervision, continuous upgrading of staff, monitoring and evaluation of all agricultural extension activities and minimal office and paper work must be closely followed everywhere. If this is not done the potential effectiveness of the T&V System is drastically curtailed.

The training and visit system is designed to achieve results rapidly and at as little cost as possible. The financial cost of this system to the farmers is very small.

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*(This chapter is mainly a reproduction of summaries given in a World Bank Publication : "Training and Visit Extension" by Daniel Benor and Michael Baxter, 1984)

2.1 Some key features of the training and visit system

The purpose of training and visit system of agricultural extension is to build a professional extension service that is capable of assisting farmers to raise production and increase their incomes and provide appropriate support for agricultural development. A key means to this end is the creation of a dynamic link between farmers, professional extension workers and researchers. This is done through the training and visit system of extension, the impact of which is readily apparent over a wide range of agro-ecological conditions in farmers' fields, whether irrigated or rainfed.

The system has been widely adopted in many countries, with some adjustments, reflecting particular agro-ecological conditions, socio-economic environments and administrative structures. To be successful, the training and visit system must be adopted to fit local conditions. Certain features of the system, however, cannot be changed significantly without adversely affecting its operation. These features include professionalism, a single line of command, concentration of effort, time-bound work, field and farmers orientation, regular and continuous training and close linkages with research.

2.2 Role of the Village Extension Worker

The Village Extension Worker (VEW) is the only extension worker who teaches production recommendations to farmers. He is just as specialised and professional as other extension workers. The task of teaching the farmers suitable technical practices and convincing farmers to try them is not easy. Hence, the VEW must receive intense support and guidance and must not be burdened with non-extension functions. Moreover, the nature of his work and his

achievements must be recognised personally and in terms of opportunities for professional growth and technical upgrading. The main responsibility of the VEW is to visit regularly each of the contact farmers, groups of his area of jurisdiction (the "circle"), and to teach and try to convince the farmers to adopt recommended production practices. He must also advise farmers on the prices and availability of necessary inputs and market conditions. He should report farmers' response to recommendations, production problems, input demand and availability, and market conditions to his supervisor (the Agricultural Extension Officer) and in training. Days without a regularly scheduled visit or training are used for makeup visits, farm trials, and field days. In addition to making field visits for atleast eight days, each fortnight the VEW must attend a fortnightly training session given by Subject Matter Specialists (SMS) and a review meeting with his Agricultural Extension Officer (AEO).

2.3 Role of the Agricultural Extension Officer

The importance of the Agricultural Extension Officer (AEO) is frequently under estimated. The AEO has two basic functions. The first is to review and assist in the organizational aspects of the job of the Village Extension Worker (VEW); the second, to provide technical support to the VEW, in particular to see that production recommendations are effectively taught to farmers and that field problems encountered by a VEW, and which he himself cannot resolve, are passed on immediately to appropriate authorities. Like the VEW, the AEO is primarily a field worker. He spends atleast 8 days each fortnight in the field, visiting each of the eight or so VEW's of his area of jurisdiction (the "range"), in particular to make sure that farmers are being visited regularly

by the VEW, and that the recommendations they receive are appropriate and are adopted. He reviews whether contact farmers have been correctly selected, farmers groups are properly delineated, and all farmers are aware of the VEW's visit schedule and activities. The AEO should also conduct some farm trials in farmers fields, participate in fortnightly training sessions. and hold a fortnightly review meeting with his VEWs. In addition to these specific tasks, the AEO should take any step that may be necessary to fulfil his main responsibility of helping the VEW increase his effectiveness as an extension worker.

2.4 Role of Sub-Divisional Extension Officer

The Sub-Divisional Extension Officer (SDEO) has overall responsibility for effective agricultural extension in his sub-division. Through leadership, planning and supervision, he must ensure that extension has a significant impact on agricultural production and farmers' incomes. To do this, the SDEO must use his initiative to take any action required to increase the effectiveness of the extension service. The SDEO is active in two main areas- field visits and training- in addition to coordinating information on the actual and likely supply and demand of agricultural inputs and on market conditions in his sub-division. He makes field visits on atleast three days each week to review both technical and organizational aspects of the work of extension staff in his subdivision. He is the organizer, convenor and leader of fortnightly training sessions. Monthly and zonal workshops and other extension research meetings are attended by the SDEO mainly to ensure that significant relevant local conditions are taken into account in the formulation of recommendations and research activities. The SDEO should ensure that extension staff of his

sub-division receives adequate and appropriate special training.

2.5 Role of the Subject Matter Specialist

The Subject Matter Specialist (SMS) who provides technical training and guidance to extension workers, has an important role in the formulation of production recommendations, and is a focus of links between extension and research. The extension service's ever-increasing requirement of technical specialization is met primarily through increasing the number of SMSs and improving their degree of specialization. SMSs are usually placed at all the three levels (Sub-division, district and headquarters), at each of which they have three common functions: to make field visits, to train extension staff, and get trained by and exposed to research. Approximately, equal time is devoted to each function. In field visits, their main concerns are : to check the correctness of recommendations taught to farmers by Village Extension Workers (VEWs), farmers reactions to production recommendations, and aspects of agriculture that require additional recommendations or reference to research. SMSs are the trainers at fortnightly training sessions as well as for some specialized short courses. SMSs are trained by research staff at monthly workshops and elsewhere. They also visit research stations, attend specialized training courses given by researchers and conduct farm trials. This regular contact with research ensures the proposed conditions to perform their vital function effectively. SMSs should be hired, trained, and promoted within a specialized staff cadre.

2.6 Village Extension Worker Circles, Farmers Groups and Agricultural Extension Officers Ranges

Effective agricultural extension depends on extension messages reaching many farmers, and farmers' problems reaching

extension staff, quickly and regularly. A key means towards this end are regular & fixed visits made by extension workers to specific groups of farmers within a precisely defined area. The groups of farmers for which the base- level extension worker- Village Extension Worker (VEW)- is responsible comprise the VEW "circle". The size of the circle is derived from a broad ratio of effective operating farm families to a VEW, which is based mainly on the compactness of settlement, the case of communications, and the intensity of agriculture. There is no standard rule for determining the number of operating farm families to be served by one VEW. The number should not be so large that the VEW's messages are unable to reach quickly to most farmers. A common ratio is one VEW to about 800 operating farm families. The farmers of a circle are divided into eight "farmers groups", each of which will be visited on a fixed day by the VEW. VEW circles that are the responsibility of one Agricultural Extension Officer (AEO), the immediate supervisor of the VEW, comprise the AEO "range". A range should be sufficiently small (usually comprising not more than eight VEW circles) so that each VEW in it can be closely and effectively guided by the AEO. The areas of circles, farmers groups, and ranges must be compact and contiguous.

2.7 Contact Farmers

Frequent contacts between a Village Extension Worker (VEW) and all farmers in his circle is not possible. Instead, while being responsible to all farmers, on each fortnightly visit the VEW focuses on a small, selected number of farmers- "Contact farmers" in each farmers group, and meets with any other farmers who are willing and interested to attend his visits and seek his advice. Contact farmers are identified by the VEW and the Agricultural

Extension Officer (AEO) with the assistance of the local villagers, especially village elders. Contact farmers are selected according to the following characteristics: (1) they should represent proportionately the main socio-economic and farming conditions of their group and be regarded by other farmers as able and worthy of imitation; (2) they should be practising farmers; (3) they should be willing to adopt relevant recommendations on atleast a part of their land, allow other farmers to observe the practices, and explain the practices to them; (4) as far as size and composition of farmers' groups permits, they should come from different families; and (5) their farms should be dispersed throughout the group area. Tenants, sharecroppers, young farmers, and women farmers may be contact farmers if they possess these characteristics. No major type of farmer should be over- or under-represented among the contact farmers of a group. Once a contact farmer becomes disinterested in the work of the VEW or becomes in other ways ineffective, he should be replaced.

2.8 Visits

A key feature of the training and visit system of agricultural extension are the regularly scheduled visits to farmers' fields by extension staff. Visits are made, on the one hand, to advise and teach farmers the recommendation on relevant agricultural technology and to encourage them to adopt these, and, on the other, to establish in extension and research, an awareness of actual farmer's conditions and needs. All extension staff on field visits should listen as much as they talk. The basic extension worker is the Village Extension Worker (VEW), who visits each of his eight groups of farmers on a fixed day once every fortnight. His visits must be regular, specific, and purposeful. On a visit, a VEW should

teach production recommendations to as many farmers as possible, and certainly to all contact farmers, and attempt to convince them to adopt the recommendations on atleast a small part of their land. The Agricultural Extension Officer (AEO) visits his eight or so VEW's regularly in the field- not less than once each fortnight- guiding, supervising, and giving technical support. The Sub-Divisional Extension Officer (SDEO) makes field visits for atleast three days a weak, providing support for VEWs and AEOs in technical and organizational aspects of extension. The SDEO is responsible for the effectiveness of extension in his area, seeing to it that the VEWs and AEOs work as required. Subject Matter Specialists (SMSs) spend one third of their time in the field providing technical support to VEWs and AEOs. Field visits by AEOs, SDEOs, and SMSs are an important means of support for VEWs.

2.9 Fortnightly Training

The chief means of continuously upgrading and updating the professional skills of Village Extension Workers (VEWs) and Agricultural Extension Officers (AEOs) is the fortnightly training session, which is held for one full day each fortnight. At fortnightly training, VEWs and AEOs review farmers reactions to previous recommendations taught, specific recommended practices that will be taught to farmers during the coming two weeks, report field problems or conditions that need to be taken into account in these recommendations or which are to be passed on to research stations for investigation, and discuss, and learn from each others' experience. The organizer of the training session is the Sub-Divisional Extension officer (SDEO), helped by the Training Officers. The trainers are primarily Sub-Divisional Subject Matter Specialists (SMSs). Not more than about thirty VEWs and AEOs should attend

a fortnightly training session. Representatives of local input and marketing organizations should also attend and some local farmers may be invited. Training should emphasize a small number of production recommendations and impact points and encourage practical work by the VEWs and AEOs. Fortnightly training sessions can be organized in a number of ways, although each should include some common activities and involve approximately equal time in teaching and in practical work.

2.10 Monthly Workshops

The monthly workshop is the main venue of in-service training for Subject Matter Specialists (SMSs) and of regular contacts between extension and research workers. The main purpose of the two-day workshop is to build up the technical skills of SMSs regularly in the field of their specialization so they can meet effectively the actual technological needs of farmers. Another purpose is for researchers and SMSs to discuss and formulate relevant production recommendations for subsequent transferral to Village Extension Workers (VEWs) and Agricultural Extension Officers (AEOs) by SMSs at the next two fortnightly training sessions. To be effective, monthly workshops must have a strong practical orientation and encourage discussion among participants. The learning that takes place through extension and research workers discussing each others' experience is as important as the formal learning of recommendations and solutions to farmers problems. Monthly workshops should be held at a district level, if possible. They require considerable advance planning. Monthly workshops may be organized in a variety of ways, although there are basic activities that must be covered in each.

2.11 Production Recommendations

Production recommendations are the specific agricultural practices that extension teaches the farmers. They represent the most suitable and economically viable production technology for a crop under a farmers production conditions. Without production recommendations, it is impossible to plan, implement, monitor, or evaluate extension work, and extension staff are unlikely to be able to assume their desired active and diagnostic role. All major crops and practices should be covered by production recommendations, although at any given time extension will emphasize selected key points from the recommendations. Recommendations should be so designed that farmers would be willing and able to follow them. Therefore, recommendations that represent a new practice for a farmer must be financially feasible, result in increased production and income, and entail minimum risk. Recommendations are provisionally developed at seasonal zonal workshops of extension and research staff; they are refined and modified at monthly workshops and fortnightly training sessions to take into account of local field and production conditions. To be useful to farmers, recommendations must be continually reviewed and adjusted in the light of changing production conditions.

2.12 Linkages between Extension & Research

Extension and research are dependent on one another for their successful operation. Extension needs research findings and its solutions to technical problems to teach to farmers as production recommendations. Extension should serve as a main source for research to develop an orientation to, and maintain an awareness of, actual farm problems. While close linkages between extension and research are a necessity, they are not easy to achieve. Under

the training and visit system of extension systematic procedures have been established to promote and strengthen the necessary linkages by means of periodic meetings of research and extension staff in the monthly workshops, as well as through seasonal zonal workshops of the State Technical Committee. Though its frequency, activities, and composition, the monthly workshop is the most important of these meetings. Research/ Extension linkages are also promoted through the training of extension staff by research staff, by collaboration in farm trials, and through visits of research staff to farmers fields and of extension staff to research facilities.

2.13 Applied and Adaptive Research

Applied research is the development of new technology and its verification under different agro-ecological conditions. Applied research is the responsibility of Agricultural Universities or other research organizations rather than the Department of Agriculture. Adaptive research is usually the responsibility of the Department of Agriculture, although farm trials are planned by extension and research together, executed by extension, and analyzed by extension and research. Subject Matter Specialists (SMSs), Agricultural Extension Officers (AEOs) and Village Extension Workers (VEWs) are all closely involved in farm trials, which are also reviewed in seasonal and monthly extension/research workshops.

2.14 Supervision

Good extension is rarely possible without effective supervision. Supervision should be tailored to fit the training and visit system of agricultural extension. Supervision must take place at the location of the activity to be supervised the only

exception being supervision of training. Supervision must be thoroughly planned and thoughtfully implemented. The objective of supervision is to guide the staff and help them to become more effective. Besides Village Extension Workers (VEWs) all extension staff have some supervisory functions, the nature and intensity of which vary according to their levels of responsibilities. Extension supervisors at all levels should check (among other things) the end result of extension work: whether farmers benefit economically and otherwise from extension.

2.15 Diaries of Village Extension Workers and Agricultural Extension Officers

Diaries are used to record three main things : (1) basic information about the VEW's circle or AEO's range (2) the extension workers daily activities and problems encountered in the field; and (3) the main points discussed in each fortnightly training session. With such information, the diary serves as a guide to VEWs and AEOs in their field work and training and to supervisory staff in their guidance to extension workers. It should not, however, be used to monitor or evaluate an officers work. A diary should be relatively small and sturdy, so that it can with-stand constant use in the field (where problems and observations are recorded as they arise). It should be available for perusal by officers, who should write substantive comments in it whenever they visit the staff in the field. No copies should be made of the diaries and, of course, no copies should be sent to any officer.

2.16 Monitoring and Evaluation

Monitoring keeps track of extension activities and progress in the implementation of the extension system. Evaluation determines the impact of extension activities, particularly on the

production and income of farmers. Monitoring and evaluation of training and visit extension entails three functions, the first being done by extension management and the other two by a monitoring and evaluation unit : (1) routine monitoring of extension activities and their impact (staff employed, training conducted, field visits made, and so on); (2) monitoring and evaluation surveys of farmers covered by the extension service, focussing on visits made by extension staff, recommendations taught to farmers, and crop yields; and (3) special studies of particular aspects of the extension system. Reporting of all monitoring and evaluation must be done concisely and quickly if it is to be of use to management. To do their job effectively, monitoring and evaluation staff must be properly trained, be autonomous from the extension service, and have adequate mobility to conduct survey and other work as scheduled.

2.17 Training of Extension Staff

Professional agricultural extension depends on the continuous upgrading of staff through training. Regular fortnightly, monthly and seasonal training, specialized training of staff is required. Special training requirements should be determined under the guidance of extension management and Training Officers by evaluating the skills and training needs of all staff individually. The extension service must have a professional atmosphere in which a staff member who does not attend regular and specialized training and who does not improve professionally, feels out of place in the service's environment of learning, training and know-how. Training priorities must be established, and long-term and annual programmes to meet these be drawn up. As a guide, each staff member should participate in atleast one special short course each year. Some

training requirements may be met through short courses held by Universities and other training institutions. Others should be organized and given by extension staff. In addition to short courses, some staff will require longer-term upgrading through refresher training or university degree studies.

2.18 Information Support

Dissemination of information about extension operations is important within the extension service for the training and motivation of staff and as input for policy decisions. Externally, it builds up understanding and support for extensions objectives and achievements. Information support activities must be carefully planned, implemented and monitored. Staff are available for the task, particularly Training Officers. Success stories from staff, farmers' reactions to extension, general data on extension activities and achievements, and monitoring and evaluation results are chief subjects for dissemination. Suitable verified stories on these subjects should be publicised and made available to newspapers and radio and at exhibitions.

2.19 Planning Extension Activities

The organisational structure and fixed schedule of activities of the training and visit system of agricultural extension enable extension to operate in a systematic way. For extension to be truly effective, however, extension goals (and strategies to achieve these) must be continuously valuated and their implementation planned. Planning of extension activities takes place at different levels, but at each level there is the same concern for making general goals specific and for identifying strategies to achieve these goals. Agricultural extension and research staff

dominate the extension planning process, but farmers and representatives of agricultural input and marketing agencies are involved at all levels. Effective planning depends on feedback from lower levels of strategy implementation. This is particularly important at planning closest to the farmers where objectives and strategies are the most detailed. Targets of activity are a vital part of the planning process, but care should be taken that the criteria for the targets are defined in terms of extension's specific goals.

2.20 Agricultural Input Supply and Extension

Agricultural input supply and agricultural extension are mutually dependent. Confusion over the responsibility of extension with respect tc inputs is common although the relationship is clear: extension workers at any level do not handle any inputs and are not responsible for their distribution or sale. Extension does have an important role, however, in advising input agencies of the input supply situation in the field and anticipated demand. It also has an interest in the accuracy of this information as it will affect the timely availability of inputs. Farmers should not be advised of production recommendations involving inputs unless those inputs are available to them. To ensure this necessary coordination, representatives of input agencies should participate in preseasonal, monthly, and fortnightly extension planning and training meetings.

2.21 Communication Techniques

Without an effective system of communication within the extension service and between it an farmers, agricultural extension can achieve little. The training and visit system of extension establishes a broad structure to facilitate such communication,

but equally important are the communication skills of extension staff. Five communication techniques have proved to be particularly effective in training extension staff : practical orientation, skill teaching, trainee involvement, samples and examples, and visual aids. These techniques have some application in extension contact with farmers, but there the use of contact farmers and initial implementation of production recommendations on small areas are important communication techniques.

2.22 Incentives for Extension staff

Staff of an agricultural extension service should receive appropriate incentives to work well. The most effective incentives to good work is that a job be purposeful and satisfying, and that good work be recognized and rewarded. Appropriate incentives are particularly important in extension, since the effectiveness of the system depends to a large extent on the contribution of lower-level staff. The employment structure of an extension service must provide material and encouragement for staff at all levels. An attractive, flexible remuneration structure, access to training on the basis of need and ability, promotion in response to responsibility and ability, and the establishment of professional staff cadres, all under effective management, are necessary. Selective incentives such as awards and study tours are most useful in the context of a well-managed system that caters to the overall professional development of all extension staff.

2.23 Agricultural Extension and Farm women

Women have an important role in agriculture. Their involvement in agriculture varies between cultures, but there are few major agricultural operations in which women do not participate. To be truely effective an agricultural extension service must deal with

the activities handled by women. This is not often done, however, because of sociological constraints and inadequate focus by extension on women's agricultural activities. An agricultural extension service can adopt a number of strategies to improve its support for farm women, among others, by developing production recommendations of activities solely or largely performed by women. Ways to ensure this contact include the selection in each farmers group of some female contact farmers. Whatever approach is adopted to have extension serve farm women, local agricultural, sociological. and administrative considerations should be taken into account, and involvement of extension, research, and training staff at all levels is required.

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C H A P T E R-III

THE STATE OF MADHYA PRADESH AND T&V SYSTEM

In this Chapter the details of operation of T & V system in the state of Madhya Pradesh have been given. Before we describe the administration etc. of the system as such it will be useful to know a few characteristics of the state. The same are given below:

3.1 Background of Madhya Pradesh

3.1.1 Location:

Centrally situated between the latitudes 17° 48'N and 26°52' N and the longitudes 74°2'E and 84°24'E, Madhya Pradesh is said to be the heart of India surrounded by Uttar Pradesh and Rajasthan in the north and north west, Andhra Pradesh in the south, Maharashtra in the west and Orissa and Bihar states in the east.

3.1.2 Area, Villages and Administrative Divisions

Madhya Pradesh is biggest in area amongst all the Indian states. It occupies an area of 4,43,446 sq.kms. which has 76,603 villages and 327 cities and towns. For administrative purpose the state is divided into 45 districts which are grouped into 12 divisions. The developmental activities in the state are channelized through 459 development blocks. In addition, under tribal sub-plan 62 Integrated Tribal Area Development Projects are also running in the scheduled tribal areas of the state.

3.1.3 Population and its characteristics

Madhya Pradesh ranks sixth in population amongst the Indian states. In the census 1981, there returned 5,21,78,844 persons including 2,68,86,305 males and 2,52,92,539 females. In the density of population, Madhya Pradesh occupies 14th position amongst the

states excluding the smaller states and union territories. It had 118 persons per square kilometre. There returned 941 females for every 1000 males.

The state population comprised 22.97 per cent scheduled tribes-men and 14.10 per cent scheduled caste people. The literacy in the state was 27.82 per cent while growth rate for the last decade (1971 and 1981) was 25.15 per cent. Madhya Pradesh is mainly a rural state and its 4,15,92,385 persons or 79.71 per cent population reside in the country side. Proportion of workers in the state population was 38.41 per cent. Among the workers 51.96 per cent were cultivators, 24.24 per cent agricultural labourers and the remaining 23.80 per cent workers were engaged in other trades.

3.1.4 Physical Features:

Broadly speaking the state is full of forest-clad-hilly-terrains. The Vindhyas and Satpuras are the two parallel mountain ranges running west to east through the middle of the state. Nermada is the longest river running through the state for more than 1,000 kilometres from east to west. It has its origin at Amarkantak in Shahdol district.

The main physical regions of the state are (i) the Northern Region (ii) the Malwa Plateau (iii) the Narmada valley (iv) the Satpura Ridge and (v) Chhatisgarh Plains.

The main river systems in the state are the Chambal, the Betwa, the Sone, the Narmada, the Tapti, the Mahanadi and the Indrawati.

The state is divided into six catchments of the six important rivers viz. Jamuna, Narmada, Tapti, Godawari, Mahanadi

and Ganga. The catchment of Jamuna covers largest area of the state followed by those of Narmada and Mahanadi. The catchments of Godawari and Ganga also cover an appreciable area but that of Tapti is confined to a small area in the south of Satpura Hills in Betul and Khandwa districts. The catchment of Narmada is located in the central part of the state. It is separated from the catchment of Jamuna in the north by the ranges of Vindhya and Bhander hills and from the catchment of Tapti and Godawari in the south by the Satpura and Mahadeo hill ranges, from the catchment of Mahanadi in the east by Maikal hills and from the catchment of Ganga in the north east by the eastern flanks of the Vindhya hills.

3.1.5 Climate:

The average rainfall of the state is 1135 mm. per annum. The most important rainfall characteristic of the state is that about nine-tenth of it falls during the monsoon season i.e. June to September. Neither the total annual rainfall nor its distribution in various months of the year has any stability, as both suffer from a high degree of variability.

Classification of districts by annual rainfall

Annual (Normal) Rainfall	Districts included
Below 875 mm.	Bhind, Morena, Datia, Gwalior, Shivpuri, Mandsaur, Jhabua, Khargone, Dhar
875 mm. to 1000 mm.	Khandwa, Ujjain, Ratlam, Indore, Shajapur
1000 mm. to 1125 mm.	Tikamgarh, Guna, Chhatarpur, Dewas, Betul, Satna, Rajgarh
1125 mm. to 1500 mm.	Vidisha, Panna, Damoh, Rewa, Sagar, Sehore, Sidhi, Durg, Jabalpur, Hoshangabad, Narsinghpur, Chhindwara, Raisen, Seoni, Raipur, Bilaspur, Shahdol, Surguja.
1500 mm. & above	Bastar, Mandla, Raigarh, Balaghat

January and February are the coldest months and May and June are the hottest months.

3.1.6 Soils

The main soil types met with in the state are alluvial, deep black, medium black, shallow or light black, mixed red and black, mixed red and yellow and skeletal or gravel.

Classification of districts according to soil types

Soil types	Districts included
Alluvial soil	Gwalior, Morena, Bhind
Deep black soil	Narmada valley (Narsinghpur, Hoshangabad and part of Jabalpur district)
Medium black soil	Raigarh, Mandsaur, Shajapur, Ratlam, Ujjain, Dewas, Indore, Jhabua, Dhar, Sidhi, Shahdol, Damoh, Sagar, Khandwa, Raisen, Sehore, Bhopal, part of Jabalpur and southern part of Shivpuri district.
Shallow black soil	The central Satpuras covering the districts of Seoni, Chhindwara and Betul
Mixed red and black soil	Rewa, Satna, Panna, Chhatarpur, Tikamgarh, Datia and part of Shivpuri district.
Red and yellow soil	Raipur, Raigarh, Bilaspur, Durg, Rajnandgaon, Balaghat and part of Mandla, Surguja and Bastar.
Skeletal or gravel soil	The stony uplands of the Vindhya and Satpura ranges covering part of Shahdol, Raigarh, Mandla, Surguja, Bastar and Jhabua.

3.1.7 Land Utilization

The total geographical area of the state is 442.10 lakh hectares, of which 192.06 lakh hectares or 43.44 per cent is cultivated as compared to 46.61 per cent for the country as a whole.

Area under non-agricultural uses accounted for 56.56 per cent including 31.78 per cent forests. The proportion of forest area in

the country as a whole was lesser (22.08 per cent). Madhya Pradesh has an area of 140.50 lakh hectares under forests and it covers 20.92 per cent of the total area under forests in the country.

About 13 per cent of area in the state is not available for cultivation and 8.50 per cent is under culturable waste including 3.14 per cent permanent fallow. Another 5.10 per cent is uncultivable which includes pastures, grazing lands, tree crops and groves (Table 3.1).

Table 3.1 Land use classification of India and Madhya Pradesh

Particulars	Madhya Pradesh (1984-85)		India (1982-83)		Percentage of M.P. to India
	Area	%	Area	%	
1. Forests	140.50	31.78	671.61	22.08	20.92
2. Land put to non-agricultural uses	22.58	5.11	195.82	6.44	11.53
3. Barren and un-cultivable land	23.10	5.22	201.39	6.62	11.47
4. Permanent pastures and other grazing land	27.92	6.32	119.56	3.93	24.86
5. Land under misc. trees, crops and groves	1.50	0.34	35.51	1.17	4.22
6. Culturable waste	17.42	3.94	163.13	5.36	10.68
7. Current fallows	8.99	2.03	141.33	4.65	6.36
8. Other fallow land	8.03	1.82	95.53	3.14	8.40
9. Net area sown	192.06	43.44	1417.69	46.61	13.55
Geographical Area	442.10	100.00	3041.70	100.00	14.53

3.1.8 Agriculture

During 1984-85, an area of 209.08 lakh hectares was under agricultural uses and it included 3.85 per cent fallow land including 1.82 per cent old fallow. An area of 192.06 lakh hectares or 43.44 per cent of the total geographical area was sown and an area of 32.01 lakh hectares or 7.24 per cent was sown more than once. Thus the gross-cropped area of the state accounted for 224.07 lakh hectares.

Area irrigated by different sources was 3010 thousand hectares covering 15.7 per cent of the net sown area. The sources of irrigation included canals, tanks, wells and other sources. Among these wells irrigated the largest area of 1285 thousand hectares or 42.7 per cent followed by canals (1267 thousand hectares or 42.1 per cent). There were 2710 canals, 50588 tanks, 939 reservoirs, 11374 tubewells and 10,33,880 irrigation wells in the state.

The crops of the state mainly thrived on rains particularly the monsoon. The kharif crops therefore are the mainstay of agriculture and they covered nearly two-third of the food crops. During the year the food crops were sown on 18,184.9 thousand hectares, of which an area of 14,088.4 thousand hectares or 62.88 per cent was sown under kharif crops and 8,318.3 thousand hectares or 37.12 per cent under rabi crops. The crop groups included cereals, millets, pulses, oilseeds, vegetables, spices and fruits, fibres, fodder crops and other crops.

Among these crops, cereals and millets were sown on 12,935.9 thousand hectares or 57.73 per cent, pulses on 4,833.7 thousand hectares or 21.57 per cent, oilseeds on 2,761.2 thousand hectares or 12.32 per cent, fruits, vegetables and spices on 336.0 thousand

hectares, fibre crops on 550.0 thousand hectares and fodder crops on 883.8 thousand hectares.

Paddy, wheat, jowar, maize, gram, urd, tur, teora, groundnut, sesamum, soybean, linseed, cotton, potato appeared as important crops. However, of the total gross cropped area of 22,406.7 thousand hectares, total food crops covered 18,184.9 thousand hectares or 81.16 per cent and non-food crops 4221.8 thousand hectares or 18.84 per cent. (Table 3.2)

Table 3.2 Main features of cropping pattern, 1984-85

(Area in thousand Hectares)

Particulars	Area	Percentage
1. Net sown area	19205.5	85.71
2. Area sown more than once	3201.2	14.29
3. Gross cropped area	22406.7	100.00
4. Classification of crops		
I. a) Kharif	14088.4	62.88
b) Rabi	8318.3	37.12
II. a) Food Crops	18184.9	81.16
b) Non-food crops	4221.8	18.84
III. a) Cereals & millets	12935.9	57.73
b) Pulses	4833.7	21.57
c) Oilseeds	2761.2	12.32
d) Fruits, Vegetables & Spices	336.0	1.50
e) Fibre crops	550.0	2.45
f) Fodder crops	883.8	3.94
5. Area under main crops		
1. Paddy	4921.9	21.97
2. Wheat	3589.6	16.02
3. Jowar	1902.7	8.49
4. Maize	840.2	3.75
5. Gram	2074.3	9.26
6. Urd	768.8	3.43
7. Tur	490.2	2.19
8. Teora	671.5	3.00
9. Linseed	574.0	2.56
10. Soybean	986.5	4.40
11. Cotton	522.4	2.33

Wheat was largely sown under irrigation conditions while other crops generally irrigated included paddy, gram, cotton, sugarcane, vegetables and spices.

Average yield reported for some of the important crops for the year 1984-85 was not encouraging. In this year the average yield per hectare obtained from paddy was 802 Kg.wheat 1141 Kg. jowar 798 Kg., maize 1379 Kg., bajra 777 Kg., barley 875 Kg.,gram 626 Kg., tur 817 Kg., urad 167 Kg., groundnut 532 Kg., sesamum 168 Kg. linseed 221 Kg., soybean 780 Kg., cotton 268 Kg., potato 12359 Kg. and onion 14095 Kg. (Table 3.3)

Table 3.3 Average yield of important crops, 1984-85

Crops	Yield (Kg./hect.)
Paddy	802
Wheat	1141
Jowar	798
Maize	1379
Bajra	777
Barley	875
Gram	626
Tur	817
Urad	167
Groundnut	532
Sesamum	168
Linseed	221
Soybean	780
Cotton	268
Potato	12359
Onion	14095

3.2 Training and Visit System in Madhya Pradesh

Madhya Pradesh is one of the backward states of Indian Union. Scheduled Tribes comprised nearly 23 per cent of the state's population. Agriculture in the state is still in the backward stage and there are certain areas like Baiga Chack and Abhujmarh where settled cultivation is yet not done by the Adivasis. Agricultural production in the backward areas of the state is not keeping pace with the average standards of the production.

3.2.1 Introduction of Training and Visit System in Madhya Pradesh

A better approach to the agricultural extension called training and visit system was contemplated by Mr. Daniel Benor and was first tried through a pilot project in the Chambal command area of Madhya Pradesh. It was started in September 1975 with the Coverage of 5 extension blocks of Bhind and Morena districts. After two seasons the average yield of wheat rose from 13 quintals to 20 quintals per hectare. Encouraged with the results obtained through this pilot project the agricultural extension system in the state was organised as per the guidelines of Training and Visit system.

3.2.2 Coverage of districts

As was done elsewhere in India, the Madhya Pradesh Government also adopted Training and Visit system for the development of agricultural extension services and agricultural production in a balanced manner. Training and Visit system in Madhya Pradesh was introduced in two phases.

First phase started in the year 1977-78 when 5 districts namely Balaghat, Bhind, Morena, Sehore & Raisen (Bari) were covered. During the next year (1978-79) 10 more districts were covered to

complete the first phase. These districts were Bilaspur, Chhatarpur, Chhindwara, Gwalior, Jhabua, Khandwa, Mandsaur, Narsinghpur, Sagar & Satna. Total outlay of Rs.18.77 crores was provided for a period of 5 years to be incurred on this project in these districts.

Mid-term appraisal of phase-I was carried out in October 1980 by the Government of India and World Bank. The results obtained were quite encouraging. Therefore, it was decided to extend the Training and Visit System to all the remaining districts of the State in a phased manner under phase second of the project. The yearwise coverage of the districts under Training and Visit system during phase second was as under :

Year	Districts
1981-82	Raipur (2 units), Tikamgarh, Guna, Raisen
1982-83	Indore, Ujjain, Rewa, Sidhi, Vidisha, Surguja (2 units), Bastar (North)
1983-84	Durg, Raigarh, Shahdol, Datia, Shivpuri, Khargone, Dhar, Ratlam, Bastar (South)
1984-85	Jabalpur, Panna, Betul, Bhopal, Rajgarh, Dewas, Shajapur
1985-86	Rajnandgaon, Mandla, Seoni, Damoh

The total outlay for the project in phase second is about 48.04 crores.

3.2.3 Organisational pattern :

At the state level, Director of Agriculture holds the overall command of Training and Visit project and he is assisted by two Additional Directors of Agriculture. At the division level Joint Director of Agriculture coordinates the activities of Training and Visit project among the different districts of a division.

At the district level, the Deputy Director of Agriculture is the overall incharge for the implementation of Training and Visit project. A team of five Subject Matter Specialists (SMSs) (Training, Agronomy, Plant Protection, Water Management and Supply) are provided for greater support to Subject Matter Specialists (SMSs) at Sub-Divisional Agricultural Officer (SDAO) level and for field visits. At the tehsil or sub-division level one Sub-Divisional Agriculture Officer (SDAC) is made responsible for the execution and supervision of 3-4 blocks. He is also provided 4 ubject Matter Specialists (SMSs)-Agronomy, Training, Plant Protection and Supply . At the block level a senior Agriculture Development Officer (ADO) at the headquarters is appoint to regulate the input supplies and to guide Agricultural Development Officers (ADO's) . There is one Agricultural Development Officer (ADO) to supervise the work of 6 Rural Agriculture Extension Officers (RAEO's) in the block. At the grass root level one Rural Agricultural Extension Officer (RAEO) is placed to cover 500 farm families in the major irrigation command areas and 700 farm families in other areas.

Organisational pattern is given in the following chart :-

Organisational chart of Training and Visit Project in Madhya Pradesh

Extension Officers	Level of Administration
Director of Agriculture	State
2 Additional Directors of Agriculture (JDA & DDA)	
Joint Director of Agriculture	Division
Deputy Director of Agriculture	District
5 Subject Matter Specialists	
Sub-Divisional Agriculture Officer	Sub-division
4 Subject Matter Specialists	
Senior Agriculture Development Officer	Block
RAEO (Input)	
Agriculture Development Officer	ADO Circle
Rural Agriculture Extension Officer	Village

3.2.4 Extension Methodology adopted under Training and Visit Project

Each RAEO is assigned to work with a certain number of farm families. During phase-I, one RAEO was made responsible for 600 farm families, but now in phase-II, in districts which have a predominance of tribal population, sparsely distributed and in areas where medium and major irrigation projects are in operation, one RAEO covers 700 farm families. To reach the farmers systematically, the RAEO divides them into 8 groups consisting of about 60-90 farm families. He visits each group regularly on a fixed

day once a fortnight. During his visit, the RAEO concentrates his efforts on about 10 contact farmers selected from each group, involving as many other farmers as possible. During each visit, the RAEO concentrates on only a few strategically selected recommendations relevant to that particular phase in the crop cycle. The RAEO is supervised and guided in his work by an ADO. One ADO supervises the work of 6 RAEO's and spends atleast 4 days a week visiting them in the field. One senior ADO is provided in each block to supervise and guide ADO's in the block and to regulate input supplies with the assistance of 3 RAEO's. Once in a fortnight the RAEO receives a full day's intensive training at Block Headquarters from Subject Matter Specialists regarding recommendations for the following fortnight.

At the Sub-division level, one SDAO is made responsible for the supervision of 3 to 4 blocks. Four SMS's (Agronomy, Training, Plant Protection and Supply) are provided to assist the SDAO. The SDAO is responsible for supervising ADOs in his area and for ensuring effective extension operation. SMSs are to train the RAEO's once in a fortnight and to provide technical support and guidance to RAEOs in the field. They are also required to build their own stock of knowledge by having a dialogue with research workers, carrying out simple field trials in farmers fields and attending short training courses. Two Statistical Assistants are provided at the SDAO level for the special job of monitoring and evaluation of reorganised extension project.

At the district level, Deputy Director of Agriculture is directly responsible for extension operations throughout his district and for guiding/supervising the work of SDAOs. A team of 5 SMS's (Training, Agronomy, Plant Protection, Water Management

and supply) are provided for greater support to SMSs at SDAO level and for field visits. One scientist of the Agricultural University is provided at district level (Phase-I) for coordinating the research programmes, training activities, preparation of lesson plans etc. At this level one Research Assistant is provided for the special job of monitoring and evaluation of the extension project.

The Divisional Joint Director of Agriculture is in-charge of the division consisting of 4-6 districts. He is responsible for supervising the extension programme in these districts. He is assisted by six Subject Matter Specialists for field work and one Assistant Director of Agriculture (Statistics) to monitor the activities.

At the state level the Director of Agriculture is responsible for all the activities of the department. He is assisted by 5 Additional Directors of Agriculture, 13 Joint Directors of Agriculture, 22 Deputy Directors of Agriculture and 25 Assistant Directors of Agriculture in programme planning and implementation, giving technical guidance to the field officers and evaluating the programmes. For extension service a full time Additional Director of Agriculture has been provided.

3.2.5 Training

Training is vital to build the skill and professional confidence among the extension workers. Field workers at different levels need regular and systematic training. With this view, various training courses are organised for different categories of extension functionaries both outside and within the state.

The officers of the level of Joint Director of Agriculture/ Deputy Director of Agriculture/District level Subject Matter Specialists are sent to receive training outside the state at All India Institutes like Indian Agricultural Research Institute, New Delhi, Central Plant Protection Training Institute, Rajendranagar, Hyderabad, Extension Education Institute, Anand, etc. These trainings are sponsored by the Government of India and are mainly on crop production technologies of crops such as wheat, rice, cotton, sugarcane, pulses, oilseeds, plant protection technology, water management, dry land farming, communication techniques and extension methodology etc.

Within the state, trainings are organised for subject Matter specialists and Agricultural Development Officers with the assistance of the Directorate of Extension, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Water and Land Management Institute, Bhopal, Central Institute of Agricultural Engineering, Bhopal on various subjects like crop production technologies, plant protection technology, soil & water management, dry farming, horticulture, farm implements and farm machinery, storage of farm produce, communication techniques in extension etc.

Refresher courses and orientation workshops are regularly held for Agriculture Development Officers and Rural Agricultural Extension Officers. There is also a provision in the project for Agricultural Development Officers for post graduate courses and Rural Agricultural Extension Officers for graduate courses.

3.2.6 Fortnightly Training

This training is organised after every 15 days at the SDAO level where the ADOs and RAEOs are trained so that they can pass on the latest technology to the contact farmers for adoption.

3.2.7 Monthly Workshops

These are organised in almost all the districts in close coordination with the research scientists and attended by the District Agronomist, Other research scientists, Deputy Director of Agriculture, Subject Matter Specialists at district level, Sub-Divisional Agriculture Officers and their Subject Matter Specialists etc.

The extension workers, after collecting the specific problems from farmers and their reactions regarding adoption of new technology, provide feed back to the research workers. Lesson plan is also prepared in these workshops.

3.2.8 Research and Extension linkage

Agricultural Extension and Research are mutually dependent. Extension requires the findings of research to reach the farmers. Research also requires extension guidance on problems that farmers face and on new issues that become apparent from field exposures and on which research attention should be focussed. Under the Training and Visit system effective linkages between research and extension have been developed. For conducting problem oriented research and its transfer to farmers through the extension workers, 12 agro-climatic regions in the 5 crop zones have been identified according to soil types, rainfall, temprature and cropping systems etc. In each of the agro-climatic regions research station has

been suitably strengthened or set-up to cater the needs of the region. Each regional station provides technical support to the extension system of the region. Linkages between research and extension systems are achieved by setting up coordination committees at different levels as follows:

A. State Level Coordination Committee under the Chairmanship of the Agricultural Production Commissioner to solve problems at the state level and to have proper coordination between the Agricultural University, Agriculture Department and other agencies.

B. Central Planning Committee under the chairmanship of the Director of Agriculture, Director of Extension and other Senior Scientists from University are the members of this committee. This committee meets twice a year and approves the research programme of the adaptive trials etc. for each crop season and passes on instructions to the research stations and the field workers.

C. Regional Coordination Committee : Senior Joint Director of Agriculture (from field) is the chairman of this committee and Associate Director of Research and other scientists, Deputy Directors of Agriculture are the members. This committee reviews the research work done at various research stations and on cultivators fields, analyses the problems of the extension workers and the farmers and approves the programme for adaptive trials for the season.

CHAPTER-IV

SELECTED DISTRICTS

4.1 Chhindwara District

4.1.1 Location

Chhindwara district is named after the town of Chhindwara which is located almost in the centre of the district. The district is situated on the Satpura plateau between 21°28' and 22°49' North latitudes and 78°10' and 79°24' East longitudes. It is bounded in the north by Hoshangabad and Narsinghpur districts, on the east by Seoni district, on the south by Nagpur district of Maharashtra and on the west by Amaravati district of Maharashtra.

4.1.2 Physical Features

Chhindwara district is situated on the southern boundary of Madhya Pradesh and forms a part of Jabalpur division. The entire district lies in the "Satpura Range" of mountains at a height of about 370 to 1000 metres. The whole district is intersected by rivulets and streams. Small hills are scattered all over the plateau.

4.1.3 Climate and Rainfall

Chhindwara district exihibits considerable variations in the climate in the light of its physiographical divisions. The plains of Sausar have hot climate like the plains of Nagpur. North east portion including Tamia are on higher elevation and these areas enjoy cool climate as that of Panchmarhi. The central portion of the district is modest. January is the coldest month in the year when maximum and minimum temperatures are 25.5°c and 10.6°c

respectively. May is the hottest month and temperature varies between 39.2°c and 26.1°c during day and night.

District receives rainfull from south west monsoon. The average rainfall is least in the plains of Sausar but it increases with the rising elevation to the north. The average rainfall of the district is 1035 mm. Rains start in the third week of June from the south west monsoon and continue till October. The months of July and August receive heaviest down pour. District also receives some rains during winter.

4.1.4 Area, Villages and Population

The district has an area of 11,849 square kilometres. It ranks tenth in area among the districts of Madhya Pradesh.

According to 1981 census, the population of the district was 12,33,131 residing in 1,996 villages and 13 towns.

4.1.5 Scheduled Castes and Scheduled Tribes

The district has a large population of Scheduled Tribes numbering 4,11,478 persons which constitutes 33.38 per cent of the total population. Scheduled Castes (1,45,131) form 13.77 per cent of the total population of the district. Thus 47.15 per cent of the population of Chhindwara comprises of Scheduled Castes and Scheduled Tribes. Major tribes returned from the district are Gond, Pardhan, Bharia and Baiga.

4.1.6 Literacy

Chhindwara district has made spectacular progress in the field of literacy attainments. There returned 10 per cent literates in the census of 1951 and this figure increased to 16.28 per cent in 1961 just

about the state figure of 17 per cent. In the 1971 census the proportion of literates was 22.04 per cent while the state figure was 22.14 per cent. Literacy among the males was 31.82 per cent while among the females it was 11.93 per cent.

4.1.7 Administrative Units

The district is divided into 6 tehsils namely Chhindwara, Amarwara, Sausar, Pandhurna, Tamia and Parasia. There are 11 development blocks in the district. The district has an extensive forest area and is divided into three forest divisions and 22 forest ranges.

4.1.8.1 Land Utilization

Chhindwara is full of forest-clad-hilly-terrains. It has an area 1184.9 thousand hectares of which 37.4 per cent is under reserve forests. Further, area not available for cultivation or barren and unculturable land and land put to non-agricultural uses was 98.7 thousand hectares or 8.3 per cent. Other uncultivated land including pastures etc. was 57.7 thousand hectares or 4.9 per cent. Culturable waste was 24.6 thousand hectares or 2.1 per cent. The area available for cultivation was 561.3 thousand hectares or 47.4 per cent and it included 66.4 thousand hectares or 5.6 per cent fallow land. Thus of the total area 52.6 per cent was earmarked for non-agricultural purposes and 47.4 per cent for agricultural uses (Table 4.1).

Table 4.1 Land Utilization, Chhindwara District, 1984-85

Particulars	Area (Thousand Hect.)	Percentage to total geographical area
1. Forests	442.6	37.4
2. Land not available for cultivation	98.7	8.3
a) Land put to non-agricultural uses	49.2	4.2
b) Barren and unculturable land	49.5	4.2
3. Other uncultivated land excluding fallow land	82.3	6.9
a) Permanent pastures and other grazing land	57.3	4.8
b) Land under miscellaneous tree crops and grove not included in net area sown	0.4	0.03
c) Culturable waste	24.6	2.1
4. Fallow land	66.4	5.6
a) Fallow land other than current fallows	32.4	2.7
b) Current fallows	34.0	2.9
5. Net area sown	494.9	41.8
Total geographical area	1184.9	100.00

4.1.8.2 Crop zones

Agriculturally Chhindwara district is divided in three crop zones.

1. Niger-Kodon- Kutki Zone

This zone covers entire Tamia, Harrai and Junnardeo blocks and nearly 40 per cent area of Amarwara, Mohkhed and Parasia blocks.

Soil is gravelly and sandy loam in general while light black cotton soil is also found in patches. Topography of this zone is mostly rolling.

2. Jowar-Wheat Zone

In this tract Chhindwara, Chourai, Bichhuwa blocks are included fully and nearly 60 per cent of Amarwara, Parasia and Mohkhed blocks are also treated as a part of this zone.

It possesses shallow black cotton soil and its topography is comparatively less undulating.

3. Jowar-Cotton-Groundnut Zone

Under this zone comes Sausar and Pandhurna blocks and its soil is of shallow and medium black cotton type. This zone possesses long patches of plain area.

4.1.8.3 Utilization of area under agricultural uses

An area of 561.3 thousand hectares was available for cultivation purposes. Of this 32.4 thousand hectares or 5.8 per cent was under old fallows and 34.0 thousand hectares or 6.1 per cent current fallows. Area used for growing crops was 494.9

thousand hectares of which 82.7 thousand hectares or 16.7 per cent was sown more than once. Thus the district had cropping intensity of 117 per cent. Area irrigated was 62.0 thousand hectares or 12.5 per cent of the net area sown.

Gross cropped area was 577.6 thousand hectares of which 443.4 thousand hectares or 76.8 per cent was sown under kharif crops, 134.2 thousand hectares or 23.2 per cent under rabi crops. Thus agricultural economy of the district mainly thrived on kharif crops (Table 4.2).

4.1.8.4 Crops Grown

Cropping pattern of the district comprised both food and non-food crops. The crops grown in 1984-85 indicated that farmers followed subsistence type of cropping pattern by growing food crops predominantly to the extent of 77.7 per cent. The non-food crops had a very meagre area and covered only 22.3 per cent of the gross cropped area. Further, the kharif crops served as a back bone of cropping pattern with a coverage of 76.8 per cent. The rabi crops were also gaining importance but their coverage depended on the winter rains and the assured source of irrigation.

Cropping pattern mainly depended on millets and cereals while pulses and oilseeds were also grown on a sizeable area. Chhindwara has also earned good name in the cultivation of vegetables during the recent years and presently vegetable crops covered a considerable area. Area covered under cereals and millets was 53.4 per cent, under pulses 20.8 per cent, oil seeds 20.5 per cent, fruits, vegetables and spices 2.2 per cent and other crops including sugarcane, cotton, fodder crops etc. 3.1 per cent (Table 4.2).

4.1.8.5 Area under major crops

During 1984-85, among the cereals and millets, wheat, jowar, kodon- kutki were largely grown and these covered 15.1 per cent, 14.0 per cent and 12.0 per cent area respectively. Maize and paddy were other important crops sown on 6.0 per cent and 4.6 per cent respectively. Pulses were also grown on a sizeable area and important among them were urad, tur, gram, moong, lentil and teora. Among these urad, tur and gram were more important and each of them covered more than 5 per cent of the gross cropped area, the figures being 5.9 per cent, 5.4 per cent and 5.3 per cent respectively. Formerly oilseed crops like groundnut, niger and til were grown in the district. Soybean is a new entrant and now a days it has become most important oilseed crop. It was sown on an area of 53.1 thousand hectares or 9.2 per cent. Niger was other important crop grown on 36.2 thousand hectares or 6.3 per cent followed by groundnut which was sown on 23.0 thousand hectares or 4.0 per cent of the gross cropped area. Among fruits orange was important while potato was largely grown among the vegetables. Cotton, sugarcane were other important crops grown in the district (Table 4.2).

4.1.8.6 Yield

Average yield reported for some of the important crops for the year 1984-85 was quite encouraging. In this year the average yield per hectare obtained for maize was 2000 Kg., jowar 731 Kg., wheat 1,307 Kg., tur 1,481 Kg., gram 761 Kg., urad 271 Kg., moong-moth 225 Kg., soybean 1,577 Kg. and groundnut 794 Kg. (Table 4.2).

Table 4.2 Utilization of land under agricultural uses and area under important crops in 1984-85

Particulars	Area (thousand hectares)	Percentage
1. Area under agricultural uses	561.3	
2. Fallow land	66.4	11.9
a) Old fallow	32.4	5.8
b) Current fallow	34.0	6.1
3. Net area sown	494.9	88.2
4. Area sown more than once	82.7	16.7
5. Gross cropped area	577.6	117.0
6. Irrigated area	62.0	12.5
7. Classification of crops		
1. a. Kharif crops	443.4	76.8
b. Rabi crops	134.2	23.2
2. a. Food crops	449.0	77.7
b. Non-food crops	128.6	22.3
3. a. Area under cereals	308.7	53.4
b. Area under pulses	120.1	20.8
c. Area under food grains	428.8	74.2
d. Area under oilseeds	118.4	20.5
e. Area under fruits, vegetables and spices	12.7	2.2
f. Other crops	17.7	3.1
8. Area under main crops		
1. Paddy	26.4	4.6
2. Wheat	87.0	15.1
3. Jowar	80.8	14.0
4. Maize	34.6	6.0
5. Kodon-kutki	69.6	12.0
6. Gram	30.8	5.3
7. Tur	31.4	5.4
8. Urad	34.2	5.9
9. Moong-Moth	13.3	2.3
10. Groundnut	23.0	4.0
11. Niger	36.2	6.3
12. Soybean	53.1	9.2
13. Cotton	8.3	1.4

Continued....

Table 4.2 continued.....

9. Yield of main crops	Kgs./hect.
1. Paddy	716
2. Wheat	1307
3. Jowar	731
4. Maize	2000
5. Kodon-Kutki	182
6. Gram	761
7. Tur	1481
8. Urad	271
9. Moong-Moth	225
10. Groundnut	794
11. Niger	232
12. Soybean	1577
13. Cotton	728

4.1.8.7 Irrigation

During 1984-85 an area of 62.0 thousand hectares was irrigated. Irrigation wells numbering 54 thousand, electric and diesel pumpsets 26,160 and tank numbering 50 were mainly responsible to supply irrigation water. These sources were mainly used to irrigate rabi crops. Oranges, vegetables, spices, sugarcane were totally grown as irrigated crops. Area irrigated among these crops was : sugarcane 7.5 thousand hectares, fruits, Vegetables and spices 11.3 thousand hectares, wheat 34.9 thousand hectares or 40.1 per cent, gram 5.9 thousand hectares or 19.1 per cent, pea 1.2 thousand hectares or 42.1 per cent, cotton 0.8 thousand hectares or 9.1 per cent.

4.1.9 Agricultural development other than T&V System

A number of agricultural development schemes were in operation in the district. Important among them were High yielding

Varieties Programme, Intensive Oilseed Development Project, Project on Development of Pulses, Departmental Demonstration and Minikit Schemes and Minor Irrigation Projects, Soil Conservation Schemes, Plant Protection Programme, Agricultural Development under Landless Labour Employment Scheme, Prime Minister's 20 Point Programme.

A. Progress under High Yielding Varieties Programme

During 1985-86, High Yielding Varieties Programme was taken on 1,24,740 hectares which included jowar 52,002 hectares or 41.69 per cent, maize 21,516 hectares or 17.25 per cent, paddy 13,337 hectares or 10.69 per cent, cotton 7,785 hectares or 6.24 per cent and wheat 30,100 hectares or 24.13 per cent.

B. Development of Pulses

For the intensive cultivation of pulses specific efforts were made to increase the area under pulse crops to be sown under improved varieties of pulses. Under this programme pulse crops were grown on 35,583 hectares which included tur 10,341 hectares or 29.06 per cent, moong 5,432 hectares or 15.27 per cent, urad 7,210 hectares or 20.26 per cent, gram 11,200 hectares or 31.48 per cent, lentil 150 hectares or 0.42 per cent and pea 1,250 hectares or 3.51 per cent. Besides 1,100 minikits were also distributed along with number of demonstrations.

C. Oilseed Development Programme

This scheme also aims to increase the area under oilseed crops and adoption of improved varieties. For this purpose 95 demonstrations were laid on the farmers fields, 3,071 seed minikits were distributed. Fertilizer minikits were distributed among 2665 farmers.

Main thrust was to increase the area and improve the cultivation of soybean, groundnut, niger. Under these crops 45,200; 18,000; 15,700 hectares were brought in 1985-86.

D. Minor Irrigation

Under this scheme 438 new wells were dug and 201 were repaired. A total number 429 electric pumps were energised. Under this scheme a subsidy of Rs.33.61 lakhs was distributed and Rs.1.35 lakhs were given as subsidy on interest.

E. Plant Protection Programme

Seed was treated to cover an area of 68700 hectares and plant protection measures were adopted for the crops on 102000 hectares. Besides, 149 plant protection implements and 51 agricultural implements were distributed. The subsidy distributed under plant protection programme was Rs.12,830.

F. Soil Conservation Scheme

Soil conservation programme was implemented on 1,245 hectares and 3 stop dams were constructed to check the soil erosion. Under this scheme Rs.12.34 lakhs were spent.

G. Rural Employment Scheme

Under this scheme soil conservation work was done on 325.17 hectares creating 39,691 man-days and Rs.3.66 lakhs were paid as wages.

H. Departmental Demonstrations and Minikit Schemes

Departmental demonstrations were laid on the fields of 11 farmers and 3,376 seed minikits were distributed.

I. Prime- Minister's Programme

This programme included development of minor irrigation, land development and distribution of seed minikits. Under this programme 280 irrigation wells were dug, 130 wells were repaired and 295 electric pumps were installed. Land development, soil conservation work was carried out on 322.11 hectares and 5,100 seed minikits of different crops were distributed. For this purpose Rs.34.40 lakhs were spent.

J. Twenty-point Programme

Under this programme irrigation potential was created for 1,375 hectares and dry-land farming was adopted on 16,846 hectares. Further, additional 110.17 thousand tonnes of production of pulses and 114.31 thousand tonnes of production of oilseeds was also achieved. Biogas plants numbering 102 were also installed and 5,756 families of scheduled castes and scheduled tribes were extended various benefits.

K. Other Programmes associated with Agricultural Development

Under tribal sub-plan Rs.35.31 lakhs were spent to improve the agriculture of tribal people. Rupees 3.89 lakhs were spent for agricultural development under Harijan Welfare Schemes. Farmers trainings were conducted at the cost of Rs.68,700 and farmers were taken on visits of other areas at an expenditure of Rs.25,000.

Crop insurance scheme was introduced and 370 farmers were benefitted.

4.2 VIDISHA DISTRICT

4.2.1 Location

Formerly Vidisha was known as "Bhilsa". It reminds the people about the glorious past with numerous ancient buildings and historical monuments. Vidisha lies between $23^{\circ}20'$ and $29^{\circ}22'$ north latitudes and $77^{\circ}24'$ and $78^{\circ}18'$ east longitudes. The district is surrounded by Sagar district on the east, Raisen district in the south, Sehore district on the west and Guna district in the north.

4.2.2 Physical Features

Vidisha district comes under the central zone of the state and it lies in the north-eastern tip of the fertile plateau of Malwa and has great historical and archaeological importance. On the north and south can be noticed the thickly wooded Vindhya ranges enclosing the fertile tract on both the sides. The whole district is more or less a plateau with hillocks all around which add to the natural beauty of the district.

4.2.3 Climate and Rainfall

The climate of the district is more or less same as found in Malwa plateau. Its climate is temperate with pleasant winter. The temperature rises during the month of April and May when days become warm but gradually the temperature comes down after sunset and the nights become pleasant to justify the praise called "Shab-i-Malwa", famous through out the country. Temprature during the summer goes up to $44^{\circ}C$. The winter is not very cool and temperature remains around $10^{\circ}C$.

Monsoon sets generally during June and continues till

September and October. The average rainfall of the district is about 1,200 mm. which is mostly received between June to September.

4.2.4 Area, Villages and Population

District has an area of 7,371 square kilometres. According to census 1981, there returned 7,83,098 persons and were residing in 1,618 villages and 5 towns. It ranks twenty seventh in area among the districts of Madhya Pradesh. It is a rural district and 83.03 per cent persons resided in the countryside.

4.2.5 Scheduled Castes and Scheduled Tribes

In the census 1981, the scheduled castes had 1,60,044 persons and they constituted 20.44 per cent of the district population. Scheduled tribes men numbered 33,706 and comprised 4.30 per cent in the district population. The important scheduled castes residing in the district included Chamar and their sub-sections called Bairwa, Bhambi, Jatav, Mochi and Regar, Bagdi, Basod, Bhangi, Koli and chidar. Saharia, Mina, Korku and Gonds returned as scheduled tribes in the district.

4.2.6. Literacy

There were 13.51 per cent literates in the district in 1961 against the state average of 17.13. In the census 1971, the proportion of literates increased to 19.00 per cent, whereas, the state average was about 22 per cent. Literacy among the males was 27.48 per cent. Females lagged far behind with the literacy percentage of 11 per cent.

4.2.7 Administrative Units

The district is divided into 5 tehsils namely Lateri, Sironj, Kurwai, Basoda and Vidisha. There are 7 development blocks and substantial work appears to have been done especially in the agricultural sector.

4.2.8.1 Land Utilization

Vidisha district occupied an area of 730.2 thousand hectares. Of this 71 per cent was put under agricultural uses and remaining 29 per cent was under non-agricultural uses including forests 14.4 per cent, land not available for cultivation 6.5 per cent and other uncultivable land 5.4 per cent. Cultivable waste covered 2.7 per cent.(Table 4.3).

Table 4.3 Land Utilization, Vidisha District, 1984-85

	Particulars	Area (thousand hectares)	Percentage to total geographical area
1.	Forests	105.3	14.4
2.	Land not available for cultivation	47.5	6.5
	a) Land put to non-agricultural uses	36.2	5.0
	b) Barren and unculturable land	11.3	1.5
3.	Other uncultivated land excluding fallow land	59.0	8.1
	a) Permanent pastures and other grazing land	39.6	5.4
	b) Land under miscellaneous tree crops and grove not included in net area sown	0.1	0.1
	c) Culturable waste	19.3	2.7
4.	Fallow land	7.0	1.0
	a) Fallow land other than current fallow	2.9	0.4
	b) Current fallow	4.1	0.6
5.	Net area sown	511.4	70.0
6.	Total geographical area	730.2	100.0

4.2.8.2 Utilization of area under agricultural uses

Area under agricultural uses was 518.4 thousand hectares. Of this, 7 thousand hectares (1.4 per cent) was fallow including 0.6 per cent old fallow and 0.8 per cent current fallow. Net area sown was 511.4 thousand hectares or 98.6 per cent. Of this 18.8 thousand hectares or 3.6 per cent was sown more than once. Thus gross cropped area of the district was 530.2 thousand hectares. This means a cropping intensity of 102.3 per cent. Area irrigated was 22.1 thousand hectares which means 4.7 per cent of the gross cropped area (Table 4.4).

4.2.8.3 Crops Grown

Cropping pattern of the district mainly comprised food crops which were mostly grown in rabi season. In 1984-85, kharif crops were grown on 95.0 thousand hectares or 17.9 per cent area while rabi crops covered 435.2 thousand hectares or 82.1 per cent. Area under food crops was 473.3 thousand hectares or 89.3 per cent, whereas, non-food crops were sown on 56.9 thousand hectares or 10.7 per cent. Cereals and millets dominated the cropping pattern and these crops covered 297.4 thousand hectares or 56.1 per cent. Pulses were also largely sown on 173.5 thousand hectares and covered 32.7 per cent of the gross cropped area. Oilseeds occupied 28.9 thousand hectares or 5.4 per cent of the area. Other crops including cotton, sugarcane, tobacco, fodder crops and other crops grown together covered 5.4 per cent of the gross cropped area (Table 4.4).

4.2.8.4 Area under major crops

Vidisha was known as wheat district, where the crop was grown to the extent of 47.8 per cent of the gross cropped area. Among the cereals, jowar was another important crop and it covered 6.3 per cent.

Among pulses gram, tur, moong, teora and pea were important. Gram was sown on 83.6 thousand hectares and it covered 15.8 per cent of the gross cropped area. Teora was also sown on a considerable area of 9.2 thousand hectares or 1.7 per cent. Soybean and linseed were worth mentioning among the oilseed crops. Soybean was more important and it covered 2.2 per cent and followed by linseed 1.6 per cent of the gross cropped area.

4.2.8.5 Yield

Yield obtained during 1984-85 was not encouraging. The average yield of paddy was 530 kg. per hectare, wheat 718 kg, jowar 909 kg and maize 1,596 kg per hectare. In the case of pulses the average yield of gram was 647 kg, tur 673 kg., teora 454 kg., moong 363 kg. and pea 362 kg per hectare. Yield of soybean was 708 kg., groundnut 627 kg., rape and mustard 529 kg. and linseed 448 kg per hectare (Table 4.4).

4.2.8.6 Irrigation

During 1984-85, net area irrigated in the district was 20 thousand hectares of which 100 hectares was irrigated more than once. Of the total irrigated area 65.2 per cent was irrigated by canals, nearly 1 per cent by tanks, 12.7 per cent by wells and the remaining 21.2 per cent by other sources.

Crops irrigated in the district were wheat, gram, masoor, sugarcane, vegetablesand spices. Irrigation in the case of wheat crop was done on 14.4 thousand hectares, gram 5.7 thousand hectares, masoor 0.4 thousand hectares and sugarcane 0.6 thousand hectares, fruits and spices 0.8 thousand hectares.

Table 4.4 Utilization of land under agricultural uses, 1984-85

	Particulars	Area (thousand hectares)	Percentage
1.	Area under agricultural uses	518.4	100.0
2.	Fallow land	7.0	1.4
	a. Old fallow	2.9	0.6
	b. Current fallow	4.1	0.8
3.	Net area sown	511.4	98.6
4.	Area sown more than once	18.8	3.6
5.	Gross cropped area	530.2	102.3
6.	Irrigated area	22.1	4.7
7.	Classifation of crops		
	1. a. Kharif crops	95.0	17.9
	b. Rabi crops	435.2	82.1
	2. a. Food crops	473.3	89.3
	b. Non-food crops	56.9	10.7
	3. a. Area under cereals	297.4	56.1
	b. Area under pulses	173.5	32.7
	c. Area under foodgrains	470.9	88.8
	d. Area under oilseeds	28.9	5.4
	e. Area under fruits, vegetables and spices	1.9	0.4
	f. Other crops	28.5	5.6

Continued....

Table 4.4 continued...

Particulars	Area (thousand hectares)	Percentage
8. Area under main crops		
1. Paddy	1.7	0.3
2. Wheat	253.2	47.8
3. Jowar	33.2	6.3
4. Maize	8.6	1.6
5. Gram	83.6	15.8
6. Tur	2.3	0.4
7. Moong	3.6	0.7
8. Teora	9.2	1.7
9. Pea	2.1	0.4
10. Groundnut	2.6	0.5
11. Rapeseed and Mustard	4.1	0.8
12. Linseed	8.4	1.6
13. Soybean	11.6	2.2
14. Sugarcane	0.6	0.1
9. Yield of main crops	Kgs./hect.	
1. Paddy	530	
2. Wheat	718	
3. Jowar	909	
4. Maize	1596	
5. Gram	647	
6. Tur	673	
7. Moong	363	
8. Teora	454	
9. Pea	362	
10. Groundnut	627	
11. Rapeseed and Mustard	529	
12. Linseed	448	
13. Soybean	708	

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CHAPTER V

T AND V PROJECT ACTIVITIES IN THE SAMPLE DISTRICTS

As mentioned earlier Chhindwara and Vidisha districts were selected and from each district two blocks were selected. They were Tamia and Sausar blocks from Chhindwara district and Vidisha and Basoda blocks from Vidisha district. From each block one RAEO circle was selected for sample farmers. The RAEO circles selected were Delakhari from Tamia block, Jovanikhapa from Sausar block in Chhindwara district and Imaliya from Vidisha block and Udaipur from Basoda block in Vidisha district. From each RAEO circle 15 contact farmers and 10 non-contact farmers were selected. Thus from each block 25 farmers were selected.

Selected Districts, Blocks and RAEO's Circles

District	Block	RAEO's circle
1. Chhindwara	1. Tamia	Delakhari
	2. Sausar	Jovanikhapa
2. Vidisha	1. Vidisha	Imaliya
	2. Basoda	Udaipur

In this chapter T & V activities carried out at different stages are discussed.

T & V activities at the district level are discussed in general highlighting the staffing pattern, activities and some other important features. Field activities are mainly controlled from the sub-division level, therefore, activities of sub-division had a direct bearing on the blocks and RAEO circles. Therefore the activities carried out from the sub-division levels and in

the selected RAEO circles have been dealt with in detail. Both extension officers and activities had direct impact on the farmers for the adoption of new technology, knowledge and higher production.

5.1 T & V Activities at District Level

5.1.1 Organization Pattern

Chhindwara district was included on 1st September, 1978 during first phase and Vidisha district during 1982-83 under the second phase. Both the districts had staff and all extension activities as envisaged in the guidelines of the T&V project.

One RAEO circle is composed of 500-700 farmers and among them 8 groups (Hars) consisting of 8-10 farmers each are further divided to be looked after regularly by the RAEO to communicate the messages and techniques among the contact farmers.

To supervise and to guide the 6-8 RAEC's, one Agricultural Development Officer (ADC) was placed to visit the RAEO's circle atleast twice a month. An ADO was supposed to cover 3000-3500 families.

At the block headquarters one Senior Agricultural Development Officer (SADO) was placed and he was mainly responsible for input supply and to make arrangements for the fortnightly trainings held every month at block headquarters.

Three to four development blocks usually constituted a tahsil or district sub-division. A sub-divisional office for channelizing the T&V activities was headed by a SDAO (Sub-Division Agricultural Officer). Under him 3-4 Subject Matter Specialists (SMS's) from Agronomy, Plant Protection and Input supply from cooperatives were also placed to help him in the tasks of T&V project.

At the district level, Deputy Director, Agriculture was the overall in-charge of the T&V project. He is provided 5 Subject Matter Specialists, one each for Agronomy, Plant Protection, Water Management, Input supply and special crops. In addition to these, one Research Assistant from Agronomy for publicity purposes was also provided.

Every district was linked with the Regional Research Station of JNKVV. Chhindwara district was associated with the Regional Research Station, Chandangaon, Chhindwara and Vidisha with the Regional Research Station located at College of Agriculture, Sehore.

5.1.2 Staffing Pattern

At the district level, Chhindwara district had one Deputy Director, 5 Subject Matter Specialists, 2 Research Assistants (Agronomy), 2 SADO's and 3 ADOs. All these posts were filled during the reference year except that of two posts of SMS which were vacant.

At the sub-divisional level the district had 4 SDAO, 12 SMS & 8 ASO . All the posts except one post of SMS were filled.

At the block level the sanctioned posts of SADO were 11 and all of them were filled. There were 28 posts of ADO's, of which 19 or 67.86 per cent posts were filled. To serve the grass root level (RAEO's circle) there were 74 posts and among them 50 or 67.56 per cent were filled.

Vidisha district was provided one Deputy Director, 5 SMS and one RA (Agronomy) at district level and among these the post of Deputy Director and two posts of SMS were filled. At the sub-divisional level the sanctioned posts included 3 posts of SDAO,

12 SMS 6 ASO. Among these all the three posts of SDAO, 10 posts of SMS and 3 posts of ASO were filled.

For different blocks the sanctioned posts of SADO were seven and all of them were filled. There were 21 posts of ADO's and among these one post was lying vacant. There were 138 posts of RAEO's and 121 or 87.70 per cent of them were filled.

The gap between the posts sanctioned and those filled up was mainly at the grass root level particularly in the case of ADO's and RAEO's. In Chhindwara district the proportion of vacant posts of RAEO's was 32.43 per cent and that in Vidisha district, 12.32 per cent. Both the districts also suffered in the case of SMS in which 40 per cent posts in Chhindwara district and 60 per cent in Vidisha district were lying vacant. All these vacancies must be having adverse effect on the progress of T & V activities (Table 5.1).

5.1.3 Coverage

Chhindwara district was divided into 4 agricultural sub-divisions and 11 development blocks. To channelise the T & V activities 42 ADO circles were created and these were further divided into 250 RAEO's circles.

There were 1,81,297 cultivators and they were cultivating 10,13,405 hectares of land. Among these cultivators 16,385 were selected as contact farmers who were further grouped to make 2040 hars. Each har consisted of 8-10 contact farmers (Table 5.2).

Vidisha district had 3 agricultural sub-divisions covering 7 development blocks having 21 ADO circles.

Table 5.1 Staffing pattern under T&V System in the sample districts

Designation	Chhindwara		Vidisha	
	Sanctioned posts	Filled	Sanctioned posts	Filled
District level				
Deputy Director	1	1	1	1
Subject Matter Specialist (SMS)	5	3	5	2
Research Assistant (RA)	1	1	1	-
Senior Agriculture Development Officer (SADO)	2	2	-	-
Agriculture Development Officer (ADO)	3	3	-	-
Sub-Division level				
Sub-Divisional Agriculture Officer (SDAO)	4	4	3	3
Subject Matter Specialist (SMS)	12	11	12	10
Assistant Statistical Officer (ASO)	8	8	6	3
Block level				
Senior Agriculture Development Officer (SADO)	11	11	7	7
Agriculture Development Officer (ADO)	28	19	21	20
Rural Agriculture Extension Officer (RAEO)	74	50	138	121

Table 5.2 Coverage under T&V System in Chhindwara district

Sub-division	Block	ADO circle (No.)	RAEO circle (No.)	Hars. (No.)	Contact farmers (No.)	Cultivators No.)	Area (Hect.)
Chhindwara	Chhindwara	4	24	200	1607	17037	62141
	Chourai	5	33	256	2112	23955	92102
	Mohkhed	5	29	224	1792	17037	68749
Amarwara	Amarwara	4	22	176	1792	15418	82784
	Harrai	3	16	128	1408	9945	171460
Parasia	Parasia	4	24	192	1536	16955	69293
	Junardeo	4	22	176	1408	15726	125995
	Tamia	2	15	120	960	9793	143715
Sausar	Sausar	4	25	192	1536	18507	69294
	Bichhua	3	16	128	1024	14010	44948
	Pandhurana	4	24	248	1984	22914	82924
District	11	42	250	2040	16385	181297	1013405

There were 117 RAEO's circles which covered 936 hars or 8,058 contact farmers. There were 1,15,000 cultivators in the district cultivating 730197 hectares (Table 5.3).

5.1.4 Monthly Seminar

In both the districts monthly seminar was held in the last week at JNKVV research stations. The Deputy Director Agriculture, his SMS's and SDAO's and Scientists of JNKVV research station participated to exchange views on the problems faced in the field and the new techniques to be introduced under T & V. These seminars continued for two days, one day for field problems and second day for new techniques and other activities. The adaptive trials to be conducted by JNKVV and the department were also discussed in these seminars.

5.1.5 Preparation of subject matters for the fortnightly Trainings

Subject matter specialists of the district level were primarily responsible to prepare subject matters and training plans for the workshop and trainings to be held at the sub-divisions and block levels. These were prepared in a printed or cyclostyled form so as to provide one copy for each participant particularly to every ADO and RAEO. These generally included agricultural operations to be done during the month or fortnight. The new varieties, new crops and new techniques of cultivation were also incorporated in these lesson plans.

5.1.6 Participation in the training

The Deputy Director Agriculture, his SMS invariably attended monthly workshops held at different agriculture sub-divisions. Besides they also attended atleast 5-6 fortnightly trainings helda at block headquarters in the district.

Table 5.3 Coverage under T & V System in Vidisha district

Sub-division	Block	ADO Circle (No.)	RAEO circle (No.)	Hars (No.)	Contact farmers (No.)	Cultivators (No.)	Area (Hect.)
Vidisha	Vidisha	3	18	144	1471	16000	106552
	Gyaraspura	3	16	128	1060	15000	87191
Basoda	Basoda	3	18	144	1006	18000	122324
	Nateran	3	16	128	1150	16000	106899
Sironj	Sironj	3	19	152	1193	20000	125454
	Kurwai	3	15	120	1116	15000	83144
	Lateri	3	15	120	1062	15000	98633
District	7	21	117	936	8058	115000	730197

5.1.7 Visits

Visits to the RAEO's circle was given prime importance and the SMs from the district usually visited hars of the RAEO's to provide guidance on the spot to solve the field problems. Adaptive trials were also guided by them.

5.1.8 Farmers' fairs Exhibitions and Tours

Under T&V system farmers fairs (Kisan Melas), exhibitions were organised at different levels during kharif and rabi seasons. Farmers' tours were also organised to JNKVV research stations to show developmental activities pertaining to the new varieties, fertilizer use, plant protection measures and animal husbandry. Specific funds were allocated for this purpose.

5.1.9 (a) Physical Achievements in Vidisha district

For the extension of high yielding varieties seed of the improved varieties were distributed. During the year 1986-87, the seed distributed included jowar 35 quintals, paddy 81 quintals, soybean 4,595 quintals, wheat 1,682 quintals and gram 443 quintals. Under low cost technology 5,000 quintals of seed were distributed. Seed treatment was done for 14,000 hectares and land development work was carried out on 500 hectares. Mixed cropping of soybean and jowar was introduced on 3,000 hectares. Inoculation of seed with rhizobium culture was also conducted and 6,000 packets for soybean and 3,000 packets for gram were distributed. Under plant protection measures 78 dusters and 713 sprayers were distributed. Among fertilisers 3,586 tonnes of nitrogen, 4,665 tonnes super phosphate and 302 tonnes of potash were distributed.

5.1.9(b) Physical Achievements in Chhindwara district

Area covered under H.Y.V.P. in 1986-87 was jowar 48,188 hectares, maize 25,273 hectares, cotton 6,242 hectares, wheat 39,520 hectares and soybean 58,888 hectares. Among these crops remarkable progress was made in the case of soybean as it was grown on 368 hectares in 1981-82 which increased to 58,888 hectares during the span of 5 years in 1986-87. Under low cost input technology seed grading was done for seed sufficient for 4,01,950 hectares, seed treatment for 91,200 hectares, soil treatment for 19,500 hectares and plant protection on 69,960 hectares. For seed inoculation rhizobium culture packets were also distributed.

Under plant protection measures 350 dusters and sprayers were distributed. About 900 seed drills were distributed.

To popularize the use of fertilizers, 5,216 tonnes of nitrogen, 2,503 tonnes of super phosphate and 748 tonnes of potash were distributed.

Yield obtained from different crops during 1985-86 was nearly double as compared to 1978-79. The yield of maize was 1,053 Kg. in 1978-79 and it increased to 1,787 Kg. in 1986-87. In the case of jowar it increased from 619 Kg. to 1,705 Kg., in groundnut from 602 Kg. to 1,076 Kg., wheat 653 Kg. to 1,200 Kg and soybean from 491 Kg. to 1,200 Kg.

5.2 T & V at sub-divisional level

Trainings, adaptive trials, demonstrations and field visits for supervision were main duties of the staff posted at sub-divisions. Subject Matter Specialists of Agronomy & Plant Protection were there to assist the officers and SMS from Cooperatives

was associated for input supply purposes. Sub-divisional offices had direct control on the trainings and visits programme in the sub-division.

5.2.1 Trainings and Seminars

Monthwise trainings and seminars held at the sub-divisional level indicated that monthly workshops of two days duration were conducted by these sub divisions besides conducting three quarterly seminars during the year 1986-87. At block level two fortnightly trainings at each block were conducted every month. Besides these scheduled seminars and trainings, 15 training camps in Parasia sub-division, 32 in Sausar sub-division, 29 trainings were also organised at farmers level. In these trainings and seminars SDAO, his SMS, SADO, ADO and RAEO's necessarily participated. In the village level training camps, both contact and non-contact farmers participated. Besides Deputy Director, Agriculture, his SMS also attended some of these trainings.(Table 5.4 and Table 5.5).

These trainings mainly dealt with the adoption of improved varieties of different crops, improved methods of cultivation, seed treatment, seed inoculation, plant protection measures, fertilizer use, harvesting, threshing and storage techniques.

During monthly and fortnightly trainings, field problems were narrated by RAEOs. and ADOs. These were discussed and later on selected recommendation and agricultural operations to be done were discussed to make recommendations to the farmers.

5.2.2 Adaptive trials

Adaptive trials for different crops were formulated at JNKVV regional research stations in the light of the recommendations to be adopted in different areas according to the soil and climatic

Table 5.4 Trainings workshops and seminars held in Parasia and Sausar sub-divisions of Chhindwara district during 1986-87

Months		Trainings				Benefitted (participants)			
		SDAO Qtly. Seminar	SDAO level	Block level	Farmers level	ADO	RAEO	FARMERS	
								Contact	Non-contact
PARASIA SUB-DIVISION									
June	86	1	1	3	2	3	46	105	1110
July	"	-	1	6	-	3	49	203	4297
Aug.	"	-	1	6	-	4	45	186	4914
Sept.	"	1	1	3	3	7	60	183	2314
Oct.	"	-	1	6	2	9	60	149	2680
Nov.	"	-	1	9	-	9	58	174	2806
Dec.	"	1	1	3	-	9	59	178	2972
Jan.	87	-	1	6	-	10	57	184	4026
Feb.	"	-	1	6	1	7	57	70	1280
March	"	-	1	6	2	9	56	80	2500
April	"	-	1	6	4	8	53	150	3010
May	"	-	1	9	1	10	53	204	4442
Total		3	12	69	15	88	653	1971	36352
SAUSAR SUB-DIVISION									
June	86	-	1	3	4	8	70	195	4360
July	"	1	1	6	3	7	80	307	6742
Aug.	"	-	1	6	3	9	65	260	3512
Sept.	"	1	1	3	6	8	68	180	4629
Oct.	"	-	1	6	2	6	72	280	5215
Nov.	"	-	1	9	3	9	78	215	5104
Dec.	"	-	1	3	2	7	71	201	4695
Jan.	87	-	1	6	2	9	72	250	4932
Feb.	"	-	1	6	2	7	63	230	4134
March	"	-	1	6	1	8	76	260	4500
April	"	-	1	6	3	9	97	195	3506
May	"	-	1	6	1	6	60	265	4560
Total		2	12	66	32	93	872	2838	55889

Table 5.5 Trainings, workshops and seminars held in Vidisha and Basoda sub-divisions of Vidisha district in 1986-87

Months		Trainings				Benefitted (participants)			
		SDAO Qtly. Seminar	SDAO level	Block level	Farmers level	ADO	RAEO	FARMERS Contact	FARMERS Non-contact
		VIDISHA DISTRICT							
June	86	1	1	4	10	6	30	220	310
July	"	-	1	5	-	6	32	NA	NA
Aug.	"	-	1	6	-	5	30	NA	NA
Sep.	"	-	1	5	8	6	31	NA	NA
Oct.	"	-	1	4	5	5	29	NA	NA
Nov.	"	-	1	4	4	6	35	NA	NA
Dec.	"	1	1	6	-	6	35	NA	NA
Jan.	87	-	1	5	-	5	30	100	150
Feb.	"	-	1	4	4	6	32	150	180
March	"	1	1	5	4	6	29	180	160
April	"	-	1	6	-	4	28	170	200
May	"	-	1	4	-	3	30	120	140
Total		3	12	58	35	64	371	940	1140
		BASODA SUB-DIVISION							
June	86	-	1	4	16	6	33	139	143
July	"	-	1	6	3	4	29	147	157
Aug.	"	-	1	4	-	5	33	101	117
Sept.	"	1	1	2	3	6	34	133	165
Oct.	"	-	1	5	5	4	30	135	169
Nov.	"	-	1	4	3	5	32	141	141
Dec.	"	-	1	3	2	6	29	145	167
Jan.	87	-	1	4	2	5	33	140	186
Feb.	"	-	1	3	1	6	31	137	126
March	"	1	1	4	1	6	30	131	167
April	"	-	1	4	1	5	32	123	176
May	"	-	1	4	2	5	28	129	139
Total		2	12	47	39	63	374	1601	1853

conditions. As such the entire programme of the adaptive trials was carried out after the approval of regional committee. SMS from selected sub-divisions organised these adaptive trials for both kharif and rabi crops.. The crops covered under adaptive trials included jowar, maize, soybean, arhar, moong, urd, cotton in kharif and wheat, gram, pea, linseed in rabi. The varieties of these crops which were thought to be responsive to these areas were used. These adaptive trials were laid in the presence of SMS who also supervised them from time to time till the harvesting and threshing was done.

5.2.3 Replacement in crop varieties

In kharif local jowar was sown in selected areas before the introduction of T&V project. Now the improved varieties of jowar such as CSH-5, CSH-9, SPV-472, 235, 236 and Vidisha 60-1 are commonly sown and the local jowar had almost disappeared. Similarly, instead of local varieties of arhar, the improved varieties T-21, T-48 and CPL-81 are widely adopted. In the case of moong pusa-baisakhi, T-44, K-851 are sown. T-9 varieties of urd has become quite popular. Local maize has been replaced by Ganga-5, Chandan-3 and Dekan-101 varieties. In the case of paddy JR-75, JR-15, JR-55 and IR-36 have been adopted in place of local varieties. Formerly wheat varieties C-306, S-227, S-308 and local wheat were largely sown. But at present WH-147, LOK-1, HD-1593, HD-1553, Sonalika, Sujata, N-112 are widely sown. In the case of gram Ujjain-21, N-24 have become quite popular. Gangapari variety of groundnut has been widely adopted by the farmers.

Soybean crop was a new introduction to the farmers of both the districts and presently its varieties known as Gaurav (JS-72-44), JS-2 and Punjab-1 are sown by the farmers (Table 5.6).

Table 5.6 Replacement of varieties under T & V Project in Chhindwara and Vidisha districts.

	Chhindwara District				Vidisha District			
	Parasia		Sausar		Vidisha		Basoda	
	Before T&V	After T&V	Before T&V	After T&V	Before T&V	After T&V	Before T&V	After T&V
KHARIF								
1.	Jowar CSH-1 & Local	Jowar CSH-5, CSH-9, Comp.Jowar, SFV-472, 235, 236	Jowar CSH-1 & Local	Jowar CSH-5, CSH-9, Comp.Jowar, SPV-472, 235, 236	-	-	Jowar Local, CSH-5, CSH-6, Vidisha 60-1	Jowar
2.	Arhar Local	Arhar Type-21, T-148	Arhar Local	Arhar T-148, T-21, Upasa, ICPL-87	Arhar Local	Arhar T-148, T-21, Upasa,	Arhar Local	Arhar T-148, T-21
3.	Moong Local	Moong Pusa-Baisakhi	Moong Local	Moong T-44, Pusa-Baisakhi, K-85	Moong Local	Moong T-44, Pusa-Baisakhi, K-85	Moong Pusa-Baisakhi	Moong K-85
4.	Urd Local	Urd T-9	Urd Local	Urd T-9	Urd Local	Urd T-9	Urd Local	Urd T-9
5.	Niger Local	Niger Utakmand	-	-	-	-	-	-
6.	Maize Ganga-101 & Local	Maize Hybrid Ganga-5, Dekan 101, Comp. Chandan-3	Maize Local	Maize Chandan-3, Ganga-5	-	-	Maize Local	Maize Chandan-3 Ganga-5
7.	Paddy Local(late maturity)	Paddy JR-75, JR-15, JR-55, IR-36	-	-	-	-	-	-
8.	Soybean No Crop	Soybean JS-72-44(Gaurav) JS-2, Punjab-1, Durga, JS-72-280	Soybean No crop	Soybean Shyama, JS-72-44 JS-2, Punjab-1, Durga	Soybean Black, Yellow-149	Soybean JS-72-44, Punjab-1, JS-76-280, JS-75-46, Black 76-205	Soybean Local black, T-49	Soybean JS-72-44, Punjab-1, JS-72-280, JS-2

Continued.....

Table 5.6 Continued.....

Chhindwara district				Vidisha District			
Parasia		Sausar		Vidisha		Basoda	
Before T&V	After T&V	Before T&V	After T&V	Before T&V	After T&V	Before T&V	After T&V
-	-	Groundnut Small Japan, Local	Groundnut JL-24,Jyoti, Ak-12-24 TG-3	Groundnut Local	Groundnut JL-24,Jyoti, Junagarh-1	Groundnut Local & Gangapari	Groundnut JL-24,Jyoti,
-	-	Cotton Boori,Local & L-147	Cotton H-4,JKH-1,H-6 Ver Laxmi, Khandwa-2	-	-	-	-
RABI							
1. Wheat S-227, S-308 &Local	Wheat S-227,1593, WH-147,1553, Lok-1	Wheat S-227,S-308 & Local	Wheat HDM-1553,1593 Lok-1, WH-147 HD-1467,N-195 N-4, N-112	Wheat C-306,1553 & Local	Wheat WH-147,1593, Lok-1 HD-1467, N-112, N-4, Sujata	Wheat C-306, N-4, HDM-1593 Kalyan Sona& Local	Wheat WH-147,HDM-1553 Sonalika,Lok-1 Sujata, N-112, RR-21,Hybrid-65
2. Gram Local	Gram Ujjain-21, Annagiri, H-208	Gram Local	Gram Ujjain-21, JG-62,JG-315	Gram local	Gram Ujjain-21, Ujjain-24, JG-62, JG-74, JG-315, Radhe, Annagiri	Gram Local, Ujjain-21 Malida, JG-62	Gram C-235,JG-315, JG-74 Annagiri, Pusa-209 Ujjain-24
3. Pea Local	Pea Bournville, Arkeel, GC-Gwalior	Pea Local	Pea Bournville, JG-141	Pea Local	Pea Bournville, JG-141	Pea Local,Archal Bournville, JG-141	Pea JM-1
SUMMER							
1. Groundnut No crop	Groundnut Gangapari	Groundnut No crop	Groundnut No crop	Groundnut No crop	Groundnut Gangapari	Groundnut Jyoti	Groundnut No crop
2. Moong No crop	Moong Pusa-Baisakhi	Moong No crop	Moong No crop	Moong No crop	Moong Pusa-Baisakhi, K-851	Moong Pusa-Baisakhi	Moong K-851

5.3 Coverage at the selected RAEO Circles

The four RAEO's circles taken as sample for the present study covered 53 villages, including Delakhari 12 villages, Jovani khapa 11 villages, Imaliya 13 villages and Bareth 17 villages. There were 3,013 cultivators who cultivated 28,872 hectares of land. These farmers were grouped into 64 hars including 8 in every RAEO circle. In all 284 contact farmers were selected. Among these 51 belonged to Delakhari, 72 to Khapa, 76 to Imaliya and 87 contact farmers belonged to RAEO circle Bareth. Due representation was given to scheduled castes, scheduled tribes, small and marginal farmers. The selection of contact farmers was done as per the prescribed guidelines. The replacement of contact farmers was also done due to the death or inactiveness of particular contact farmer in the T&V activities (Table 5.7).

5.3.1 Visit and Training Programme of RAEO's

As per the scheduled programme the RAEO was to attend meeting every week at the head quarters of ADO to tell him his weekly work and problems and to take new messages from him. At the block level he was expected to attend 2 fortnightly trainings in a month of two days duration. In this training firstly the field problems [illegible]ns were discussed and then messages for new activities were given to them in a lesson form which contained necessary details for doing the necessary jobs. For some specific problems the concerned RAEO's were specifically advised accordingly. As per the data collected from the selected RAEO's the prescribed meetings, trainings, seminars and workshops were attended by them during the year.

Table 5.7 Hars, villages, area and farmers covered under selected RAEO circles.

S.No.	Name of Har	No. of villages	Total Area (in hect.)	Total Cultivators	Contact farmers
	CHHINDWARA				
	RAEO's Circle Delakhari				
1.	Delakhari west	1	1874	182	8
2.	Delakhari east	1			7
3.	Umaria	1	1198	103	8
4.	Khapakhurd	1	679	46	4
5.	Doriakheda	2	2204	107	8
6.	Dhaukheda	2	1109	41	4
7.	Shehraka	1	1194	74	8
8.	Sitadongri	3	7215	63	4
	Total	12	15473	616	51
	RAEO's circle Jovanikhapa				
1.	Khapa	1	835	111	10
2.	Piplakanhan	1	668	107	10
3.	Piplakanhan	2		108	10
4.	Jovani Ramudhano	2	446	114	10
5.	Khutama	1	282	101	10
6.	Apla Nandudhana	2	316	113	10
7.	Bada Dehi	1	275	48	5
8.	Nauthal	1	304	50	5
	Total	11	3126	752	70
	VIDISHA				
	RAEO's Circle Imaliya				
1.	Kararia	1	625	102	12
2.	Bamankheda	2	406	39	10
3.	Semra	1	255	56	8
4.	Imaliya	1	332	58	9
5.	Gurariya	1	448	76	8
6.	Jambar	2	845	131	10
7.	Nagpipariya	2	542	27	11
8.	Jafarkhedi	3	534	54	8
	Total	13	3987	543	76
	RAEO's circle Bareth				
1.	Chulehta	3	976	NA	18
2.	Kanjana	2	533	68	6
3.	Batisa	2	927	201	13
4.	Khiria	2	481	NA	10
5.	Fatehpur	1	405	102	4
6.	Sonavi	2	1477	385	10
7.	Biskawali	3	982	178	11
8.	Bareth	2	505	168	15
	Total	17	6286	1102	87
	Grand Total	53	28872	3013	284

5.3.2 Visit to the hars by RAEO's

As per the programme a RAEO was supposed to visit 4 hars in a week by spending 4 days and remaining 4 hars during the second week. In other words during the month he was to pay 16 visits to hars which meant two visits to every har (Table 5.8).

Table 5.8 Har Visit Programmes selected RAEO's

RAEO's Circle	Monday	Tuesday	Wednesday	Thursday	Friday
		FIRST WEEK			
Delakhari	Market	Delakhari	Delakhari	Umaria	Khapakhurd
Jovanikhapa	Khapa	Piplakanhan	Jovani Ramudhana	Market	Khutama
Imaliya	Market	Kararia	Bamankheda	Semra	Imaliya
Bareth	Batisa	Khiria	Market	Chulehta	Kanjana
		SECOND WEEK			
Delakhari	Market	Doriakheda	Dhaukheda	Shehraka	Sitadongri
Jovanikhapa	Apla Nandu-dhana	Piplakanhan	Baradehi	Market	Nauthal
Imaliya	Market	Gurariya	Jambar-bagri	Nag-pipaliya	Jafar-khedi
Bareth	Biska-wali	Bareth	Market	Fatehpur	Sonavi

However data collected indicated that this objective was seldomly achieved by 4 RAEO's. RAEO Delakhari did not pay 16 visits in any month and that of khapa did so only in two months namely April 86 and Jan.87. Imaliya RAEO paid 16 visits once in July 86 and RAEO Bareth during 5 months namely July 86, Sept.86, Jan.87, March 87 and April 87.

As per the programme a RAEO was to pay 192 har visits during the year. This means selected 4 RAEO's were to spent 768 days on field visits. However they paid visits to their hars for 646 days or 83.86 per cent. Remaining days including 62 days or 8.07 per cent were spent on attending meetings and another 62 days or 8.07 per cent were availed either as holiday or leave.

RAEO Delakhari covered scheduled visits to the extent of 84.38 per.cent and he could not visit hars for 13.54 per cent days due to meeting, trainings and seminars called on visit days. RAEO Khapa covered visits to the hars for 86.46 per cent days, 7.29 per cent days spent on training and 6.25 per cent days were marked as holidays and leaves.

In Vidisha district RAEO Imaliya paid visits to the hars for 86.73 per cent days, for 8.33 per cent days attended meetings and trainings and 10.94 per cent days he availed as leave or holidays. RAEO Bareth covered visits for 83.86 per cent days, 3.13 per cent days spent on training & meetings and 13.01 per cent days as holidays or leave (Table 5.9).

Scrutiny of the field visits also highlighted that the RAEO's could hardly pay visits to the hars to the extent of 50.00 per cent on scheduled days while remaining visits were paid by them on unscheduled days. It was further noticed that in a day they covered more than one har. The reason being that they were also alloted other works by the officials who some times even did not belong to the agriculture department. Irregular visits kept the contact farmer in the dilemma about the visit of RAEO on appointed days.

Table 5.9 Details about field visits and trainings attended by RAEO's during the year

Months	CHHINDWARA						VIDISHA					
	Delakhari			Jovanikhapa			Imaliya			Bareth		
	Total visit	Meeting & Training	Leave & Holiday	Total visit	Meeting & Training	Leave & Holiday	Total visit	Meeting & Training	Leave & Holiday	Total visit	Meeting & Training	Leave & Holiday
June 86	13	1	2	14	-	2	15	1	-	12	-	4
July "	14	1	1	14	1	1	16	-	-	16	-	-
Aug. "	15	-	1	16	-	-	12	-	4	12	4	-
Sept. "	14	2	-	12	2	2	9	4	3	16	-	-
Oct. "	14	2	-	13	1	2	14	-	2	14	-	2
Nov. "	14	2	-	15	1	-	11	5	-	12	2	2
Dec. "	12	4	-	12	4	-	11	-	5	14	-	2
Jan. 87	14	2	-	16	-	-	15	1	-	16	-	-
Feb. "	14	2	-	14	1	1	13	-	3	15	-	1
March "	12	4	-	13	1	2	14	1	1	16	-	-
April "	13	3	-	15	1	-	13	-	3	16	-	-
May "	13	3	-	12	2	2	12	4	-	2	-	14
Total	162	26	4	166	14	12	155	16	21	161	6	25
Percentage	84.38	13.54	2.08	86.46	7.29	6.25	80.73	8.33	10.84	83.86	3.13	13.01

As envisaged in the programme the RAEOs usually contacted the contact farmers on their fields on the first half of the day to assess the problems etc. on the spot. In the second half the contact as well as non-contact farmers were to be assembled at some notified place which might be a Panchayat Bhavan or house of a village Patel etc. During this half farmers were to report their problems to seek solutions from the RAEO and they were given directions, guidance and messages for different aspects of cultivation needed during the reference period.

The RAEOs convey messages to the farmers as per the lessons provided to them during the fortnightly trainings and monthly workshops. Their diaries confirmed that they acted as per the guidelines provided to them during the trainings, workshops and seminars attended by them.

5.3.3 Supervision

ADOs supervised the works of RAEOs as per the approved programme every month. Besides, in Delakhari RAEO circle, Sub-Divisional Agriculture Officer paid 15 visits during the year and also organised farmer training camps and farmers day. Subject Matter Specialists also laid adaptive trials and demonstrations. They visited RAEO circle 4 times during the year.

Sub-Divisional Agricultural Officer for Khapa RAEO circle also paid 16 visits and covered almost all the hars in RAEO circle during the year and had first hand knowledge about the problems and prospects of the farmers. Besides, his Subject Matter Specialists also laid adaptive trials for different crops particularly jowar, cotton, groundnut, soybean and visited circle almost every month by paying 12 visits during the year.

In Vidisha district SDAO visited Imaliya RAEO circle 16 times during the year and his SMS also visited hars 22 times for laying adaptive trials and demonstrations etc.

Deputy Director, Agriculture, Subject Matter Specialists and Scientists of JNKVV Regional Research Stations also visited these RAEO circles on the occassions of farmers training camps, celebrations of farmers days and such other occassions. On these occassions they also visited the fields and discussed with the farmers to have first hand knowledge about their problems and to convey messages to them.

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CHAPTER- VI

SAMPLE HOUSEHOLDS

6.1 Households by Caste and Tribe

The sample comprised 60 contact farmers and 40 non-contact farmers. In all 100 farmers constituted the sample and among them 46 were scheduled tribesmen, 11 scheduled caste people, 5 came from backward castes and 38 came from other castes. Among contact farmers 27 were from scheduled tribes, 7 from scheduled castes, 3 from backward castes and 23 from other castes. Among non-contact farmers 19 households were from scheduled tribes, 4 from scheduled castes, 2 from backward castes and 15 from other castes.

Among the farmers from Chhindwara district 45 or 90 per cent belonged to scheduled tribes namely Gond, Pardhan and Bharias. Among the remaining 5 households, 2 each belonged to the scheduled castes and other castes and 1 household belonged to the backward caste.

In Vidisha district the position was quite different. In this district 36 or 72.00 per cent households came from other castes. Scheduled castes comprised 10 households, backward castes, 4 households and remaining 1 household represented the scheduled tribe. (Table 6.1).

6.2 Population

Sample households had a population of 749 persons and among them 388 or 51.80 per cent were males and 361 or 48.20 per cent, females. The contact farmers group had 452 persons or 60.34 per cent and they included 235 males and 217 females. The non-contact farmers group had 297 persons or 39.66 per cent and they included 153 males and 144 females.

The scheduled tribemen comprised 341 persons or 45.53 per cent, scheduled castes 83 persons or 11.08 per cent, backward castes

Table 6.1 Households according to Caste/Tribe

Castes/Tribes	Chhindwara District			Vidisha District			Total		
	Contact farmers	Non-contact farmers	Total	Contact farmers	Non-contact farmers	Total	Contact farmers	Non-contact farmers	Total
Scheduled Tribes	27	18	45	-	1	1	27	19	46
Scheduled Castes	2	-	2	5	4	9	7	4	11
Backward castes	-	1	1	3	1	4	3	2	5
Other castes	1	1	2	22	14	36	23	15	38
All	30	20	50	30	20	50	60	40	100

33 persons or 4.40 per cent and other castes, 292 persons or 38.98 per cent.

In Chhindwara district scheduled tribemen preponderated in the population (89.38 per cent) while other castes returned in majority with 70.59 per cent in the sample of Vidisha district. (Table 6.2).

6.3 Average size of Household

Average size of the household was 7.5 persons and this figure was slightly lower in Chhindwara district with 7.2 persons and Vidisha district, 7.8 persons. Among the contact farmers the average size was 7.5 and among non-contact farmers 7.4 persons. Average size among the scheduled tribes was 7.4 persons, scheduled castes 7.5 persons, backward castes 6.6 persons, and other castes 7.7 persons. (Table 6.3).

6.4 Population by Age groups

As per the age groups the adult persons (14-59 years) were in majority and constituted 432 or 57.67 per cent out of 749 persons followed by children, 269 or 35.91 per cent. The aged persons were very few numbering 48 or 6.40 per cent. Adults dominated the population in all groups including contact farmers and non-contact farmers as well as among the males and females groups (Table 6.4).

6.5 Educational level of Heads

Among 100 heads of the households there were 25 heads who did not complete schooling upto primary, 29 had education upto primary level, 12 up to middle standard, 7 were high school or higher secondary and 3 heads were educated upto graduation. Thus 76 returned as literates and 24 illiterates.

Table 6.2 Population according to Caste/Tribe

Caste/ Tribe	Chhindwara district						Vidisha district						Total					
	CF		NCF		Total		CF		NCF		Total		CF		NCF		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
ST	100	103	59	58	159	161	-	-	9	12	9	12	100	103	68	70	168	173
SC	8	7	-	-	8	7	19	16	19	14	38	30	27	23	19	14	46	37
BC	-	-	5	2	5	2	12	8	2	4	14	12	12	8	7	6	19	14
OC	5	4	2	5	7	9	91	79	57	49	148	128	96	83	59	54	155	137
Total	113	114	66	65	179	179	122	103	87	79	209	182	235	217	153	144	388	361

Table 6.3 Average size per household

Caste/Tribe	Chhindwara district			Vidisha district			Total		
	CF	NCF	Total	CF	NCF	Total	CF	NCF	Total
Scheduled Tribes	7.5	6.5	7.1	-	21.0	21.0	7.5	7.3	7.4
Scheduled Castes	7.5	-	7.5	7.0	8.2	7.6	7.1	8.2	7.5
Backward Castes	7	7.0	7.0	6.7	6.0	6.5	6.7	6.5	6.6
Other Castes	9.0	7.0	8.0	7.7	7.8	7.7	7.8	7.5	7.7
Total	7.6	6.6	7.2	7.5	8.3	7.8	7.5	7.4	7.5

Table 6.4 Population by age and sex

Population classification	Chindwara district			Vidisha district			Total		
	CF	NCF	TOTAL	CF	NCF	TOTAL	CF	NCF	Total
A. Total Persons	227	131	358	225	166	391	452	297	749
Males	113	66	179	182	87	209	235	153	388
Females	114	65	179	103	79	182	217	144	361
B. Total Aged Persons	14	8	22	15	11	26	29	19	48
Males	8	3	11	8	5	13	16	8	24
Females	6	5	11	7	6	13	13	11	24
C. Total Adults	126	83	209	131	92	223	257	175	432
Males	63	40	103	71	53	124	134	93	227
Females	63	43	106	60	39	99	123	82	205
D. Total Children	87	40	127	79	63	142	166	103	269
Males	42	23	65	43	29	72	85	52	137
Females	45	17	62	36	34	70	81	51	132

Among contact farmers 49 were literates and 11 illiterates while among non-contact farmers 27 were literates and 13 illiterates. In Chhindwara district 37 heads of the households returned as literates and among them no one was educated beyond high school level. There were 13 illiterates in this group. In Vidisha district 39 were literates and 11 were illiterates (Table 6.5).

6.6 Households according to size of farms

There were 52 small farmers (1-4 hectares), 34 medium farmers (4-10 hectares) . . , 14 large farmers (more than 10 hectares of land). The small farmers preponderated among both contact and non-contact farmers with 30 and 22 households respectively covering more than 50 per cent of the households. The medium size farmers were 20 among contact and 40 among non-contact farmers. There were 10 large farmers among the contact farmers and 4 among non-contact farmers.

In Chhindwara district the small farmers numbered 36 while in Vidisha district there were 16 of them. Medium size farmers in Chhindwara district were 12 while this figure in Vidisha district was 22. The large farmers in Chhindwara district were very few, 2 farmers as against 12 farmers in Vidisha district (Table 6.6).

Table 6.5 Details of educational levels of the heads of the households.

Educational level	Chhindwara district			Vidisha district			Total		
	CF	NCF	Total	CF	NCF	Total	CF	NCF	Total
Below Primary	11	4	15	5	5	10	16	9	25
Primary	10	6	16	10	3	13	20	9	29
Middle	2	-	2	7	3	10	9	3	12
High School	1	3	4	-	-	-	1	3	4
Inter-mediate	-	-	-	1	2	3	1	2	3
Graduate	-	-	-	2	1	3	2	1	3
Total Literates	24	13	37	25	14	39	49	27	76
Total Illiterates	6	7	13	5	6	11	11	13	24

Table 6.6 Distribution of households according to the size of farms

Farms (in hectares)	Chhindwara district			Vidisha district			Total		
	CF	NCF	Total	CF	NCF	Total	CF	NCF	Total
Marginal (Less 1.00)	-	-	-	-	-	-	-	-	-
Small (1.00-4.00)	21	15	36	9	7	16	30	22	52
Medium (4.00-10.00)	7	5	12	13	9	22	20	14	34
Large (10.00- +)	2	-	2	8	4	12	10	4	14
Total	30	20	50	30	20	50	60	40	100

6.7 Land Owned

Sample households owned 509.05 hectares of land, of which 21.55 per cent was occupied by small farmers, 37.88 per cent by medium size cultivators and 40.57 per cent by large farmers. In Chhindwara district the sample farmers owned 171.55 hectares of land including 43.83 per cent by small farmers, 39.20 per cent by medium size farmers and 16.97 per cent by large farmers. Land owned by sample farmers in Vidisha district was 337.50 hectares of which more than 50 per cent, (52.56 per cent) was occupied by the large farmers, 37.22 per cent by medium size cultivators and remaining 10.22 per cent land was owned by the small farmers.

Of the total land the contact farmers occupied 327.60 hectares or 64.35 per cent and non-contact farmers 181.45 hectares or 35.65 per cent. In Chhindwara district contact farmers comprised 67.27 per cent while this figure in Vidisha district was 62.87 per cent. The figure in the case of non-contact farmers in Chhindwara district was 32.73 per cent and in Vidisha district 37.13 per cent.

The average size of the holding was 5.09 hectares which in the case of contact farmers was 5.46 hectares and that in the non-contact farmers group, 4.53 hectares. The average size in Chhindwara district was 3.43 hectares per household as against 6.75 hectares in Vidisha district (Table 6.7).

Table 6.7 Land owned according to the size of farms

Farms (in hectares)	Chhindwara district			Vidisha district			Total		
	CF	NCF	TOTAL	CF	NCF	TOTAL	CF	NCF	TOTAL
Marginal (Less 1.00)	-	-	-	-	-	-	-	-	-
Small (1.00- 4.00)	43.90	31.30	75.20 (43.83)	17.80	16.70	34.50 (10.22)	61.70	48.00	109.70 (21.55)
Medium (4.00-10.00)	42.40	24.85	67.25 (39.20)	78.00	47.60	125.60 (37.22)	120.40	72.45	192.85 (37.88)
Large (10.00- +)	29.10	-	29.10 (16.97)	116.40	61.00	177.40 (52.56)	145.50	61.00	206.50 (40.57)
Total	115.40 (67.27)	56.15 (32.73)	171.55 (100.00)	212.20 (62.87)	125.30 (37.13)	337.50 (100.00)	327.60 (64.35)	181.45 (35.65)	509.05 (100.00)
Average size of land owned	3.85	2.81	3.43	7.07	6.27	6.75	5.46	4.53	5.09

6.8 Utilization of land owned

The sample farmers cultivated 467.50 hectares or 91.84 per cent of the total area owned by them. The proportion of cultivated area among the contact farmers was 91.74 per cent and that among the non-contact farmers 92.00 per cent. According to the size of holding the proportion of cultivated land among small farmers was 95.40 per cent, medium size farmers 91.60 per cent and large farmers 90.17 per cent. It indicated that farmers in all groups in both the districts cultivated more than 90 per cent of the land owned (Table 6.8).

6.9 Crops grown

Wheat, paddy, jowar, gram, soybean and vegetables were grown in both the districts. While kodo, kutki, sawa, urad, tur were grown only in Chhindwara district, lentil, pea, teora were grown in Vidisha district only. The cropping pattern of both the districts included food crops including cereals & millets, pulses, oilseeds, vegetables and spices etc. Kharif crops predominated in Chhindwara district while Rabi crops dominated the scene in Vidisha district.

Net area sown by the sample farmers was 467.50 hectares, of which 130.28 hectares or 27.87 per cent was sown more than once. Thus the sample farmers had gross cropped area of 597.78 hectares, of which 205.70 hectares or 34.41 per cent was irrigated.

Among the crops grown wheat was most important sown on 225.10 hectares and covered 37.66 per cent of the gross cropped area. Gram and soybean were next important crops and covered 18.18 per cent and 17.66 per cent of the gross cropped area

Table 6.8 Land cultivated according to the size of farms

Farms (in hectares)	Chhindwara district			Vidisha district			Total		
	CF	NCF	TOTAL	CF	NCF	TOTAL	CF	NCF	TOTAL
Small (1.00-4.00)	40.85 (93.05)	31.30 (100.00)	72.15 (95.94)	17.80 (100.00)	14.70 (88.02)	32.50 (94.20)	58.65 (95.06)	46.00 (95.83)	104.65 (95.40)
Medium (4.00- 10.00)	36.40 (85.85)	20.45 (82.29)	56.85 (84.54)	76.30 (97.82)	43.50 (91.39)	119.80 (95.38)	112.70 (93.60)	63.95 (88.27)	176.65 (91.60)
Large (10.00 - +)	23.60 (81.10)	-	23.60 (81.10)	105.60 (90.72)	57.00 (93.44)	162.60 (91.66)	129.20 (88.80)	57.00 (93.44)	186.20 (90.17)
Total	100.85 (87.39)	51.75 (92.16)	152.60 (88.95)	199.70 (94.10)	115.20 (91.94)	314.90 (93.30)	300.55 (91.74)	166.95 (92.00)	467.50 (91.84)

respectively. The other crops which occupied considerable area were jowar 5.57 per cent, lentil 6.14 per cent, groundnut 4.19 per cent, tur 3.55 per cent and maize 1.52 per cent. The remaining crops were grown on a meagre area and individually covered less than 1.00 per cent of the gross cropped area.

In Vidisha district wheat covered largest area (46.56 per cent) followed by gram (21.14 per cent) and soybean (19.70 per cent). These crops occupied collectively 87.40 per cent of the gross cropped area and the remaining 12.60 per cent area was under other crops including lentil (8.69 per cent).

In Chhindwara district wheat, jowar, gram, soybean, tur and groundnut returned as important crops and covered area between 11.00 per cent to 17.00 per cent individually and collectively these crops covered 81.20 per cent of the gross-cropped area. Remaining area was shared by the minor millets (5.73 per cent), urad (3.08 per cent), maize (5.19 per cent), paddy (2.74 per cent) and vegetables (2.06 per cent) (Table 6.9).

6.10 Yield

Average yield of wheat was 1,219 Kg/hectare which in the case of contact farmers was 1,311 Kg/hectare and non-contact farmers 1,051 Kg/hectare. Average yield of jowar was 850 Kg/hectare and this figure in the case of contact farmers was 892 Kg/hectare and non-contact farmers was 789 Kg/hectare. Yield of gram was 706 Kg/hectare which in the case of contact farmers was 738 Kg/hectare while among non-contact farmers 652 Kg/hectare. Soybean yielded 906 Kg/hectare among the contact farmers and 669 Kg/hectare among non-contact farmers with an average yield of 845 Kg/hectare.

Table 6.9 Area under different crops (in hectares)

Crops	Chhindwara District			Vidisha district			Total		
	CF	NCF	Total	CF	NCF	Total	CF	NCF	Total
Wheat	21.60	6.80	28.40 (16.19)	123.60	73.10	196.70 (46.56)	145.20	79.90	225.10 (37.66)
Paddy	2.80	2.00	4.80 (2.74)	0.30	-	0.30 (0.07)	3.10	2.00	5.10 (0.85)
Jowar	15.35	10.68	26.03 (14.84)	4.25	3.00	7.25 (1.72)	19.60	13.68	33.28 (5.57)
Maize	6.20	2.90	9.10 (5.19)	-	-	-	6.20	2.90	9.10 (1.52)
Kodo	2.40	-	2.40 (1.37)	-	-	-	2.40	-	2.40 (0.40)
Kutki	2.00	1.45	3.45 (1.97)	-	-	-	2.00	1.45	3.45 (0.58)
Sawa	3.00	1.20	4.20 (2.39)	-	-	-	3.00	1.20	4.20 (0.70)
Gram	14.80	4.60	19.40 (11.06)	53.30	36.00	89.30 (21.14)	68.10	40.60	108.70 (18.18)
Soybean	18.35	4.00	22.35 (12.74)	60.20	23.00	83.20 (19.70)	78.55	27.00	105.55 (17.66)
Lentil	-	-	-	26.70	10.00	36.70 (8.69)	26.70	10.00	36.70 (6.14)
Urad	4.80	0.60	5.40 (3.08)	-	-	-	4.80	0.60	5.40 (0.90)
Tur	13.20	8.00	21.20 (12.09)	-	-	-	13.20	8.00	21.20 (3.55)
Pea	-	-	-	1.40	0.20	1.60 (0.38)	1.40	0.20	1.60 (0.27)
Teora	-	-	-	3.65	2.00	5.65 (1.34)	3.65	2.00	5.65 (0.95)
Groundnut	16.80	8.25	25.05 (14.28)	-	-	-	16.80	8.25	25.05 (4.19)
Vegetables	3.40	0.20	3.60 (2.06)	1.20	0.50	1.70 (0.40)	4.60	0.70	5.30 (0.88)
Total :	124.70	50.68	175.38 (100.00)	274.60	147.80	422.40 (100.00)	399.30	198.48	597.78 (100.00)

Table 6.10 Yield under different crops in sample households, 1986-87

Crops	Chhindwara district			Vidisha district			Total		
	CF	NCF	Total	CF	NCF	Total	CF	NCF	Total
Wheat	1456	1287	1415	1286	1029	1190	1311	1051	1219
Paddy	679	600	646	833	-	833	694	600	657
Jowar	879	758	830	936	900	921	892	789	850
Maize	2073	1517	1896	-	-	-	2073	1517	1896
Kodon	250	-	250	-	-	-	250	-	250
Kutki	213	241	225	-	-	-	213	241	225
Sawa	367	271	339	-	-	-	367	271	339
Gram	708	459	649	747	676	718	738	652	706
Soybean	1493	1300	1459	727	559	680	906	669	845
Lentil	-	-	-	319	322	320	319	322	320
Urad	215	333	228	-	-	-	215	333	228
Tur	1364	1313	1344	-	-	-	1364	1313	1344
Pea	-	-	-	332	500	353	332	500	353
Teora	-	-	-	452	400	434	452	400	434
Groundnut	667	676	670	-	-	-	667	676	670

Table 6.11 Area irrigated by different sources.

Irrigation Sources	Chhindwara district			Vidisha district			Total		
	CF	NCF	TOTAL	CF	NCF	TOTAL	CF	NCF	TOTAL
Well + Pump	26.40 (65.59)	2.90 (23.97)	29.30 (55.97)	9.40 (8.19)	4.00 (10.36)	13.40 (8.74)	35.80 (23.10)	6.90 (13.61)	42.70 (20.76)
Tube-well	-	-	-	5.00 (4.36)	-	5.00 (3.26)	5.00 (3.22)	-	5.00 (2.43)
Canal	13.85 (34.41)	9.20 (76.03)	23.05 (44.03)	90.45 (78.82)	33.60 (87.65)	124.05 (80.89)	104.30 (67.29)	42.80 (84.42)	147.10 (71.51)
Other	-	-	-	9.90 (8.63)	1.00 (2.59)	10.90 (7.11)	9.90 (6.39)	1.00 (1.97)	10.90 (5.30)
Total :	40.25 (100.00)	12.10 (100.00)	52.35 (100.00)	114.75 (100.00)	38.60 (100.00)	153.35 (100.00)	155.80 (100.00)	50.70 (100.00)	205.70 (100.00)

In the case of wheat the average yield in Chhindwara district was 1,415 Kg/hectare while it was 1,190 Kg/hectare in Vidisha district. In the case of jowar 921 Kg/hectare yield was reported in Vidisha district as against 830 Kg/hectare in Chhindwara district. In the case of soybean Vidisha district was far behind as its yield was 680 Kg/hectare as against 1,459 Kg/hectare in Chhindwara district. Situation was different in the case of paddy as its yield in Vidisha district was 833 Kg/hectare as against 646 Kg/hectare in Chhindwara district. In the case of gram 718 Kg/hectare yield was in Vidisha district as against 649 Kg/hectare in Chhindwara district.

Yield obtained for different crops indicated that contact farmers in general obtained higher yield as compared to non-contact farmers (Table 6.10).

6.11 Area Irrigated

An area of 205.70 hectares was irrigated of which 71.51 per cent was by canals, 20.76 per cent by wells, 2.43 per cent by tube-wells and 5.30 per cent by other scurces.

In Chhindwara district the contact farmers irrigated the largest proportion of area (65.59 per cent) by wells and the non-contact farmers irrigated 76.03 per cent of the irrigated area by canals.

In Vidisha district the largest proportion of area (78.82 per cent) among contact farmers and also (87.05 per cent) among non-contact farmers was irrigated by the canals (Table 6.11).

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CHAPTER- VII

ADOPTION OF CULTIVATION TECHNOLOGY

In rabi season, wheat and gram were the main crops grown by the sample farmers of both the districts. In kharif jowar and soybean were important crops. Under the Training and Visit programme these four crops were paid special attention as compared to other crops. Thus cultivation practices followed by the sample farmers for wheat, gram, jowar and soybean were studied in details. Results obtained from the analysis of this data are discussed in this chapter.

7.1 Pre-sowing operations

Pre-sowing operations mainly included the breaking of soil with bakhar or plough and cleaning of stubbles etc. from the fields. The farmers were told that for growing wheat, gram, jowar and soybean soil should be pulverized. For this purpose it was suggested that they should plough the soil with plough or bakhar atleast three times before sowing the seed. They may adopt two ploughings and one harrowing or one ploughing and two harrowings. The soil must become quite loose and clodless.

In the case of wheat, 73.47 per cent contact farmers and 88.89 per cent non-contact farmers carried out ploughing and harrowing as per the recommendations. Required level of soil preparation was done by 24.49 per cent contact farmers and 11.11 per cent non-contact farmers. There were 2.04 per cent contact farmers who did not prepare soil to the desired extent. Higher level of ploughings and harrowings were carried out by larger number of non-contact farmers in Vidisha district while this place was occupied by contact farmers in Chhindwara district :

Both contact farmers and non-contact farmers in Chhindwara district carried out soil preparation for gram crop as per the recommendations. In Vidisha this proportion was 76.00 per cent and 94.12 per cent respectively. In both the samples 15.79 per cent contact farmers and 4.00 per cent non-contact farmers did soil preparation operations to the required level and remaining to a higher level.

For growing jowar 27.27 per cent contact farmers and 28.57 per cent non-contact farmers did soil preparation to the required level and the remaining did more than that. Proportion of higher level farmers was larger in Chhindwara district while this position in Vidisha district was occupied by the required level farmers.

Soybean was the newly introduced crop in both the districts and soil preparation for this crop was done to a desired level by 39.48 per cent contact farmers and 56.25 per cent non-contact farmers. There were 23.68 per cent farmers who could not do operation to the desired level but remaining 36.84 per cent contact farmers and 43.75 per cent non-contact farmers prepared soil by carrying out higher level of operations. In Chhindwara district 68.75 per cent contact farmers and 50.00 per cent non-contact farmers adopted higher level of operations and remaining farmers to a required level. Situation in Vidisha district was different where 40.91 per cent contact farmers did operation at lower level, 45.45 per cent at required level and 13.64 per cent at higher level. Among non-contact farmers 60.00 per cent farmers reported the required level and 40.00 per cent the higher level category (Table 7.1).

Table 7.1 Levels of soil preparations adopted by farmers

Particulars (Soil preparation)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
		WHEAT				
At higher level	84.21	77.78	66.67	94.44	73.47	88.89
At required level	15.79	22.22	30.00	5.56	24.49	11.11
At lower level	-	-	3.33	-	2.04	-
		GRAM				
At higher level	100.00	100.00	76.00	94.12	84.21	96.00
At required level	-	-	24.00	5.88	15.79	4.00
At lower level	-	-	-	-	-	-
		JOWAR				
At higher level	82.35	75.00	40.00	50.00	72.73	71.43
At required level	17.65	25.00	60.00	50.00	27.27	28.57
At lower level	-	-	-	-	-	-
		SOYBEAN				
At higher level	68.75	50.00	13.64	40.00	36.84	43.75
At required level	31.25	50.00	45.45	60.00	39.48	56.25
At lower level	-	-	40.91	-	23.68	-

7.2 Varieties sown

Wheat

Wheat varieties sown by the farmers included WH-147, HDM-1553, HDM- 1593, Hybrid-65, Lok-1 as improved varieties recommended for the district and C-306 and other local wheat varieties under non-recommended varieties.

Among the contact farmers 42.86 per cent farmers used recommended varieties and 65.31 per cent local varieties. Among them there were 8.17 per cent farmers who used both recommended and local varieties. Among non-contact farmers a majority of 66.67 per cent adopted local varieties and 33.33 per cent recommended varieties. In Chhindwara district both contact farmers and non-contact farmers used recommended varieties and among the contact farmers 15.79 per cent also raised local varieties. In the case of Vidisha district all the non-contact farmers used local varieties and this proportion among contact farmers was 96.67 per cent. There were only 3.33 per cent contact farmers who cultivated the recommended varieties of wheat.

The varieties popularly sown by largest number of farmers (67.86 per cent) was WH-147 in Chhindwara district. In Vidisha 59.21 per cent farmers grew C-306.

Gram

Varieties of gram sown by the farmers included Ujjain-21, JG-5 as improved varieties and other local varieties. A vast majority of 73.69 per cent contact farmers adopted the improved and recommended varieties of gram and this figure among non-contact farmers was 56.00 per cent. Remaining farmers in both the groups raised the local gram varieties. In Chhindwara district the majority of contact farmers raised recommended varieties while

non-contact farmers cultivated local varieties. In Vidisha district the adopters of improved varieties were in overwhelming majority among both the groups of farmers.

Jowar

Jowar varieties sown by the farmers included local jowar and improved varieties CSH-9, CSH-5 and SPU-472. The farmers of Vidisha district cultivated only local jowar varieties while in Chhindwara district 82.34 per cent contact farmers and 66.67 percent non-contact farmers adopted the recommended varieties of jowar.

Thus taking both the districts together 63.34 per cent contact farmers and 57.11 per cent non-contact farmers used the improved varieties and others remained associated with the local varieties.

Soybean

No one cultivated black soybean. The variety known as Gaurav (JS-72-44) was popularly grown by the farmers and some of them also adopted Punjab-1 and JS-2 varieties (Table 7.2).

Table 7.2 Varieties sown and the farmers in percentages

Particulars (Varieties sown)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
		WHEAT				
Recommended	100.00	100.00	3.33	-	42.86	33.33
Local	15.79	-	96.67	100.00	65.31	66.67
		GRAM				
Recommended	61.54	12.50	80.00	76.47	73.69	56.00
Local	46.15	87.50	36.00	29.41	39.47	48.00
		JOWAR				
Recommended	82.34	66.67	-	-	63.64	57.11
Local	23.53	33.33	100.00	100.00	40.91	42.86
		SOYBEAN				
Recommended	100.00	100.00	100.00	100.00	100.00	100.00
Local	-	-	-	-	-	-

7.3 Seed rate

The seed rates recommended for different crops in the sample districts are termed as "required rate","higher rate" and "lower rate".

Wheat

In the case of wheat majority of the farmers (61.23 per cent contact farmers and 55.56 per cent non-contact farmers) adopted the higher seed rate and a very few including 8.16 per cent in the former group and 3.70 per cent in the latter adopted the lower seed rate. There were 30.61 per cent contact farmers and 40.74 per cent non-contact farmers who adopted the seed rate as per the recommendations. Most of the contact farmers in both the districts adopted the higher seed rate. Among non-contact farmers majority (61.77 per cent) kept higher seed rate but in Chhindwara district they were only 44.44 per cent.

Gram

In the case of gram, majority (60.53 per cent) of contact farmers and 52.00 per cent non-contact farmers, adopted the recommended seed rate and a few farmers (7.89 per cent contact farmers and 16.00 per cent non-contact farmers) used the lower seed rate. Nearly one-third of the farmers in both the groups adopted higher seed rate. In Vidisha district the farmers who adopted the required seed rate were in large number and no one in this district adopted the lower seed rate. In Chhindwara district 50.00 per cent of non-contact farmers adopted required seed rate and this was done by 38.46 per cent among the contact farmers. Lower seed rate was adopted by 23.08 per cent contact farmers and 25.00 per cent non-contact farmers.

Jowar

Majority of the farmers adopted lower seed rate for jowar and they comprised 77.27 per cent contact farmers and 78.57 per cent non-contact farmers. Situation was similar in the case of Chhindwara district where these figures were much higher (82.35 per cent and 83.34 per cent respectively). In Vidisha district 60.00 per cent contact farmers and 50.00 per cent non-contact farmers adopted lower seed rate. Required seed was adopted by a small section of farmers including 17.65 per cent contact farmers and 8.33 per cent non-contact farmers in Chhindwara district and 20.00 per cent contact farmers in Vidisha district.

Soybean

Seed rate adopted for soybean crop was in line with the recommendations in the case of large number of farmers including 76.32 per cent contact farmers and 75.00 per cent non-contact farmers. These figures for required seed rate adopters in Chhindwara district were 87.50 per cent among contact farmers and 66.67 per cent among non-contact farmers and in Vidisha district 68.18 per cent and 80.00 per cent respectively. Higher rate adopters were in smaller number and varied between 12.50 per cent to 33.33 per cent. There were only 4.55 per cent farmers who adopted the lower seed rate of soybean in Vidisha district (Table 7.3).

7.4 Seed treatment and seed inoculation

Importance of seed treatment and seed inoculation was told to the farmers time and again but both these treatments were not commonly adopted by the farmers. In the case of wheat 24.49 per cent contact farmers and 7.41 per cent non-contact farmers treated the seed. Seed inoculation was adopted by a very few farmers including 2.04 per cent contact farmers and 3.70 per cent non-contact

Table 7.3 Seed rates and the farmers in percentages

Particulars (Seed rates)	Chhindwara		Vidisha		Both	
		NCF	CF	NCF	CF	NCF
		WHEAT				
At higher rate		44.44	66.67	61.11	61.23	55.56
At required rate	36.84	44.44	26.67	38.89	30.61	40.74
At lower rate	10.53	11.12	6.66	-	8.16	3.70
		GRAM				
At higher rate	38.46	25.00	28.00	35.29	31.58	32.00
At required rate	38.46	50.00	72.00	64.71	60.53	52.00
At lower rate	23.08	25.00	-	-	7.89	16.00
		JOWAR				
At higher rate	-	8.33	20.00	50.00	4.55	14.29
At required rate	17.65	8.33	20.00	-	18.18	7.14
At lower rate	82.35	83.34	60.00	50.00	77.27	78.57
		SOYBEAN				
At higher rate	12.50	33.33	27.27	20.00	21.05	25.00
At required rate	87.50	66.67	68.18	80.00	76.32	75.00
At lower rate	-	-	4.55	-	2.63	-

farmers. In Chhindwara district 26.32 per cent contact farmers adopted seed treatment while it was done by 3.33 per cent contact farmers in Vidisha district. Among non-contact farmers 22.22 per cent in Chhindwara district did seed treatment while no one did so in Vidisha district. Seed inoculation was adopted by 5.26 per cent contact farmers in Chhindwara district and 5.56 per cent non-contact farmers in Vidisha district.

Seed treatment of gram was adopted by 18.42 per cent and seed inoculation was done by 34.21 per cent contact farmers and 20.00 per cent non-contact farmers. In Chhindwara district 40.16 per cent of both the contact and non-contact farmers did the seed treatment and seed inoculation with Rhizobium culture. In Vidisha district only 4.00 per cent contact farmers adopted seed treatment and 28.00 per cent adopted the seed inoculation. Among non-contact farmers 29.41 per cent did seed inoculation.

Seed treatment of jowar was adopted only in Chhindwara district by 64.41 per cent contact farmers and 66.67 per cent non-contact farmers.

Response towards seed treatment and seed inoculation of soybean quite good as compared to other crops. Among contact farmers 26.32 per cent and among non-contact farmers 43.75 per cent farmers treated the soybean seed and this proportion was quite high as far as inoculation with Rhizobium culture was concerned. There were 68.42 per cent contact farmers and 75.00 per cent non-contact farmers who inoculated the seed before sowing. The proportion of seed inoculation was higher in both the districts as compared to the seed treatment. Seed treatment and seed inoculation was done by manual methods (Table 7.4).

Table 7.4 Seed treatment and seed inoculation and the farmers in percentages

Particulars (Seed treatment and seed inoculation)	Chhandwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
			WHEAT			
Seed treatment	26.32	22.22	3.33	-	24.49	7.41
Seed inoculation	5.26	-	-	5.56	2.04	3.70
			GRAM			
Seed treatment	46.15	-	4.00	-	18.42	--
Seed inoculation	46.15	-	28.00	29.41	34.21	20.00
			JOWAR			
Seed treatment	64.71	66.67	-	-	50.00	57.14
Seed inoculation	-	-	-	-	-	--
			SOYBEAN			
Seed treatment	37.50	66.67	18.18	30.00	26.32	43.75
Seed inoculation	57.25	83.33	77.27	70.00	68.42	75.00

7.5 Method of sowing

Line sowing was most popular method of sowing while broadcasting method was also adopted by a few farmers. For linesowing farmers generally used specially made seed drill called Dufan and Tifan. This drill provided desired row to row distance and depth of the seed.

In both the districts all the farmers except 8.16 per cent contact farmers and 7.41 per cent non-contact farmers adopted the linesowing method for wheat-crop. In Vidisha district all the farmers did linesowing and most of them used tractors. In Chhindwara district 78.95 per cent contact farmers and 77.78 per cent non-contact farmers did linesowing with the help of Dufan and Tifan. Remaining farmers adopted broadcasting method for sowing wheat crop.

Gram was totally sown by line sowing method. Similarly line sowing method was adopted by almost all except 9.90 per cent contact farmers who did it by way of broadcasting. It was in Chhindwara district where 11.76 per cent contact farmers adopted broadcasting method otherwise all farmers used linesowing method for jowar.

In the case of soybean all farmers excluding 5.26 per cent contact farmers, used linesowing method with the help of Dufan and Tifan. Non-contact farmers in both the district adopted line sowing method while among contact farmers this figure was 93.75 per cent in Chhindwara district and 95.45 per cent in Vidisha district (Table 7.5)

Table 7.5 Methods of sowing and the farmers in percentages

Particulars (Methods of sowing)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
		WHEAT				
Line sowing	78.95	77.78	100.00	100.00	91.84	92.59
Broadcasting	21.05	22.22	-	-	8.16	7.41
		GRAM				
Line sowing	100.00	100.00	100.00	100.00	100.00	100.00
Broadcasting	-	-	-	-	-	-
		JOWAR				
Line sowing	88.24	100.00	100.00	100.00	90.91	100.00
Broadcasting	11.76	-	-	-	9.09	-
		SOYBEAN				
Line sowing	93.75	100.00	95.45	100.00	94.74	100.00
Broadcasting	6.25	-	4.55	-	5.26	-

7.6 Date of Sowing

The period recommended for sowing purposes was termed as timely sown, sowing done earlier to that was marked early and sowing done after the recommended period was termed as late sowing. Crops like jowar and soybean were sown during the recommended period by all the farmers. Early sowing was not reported in any crop while there were some cases of late sowing of wheat and gram.

There were 14.29 per cent contact farmers and 11.11 per cent non-contact farmers who did late sowing of wheat crop. Such farmers for gram were 7.89 per cent of the contact farmers and 4.00 per cent of the non-contact farmers. Late sowing of wheat and gram was reported from Chhindwara district among both the categories of farmers but their proportion was a little more than one-third in the case of wheat and very little in the case of gram. In Vidisha district only 8.00 per cent contact farmers did late sowing of gram (Table 7.6).

Table 7.6 Dates of sowings and the farmers in percentages

Particulars (Dates of sowing)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
		WHEAT				
Early	-	-	-	-	-	-
Timely	63.16	66.67	100.00	100.00	85.71	88.89
Late	36.84	33.33	-	-	14.29	11.11
		GRAM				
Early	-	-	-	-	-	-
Timely	92.31	87.50	92.00	100.00	92.11	96.00
Late	7.69	12.50	8.00	-	7.89	4.00
		JOWAR				
Early	-	-	-	-	-	-
Timely	100.00	100.00	100.00	100.00	100.00	100.00
Late	-	-	-	-	-	-
		SOYBEAN				
Early	-	-	-	-	-	-
Timely	100.00	100.00	100.00	100.00	100.00	100.00
Late	-	-	-	-	-	-

7.7 Fertilizer application

Fertilizer application was divided into three doses of NPK as per the recommendations made for the crops under reference. These included basal dose, top dressing and foliar spray.

Wheat

Basal dose recommended for wheat was adopted by majority of the farmers in all the groups : 75.51 per cent of the contact farmers and 92.59 per cent non-contact farmers. In Vidisha district all the non- contact farmers adopted basal dose while such farmers were 86.67 per cent among contact farmers. In Chhindwara district 57.89 per cent contact farmers and 77.78 per cent non-contact farmers adopted the basal dose. Top dressing of wheat was done by less than 50.00 per cent farmers and such farmers among contact farmers were 38.78 per cent and among non-contact farmers 48.15 per cent. In Chhindwara district 66.67 per cent non-contact farmers did top-dressing while in other group in both the districts this proportion varied between 36.67 per cent and 42.11 per cent.

Foliar spray was not popular as it was done by only 10.20 per cent contact farmers and 14.81 per cent non-contact farmers. In Chhindwara district it was done by both the groups including 26.32 per cent contact farmers and 22.22 per cent non-contact farmers.

Gram

Basal doses of fertilizers were also adopted by the farmers. Among the contact farmers 73.68 per cent applied basal dose as against 52.00 per cent non-contact farmers. In Vidisha district a vast majority (84.00 per cent) of contact farmers and 70.59 per

cent non-contact farmers adopted the basal dose of fertilizer for gram. Position in Chhindwara district was some what different where 58.65 per cent contact farmers and 12.50 per cent non-contact farmers applied the basal fertilizer doses for gram crop.

Jowar

Fertilizer application for jowar had a mixed response as 45.45 per cent contact farmers and 50.00 per cent non-contact farmers adopted the basal dose. Top dressing was done by 54.55 per cent contact farmers and 35.71 per cent non-contact farmers. A few farmers (7.14 per cent) also did foliar spray. In Vidisha district it had a better response where 60.00 per cent contact farmers and 50.00 per cent non-contact farmers applied the basal dose of fertilizers but top dressing was done by only 40.00 per cent contact farmers. In Chhindwara district 41.18 per cent contact farmers and 50.00 per cent non-contact farmers adopted the basal dose but in the case of top dressing a large number of contact farmers (58.82 per cent) did top dressing as against 41.67 per cent non-contact farmers. Foliar spray was adopted only by 8.33 per cent non-contact farmers.

Soybean

Fertilizer use in soybean was quite popular like wheat crop and most of the farmers including 78.95 per cent contact farmers and 75.00 per cent non-contact farmers applied the basal dose of fertilizers. The top dressing was done by 39.47 per cent contact farmers and 18.75 per cent non-contact farmers. In Vidisha district 90.00 per cent non-contact farmers applied fertilizer doses as against 81.82 per cent contact farmers. Position in Chhindwara district was just opposite where 75.00 per cent contact farmers applied fertilizers as against 50.00 per cent non-contact farmers. Nearly

one-third of the farmers also did the top dressing which was done by 45.45 per cent contact farmers and 10.00 per cent non-contact farmers in Vidisha district (Table 7.7).

7.8 Irrigation

It was made known to the farmers that they should start sowing only when there is sufficient moisture in the soil for germination purposes otherwise they should adopt pre-sowing irrigation.

Specific number of irrigations were advocated for growing wheat and gram. For wheat they were advised to provide 5 irrigations. First, at the time of root formation (after 15-20 days), second, on the completion of tillering, third at node formation stage, fourth at flowering stage and fifth at milking stage. Similarly 3 irrigations for gram were also advised.

Wheat

A little more than 50.00 per cent farmers did pre-sowing irrigation. First irrigation was also adopted by majority of the farmers : 67.35 per cent contact farmers and 55.56 per cent non-contact farmers. Since there had been showers from time to time the other irrigations were influenced by them. There were 32.65 per cent contact farmers who adopted second irrigation, 30.61 per cent third stage irrigation, 24.49 per cent fourth and 16.33 per cent fifth and final irrigation. Among non-contact farmers 14.74 per cent adopted second irrigation, 25.93 per cent third irrigation, 11.11 per cent fourth irrigation and 7.41 per cent fifth irrigation. Irrigation schedule in Chhindwara district was followed by larger number of farmers as compared to those of Vidisha district.

Gram

In Vidisha district all the farmers did sowing of gram in residual moisture while this was not true in Chhindwara district

Table 7.7 Doses of fertilizers and the farmers in percentages

Particulars	Chhindwara		Vidisha		Both	
Fertilizers application	CF	NCF	CF	NCF	CF	NCF
			WHEAT			
Applied basal doses	57.89	77.78	86.67	100.00	75.51	92.59
Did topdressing	42.11	66.67	36.67	38.89	38.78	48.15
Did foliar spray	26.32	22.22	--	11.11	10.20	14.81
			GRAM			
Applied basal doses	53.85	12.50	84.00	70.59	73.68	52.00
Did topdressing	--	--	--	--	--	--
Did foliar spray	--	--	--	--	--	--
			JOWAR			
Applied basal doses	41.18	50.00	60.00	50.00	45.45	50.00
Did topdressing	58.82	41.67	40.00	--	54.55	35.71
Did foliar spray	--	8.33	--	--	--	7.14
			SOYBEAN			
Applied basal doses	75.00	50.00	81.82	90.00	78.95	75.00
Did topdressing	31.25	33.33	45.45	10.00	39.47	18.75
Did foliar spray	--	--	--	--	--	--

where 46.15 per cent contact farmers and 25.00 per cent non-contact farmers applied pre-sowing irrigation. Nearly more than one-third of the farmers used first irrigation while second and third irrigations was done by a few farmers because of showers (Table 7.8).

7.9 Plant protection and Weeding

Plant protection measures and weedings were not adopted for wheat crop in Vidisha district. In Chhindwara district 10.53 per cent contact farmers used plant protection measures and 21.05 per cent also did weeding. Among non-contact farmers 11.11 per cent did both plant protection and weedings for wheat crop.

Large number of farmers adopted plant protection measures for gram. Such farmers among contact farmers were 58.33 per cent and among non-contact farmers, 55.56 per cent. In Vidisha district the large majority adopted the plant protection devices including 68.75 per cent contact farmers and 66.67 per cent non-contact farmers. These figures in Chhindwara district were much lower : 37.50 per cent and 25.00 per cent respectively. In Chhindwara district 30.11 per cent contact farmers also did weeding.

Weeding operations for jowar and soybean crops were adopted by all the farmers and these crops were weeded with the help of Dora and manual methods atleast 2-3 times. As against this plant protection measures for these crops were adopted by a few farmers. There were only 4.55 per cent contact farmers and 7.14 per cent non-contact farmers who adopted plant protection devices to protect the jowar crop from insects and pests. This proportion of farmers was some what larger for soybean crop. In this case 15.79 per cent contact farmers and 18.75 per cent non-contact farmers applied plant protection measures (Table 7.9).

Table 7.8 Irrigations recommended and the farmers in percentages

Particulars (Irrigation)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	NC	NCF
			WHEAT			
Presowing	36.84	66.67	66.67	44.44	55.10	51.85
I Irrigation	84.21	100.00	56.67	33.33	67.35	55.56
II Irrigation	42.11	88.89	26.67	16.67	32.65	40.74
III Irrigation	78.95	66.67	--	5.56	30.61	25.93
IV Irrigation	63.16	22.22	--	5.56	24.49	11.11
V Irrigation	42.11	22.22	--	--	16.33	7.41
			GRAM			
Presowing	46.15	25.00	--	--	15.79	8.00
I Irrigation	53.85	37.50	24.00	35.29	34.21	36.00
II Irrigation	23.08	--	12.00	11.76	15.79	8.00
III Irrigation	30.77	--	--	--	10.53	--

Table 7.9 Plant protection measures and the farmers in percentages

Particulars (Plant protection)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
			WHEAT			
Weeding	21.05	11.11	-	-	8.16	3.70
Plant protection	10.53	11.11	-	-	4.08	3.70
			GRAM			
Weeding	30.77	--	-	-	10.53	--
Plant protection	37.50	25.00	68.75	66.67	58.33	55.56
			JOWAR			
Weeding	100.00	100.00	100.00	100.00	100.00	100.00
Plant protection	5.88	8.33	-	-	4.55	7.14
			SOYBEAN			
Weeding	100.00	100.00	100.00	100.00	100.00	100.00
Plant protection	12.50	-	18.18	30.00	15.79	18.75

7.10 Harvesting

No one harvested earlier than recommended but few farmers harvested wheat and gram crops late. There were 8.16 per cent contact farmers and 3.70 per cent non- contact farmers who did late harvesting of wheat crop and there were 2.63 per cent contact farmers who also harvested gram crop late. Remaining farmers did harvesting of wheat and gram crop in time when crop became fully matured. They completed harvesting before starting of the shattering of grain. Jowar and soybean crop were harvested in time by all the farmers (Table 7.10).

7.11 Yield

Wheat

Average yield of wheat in Chhindwara district was 1,307 kg/hectare and in Vidisha district 718 Kg/hectare. Average yield for the state was 1,141 Kg/hectare. District yield was rated as average while those who produced more were rated as higher yielding and who produced below average were rated as lower level producers.

In Chhindwara district a majority of the contact farmers (52.94 per cent) obtained yield higher than the district average. As against this, a vast majority of 66.67 per cent non-contact farmers could not produce up to the district average. There were 17.65 per cent contact farmers and 11.11 per cent non-contact farmers who obtained yield equal to the district average. In Vidisha district average yield of wheat was much lower, therefore, an overwhelming majority including 73.33 per cent contact farmers and 83.33 per cent non-contact farmers obtained higher yield as compared the district average. There were very few farmers whose yield was lower than the state average. There were 20.00 per cent

Table 7.10 Harvesting of crops and the farmers in percentages.

Particulars (Harvesting)	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
			WHEAT			
Early	--	--	--	--	-	--
Timely	84.21	88.89	96.67	100.00	91.84	96.30
Late	15.79	11.11	3.33	--	8.16	3.70
			GRAM			
Early	--	--	--	--	--	--
Timely	92.31	100.00	100.00	100.00	97.37	100.00
Late	7.69	--	--	--	2.63	--
			JOWAR			
Early	--	--	--	--	--	--
Timely	100.00	100.00	100.00	100.00	100.00	100.00
Late	--	--	--	--	--	--
			SOYBEAN			
Early	--	--	--	--	--	--
Timely	100.00	100.00	100.00	100.00	100.00	100.00
Late	--	--	--	--	--	--

contact farmers and 11.11 per cent non-contact farmers who obtained yield equal to the district yield rate of wheat.

Gram

In Chhindwara district the average yield of gram was 761 Kg/hectare and that in Vidisha 647 Kg/hectare. In Chhindwara district majority of the farmers including 53.33 per cent contact farmers and 87.50 per cent non-contact farmers could not reach the district average while in Vidisha district farmers in majority (54.17 per cent contact farmers and 52.94 per cent non-contact farmers) produced above the district average. However, 20.00 per cent contact farmers and 12.50 per cent non-contact farmers in Chhindwara district and 4.17 per cent contact farmers and 11.76 per cent non-contact farmers in Vidisha district produced equal to the district average.

Jowar

Average yield for the state as a whole was 798 Kg/hectare. In Vidisha district this figure was higher with 909 Kg/hectare and in Chhindwara district it was lower with 731 Kg/hectare. In Chhindwara district two-third (66.67 per cent) farmers produced more than the district average while in Vidisha district majority of the farmers including 66.67 per cent contact farmers and 50.00 per cent non-contact farmers could not attain the district average.

Soybean

The average yield of soybean in Chhindwara district was 1,577 Kg/hectare. This was more than twice the state yield of 780 Kg/hectare. In Vidisha district the average yield of soybean was 708 Kg/hectare, lower than the state average. The non-contact farmers in both the districts miserably failed to attain the district average yield. In Chhindwara district all the farmers produced lower than

Table 7.11 Yield and the farmers in percentages

Particulars	Chhindwara			Vidisha			Madhya Pradesh		
	Higher	Average	Lower	Higher	Average	Lower	Higher	Average	Lower
WHEAT	Av.yield- 1307 Kg/hect.			Av.yield- 718 Kg/hect.			Av.yield- 1141 Kg/hect.		
CF	52.94	17.65	29.41	73.33	20.00	6.67	57.45	8.51	34.04
NCF	22.22	11.11	66.67	83.33	11.11	5.56	40.74	7.41	51.85
GRAM	Av. yield-761 Kg/hect.			Av. yield-647 Kg/hect.			Av. yield- 626 Kg/hect.		
CF	26.67	20.00	53.33	54.17	4.17	41.66	53.85	2.56	43.59
NCF	-	12.50	87.50	52.94	11 76	35.30	40.00	8.00	52.00
JOWAR	Av. yield-731 Kg/hect.			Av. yield- 909 Kg/hect.			Av. yield- 798 Kg/hect.		
CF	66.67	6.67	26.66	33.33	-	66.67	57.14	4.76	38.10
NCF	66.67	8.33	25.00	50.00	-	50.00	64.29	-	35.71
SOYBEAN	Av. yield-1577 Kg/hect.			Av. yield- 708 Kg/hect.			Av. yield- 780 Kg/hect.		
CF	7.69	-	92.31	35.29	35.29	29.42	30.00	20.00	50.00
NCF	-	-	100.00	30.00	-	70.00	25.00	-	75.00

the district average and in Vidisha district this proportion was 70.00 per cent. Among contact farmers 7.69 per cent obtained higher yield and 92.31 per cent lower yield in Chhindwara district. Situation was some what better in Vidisha district where 35.29 per cent contact farmers obtained higher yield and another 35 per cent obtained yield equal to the district average. There were 29.42 per cent contact farmers in this district who obtained lower yield as against the district figure (Table 7.11).

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CHAPTER- VIII

KNOWLEDGE, PARTICIPATION AND OPINION

8.1 Knowledge about T & V Programme

In Chhindwara district T & V programme was introduced in 1978-79. During the same year 10 farmers including 8 contact farmers come to know about it. In the succeeding year this figure rose to 15 and including 13 contact farmers. During 1980-81, 14 farmers including 11 non-contact farmers acquired knowledge about this programme. Remaining 11 farmers including 6 contact farmers and 5 non-contact farmers became aware about the activities of T&V programme during 1981-82.

In Vidisha district where T&V programme came into operation from 1982-83, the farmers numbering 8 including 6 contact farmers learnt about this programme during the same year. During the next year (1983-84), 19 farmers including 14 contact farmers became familiar with the activities of the programme and the remaining 23 farmers including 10 contact farmers and 13 non-contact farmers came to know about the operation of T&V programme in this district. Thus in this district all the sample farmers became aware about T&V programme in three years while farmers of Chhindwara district took four years.

Source of information

Rural Agricultural Extension Officer was the main source of information about the activities of T&V programme for all the farmers in both the districts. He was said to be responsible for the selection of contact farmers as no farmer approached any person for his selection as contact farmer. It was the RAEO who selected the contact farmers as per the prescribed standards and norms.

8.3 Knowledge about the officials and their visits

Among the different officials RAEOs were popularly known by their names and castes by all the contact farmers while 30 non-contact farmers out of 40 also knew the RAEOs quite well. There were 46 contact farmers who also knew about the days of har visits of their respective RAEOs. Among non-contact farmers such farmers were only 13. Agricultural Development Officers and Sub-Divisional Agriculture Officers were also known quite well to the farmers as majority of the contact farmers personally knew these officers. Some of the non-contact farmers also knew these officers personally. There were a few farmers including 9 contact farmers and 5 non-contact farmers who knew the Deputy Directors personally by names. Subject Matter Specialists were reported least known persons among the farmers.

8.4 Participation

The meetings called on the har visit days were attended regularly by 42 contact farmers and 7 non-contact farmers. Others participated in these meetings casually that is 10 to 12 meetings during the year. It was reported by the farmers that RAEOs and ADOs paid visits almost as per schedule. During these visits they listened to their problems on the fields and tried their best to help them. These officials always diffused knowledge about the coming agricultural operations and also explained in details in a very simple way about the inputs, new varieties, implements, plant protection measures and such other developmental activities. They were also able to tell about the activities and suggestions advocated by the RAEOs during the last har visit.

8.5 Opinions

It was accepted by the farmers in general that T&V programme had improved their agriculture. There were 46 contact farmers and

20 non-contact farmers who stated that they had streamlined the development of their agriculture just because of the T&V activities. All of them were satisfied with the role played by the T&V officials particularly the RAEOs and ADO s for the development of agriculture. They desired that this programme should be continued on permanent basis.

8.6 Knowledge about the cultivation of selected crops

To evaluate the knowledge acquired by the farmers under T&V programme, their knowledge about the cultivation practices of wheat, gram, jowar, and soybean was tested.

8.6.1 Varieties

The farmers knew 14 varieties of wheat including. WH-147, C-306, LOK-1, Narmeda-4, Narmeda-112, HDM-1553, HDM-1593, HDM-1594, RR-21, S-308, Sonalika, S-227, Hybrid-65 and Sujata. Among these WH-147 was popularly known by the majority of the farmers and the varieties like C-306, Lok-1, HDM-1553 and HDM-1593 were also well known to the majority of the farmers. Other varieties were known by different sections of farmers.

The varieties of gram known to the farmers included Ujjain-21, Ujjain-24, JG-5, JG-74, JG-315, Annagiri, Radhey and H-208. Among these Ujjain-21 variety was commonly known. Ujjain-24, JG-5 were also known by a sizable number of farmers while other varieties were known to the few farmers.

In the case of jowar, CSH-5 was popularly known by more than 70.00 per cent farmers in Chhindwara district while this position was acquired by Vidisha-60-1 in Vidisha district. CSH-9 and SPU-472 jowar varieties were also known by a section of farmers in Chhindwara district.

In the case of soybean the farmers knew well about varieties JS-72-44 (Gaurav), JS-2 and Punjab-1. Among these JS-72-44 was very well known. Remaining two varieties were also known by a sizable number of farmers (Table 8.1).

Table 8.1 Knowledge of the high yielding varieties of different crops

Cultural Practices (Varieties)	No.of farmers in percentages					
	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
Wheat						
WH- 147	86.67	70.00	56.67	60.00	71.67	65.00
C - 306	40.00	40.00	100.00	90.00	70.00	65.00
Lok-1	70.00	90.00	36.67	45.00	53.33	67.50
Narmeda-4	33.33	30.00	60.00	65.00	46.67	47.50
HDM-1553	50.00	55.00	43.33	35.00	46.67	45.00
HDM-1593	56.67	70.00	30.00	25.00	43.33	47.50
RR-21	30.00	25.00	43.33	55.00	36.67	40.00
HDM-1594	43.33	50.00	20.00	15.00	31.67	32.50
S- 308	36.67	35.00	26.67	20.00	31.67	27.50
Sonalika	30.00	25.00	26.67	15.00	28.33	20.00
Narmeda- 112	23.33	25.00	13.33	10.00	18.33	17.50
S-227	23.33	20.00	10.00	10.00	16.67	15.00
Hybrid-65	10.00	10.00	13.33	5.00	11.67	7.50
Sujata	10.00	10.00	6.67	15.00	8.33	12.50
Gram						
Ujjain-21	73.33	60.00	90.00	80.00	81.67	70.00
Ujjain-24	20.00	20.00	30.00	35.00	25.00	27.50
JG-5	26.67	20.00	43.33	25.00	35.00	22.50
JG-74	10.00	10.00	13.33	30.00	11.67	20.00
JG-315	-	-	6.67	-	3.33	-
Annagiri	6.67	5.00	-	10.00	3.33	7.50
Radhey	6.67	5.00	10.00	-	8.33	2.50
H- 208	3.33	-	-	-	1.67	-
Jowar						
CSH- 5	73.33	70.00	20.00	5.00	46.67	37.50
CSH- 9	23.33	15.00	-	-	11.67	7.50
SPU- 472	10.00	10.00	-	-	5.00	5.00
Vidisha 60-1	-	-	83.33	75.00	41.67	37.50
Soybean						
JS-72-44 (Gaurav)	73.33	65.00	70.00	55.00	71.67	60.00
JS-2	30.00	25.00	23.33	15.00	26.67	20.00
Punjab-1	20.00	20.00	23.33	10.00	21.67	15.00

8.6.2 Soil preparation

All the farmers in both the districts were well aware about the importance of desired moisture level and pulverization. They knew how many harrowings and ploughings were to be done for each crop. It was well known to them that if there was no sufficient moisture in the soil they might have pre-sowing irrigation. They also knew that ploughing and harrowing should be continued till the soil became fully pulverized.

8.6.3 Seed rate

The farmers were asked to indicate the seed rate of certified seed of wheat, gram, jowar and soybean if sown timely, ungraded seed if sown timely or sown late. In the case of wheat more than 90.00 per cent farmers knew all these quite well. Similarly 85.00 per cent to 96.00 per cent farmers knew the seed rate of gram. These figures in the case of jowar ranged between 75.00 per cent and 86.67 per cent. Farmers between 76.67 per cent to 86.67 per cent knew seed rate of soybean crop. Thus it may be said that farmers in general have acquired sufficient knowledge about the seed rates (Table 8.2).

Table 8.2 Knowledge about seed rate

Crops	No. of farmers in percentages					
	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
Wheat	93.33	90.00	100.00	95.00	96.67	92.50
Gram	86.67	96.00	90.00	85.00	88.33	90.00
Jowar	80.00	75.00	86.67	80.00	83.33	77.50
Soybean	76.67	85.00	86.67	80.00	81.67	82.50

8.6.4 Dates of sowing

Like soil preparation all the farmers were well aware about the sowing dates of wheat, gram, jowar and soybean. They were also acquainted with the dates of early sown varieties and those are late sown varieties.

8.6.5 Seed treatment and seed inoculation

Most of the farmers were not aware about the importance, methods and chemicals of seed treatment and seed inoculation. Nearly one-fourth of the farmers knew about seed treatment of wheat. In the case of gram, situation was some what better as 20.00 to 36.67 per cent farmers knew about the seed treatment and among the contact farmers 40.00 per cent to 50.00 per cent farmers knew about seed inoculation. This figure in the case of non-contact farmers was much lower (25.00 per cent). Seed treatment and seed inoculation was popularly known for soybean crop. Among non-contact farmers 65.00 to 70.00 per cent farmers knew about the seed treatment devices but such farmers among contact farmers ranged between 46.67 to 53.33 per cent. Contrary to this, contact farmers had better knowledge about the seed inoculation of soybean and proportion of such farmers was between 56.67 and 63.33 per cent. Among non-contact farmers 35.00 to 50.00 per cent knew about the seed inoculation devices (Table 8.3).

8.6.6 Methods of sowing

All the farmers were well acquainted with the recommended methods of sowing including the depth of seed and line to line distance. For this purpose they had specially made seed drills.

Table 8.3 Knowledge about seed treatnent and seed inoculation

Cultural Practices (Seed treatment and seed inoculation)	No.of farmers in percentages					
	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
Wheat						
Seed treatment	26.67	15.00	20.00	25.00	23,33	20.00
Gram						
Seed treatment	36.67	20.00	30.00	25.00	33.33	22.50
Seed inoculation	40.00	25.00	50.00	25.00	45.00	25.00
Jowar						
Seed treatment	40.00	37.50	20.00	15.00	30.00	26.25
Soybean						
Seed treatment	53.33	70.00	46.67	65.00	50.00	67.50
Seed inoculation	63.33	50.00	56.67	35.00	60.00	42.50

8.6.7 Irrigation

Farmers knew about the importance of irrigations to be given at the specific stages of crops. In the case of wheat 73.33 to 80.00 per cent among the contact farmers were acquainted with the number of irrigations to be applied at the different stages of wheat crop. Such farmers among non-contact farmers ranged between 55.00 to 65.00 per cent. All the farmers were acquainted with the irrigation schedule to be followed for gram, jowar and soybean.

8.6.8 Fertilizer application

Knowledge of farmers was tested about the doses of Nitrogen (N), Phosphorus (P) and Potash (K) for wheat, gram, jowar and soybean. Farmers could not tell about the doses of N,P,K separately but doses of mixed fertilizers such as D.A.P., Kisan, Grow-more, uphala and

Urea were known to them. The RAEOs also advised them the quantity of different brands of fertilizers to be used as basal dose, top dressing and foliar spray. A very few farmers knew about the importance and timings of foliar spray. However, a good number of farmers were well aware about the basal dose and top-dressing. In the case of wheat such farmers ranged between 35.00 and 36.67 per cent in Chhindwara district and between 86.67 and 90.00 per cent in Vidisha district. Fertilizer application for gram was known to 50.00 to 60.00 per cent farmers in Chhindwara district and 40.00 to 50.00 per cent in Vidisha district. For jowar this figure was 30.00 to 50.00 per cent in Chhindwara district and 40.00 to 45.00 per cent in Vidisha district. In Chhindwara district 63.33 per cent contact farmers and 50.00 per cent non-contact farmers knew fertilizer doses for soybean. Such farmers in Vidisha district were 40.00 per cent and 45.00 per cent respectively (Table 8.4).

Table 8.4 Knowledge about fertilizer application

Cultural Practices (Fertilizer application)	No. of farmers in percentages					
	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
Wheat	36.67	35.00	86.67	90.00	61.67	62.50
Gram	60.00	50.00	50.00	40.00	55.00	45.00
Jowar	50.00	30.00	40.00	45.00	45.00	37.50
Soybean	63.33	50.00	40.00	45.00	51.67	47.50

8.6.9 Plant protection

Information was collected about the knowledge of diseases, insects and pests. They were also asked to indicate the insecticides, pesticides and other devices to be used for the control of diseases, insects and pests.

A very few farmers had knowledge about the diseases, insects and pests of wheat and plant protection measures to be adopted. There were 10.00 to 20.00 per cent farmers in Chhindwara district who knew about the common diseases, insects and pests of wheat and 5.00 to 13.33 per cent of them also knew about the measures to be adopted. In Vidisha district 25.00 to 26.67 per cent farmers had knowledge about the diseases etc. and 15.00 to 20.00 per cent about the plant protection measures. In the case of gram 35.00 to 43.33 per cent farmers knew about the diseases and insects and 25.00 to 33.33 per cent were aware of their control measures. For jowar 10.00 to 20.00 per cent farmers were aware of the diseases etc. and 5.00 to 10.00 per cent knew about the insecticides and pesticides to be used. Diseases, insects and pests of the soybean were known to 25.00 to 36.67 per cent farmers and 20.00 to 30.00 per cent farmers also knew about the plant protection measures to be adopted. (Table 8.5).

Weeding

However all the farmers were well aware that the crops should be kept free from weeds. They also knew till what stage the crops are to be weeded and the methods of weeding to be adopted at different timings.

Table 8.5 Knowledge about plant protection

Cultural Practices (Plant protection)	No.of farmers in percentages					
	Chhindwara		Vidisha		Both	
	CF	NCF	CF	NCF	CF	NCF
Wheat						
Insects and diseases	20.00	10.00	26.67	25.00	23.33	17.50
Insecticides and pesticides	13.33	5.00	20.00	15.00	16.67	10.00
Gram						
Insects and diseases	43.33	35.00	36.67	40.00	40.00	37.50
Insecticies and pesticides	30.00	25.00	33.33	30.00	31.67	27.50
Jowar						
Insects and diseases	10.00	15.00	20.00	10.00	15.00	12.50
Insecticides and pesticides	5.00	10.00	-	-	2.50	5.00
Soybean						
Insects and diseases	30.00	25.00	36.67	35.00	33.33	30.00
Insecticides and pesticides	20.00	20.00	23.33	30.00	21.67	25.00

8.6.11 Harvesting, Drying and Threshing

All the farmers were aware of the correct stages of crop harvesting. It was well known to them that harvesting should be taken up when the crop had become fully ripe. Early and late harvesting were to be avoided to protect against the losses. They knew that crop should be allowed to dry sufficiently before starting threshing.

8.7 Views of Sub-Divisional Agriculture Officers on T&V Programme

In T&V programme SDAO occupied key position both in the field activities and organizational matters. He was the only supervisor who was directly associated with the field activities carried out by the RAEOs and ADOs. It was his prime responsibility to organize seminars, workshops and fortnightly and monthly trainings to diffuse information among the field staff. Supply of various inputs was to be managed by him and field trials were to be conducted under his command by his SMSs and others. Thus SDAO occupied a pivotal position to direct the field activities and to organize trainings etc. to the staff and the farmers. Therefore SDAO was thought the right man to be asked his experiences on the different facts of T&V programme falling under his jurisdiction.

8.7.1 Views about RAEOs

It was stated by all the four SDAOs that the circle of RAEOs and ADOs were judicially divided. Similarly the contact farmers were correctly selected in their blocks as per the prescribed norms. Field visits to the contact farmers were fixed and organized. The RAEOs were also alloted sufficient time to do their jobs by paying regular visits to the hars of the contact farmers and organizing meeting on the same day but they added that RAEOs were also alloted some other work from time to time. Therefore, they were not able to pay 10.00 to 15.00 per cent of their har visits as scheduled but they were to cover these visits on some other days. However meetings and trainings by the staff were attended regularly. RAEOs and ADOs also faced accommodation difficulties which also affected their duties. Further, a number of RAEOs posts remained vacant which also hampered the progress of the project.

Majority of the contact farmers were interested and active in the project activities and usually made efforts to remain at the field or village on the RAEOs visit. They expressed their views and difficulties to the RAEOs quite freely but some of the contact farmers were quite inactive and they did not care about the field visits and recommendations made to them. In every circle non-contact farmers were also found interested in T&V activities and they also behaved as contact farmers in expressing their problems to the RAEOs and also attended meetings called in the afternoon of har visit day. Both contact farmers and non-contact farmers were found interested in adopting the recommendations about different crops, varieties and cultivation practices.

8.7.2 Views about SMSs

As per the SDAOs, the SMSs were in direct contact with the field staff and the research stations of the Agriculture University. The SMSs participated in the fortnightly and monthly meetings and they also conducted field trials. During field visits they provided on the spot solution to the problems raised by the farmers.

8.7.3 Views about trainings & workshops

Fortnightly trainings, monthly workshops and quarterly seminars were organized as scheduled and almost all the participants remained present on these days. Matters to be discussed and the messages to be conveyed were circulated among the participants in the cyclostyled or printed forms. Fortnightly lesson plans were given much attention and these were supplied to the RAEOs, ADOs and SMSs necessarily. These lesson plans contained work plan for fortnight. Recommendations made during the trainings, workshops and seminars were directly related with the local conditions and had

relevance with the farm practices and arising field problems.

8.7.4 Views about the farmers

The recommendations for the fortnight were passed on to the farmers during the har visit days. The farmers generally felt encouraged with the dissemination of new agricultural cultivation technology. They made earnest efforts to adopt the recommendations. They were found curious in seeking answers to their problems. The farmers in overwhelming majority had friendly relations with the RAEOs and contacted him for their problems quite frequently. The farmers had realized that T&V programme had streamlined the development of their agriculture.

CHAPTER- IX

SUMMARY AND CONCLUSION

1. Abstract

The green revolution created imbalances in agricultural development between the regions and between the farmers as well. It necessitated a balanced agricultural development process which may provide benefits to all types of farmers, regions and the nation at large. An approach contemplated by Mr. Daniel Benor to agricultural extension through training and visit system was thought a master solution. To begin with, this approach was first tried as a pilot project in the Chambal command area of Madhya Pradesh in September 1975 with the coverage of 5 extension blocks of Bhind and Morena districts. Within two seasons the average yield of wheat rose from 13 quintals to 20 quintals per hectare. Besides, this training and visit system also provided systematic and regular up-to-date advice on farm practices to the farmers in the best suited conditions having immediate impact on their incomes. Encouraged by the results of this pilot project, the State Government decided to adopt this training and visit system and reorganised its agricultural extension services in the light of the training and visit system advocated by Mr. Daniel Benor. Initially, Madhya Pradesh Government introduced T & V System in the year 1977-78 with the coverage of 5 districts and during the next year (1978-79) another 10 districts were brought under this programme. Second phase of this programme started in 1980-81 and all the districts were brought under this programme by the end of 1985-86. Since a sufficient time had passed, the Ministry of Agriculture, Government of India thought it desirable to evaluate the working and impact of T & V System. Agro-Economic Research Centre for Madhya Pradesh took this study with the following objectives.

i) To assess the adoption of improved farm technology among the farmers and its impact on crop productivity.

ii) To study the impact of T&V System in diffusing the improved farm technology among the contact farmers.

iii) To assess the fortnightly visits to solve the farmers' problems and training of extension workers.

iv) To study the monitoring and evaluation procedure adopted for proper implementation of T&V System in the state.

v) To study the constraints and to suggest measures to make the T&V System more effective and efficient for future.

2) Methodology

T&V System in Madhya Pradesh was introduced in two phases. Therefore, one district from each phase was selected in consultation with the officers from the Directorate of Agriculture, Madhya Pradesh, Bhopal. These districts were Chhindwara and Vidisha. Chhindwara district was included during the first phase and was also situated in tribal belt. Vidisha district was covered during the second phase and was situated in the Malwa region, well known for soybean cultivation. From each district two blocks were selected and from each block one Rural Agricultural Extension Officer (RAEO) circle was chosen to draw the sample of farmers. From each RAEO circle 15 contact farmers and 10 non-contact farmers were selected by random sampling method on the basis of size of holdings. Thus, from each district 50 farmers including 30 contact farmers and 20 non-contact farmers were selected. Thus the study had a total sample of 100 farmers.

Survey method was adopted to conduct this study and both primary and secondary data were cclllected on the schedules. Data

were collected in two rounds during 1987-88 with reference year 1986-87. Data were analysed by applying simple statistical tools.

3. Main Findings

3.1 Coverage of districts

Training and visit system in Madhya Pradesh was introduced in two phases. Firstly, five districts were covered during 1977-78 and 10 more districts were covered during the next year to complete the first phase. The remaining districts of the state were covered during second phase from 1981-82 to 1985-86.

3.2 Organizational pattern

(1) Director Agriculture was the overall incharge of T&V system and was assisted by two Additional Directors. Joint Director of Agriculture was made responsible at the divisional level and activities at the district level were administered by Deputy Director of Agriculture.

(2) At the district level Deputy Director of Agriculture was to play a very dynamic role. He was provided five Subject Matter Specialists to help him both in training programme and field activities. In each tehsil a Sub-Divisional Agriculture Officer(SDAO) alongwith 4 SMS's was appointed to help him in the training programmes, adaptive trials and field visits. At the block headquarters Senior Agriculture Development Officer (SADO) managed fortnightly trainings and supply of inputs in the block. One ADO supervised 6 RAEOs and guided them. He was supposed to visit the RAEOs four days in a week. At the grass root level, one RAEO was given the charge of 500 farm families in a irrigation command area and 700 farm families in other areas. Under the T & V system the farmers of a RAEO circle were divided into eight groups consisting of 60-90 farm families and from each group 8-10 contact farmers were selected

to involve them in the agricultural development activities of the project. Every contact farmer was visited twice a month on the field itself to solve his problems and to guide him on the spot.

3.3 Progress of T & V system in the sample districts

(1) Coverage

Chhindwara district had four tehsils which were further divided into 11 development blocks. For development purposes the district was divided into 42 Agricultural Development Officer (ADO) circles which were further divided into 250 RAEO circles. In all, out of 1,81,297 cultivators 16,385 contact farmers were selected who were grouped into 2,040 hars to be visited twice a month by the RAEOs.

Vidisha district had three tehsils and 7 development blocks. Under T & V system the district was divided into 21 ADO circles and 1,117 RAEO circles. There were 1,15,000 cultivators in the district and among them 8,058 were selected as contact farmers who were grouped into 936 hars to be visited by the RAEOs.

(2) Staffing

The gap between the posts sanctioned and those filled up was mainly at the grass root level, particularly in the case of ADO's and RAEO's. In Chhindwara district the proportion of vacant posts of RAEOs was 32.43 per cent and that in Vidisha district, 12.32 per cent. Both the districts also suffered in the case of the post of Subject Matter Specialist (SMS): 40 per cent posts in Chhindwara district and 60 per cent in Vidisha district were lying vacant. All these vacancies had adverse effect on the T&V activities.

Among the crops grown in both the districts wheat, gram, jowar and soybean were most important in terms of area and production.

These crops were considered for the adoption of new production technology.

3) Trainings and Seminars

Data on trainings, seminars and workshops conducted at district, sub-division, block and RAEO circle level indicated that these were conducted as per schedule and discussions and recommendations had direct relation with the field activities. Both the districts maintained close contacts with the Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV) research stations to take latest technology of production to the farmers.

Among all fortnightly trainings organised at block level for RAEOs were given prime importance. These trainings mainly imparted information on improved varieties of crops, improved methods of cultivation like seed treatment, seed inoculation, plant protection measures and fertilizer uses etc. The field problems narrated by the RAEOs were discussed in details and suggestions were made to solve them.

4) Adaptive trials

Programme of adaptive trials for selected crops and varieties were conducted on the farmers' fields by the SMSs in consultation with the scientists of JNKVV research stations. The encouraging results of these trials were recommended to the farmers for adoption while erratic results were reported back to the scientists of the research stations as feed back.

5) Field visits

The field visits of the RAEOs to the hars during the referenc year indicated that the RAEOs could hardly follow the scheduled visits to the hars. They could not follow 15 to 20 per cent visits to the hars during the year. They also very often would not visit

the hars on the scheduled day. It was found in many cases that the RAEO visited two to three hars in a day to fill the gap of two visits to each har in a month. The reasons were that they were also alloted some other work to be done on priority basis. Irregular visits kept the contact farmers in the dilemma about the visits of the RAEOs.

6) Supervision

However ADOs, SADOs and SMSs from SDAO's office made frequent visits to the RAEO's circle. They also organised farmers day etc. All this helped the RAEOs in receiving the advice and suggestions on the farmers' fields itself. This was also done as supervision of work by the officials. Deputy Director of Agriculture and his SMS also visited the RAEO's circle once or twice in a season.

7) Replacement of varieties and introduction of new crops

Before the introduction of T & V system the farmers of both the districts grew local varieties of all the crops including wheat, gram, pea, groundnut, moong, jowar, arhar, urd, maize and paddy. At the time of present investigation the farmers grew improved varieties. It was only in Vidisha district that farmers still grew local varieties of wheat on some unirrigated area.

Soybean had been introduced and had become quite popular in Chhindwara district.

3.4 Adoption of improved technology by the farmers

The present level of production technology of both contact and non-contact farmers was studied for wheat, gram, jowar and soybean. Analysis of data revealed encouraging results.

(1) Presowing operations

In the case of wheat 73.47 per cent of the contact farmers and 88.89 per cent of the non-contact farmers carried out pre-sowing

operations as per recommendations. There were only 2.04 per cent farmers who did not prepare soil to the desired level while a large number of them did soil preparation to a higher level than recommended.

Soil preparation operations for gram, jowar and soybean were conducted as per recommendations by the overwhelming majority of farmers and more than 50 per cent of them conducted these operations at higher level. There were 4 to 9 per cent farmers who could not conduct operations to the required levels.

(2) Sowing of varieties

In the case of soybean all the farmers raised improved varieties in both the districts. In the case of wheat all farmers of Chhindwara district raised recommended varieties while in Vidisha district more than 95 per cent farmers grew local wheat varieties. In the case of gram and jowar majority of the contact farmers grew improved recommended varieties while this proportion among non-contact farmers remained less than 60 per cent.

(3) Seed treatment and seed inoculation

The importance of seed treatment and seed inoculation was not recognized by the farmers. Only 24.50 per cent contact farmers treated the seed before sowing and 2.04 per cent also inoculated the wheat seed. In the case of gram the response was better than wheat as 18.42 per cent contact farmers adopted seed treatment and 34.21 per cent, seed inoculation. None inoculated jowar seed but more than 50 per cent adopted seed treatment. About 25 per cent contact farmers and 40 per cent non-contact farmers treated soybean seed while majority of the farmers inoculated the soybean seed with rhizobium culture.

(4) Seed rate

For wheat nearly 60 per cent farmers used higher seed rate and less than 10 per cent, lower seed rate. There were about 30 per cent farmers who adopted the recommended seed rate. In the case of gram majority of the 60.53 per cent farmers adopted recommended seed rate and a few farmers (7.89 per cent) used lower seed rate. Nearly one-third farmers used higher seed rate. In the case of jowar majority of the farmers used lower seed rate and they comprised more than 75 per cent in the group. No one adopted higher seed rate but a very few adopted recommended seed rate. Seed rate adopted for soybean was in line with the recommendation in the case of more than 80 per cent farmers. A smaller section also used higher seed rate and the farmers using lower seed rate were quite few.

(5) Methods of sowing

In both the districts line sowing method was adopted by all the farmers barring a few farmers who practised broadcasting method for wheat, jowar and soybean in Chhindwara district alone.

(6) Dates of sowing

Hitherto, the farmers became fully conversant with the sowing dates of different crops and also tried their level best to sow crops during the recommended period. All the farmers in both the districts did timely sowing of jowar and soybean crops. More than 90 per cent farmers did timely sowing of gram crop while 85 to 89 per cent farmers did timely sowing of wheat crop.

(7) Fertilizer application

Majority of the farmers applied basal doses for wheat, gram and soybean. The proportion of farmers doing so for jowar was

between 45 and 50 per cent. Top dressing was done by 30 to 50 per cent farmers for wheat, jowar and soybean. Foliar spray was little known and only 10 to 14 per cent farmers did foliar spray of 'N' on wheat crop. This was done by 7.14 per cent farmers on jowar crop.

(8) Plant protection and weeding

Use of weedicides was not known and the farmers practicised manual weeding. Systematic weeding for wheat and gram crops was generally not needed. If there were weeds they were uprooted. However jowar and soybean were weeded two to three times. Only few farmers used insecticides and pesticides for wheat, jowar and soybean crops but majority of the farmers used them to protect the gram crop.

(9) Irrigation

The farmers were advocated the need of irrigation at different stages of wheat. They were asked to give 5 irrigations. First, at the time of root formation, second on the completion of tillering, third at the node formation stage, fourth at flowering stage and fifth at milking stage. Similarly, three irrigations were also to be given for gram. Data collected for wheat indicated that more than 50 per cent farmers have given presowing irrigation. First irrigation was adopted by 67.35 per cent farmers. Due to showers 32.65 per cent farmers needed second irrigation, 30.61 per cent third stage irrigation, 24.49 per cent fourth and 16.33 per cent fifth and final irrigation.

(10) Harvesting

No one practised early harvesting but a few did late harvesting. Remaining farmers adopted timely harvesting for wheat, gram, jowar and soybean crop.

(11) Yield performance

The average yield of the district and the state were used as average yields for the rating farmers' performance. In the case of wheat majority of the contact farmers obtained higher yield than the district and state average, while this was not true in the case of non-contact farmers. In the case of gram 53.38 per cent contact farmers obtained higher yield than the state average and 43.59 per cent, lower yield. In the case of non-contact farmers majority (52 per cent) could not reach the state average while 40 per cent produced more than state average. In Chhindwara district majority of the farmers from both the groups had lower yield than the district average while position was just opposite in Vidisha district where more than 50 per cent farmers from both the groups obtained higher yield. Yields obtained from jowar crop indicated that 57.14 per cent contact farmers and 64.29 per cent non-contact farmers obtained higher yield and remaining farmers obtained lower yield rates except 4.76 per cent farmers who equalled the district average. In Vidisha district two-third farmers obtained lower yield and one-third, higher yield than the district average. In Chhindwara district nearly one-fourth farmers produced less than the district average while two-thirds had higher yields. As regards soybean more than 90 per cent farmers did not fair well and their yield remained lower than the district average. In Vidisha district more than 85 per cent contact farmers obtained higher yields while this proportion among non-contact farmers was 30 per cent. As far as the state average was concerned 30 per cent farmers had higher yield and 50 per cent farmers, lower yields. Among non-contact farmers 25 per cent farmers crossed the state average and 75 per cent remained below the state average.

3.5 Knowledge and opinion

(1) Knowledge about T & V and source of information

In Chhindwara district all the sample farmers became aware about the T&V programme and its activities within four years of its inception while farmers of Vidisha district took only three years. RAEO was the main source of information about the different activities, aims and objects of the T&V project. He was indicated as a key figure in the selection of contact farmers as per the prescribed norms.

(2) Knowledge about the officials and their visits

Among all the officers RAEOs were well known to the contact farmers by their names and castes. Among non-contact farmers 75 per cent knew the RAEOs quite well. There were 76.67 per cent contact farmers who were well informed about his scheduled days of har visit. Among non-contact farmers this was known to 32.50 per cent. Among other officers ADO and SDAO were known to the contact farmers in large numbers. Nearly 15 per cent non-contact farmers also knew these officers. Deputy Director, Agriculture was personally known to a few farmers including 15 per cent contact farmers and 12.50 per cent non-contact farmers. Subject Matter Specialists were lesser known persons.

(3) Participation in the meeting

Seventy per cent contact farmers were present at the time of field visit of RAEO and also attended the meetings. Among non-contact farmers 17.50 per cent attended RAEO's meetings regularly. Other contact farmers participated in 41.67 to 50 per cent visits and meetings respectively during the year.

(4) Knowledge about productivity ability

3.6 Knowledge about production technology

(1) Varieties

An overwhelming majority of the contact farmers knew 14 varieties of wheat including WH-147, C-306, Lok-1, HDM-1553, HDM-1593, Nermeda-4 and Nermeda-112 which were grown by them on their fields during the recent years. The gram varieties popularly known included Ujjain-21, Ujjain-24, JG-5, JG-74, JG-315, Annagiri, Radhey and H-208. Among these Ujjain-21 was known to all the farmers and was grown by them. Ujjain-24 and JG-5 were also well known to the majority of the farmers. In the case of jowar the farmers knew 4 varieties including CSH-5 which were known to the 70 per cent farmers in Chhindwara district and Vidisha-60-1 was equally known in Vidisha district. Other two varieties viz. CSH-9 and SPU-472 were known to a sizable number of farmers. In the case of soybean the farmers knew well three varieties including JS-72-44 (Gaurav), JS-2 and Punjab-1.

(2) Soil preparation

All the farmers were well aware about the extent of moisture in the soil needed for different crops and the pulverization stage of soil. They were well acquainted with the number of ploughings and harrowings needed to prepare the soil.

(3) Seed rate

Seed rate recommended for wheat was known to more than 90 per cent farmers. They were also aware about seed rate of gram was to be increased with the delayed sowings. Seed rate known to 88.33 per cent contact farmers and 90 per cent non-contact farmers. Seed rate of jowar was known to 83.33 per cent contact farmers and 77.50 per cent non-contact farmers. More than 80 per cent farmers knew the seed rate of soybean.

(4) Dates of sowing

Like soil preparation hiterto all the farmers were acquainted with the dates of sowing of wheat, gram, jowar, and soybean.

(5) Seed treatment and seed inoculation

Most of the farmers were not acquainted with the seed treatment and seed inoculation. Nearly one-fourth farmers knew about the seed treatment of wheat and this percentage varied between 20 to 36.67 in the case of gram. Seed inoculation was known to nearly 40 per cent farmers. The situation was different in the case of soybean. More than 65 per cent farmers knew the seed treatment while 56.67 per cent farmers were also acquainted with the seed inoculation of soybean.

(6) Methods of sowing

Hitherto majority of the farmers had gained sufficient knowledge about the recommended methods of sowing, depth of seed, row to row and plant to plant distance. For this purpose they had specially made seed drills.

(7) Irrigation

Farmers knew the importance of irrigation at specific stages of crop. There were 73.33 to 80 per cent farmers who were well acquainted with the number of irrigations required for wheat crop and stages of irrigation. Irrigation schedules to be followed for gram, jowar, and soybean were known to majority of the farmers.

(8) Fertilizer application

Majority of the farmers were not aware of the doses of N,P,K but were conversant with the quantity and brands of fertilizers such as DAP, Kissan, Gromore, Suphala and Urea. However, a good number of farmers knew about the quantity of mixed fertilizers to be applied as basal dose and quantity of urea for top dressing. Foliar spray was lesser known.

(9) Plant protection

A very few farmers had knowledge about the insects and pests

and brands of chemicals used for control. There were 10 to 20 per cent farmers who could tell about the common diseases, insects and pests which commonly infested wheat, gram, jowar, and soybean crops. There were 5 to 13.33 per cent farmers who could name certain brands of chemicals. As against this, the farmers were well acquainted about the number of weedings for jowar and soybean.

3.7 Opinions

It was accepted by the farmers that the T&V project supplied them both knowledge and inputs, to improve the agriculture, regularly. Due to the activities of this project they had come to know about the improved production technology and improved varieties to replace the local ones. Seventy per cent contact farmers and 20 per cent non-contact farmers clearly indicated that they had been able to streamline their agriculture just because of T & V project. However, all the farmers were satisfied with the role of T&V system and desired that this should be made a regular process rather than a time bound programme.

4. Policy Implications and Suggestions

1) A good number of posts at the grass root level were not filled up. Administrative attention should be drawn to this and vacant posts and positions at the grass root level should be filled forthwith.

2) At the block and RAEO circle levels, where residential accomodation is not available easily, the construction of residential quarters for RAEOs should be given priority.

3) RAEOs were not able to maintain the time schedule of the har visits and very often visited more than one har in a day to fill the gap. RAEOs were also assigned other works which did not allow them to follow the time schedule of T&V

project. The RAEOs should be advised to pay har visits regularly on the scheduled dates. They should be kept aloof from other jobs.

4) Supervisory staff should visit the RAEOs more frequently to check them and to advise them.

5) Attendance of training classes should be made compulsory at all levels and alternate persons should be designated to depute in case of unavoidable absence of individual officer so that flow of information does not suffer a break at any stage.

6) Selection of farmers was not proper as a good number of farmers were pessimistic and had lost their progressiveness. The farmers not doing well should be replaced by the active and progressive farmers.

7) The programme laid much emphasis on the introduction of new crops and varieties rather than improvement on the responsing local varieties.

8) The farmers should be suggested the viable cropping pattern so that they might earn larger profit margin.

9) All the messages should be formulated timely and conveyed to the farmers well in time before their utility got reduced. The officials should be very particular to see that the communication did not hamper due to any reason and the messages were being conveyed properly.

10) The demonstrations arranged on the farmers fields were less in number than the requirement. For better dissemination of techniques 5 to 10 demonstrations per village should be arranged. Increased level of contact and display of the adoption-output relationship would encourage the farmers.

11) There were delays in the supply of inputs, particularly seed and fertilizer. This hampered the timely sowing. There should be a timely supply of inputs and farmers should be allowed credit facilities to obtain the inputs.

12) Much efforts are needed to popularise seed treatment and seed inoculation.

13) Instead of recommending the doses of fertilizers in terms of N,P,K the farmers should be told in terms of quantity of different brands to be used for basal application and top dressing. Fertilizer application should be made known to the farmers in the light of the brands available in the market.

14) Use of weedicides was not known to the farmers but it is direly needed. Similarly measures to enhance photo-synthesis are also be taught to the farmers. The farmers should be taught the phtosynthesis devices.

15) Not much was achieved in the field of plant protection measures and crops were damaged to a considerable extent. Much stress should be given on popularization of plant protection measures.

16) Exhibitions, farmers fairs, visits to the other areas should be frequently organized and a large number of farmers should be involved in it.

17) Audio visual aids at many places were lying idle because of the lack of operating staff. Efforts should be made to make use of the available means by appointing the staff.

18) Television may be used as a media of communication. During crop season a good number of television programmes and radio talks should be organized and different aspects should be

highlighted.

19) The programme provided encouraging results and was liked by the people, therefore, it should be continued on permanent basis till the farmers became fully educated about the development process of crop husbandry.

20) The monitoring and evaluation exercise should be made more broadbased to include all aspects of the programme including a survey of impact.

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