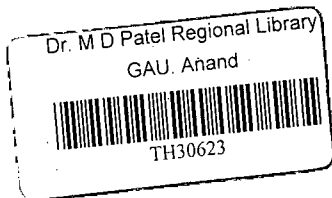


**THE CONSTRAINTS IN TRANSFER OF WHEAT TECHNOLOGY IN BARWANI
TRIBAL DEVELOPMENT BLOCK OF WEST NIMAR
DISTRICT IN MADHYA PRADESH**

**Thesis Submitted to the
GUJARAT AGRICULTURAL UNIVERSITY
in partial fulfilment of the
Requirement for the award of the degree**

**OF
MASTER OF SCIENCE (Agriculture)**



**IN
Extension Education**

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September, 1981.



ABSTRACT

THE CONSTRAINTS IN TRANSFER OF WHEAT TECHNOLOGY IN BARWANI TRIBAL DEVELOPMENT BLOCK OF WEST NIMAR DISTRICT IN MADHYA PRADESH

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Introduction;

The introduction of modern technology and high yielding varieties has doubtless raised production of cereals and cash crops. But the benefits are yet to percolate to the poor in villages. For lack of assets, either in the form of land or education or both hapless farmers continue to toil as victims of exploitation. Most of them belong to the scheduled castes and tribes. Therefore, a study to locate constraints in transfer of technology assumes special significance in this direction.

Objectives of the Study:

1. To study the socio-economic characteristics of the tribal farmers;
2. To study the sources of information utilised by the tribal farmers for the wheat technology;
3. To ascertain the knowledge of the tribal farmers for the recommended wheat technology;
4. To find out the adoption level of the recommended practices for wheat cultivation among tribal farmers;
5. To study the constraints expressed by tribal farmers in transfer of wheat technology;
6. To study the relationship between socio-economic characteristics of tribal farmers and their adoption level for wheat cultivation;
7. To ascertain the relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level;
8. To study the relationship between adoption level of tribal farmers and their constraints expressed by them in transfer of wheat technology, and
9. To study the suggestions of the tribal farmers to overcome the constraints".

Research methodology:

The present study was conducted in Barwani tribal development block of West Nimar district in Madhya Pradesh. Out of 92 villages, 15 villages were growing wheat in the block, which were selected. Randomly 150 wheat growers were selected from the 15 villages by the random sampling technique. The tool of the study was an interview schedule which was administered to the respondents personally in the month of June and July 1980.

The scientific schedule were prepared and the data were collected from the respondents. The data were analysed and presented in the table. Grouping of respondents in high, medium and low categories was done with the help of mean and standard deviation.

The socio-economic status of the respondents was decided by using the socio-economic status scale. The methodology adopted for measuring accessibility of various sources of information was ranking system. Measurement of knowledge and adoption level of respondents in respect of new agricultural technology was done by using the scale developed by Jha and Singh (1970) and all India Co-ordinated Research Programme in Extension Education, Indian Agricultural Research Institute, New Delhi, respectively.

To know the constraints in transfer of wheat technology simple ranking system was applied. In other cases frequencies and percentages were used for analysis of data.

Major findings:

1. The study clearly indicated that the wheat growers were predominantly from middle group of socio-economic status.
2. Neighbours were accorded most accessible source of information.
3. Majority of respondents had medium level of knowledge adoption and constraints.
4. Adoption of wheat technology was positively related with socio-economic status level, size of land holding, annual income, social participation, knowledge and constraints level.
5. Main constraints found in transfer of wheat technology were lack of knowledge and lack of technical guidance. Other major constraints were found to be nonavailability and high cost of inputs like organic manure, seed, fertilizers and chemicals, high labour charges, lack of irrigation, finance and improved implements.

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CERTIFICATE

This is to certify that the thesis entitled,
"The constraints in Transfer of Wheat Technology in
Barwani Tribal Development Block of West Nimar District
in Madhya Pradesh" submitted by Shri Vasant Kumar Pandit
in partial fulfilment of the requirements for the degree
of Master of Science (Agriculture) in the subject of
Extension Education of the Gujarat Agricultural University
is a record of bonafied research work carried out by him
under my guidance and supervision and the thesis has not
previously formed the basis for the award of any degree,
diploma or other similar title.

The assistance and help received during the course
of investigation from various sources have been duly
acknowledged by the investigator.

Anand

Wednesday, September 30, 1981.


(S.K. WAGHMARE)

MAJOR ADVISOR

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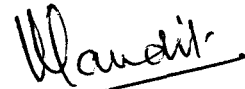
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Anand

September 30, 1981.



(V.K. PANDIT)

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Chapter I

INTRODUCTION

India, which is already the fourth largest wheat producer in the world, can soon emerge as an international "green power" provided wheat cultivation to nontraditional areas is extended and long range scientific policy is formulated to increase the per hectare yield. There is no doubt in the fact that the introduction of high yielding dwarf varieties of wheat in 1966-67 has opened a new vista for boosting production of wheat in India. But, still there is a big gap between what is achieved at the research station and what farmers know and apply in the field. It is true that the low level of literacy, lack of communication facilities and a variety of different additional value system existing in the rural India makes the transfer of technology complicated and due to this reason this gap found much more wider in case of tribal farmers.

The main task thus, is to bridge the communication gap between the scientist and the tribal farmers. There is a need for developing appropriate strategies so that the desired technology is transferred to and received by the farmers and action taken on it by them in the prescribed manner.

Tribals mostly use traditional pattern for their agriculture. They are in habit to use the same method from year to year. Modern inputs such as hybrid seed, insecticides, chemical fertilizers and improved implements are hardly used by them. Thus, there is little scope for increasing wheat production and tapping all potential resources unless the traditional pattern of farming is changed to more contemporary techniques. This change will have to be brought about by diffusion of modern technology and innovations or in other words, by transfer of technology from research stations to the farmers fields. The development of Indian tribal agriculture needs technological transformation which is the key to agricultural productivity.

Government of India, in addition to Community Development Programme (CDP) in 1952 introduced the schemes of rural development like Intensive Agricultural District Programme (IADP) in 1962, Intensive Agricultural Area Programme (IAAP) in 1963, Small Farmers' Development Agency (SFDA) in 1969, Marginal Farmers and Agricultural Labours Development Agency (MFAL) in 1969, Drought Prone Area Programme (DPAP) in 1970, Comprehensive Area Development Programme (CADP) in West Bengal in 1975 and "Lab to Land Programme" of ICAR from June 1979. But a required thorough

overhaul of the system is lacking. No developmental effort can be of benefit to the local community unless, the constraints in the process of transfer of technology are removed. The technological transformation are of little economic gain, unless they are diffused over largest possible area and adopted by the producers in general.

The principal reasons that could be attributed for the comparatively low yield (600 kg/ha against 800 kg/ha district and 952 kg/ha state production) of wheat grains per hectare in tribal areas are (i) Limited use of improved seeds, fertilizers and pesticides (ii) Lack of irrigation facilities and (iii) Lack of adoption of improved methods of cultivation practices. Thus, there is enormous scope for stepping up wheat production in India.

To maximise wheat production in the tribal areas, all the constraints faced by the tribal farmers in adoption of the new technology must be removed. Agricultural production is mainly a function of material inputs supplied timely and the technical guidance for their application imparted to the tribal farmers.

To motivate the tribal farmers, who adhere to traditions and customs from a subsistence farming to the commercial farming is only possible by providing education,

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training and communicating the research information, with necessary economic assistance. In order to make the extension effective the cultural and development background of tribal community should be considered and ultimately needs of extension system in tribal area to be examined on forcible grounds.

1.1 Statement of the Problem

The problem undertaken for the investigation was "The constraints in transfer of wheat technology in Barwani tribal development block of West Nimar District in Madhya Pradesh". The study was conducted in Barwani tribal development block of West Nimar of Madhya Pradesh (MP) State. The whole block is situated in a drought prone area. There is no shifting cultivation in the block area. But it is true that most of the tribal agriculture continues to be traditional with very little use of off farm inputs. In the tribal areas agriculture is very closely interlinked with the way of life and is influenced by the community. However, there is nothing inbuilt in the tribal customs which would prevent the individuals from improving their agriculture. However, some farmers are prone to change to this new agricultural technology while others are

hesitant to accept and some are not adopting it at all. According to Rogers¹, the adoption and rejection of any improved farm practices are influenced by several factors like, economic status, farm size, age, characteristics of improved practices, knowledge and attitude of the farmers towards improved practices. Also, there may be number of difficulties faced by the farmers in accepting the new approach.

It is, therefore, necessary not only to find out whether the farmers know the advantages of the package of practices of wheat crop and have favourable attitude towards it, but also to find out the difficulties encountered by the nonadopters with respect to nonadoption of this improved practices.

Hence, the study was undertaken to identify the constraints in this regard. The present study also focusses the socio-economic conditions of the Bhilala tribes of the area as well as indicates the possibilities of the transfer of wheat technology on locally available resources for the benefit of Bhilala tribes.

¹ E.M. Rogers, Diffusion of Innovation. The Free Press of Glencoe, New York, 1962.

1.2 Objectives of the study

The general objective of the study was to study the wheat growers from tribal area to pin point out the constraints in transfer of wheat technology and to ascertain their suggestions so that recommended technology is adopted on tribal farms. The specific objectives of the study were as follows:

- 1.2.a: To study the socio-economic characteristics of the tribal farmers.
- 1.2.b: To study the sources of information utilised by the tribal farmers for the recommended wheat technology.
- 1.2.c: To ascertain the knowledge of the tribal farmers for the recommended wheat technology.
- 1.2.d: To find out the adoption level of the recommended practices for wheat cultivation among tribal farmers.
- 1.2.e: To study the constraints expressed by tribal farmers in transfer of wheat technology.
- 1.2.f: To study the relationship between socio-economic characteristics of tribal farmers and their adoption level for wheat cultivation.
- 1.2.g: To ascertain the relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level.

- 1.2.h: To study the relationship between adoption level of tribal farmers and their constraints expressed by them in transfer of wheat technology.
- 1.2.i: To study the suggestions of the tribal farmers to overcome the constraints.

1.3 Hypotheses

The following null hypotheses were formulated for present study in the light of above referred objectives and were tested by collected data.

- 1.3.a: There is no difference in socio-economic status of the tribal farmers.
- 1.3.b: There is no difference between sources of information used by the tribal farmers with respect to high yielding variety of wheat.
- 1.3.c: There is low of knowledge level among tribal farmers about the recommended technology for wheat cultivation.
- 1.3.d: There is low extent of adoption of recommended practices for wheat cultivation among tribal farmers.
- 1.3.e: The constraints in transfer of wheat technology among tribal farmers do not differ from practice to practice.
- 1.3.f: There is no relationship between socio-economic status of tribal farmers and their extent of adoption of recommended technology for wheat cultivation.

- 1.3.g: There is no relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level.
- 1.3.h: There is no relationship between adoption level of tribal farmers and the constraints expressed by them in transfer of wheat technology.

1.4 Importance of the Study

Wheat, the second most important crop of India occupies 19 million hectares and the annual production is around 26 million tonnes. It is one crop which offers scope for imparting stability to agricultural production. With improved production technology the highest yield obtained in national demonstrations was 10,200 kg/ha, with an average of 4,501 kg/ha, as against the national highest average of 1,300 kg/ha. Thus there is enormous scope for stepping up wheat production in India.

India lives in villages and without the upliftment of these villages and villagers, India can not achieve the desired goal. About 80 per cent of Indian population lives in the rural areas. The scheduled tribes, scheduled castes, agricultural labourers and small farmers all together form the bulk of the rural population.

According to the census of 1971, the population of the scheduled tribes was 38 millions. They are distributed in all States and Union Territories of India. But overall picture of the tribal community illustrates that the position of the tribal farmers are still worse.

Indian Prime Minister, Indira Gandhi² (1980) in her call to social worker had told that in the past several laws and schemes have been formulated for the welfare of Adivasis, Harijans and weaker sections, but the benefits had not reached to them. So the opportunities should be made available to those for which the doors of development had remained closed for centuries".

The deep personal interest of the Prime Minister in the problem of the weaker sections in general and of tribal areas in particular has been a source of inspiration to all Indians. She also provided a broad policy of frame work for Tribal development in June 1974 which has guided us in articulating the developmental strategies and programmes for those areas. She had cautioned that resistance may develop within the organisations and vested interests may emerge at

² Indira Gandhi, "Call to Social Institution", New Delhi, July 18, 1980. c.f. Times of India, p. 4.

unexpected points. She clearly stated that the organizations must change their rigid stands, procedures and organisational structure. The simple tribal situation should be provided a simple administrative structure within the comprehensions of the people.

Agricultural production in India is carried out on by the millions on tiny farms, managed by individual farmers and their families who still have almost complete reliance on the traditional ways of farming.

Though a large number of improved agricultural practices are being recommended to the farmers through agricultural extension programmes, it is well known that these recommended practices are adopted only by small percentage of the farmers. The nonadoption of these practices by the farmers, therefore, possess a challenge to the planners who are interested in finding ways and means of raising the level of agricultural production in the country.

Some attempts have also been made to correct the situation by taking up special programmes for more backward areas and the weaker sections. However, the problems of tribal areas and tribal communities is a category by itself, because of its simple socio-economic structure and will need

a complete different approach. The constraints in transfer of wheat technology among tribal farmers is of particular significance in an underdeveloped economy. Even in technologically advanced countries, considerable gap exists between recommendations of agricultural research stations and the practices in use by farmers.

The present study was an attempt to find specific answers to these questions pertaining to the tribal areas. A study of tribal agriculture involves, firstly, an identification of the factors that are specific to tribal areas and their implications for the development of agriculture, secondly, an analysis of the agricultural methods and practices followed by the tribals and thirdly the methods for improving tribal agriculture. Thus, the present study is expected to provide a better insight with regards to the factors that have a bearing on the development of agriculture in tribal areas and may be beneficial in formulating and implementing the schemes in better and effective ways.

1.5 Limitations of the Study

The limitation of the study were as follows:

- 1.5.a: The study was limited to only Barwani tribal development block of west Nimar District of Madhya Pradesh State.

1.5.b: Only fifteen villages of the said tribal development block were selected for the study.

1.5.c: Only one hundred and fifty respondents were selected from these villages.

1.5.d: Out of many aspects of the tribal farmers in agricultural and the allied fields to be studied, only few of them were taken for present study.

Chapter II

REVIEW OF RELATED LITERATURE

The main purpose of this chapter is to present research findings of relevant studies on the topic of present investigation. Since, the literature on tribal is in paucity, studies on small farmers have been reviewed. This helped to understand the subject in proper perspective to great extent. The reviewed literature has been grouped in the following heads:

- 2.1 Socio-economic characteristics of the adopters
- 2.2 Sources of information used in transfer of technology
- 2.3 Knowledge of new technology and its relationship with adoption of technology
- 2.4 Adoption of recommended crop technology
- 2.5 Relationship between socio-economic characteristics and adoption of recommended technology
- 2.6 Constraints in transfer of crop technology
- 2.7 Suggestions to overcome the constraints in transfer of crop technology

2.1 Socio-economic Characteristics of the Adopters

An attempt has been made to present the related literature on some of the socio-economic characteristics of the adopters viz. Age, Education, Farm size, Type and size of family, Housing facility, Annual income, Social participation, Socio-economic status and Credit needs.

2.1.a Age:

Porwal¹ (1974) stated that age was not to be the differentiating character between small farmers and other farmers.

Ankush² (1976) reported that majority of the small farmers were observed in the middle age group (50.71 per cent), whereas 20.71 and 28.57 per cent were found in young and old age groups respectively.

¹ G.R. Porwal, "Study of the Problems of Small Farmers in Adoption of New Technology" (Unpublished Master's Thesis, M.A.U., Parbhani, 1974).

² G.R. Ankush, "To Study the Small Farmer, Their Aspiration, Needs and Problems, Related to Improve Agricultural Technology" (Unpublished Master's Thesis, M.A.U., Parabhani, 1976).

Tej Bahadur, Reddy and Veera Swamy³ (1976) also revealed that a great majority of sample respondents were found to be in the middle age group (31.35 years).

2.1.b Education:

In his M.P. study Dubey and Bahadur⁴ (1966) reported that due to low economic condition the tribal do not admit of even the smallest expenditure on education Dubey⁵ (1971) also stated that the percentage of literacy among scheduled tribes population is about 9 per cent out of 24 per cent total literate population. Majority of the tribal farmers either just literate without any educational level or educated upto primary level.

³ Tej Bahadur, B.V., Reddy and Veera Swamy, "Differential Profile of Small Farmers" (A paper presented to the National Seminar on New Agricultural Technology and Extension Strategy for Small and Marginal Farmers, Punjab Agricultural University, Ludhiana, (13-17 July, 1976), p.6.

⁴ B.K. Dubey and F. Bahadur, "Agriculture" in A Study of the Tribal People and Tribal Areas of Madhya Pradesh, Vol.VI, No.2 (Dec., 1966), pp.22-23.

⁵ S.N. Dubey, "Tribal Welfare Programme : An Analysis of Their Organisation and Administration", The Indian Journal of Social Welfare, Vol.XXXII, No.3 (October, 1971), pp.207-222.

Earnest⁶ (1973) stated that the educational level of majority of small farmers was low. Majority of them have either no education or education upto primary level.

In his study Patel⁷ (1978) also reported that the tribal farmer possess high illiteracy.

2.1.c Occupation:

Dubey⁸ (1971) reported that about 90 per cent of the scheduled tribes live on agriculture, directly or indirectly. Vidyarthi⁹ (1973) also reported that nearly 80 per cent population in India were agriculturist.

⁶ R.S. Earnest, "The Study of Differential Utilization Behaviour of Small and Big Farmers and the Communication Strategy", (Unpublished Ph.D. Thesis, I.A.R.I., New Delhi, 1973).

⁷ M.B. Patel, "An Investigation of Extension work in the Integrated Tribal Development Project Area of Panchmahals District of Gujarat State" (Unpublished Master's Thesis, Gujarat Agricultural University, Anand Campus (1978).

⁸ Dubey, loc. cit.

⁹ L.P. Vidyarthi, "Strategy for Tribal Development in India", Adivasi, Vol. XV, No.1, 2 and 4 (1973-74), p.78.

In his study Singh and Singh¹⁰ (1973) reported that the main occupation of all the small farmers was agriculture.

Raghava Rao¹¹ (1975) stated that 89.25 per cent of the scheduled tribes are, however, engaged in Agricultural sector either as cultivators or as labourers and about 24 per cent of them as shifting cultivators.

2.1.d Farm size:

Burman and Sharma¹² (1970) stated that majority of the tribal household have holding upto 5 acres barring the

¹⁰ Daulat Singh and Baldeosingh, "problems of Small Farmer", Rural India, Vol. XXXVII, No.4-5 (March, 1973), pp.91-92.

¹¹ D.V. Raghava Rao, "Institutional Frame work for Agricultural Development in Tribal Area", Community Development and Panchayat Raj Digest, Vol. VI, No.3 (January, 1975), pp.145-151.

¹² B.K. Roy Burman and P.S. Sharma, "Tribal Agriculture in India" (A paper presented at the 30th Session of the Agricultural University, Patnagar, 23-25 October, 1970) c.f. Indian Journal of Agricultural Economic, Vol. XXV, No.3, (July-September, 1970), pp.149-160.

tribal villages of Rajasthan and Gujarat where their disposal was exceeding 5 acres.

In Mysore State Kalappa¹³ (1971) studied that tribal farmers had marginal quantity of land holdings and more than half of the holding were below 5 acres.

In another study Singh and Singh¹⁴ (1973) reported that major problems of small farmers were small size of holding.

In his study Basu¹⁵ (1975) stated that among the cultivating households there were about 73 per cent tribals who possessed land upto a range of 5 acres only and in most of the cases these lands were not fertile for raising good harvest. Because of traditional farming and restricted irrigational facilities the crop yield in tribal areas were meagre.

In a field survey of Vansda tribal taluka of Valsad district of Gujarat State, Desai¹⁶ (1976) reported that the land holding of tribal farmer is less than 3 acres.

¹³ A. Kalappa, "Tribal Development in Mysore, Kurukshetra", Vol.XIX, No.5 (May, 1971), pp.2-4.

¹⁴ Singh, loc. cit.

¹⁵ S.K. Basu, "Tribal Indebtedness and the Wayout", Kurukshetra, Vol.XXIII, No.1 (March, 1975), p.12.

¹⁶ J.C. Desai, "A Wind of Change Among Tribals", Kurukshetra, Vol.XXIV, No.21 (Aug. 1, 1976), p.13.

In his study Patel¹⁷ (1978) also stated that tribal farmers possessed less than 5 acres of land holdings.

2.1.e Type and size of family:

Banerjee¹⁸ (1976) reported that majority of the tribal farmers were 6 to 10 members in the family; agriculture as their main occupation, very low technology knowledge; no education and almost no irrigation facilities.

In his study Patel¹⁹ (1978) also stated that majority of the tribal farmers had medium size of family (i.e. 6 to 10 members in the family) and small size of land holding.

2.1.f Housing facility:

In his study Tamboli²⁰ (1979) stated that the majority of the tribal farmers 149 (99.33 per cent) were having kuchha

¹⁷ Patel, loc. cit.

¹⁸ S. Banerjee, "A Study of Socio-Economic and Demographic-Factors Associated to the Knowledge of Agricultural Technology Among Tribal Farmers of Bastar District of M.P." (Publication Division, Haryana Agricultural University, Hissar, 1976), c.f. Thesis Abstract, Vol. II, No.2 (June, 1976), p.112.

¹⁹ Patel, loc. cit.

²⁰ L.N. Tamboli, "Training Needs of the Tribal Farmers in Relation to High Yielding Variety of Paddy" (Master's Thesis, G.A.U., Anand Campus, 1979), pp.32-41.

house (made out of mud) while one respondent (0.67 per cent) was having mixed house (made of bricks and mud).

2.1.g Annual income:

Patel and Krinshna Swami²¹ (1970) reported that about a one third of the tribal farmers earned even less than Rs.50 per capita per annum. At the other end, one fourth of the nontribal earned more than Rs.400 per capita per annum from crop husbandry.

Kalappa²² (1971) also stated that per capita income of the tribal vary from Rs.40/- to Rs.60/- while the state average was Rs.350/-.

Bhati and Swarup²³ (1974) reported that the average income per farmer as well as per hectare and per capita of Tharu tribal was very low.

²¹ K.V. Patel and M.S. Krinshna Swami, "Problems of Tribal Agriculture in the Context of Dry farming - A Case Study of Selected Villages in the Panchmahals District of Gujarat", Rural Development for weaker Section (Bombay - The Indian Society of Agricultural Economic, 1974), pp.79-89.

²² Kalappa, loc. cit.

²³ J.P. Bhati and R. Swarup, "Economic Problems of Tharu Tribals, Kurukshetra, Vol. XXIII, No.2 (October, 1974), p.9.

In another study Vyas²⁴ (1975) stated that the annual income of tribal and scheduled caste family was Rs.679/- and Rs.568/- respectively.

Shete²⁵ (1978) also stated that the average net income of the tribal farmers was only to the tune of Rs.300/- per annum.

2.1.h Social participation:

In his study Earnest²⁶ (1973) stated that majority of the small farmers were less willing to take risk of social participation because they remain aloof from the rest of the society for generation.

In another study Kalamegam²⁷ (1975) also stated that the small farmer's participation was more in co-operative than in the village panchayat.

²⁴ N.N. Vyas, "Integrated Tribal Development in Rajasthan", Kurukshetra, Vol. XXIII, No.11, (March, 1975), p. 10.

²⁵ N.B. Shete, "Agricultural Training Needs of Tribal Farmers of the Maharashtra", Indian Journal of Extn. Edu. Vol. XIV, No.3&4 (July-Dec., 1978), pp.65-67.

²⁶ Earnest, loc. cit.

²⁷ E.V. Kalamegam, "A Study on the Communication Behaviour of Small Farmers in Progressive and Less Progressive Village" (Unpublished Master's Thesis, Tamil Nadu Agricultural University, Coimbatore, 1975).

2.1.1 Socio-economic status:

Maurya²⁸ (1974) emphasized that the inadequate development of credit and marketing, agriculture and communication in the tribal areas has also been a major factors in their slow economic development.

Mathur²⁹ (1975) also stated that the slow socio-economic development in tribal region was that because of the lack of education, knowledge and awareness among the local population.

Zaheer³⁰ (1975) opined that tribal farmers had a very simple socio-economic status which was based on social, regional, linguistic, cultural variation and complexities and greater divergencies in their cognitive orientation.

²⁸ B.P. Maurya, "Development of the Tribals", The Maharashtra Co-operative Quarterly, Vol. LVII, No.4, (April, 1974), pp. 324-329.

²⁹ P.C. Mathur, "Jaunsar-Bawar-Rawin Area in the District of Dehra Dun, Tehri and Utter Kashi (U.P.) - A note on a Survey", In Integrated Tribal Development Planning, Edited by V.R.K. Paramahansa, Hyderabad: National Institute of Community Development, 1975).

³⁰ M. Zaheer, "Well-come Address" in Integrated Tribal Development Planning, Edited by V.R.K. Paramahansa, Hyderabad: National Institute of Community Development, 1975), p.3.

2.1.j Credit needs:

Patel³¹ (1972) found that in the field of credit, tribal farmers always go to the money lender who has been exploiting them. No wonder the co-operative have made little headway among them.

In his study Singh³² (1972) stated that credit requirement of the tribal farmers are for both productive as well as unproductive purposes. Unproductive needs include family expenditure on consumption, as also provision for social, religious and other demands these being more urgent for him than his productive requirement.

In his M.P. study, Gupta³³ (1974) estimated that (1) 52.5 per cent of the families were indebted, (2) the average debt per family was Rs.367/- (3) about one-third of the loans were for domestic consumption, and (4) about 64 per cent of the loan was provided by the money lender.

³¹ B.N. Patel, "Policy Measures for Tribal Agriculture" in Agro-Economic Problems of Tribal India, ed. M.L. Patel (Bhopal: Progress Publisher, 1972), p.15.

³² I.P. Singh, "Credit Requirements of Tribal Cultivators in West Nimar District (M.P.)" in Agro-Economic Problems of Tribal India, ed. M.L. Patel (Bhopal: Progress Publisher, 1972), p.34.

³³ R.P. Gupta, "Agricultural Credit for the Tribals" Kurukshetra, Vol. XXIII, No.6 (December, 1974), p.5.

Ghouse³⁴ (1975) stated that the tribal found it easier to borrow from a shahukar who normally was not very rigid on security than from an institutional source.

Dogra³⁵ (1977) stated that there was no branch of any nationalised bank to meet the farmer's credit needs, and the mortgage bank was of little help. For meeting his credit needs the poor farmer turns to his landlord or to the professional money lender.

Husan³⁶ (1977) also reported that majority of the members of co-operative societies too borrow from private sources. Many families borrow from more than one source. The unproductive needs for which they have taken credit was marriage followed by festivals and festival occasions.

2.2 Sources of information used in transfer of technology

The review of literature on the sources of information used in transfer of technology has been grouped in the following heads:

³⁴ Ghulam Ghouse, "Preparation of Integrated Tribal Development Project, Approach and Methods" in Integrated Tribal Development Planning, ed. V.R.K. Paramahansa, Hyderabad: National Institute of Community Development, 1975), p.74.

³⁵ Bharat Dogra, "Development - A Micro Study - Cake for the Rich and Crumbs for Poor", The Indian Express (Ahmedabad), Vol.XLL, No.288, October 13, 1977, p.9 Col.5.

³⁶ Amir Husan, "Indebtedness Among the Buxas of Nainital", Kurukshetra, Vol.XXV, No.10 (February 16, 1977).

2.2.a: Formal sources of information:

Menon³⁷ (1970) stated that among the formal sources of information gram sevak was the chief source of information for small farmers.

Dwarkinath³⁸ (1973) also stated that the field extension staff, neighbours, friends, relatives, etc., were the most important sources of information for small farmers.

Mishra³⁹ (1975) showed that the village extension worker was the chief formal sources of information for tribal farmers.

³⁷ R.K. Menon, "A Study of Small Farmers with regards to Their Participation in Extension Methods and Utilization of Assistance" (Unpublished M.Sc.(Agri.) Thesis, AC and RI Coimbatore, 1970) cited by A.J. Knight, Communication Strategy for Small Farmers (A paper presented to the Seminar on New Agricultural Technology and Extension Strategy for Small and Marginal Farmers held at PAU, Ludhiana, 13-17, July, 1976).

³⁸ R. Dwarkinath, "Adoption Incentives to Package of Practices of High Yielding Varieties in Mysore State" (Unpublished Ph.D. Thesis, Cornell University, 1973) c.f. J.S. Murthy et. al.) "Communication Strategy for Small Farmers' Development" (A paper presented to the Seminar on New Agricultural Technology and Extension Strategy for Small and Marginal Farmers held at PAU, Ludhiana, 13-17 July, 1976).

³⁹ Girish K. Mishra, "Spatial Planning for Tribal Areas in Keonjhar District" in Integrated Tribal Development Planning ed. V.R.K. Paramahansa, Hyderabad: National Institute of Community Development, 1975), p.109.

Kolte and Raju⁴⁰ (1975) also stated that Village Development Officer, Village Level Worker, Sarpanch, Chairman and Secretary of the Co-operative Society were known to small farmers.

2.2.b Informal sources of information:

⁴¹
Viswanathan et al. (1975) reported that small farmers mostly utilized in formal sources of information. Among the informal sources neighbours were utilized to the maximum extent. Radio in the mass media and village level worker in the formal sources ranked first.

2.3 Knowledge of New Technology and its Relationship with Adoption of Technology

Higher knowledge about the farm innovation would lead to higher adoption, but the tribals lacked the highest knowledge of new technology and this deprived them from higher adoption.

⁴⁰ N.V. Kolte and K.N. Raju, "Problems of Small Farmers Development and its Institutional Aspects", Behavioural Science and Community Development, Vol. X, No.1 (March, 1975), p.53.

⁴¹ N. Viswanathan et al. "Utilization of Sources of Information by Small Farmers", The Madras Agricultural Journal, Vol.62, No.10-12, (October-December,1975),p. 684.

Sinha⁴² (1973) stated that the equal attention must be provided to educate the tribal farmers and communicate the new agricultural technology to the grass root of the society.

The field survey report on the Kathodis Tribal Community of Gujarat⁴³ (1974) showed that no one tribal cultivator used to adopt chemical fertilizers and improved seeds due to lack of basic skills in their use.

Kamaluddin Sahib⁴⁴ (1978) also reported that the tribal had no plough or agricultural implements, nor any one know how to plough their paddy lands. The tribals lacked the basic skills in agriculture and this required proper training.

Sundram and Singh⁴⁵ (1978) revealed that correlation of knowledge with the extent of adoption by small farmers was found to be 0.5963 (P 0.01).

⁴² S.P. Sinha, "Planned Change in Tribal Areas", The Indian Journal of Public Administration, Vol.XIX, No.3, (July-September, 1973), pp.363-378.

⁴³ Anonymous, Research Report on the Kathodis of Gujarat (Ahmedabad: Tribal Research and Training Institute, Gujarat Vidyapeeth, 1974).

⁴⁴ M. Kamaluddin Sahib, "Transformation of Tribal" Kurukshetra, Vol.XXVI, No.15 (May, 1978), pp.40-41.

⁴⁵ Soma Sundram and S.N. Singh, "Factors Affecting the Knowledge of Adopters and Nonadopter Small Farmers", Indian J. of Extn. Edu. Vol.XIV, No.122 (June, 1978), p.32.

2.4 Adotion of Recommended Crop Technology

Many studies had indicated that mostly Indian tribal farmers used traditional and out dated cultivation methods and the adoption of improved agricultural practices were not in good number.

The survey report of the Ram Chandrapur Tribal Development Block⁴⁶ (1970) revealed that none of the tribal household received improved seeds and none had adopted agricultural implements from block.

Patel⁴⁷ (1970) also stated that the proportion of adopters of intensive agricultural practices among tribal population was not significantly high. They had tried one or other of the recommended practices such as use of fertilizers, improved seeds, etc. with varying degree of success.

Kalappa⁴⁸ (1971) reported that tribal farmers did not adopt improved farm practices to the desired extent due to their poor economic conditions.

⁴⁶ Anonymous, "Survey Report on Tribal Development Block", Bulletin of the Tribal Research and Development Institute, Bhopal, Vol.VIII, No.1 and 2 (June-December,1970), pp.19-113.

⁴⁷ M.L. Patel, "Agri-Economic Survey of Tribal Mandla", Indian Journal of Agricultural Economic, Vol.XXV, No.1.

⁴⁸ Kalappa, loc. cit.

Pawar⁴⁹ (1972) also reported that majority of the tribal farmers have not yet tried improved seeds variety on their farms. Application of manures and fertilizers to the crop was also limited, hardly 2 to 3 cultivators had followed pest and disease control measures.

Bhati et al.⁵⁰ (1973) reported that tribal farmers have adopted very little of the new agricultural innovations because of their isolated way of any developmental agency.

Bose⁵¹ (1975) also reported that a very few tribal farmers adopted the new agricultural technology. Yet, by and large, agriculture in tribal areas are even now at subsistence level.

Ghose⁵² (1975) stated that the use of modern inputs and improved methods of practices had not percolated among tribals to any appreciable extent.

⁴⁹ Jagannathrao Pawar, "Tribal Agricultural in Northern Gujarat", in Agro-Economic Problems of Tribal India, ed. M.L. Patel (Bhopal: Progress Publisher, 1972), p.59.

⁵⁰ J.P. Bhati, T.V. Moorti and L.R. Singh, "A Multi Dimensional Approach to Development of Tribal Agricultural in Tarai Region of U.P." (A paper presented at the 33rd Annual Conference of the Indian Society of Agricultural Economic, Rajendranagar, Hyderabad (A.P.), 26-28 December, 1973), c.f. Indian Journal of Agril. Economic, Vol.XXVIII, No.4, (October-December, 1973), pp.58-59.

⁵¹ Sarandindu Bose, "Agriculture in Tribal Society, in Integrated Tribal Development Planning, ed. V.R.K. Paramahansa (Hyderabad: National Institute of Community Development, 1975), p.52.

⁵² Ghulam Ghose, Op. cit., pp.74-75.

Jaiswal and Kolte⁵³ (1975) also stated that the adoption of improved agricultural practices among tribal farmers were not in good numbers. It is due to several reasons like poor knowledge of extension workers, ineffective use of extension methods, small size land holding, low unstable family incomes, and poor credit system which deprived the adoption of farm innovations.

2.5 Relationship Between Socio-Economic Characteristics and Adoption of Recommended Technology

An attempt has been made to present the related literature on some of the socio-economic characteristics of the adopters and their influence on adoption level. The important characteristics studied were age, education, farm size, social participation and socio-economic status of the adopters.

2.5.a Age and adoption:

Age of the adopters is an important socio-economic characteristics which influence the behaviour pattern.

⁵³ N.K. Jaiswal and N.V. Kolte, "Perspectives on Tribal Development and Administration" (Hyderabad: National Institute of Community Development, 1975), p.200, c.f. J.V. Ferreires, The Indian Journal of Social Work, Vol.XXXVII, No.2 (July, 1976), pp. 230-231.

Ankush⁵⁴ (1976) studied some socio-personal factors affecting adoption process and determined the relative contribution and importance of the socio-personal factors like age, etc. He reported that among the various age groups, the adoption percentage was highest (50.71 per cent) among the farmers upto 31 to 50 years of age. Whereas, very young and old age groups were 20.72 per cent and 28.57 per cent respectively.

Tej Bahadur, et al.⁵⁵ (1976) also reported that middle age groups farmers were more receptive to adopt new farm innovations.

2.5.b Education and adoption:

Earnest⁵⁶ (1973) revealed that the less educated farmers generally adoptless of agricultural technology.

Kishore and Rai⁵⁷ (1974) reported that the literacy had a positive effect on final acceptance of improved technology.

54 Ankush, loc. cit.

55 Tej Bahadur, B.V. Reddy and Veeraswamy, loc. cit.

56 Earnest, loc. cit.

57 Devesh Kishore and S.J. Rai, "Literacy and Adoption of Improved Farm Practices", Indian Journal of Adult Ed., XXXV, (November, 1974), p. 94.

Garg⁵⁸ (1975) also found that education of the farmer was the important factor in the use of better agriculture. Farmers who had received more formal education tend to adopt improved technology.

2.5.c Farm size and adoption:

Sachchidanda⁵⁹ (1972) stated that farm size was significantly associated with the adoption of improved practices. The rate of adoption of improved farm practices increased along with increased in farm size.

Madalia and Rajwadi⁶⁰ (1976) also revealed that farmers belonging to small size of land holding had low adoption index.

2.5.d Social participation and adoption:

Tripathi and Mishra⁶¹ (1971) reported that the membership in farm organisations had positive relationship with adoption index.

⁵⁸ S.G. Garg, "Problem of Small Farmers", Kurukshetra, Vol.XXXIII, No.20 (July 16, 1975), pp.6-7.

⁵⁹ Sachchidanda, "Social Dimensions of Agricultural Development" (Delhi: National Publishing House, 1972).

⁶⁰ V.K. Madalia and R.V. Rajwadi, "Adoption of Agricultural Innovations: A Case Study", Kurukshetra, Vol.XXIV, No.10, (February, 1976), pp.14-15.

⁶¹ S.L. Tripathi and Chhotalal Mishra, "Socio-personal Factors and New Ideas in Farming", Rural India, Vol.XXXIV, No.5, (May, 1971), p.88.

Earnest⁶² (1973) stated that majority of small farmers were less willing to take risk of social participation and thus they had a low adoption index.

Kalamegam⁶³ (1975) also stated that majority of small farmers were members of only co-operative society and it was due to their credit needs.

2.5.e Socio-economic status and adoption:

Kalappa⁶⁴ (1971) reported that Tribal farmers did not adopt improved farm practices due to their slow socio-economic development.

Maurya⁶⁵ (1974) emphasized that the slow economic development in the tribal areas was due to inadequate development of credit and marketing, poor communication and lack of irrigation in the tribal areas.

Garge⁶⁶ (1975) also stated that the acute scarcity of capital was the main problems faced by small farmers in adoption of new farm technology.

62 R.S. Earnest, loc. cit.

63 E.V. Kalamegam, loc. cit.

64 Kalappa, loc. cit.

65 Maurya, loc. cit.

66 Garge, loc. cit.

2.6 Constraints in Transfer of Crop Technology

The process of transfer of crop technology is influenced by a number of constraints. These constraints are unending and interrelated with each others. Lack of capital has its origin in an inadequate surplus production. Inadequate production is due to lack of productive land, irrigation facilities and various inputs.

An attempt has been made to review the reports and opinions of the researchers concerned with the constraints in transfer of a crop technology.

Dubey⁶⁷ (1964) mentioned three constraints in the way of effective communication in backward area which were as:

- (1) Considerable gap between a small modern progressive farmers and the large masses of traditional bound people.
- (2) High illiteracy among tribal farmers prevent the use of published materials as instrument of communication.
- (3) Little scientific knowledge regarding adoption of new practices for agricultural development.

⁶⁷ S.C. Dubey, "Communication in Economic Development" (A paper presented for the East West Centre Seminar on Communication and Innovation in Development Policy, August-September, 1964, Honolulu (Minco), cited by A.P. Saxena, "Backward Area Development Issues in Administrative Planning", The Indian Journal of Public Administration, Vol. XXIII, No.3 (July-September, 1977), pp.458-459.

Menon⁶⁸ (1970) has emphasized that the small farmers had poor contact with extension agency in term of frequency.

Barman and Sharma⁶⁹ (1970) reported that major constraints in transfer of crop technology were small size of land holding.

Goswami and Saikia⁷⁰ (1970) stated that no improved Agricultural tools and implements suitable for hilly areas have so far been developed. The application of chemical fertilizers in hilly slops was considered useless, because most of these will be washed away with heavy rains.

Sisodia et al.⁷¹ (1970) reported that the constraints can be broadly grouped in the following heads:

A. Physical constraints:

1. Poor communication
2. Lack of irrigation facilities
3. Low density of population
4. Gaps in technology
5. Inadequate plant protection measures

⁶⁸ R.K. Menon, loc. cit.

⁶⁹ Barman and Sharma, loc. cit.

⁷⁰ P.C. Goswami and P.D. Saikia, "problems of Agricultural Development in Tribal Areas" (A paper presented for discussion at the 30th Annual Conference of the Society, scheduled held at U.P. Agril. University, Pantnagar, 23-25 October, 1970), Indian Journal of Agricultural Economic, Vol.XXV, No.3 (July-Sept. 1970), pp.140.

⁷¹ J.S. Sisodia, V.N. Singh and J.P. Mishra, "Agricultural Development in Tribal M.P.", Indian Journal of Agricultural Economic, Vol.XXV (1970), p.190.

B. Social and Institutional

1. Lack of credit
2. Dificiencies in input supply
3. Uncertain market
4. Socio-cultural problems

C. General Development and Agricultural Development.

Kalappa⁷² (1971) reported that tribal farmers did not adopt improved farm practices to the desired extent due to their poor economic conditions.

Mohapatra and Debi⁷³ (1973) reported that the lack of extension efforts to orient the tribal farmers towards improved agricultural practices was the main constraints in transfer of crop technology.

The field survey report on the Kothodis Tribal Community of Gujarat⁷⁴ (1974) showed that lack of capability to purchase agricultural inputs due to high cost was the main constraint in transfer of agricultural technology.

⁷² Kalappa, loc. cit.

⁷³ K. Mohapatra and K. Kiranbad Debi, "Shifting Cultivation in Orissa", Adibasi, Vol. XIV, No.4 (January, 1973), pp.11-28.

⁷⁴ Anonymous, Research Report on the Kathodis of Gujarat, loc. cit.

Maurya⁷⁵ (1974) stated that the inadequate development of credit and marketing agricultural and communication in tribal areas has been a major problems in their slow economic progress.

Garg⁷⁶ (1975) also stated that acute scarcity of capital, inadequate supply of water for irrigation and non-availability of seeds and fertilizers in time were the main constraints in transfer of crop technology.

Jaiswal and Kotle⁷⁷ (1975) stated that lack of knowledge of extension workers; effective use of extension methods and missionary zeal among the extension workers were the main barriers in the way of the diffusion of farm innovations.

Dube⁷⁸ (1977) reported that the lack of technical guidance with regards to improved agricultural technology was the main constraint.

Tamboli⁷⁹ (1979) stated that lack of proper training regarding the use of high yielding varieties, fertilizers

⁷⁵ B.P. Maurya, loc. cit.

⁷⁶ S.C. Garg, loc. cit.

⁷⁷ Jaiswal and Kotle, loc. cit.

⁷⁸ S.C. Dube, "Indians Changing Villages", cited by K. Kesava Rao, "A Nellore Experiment," Indian Express (Ahmedabad), Vol. XLVI, No.163, (May 11, 1977), Col. 4.

⁷⁹ L.N. Tamboli, loc. cit.

and pesticides among tribal farmers were the main constraints in transfer of crop technology.

2.7 Suggestions to Overcome the Constraints in Transfer of Crop Technology

Jha and Singh⁸⁰ (1966) stated that it was a high time that the educational and service agencies of Community Development (CD) Block carry information about scientific farming to the lower strata of farmers too, so that the message of C.D. Programme might reach to all the sections of the community and to develop the community as a whole.

Swaminathan⁸¹ (1974) also stated that it is obvious that unless we seriously start programme to impart latest technical skill to illiterate peasants by the method of learning by doing we will not be able to accomplish our goals.

Misra and Rajguru⁸² (1975) remarked that the personal contact with the extension men exerted the maximum influence on small farmers.

⁸⁰ P.N. Jha and B.N. Singh, "Utilization of Source of Farm Information as Related to Characteristics of Farmers", Indian Journal of Extension Education, Vol. I, No.4 (January, 1966), p.301.

⁸¹ M.S. Swaminathan, "Social and Educational Requirements of New Technology in Agriculture", Indian Journal of Adult Education, Vol. XXXV, No.8, (August, 1974), pp.4-13.

⁸² B. Misra and G. Rajguru, "Adoption Behaviour of Small Farmers", Kurukshetra, Vol. XXIV, No.12 (March, 1975), p.6.

Kumar⁸³ (1978) mentioned that it is indeed a great misfortune that knowledge and benefit of improved farming went to the top, 10-15 per cent of the farming community only. Under C.D.P., the Gram Sevaks were working since 1952 so far as the agriculture was concerned, they used to help those farmers only who came forward for technical guidance supply or service. So their contact was confined mainly with those few well to do farmers only.

2.8 Summary

Transfer of technology is a complicated process, interlaced with communication strings, shaped by an undulating continuum knowledge, and pulsating with research findings and user demands. It also varies from community to community, village to village and even from individual to individual.

Increased effectiveness of transfer of technology will benefit both those in practice and in research. The results of new knowledge and techniques brought in practice will enhance our efforts for sustained high crop yields. The size of the untapped yield reservoir reveals that this can be

⁸³ K. Kumar, "Extension - Weakest Link in Indian Agriculture", Indian Express (Ahmedabad), March 30, 1978, p.9.

done, provided the tempo of research and education activities is stepped up, small and marginal farmers are helped to adopt and benefit from new technology and landless labour and rural women are enabled to improve their purchasing power through subsidiary employment in animal husbandry, fisheries and agro-industries. But this process influenced by various socio-economic characteristics of the individual farmer, communicator or adopter. The characteristics that influence them may be age, education, farm size, type and size of family, housing facility, annual income, social participation and socio-economic status. On the basis of literature reviewed it was found that the farmer of middle age group were observed to be more receptive to new technology. Similarly education, farm size and type and size of family etc. were found to be related to higher transfer of technology, though it might be inhibited in some cases by some constraints.

The communication sources are important stimuli to individual in technological transformation process. The review of literature on the pattern of information sources used in transfer of technology pointed out that neighbours and village level workers are the main sources of information for agricultural new technology. Therefore, the present

communication strategy requires development of the localite sources such as neighbours, progressive farmers and relatives etc. so that the technological information can be routed through these sources.

Technology is the systematic application of scientific knowledge. The development of applied procedures and techniques is a unique, continuing process that requires the deliberate accumulation of knowledge to solve well-defined problems. Technological development, therefore, requires an effort apart from seeking knowledge through research or applying technology in practice.

Technological transformation in agricultural practices also influence by various constraints like (i) Educational, (ii) Economical, (iii) Socio-cultural and (iv) Practical. Unless, the constraints in the process of transfer of technology are removed, it is difficult to spread the technology upto desired extent.

Most of the studies revealed that the main constraints in transfer of crop technology among tribal farmers are educational constraints like lack of knowledge, lack of technical guidance and ignorance of the agricultural practices.

These above constraints require an immediate and sustained effort on the part of the administrators, scientists and farmers to remove them and to make effective the desired transfer of technology in the field. Hence, it is duty of agricultural scientists to redouble their efforts continuously to improve the production technology.

Chapter III

METHODOLOGY

This chapter is concerned with the research design, the tools and technique including the interview schedule employed for the data collection of this study. The selection of universe and sampling technique for investigation as well as devices used for analysis of data are also explained in this chapter as per following heads:

3.1 Plan of the Study

It is common observation that there exists a technological gap between the recommendations of agricultural research stations and the practices in use by the tribal farmers. The remarkable low productivity of land in tribal area is largely due to the differences in agricultural methods. Therefore, it is necessary to make for great use of modern methods of production and to bridge the gap between demand and production by the application of latest advances in the science of agriculture. Hence, the plan of the study "The constraints in transfer of wheat technology in Barwani tribal development block of West Nimar District in Madhya Pradesh" is of particular significance.

The study was, therefore, conducted to know the socio-economic characteristics of wheat growers, sources of information accessed by them and extent of knowledge of the tribal farmers regarding new wheat technology. Moreover, this investigation was planned to assess extent of adoption of new wheat technology by tribal farmers and the constraints faced by them in adoption. Study was also undertaken to know the relationship between the extent of adoption of wheat technology among the tribal farmers and their socio-economic characteristics, knowledge level about the recommended wheat practices and the constraints in transfer of wheat technology, as well as suggestions of the tribal farmers to overcome the constraints.

3.2 Area of the Study

3.2.a Selection of the district:

The present investigation was carried out in West Nimar District of Madhya Pradesh State which is located in the centre of India. The major factors for selection of this district was that the investigator is a government servant of the Madhya Pradesh State and being in the service in the same district could establish proper rapport with the respondents.

The west Nimar District is a biggest district of the Madhya Pradesh State. The total area of the district is 13,485 sq.kms. and that of the State is 4,43,459 sq.kms. The Northern side of the district touches with Dhar, and Indore District. The North West side touches with Jabua District, North East side touches with Dewas District, East side touches with East Nimar District, South West side touches with Maharashtra State and Western side touches with the Gujarat State.

Since the most of the area of the district lies in neighbourhood of Gujarat and Maharashtra State which are quite developed areas, the impact of the culture and development activities of the surrounding areas is obvious on the culture and life of the people.

3.2.b Selection of the block

In view of the fact that time available with the investigation was limited only one tribal development block was selected for the study. For the purpose of selection of the block the local officers at the district level under the Deputy Directorate of Agriculture were consulted. As a good representation of wheat crop was necessary they suggested to take up Barwani tribal block of the district where wheat

TABLE 1
PROFILE OF WEST NIMAR DISTRICT*

Sr. No.	Item	Details
1	Number of tehsil	8
2	Number of block	16
	i. Tribal block	8
	ii. Nontribal block	8
3	Number of Panchayat	409
4	Number of villages	2040
5	Geographical area	1341776 hec.
6	Net cultivated area	655411 "
7	Irrigated area	45878 "
8	Double cropped area	92605 "
9	Population as per 1971 census	1284812
10	Density of population	96/sq.km.
11	Average rainfall	831 mm
12	Area under different crops	
	(a) <u>Kharif crops</u>	
	Cotton	100000 hec.
	Juar	199919 "
	Maize	30000 "
	Groundnut	9000 "
	(b) <u>Rabi crops</u>	
	Wheat	39000 "
	Sugarcane	894 "
	Hy. Maize	155 "
	Hy. Juar	81 "
	Groundnut	5 "
13	Tube wells	344
14	Irrigation wells	34720
15	Electric pump	5394

* Integrated Tribal Development Project Report of Project Barwani, West Nimar (M.P.)

crop was grown rather extensively. Another reason for the suggestion was that the investigator would be able to cover the block within the limited time due to better communication facilities.

The total area of the Barwani tribal block is 426.35 sq.kms. According to the census of 1971, the population of the whole block was 85,202 out of which scheduled tribes population was 41,380. The Barwani block is mainly inhabited by the Bhilala tribes. The Bhils are not much in number. The other tribal groups living in the area are the Barelas and the patelias. All these are scheduled tribes in the area. The Bhilalas can be listed among the important tribal agricultural groups of the area. Wheat is the main rabi crop for them, but they do not adopt entire package of practices recommended for wheat cultivation. The block has got 2,539 hectares of area under wheat crop but the production in this area is very low. The use of chemical fertilizers and the coverage by high yielding varieties are also at low levels. This is supposed to be due to rural constraints like socio-economic status, lack of knowledge and lack of technical guidance etc. Therefore, to identify these constraints in the tribal area the Barwani tribal block was selected for the study. The location of the block has been shown in Fig.I.

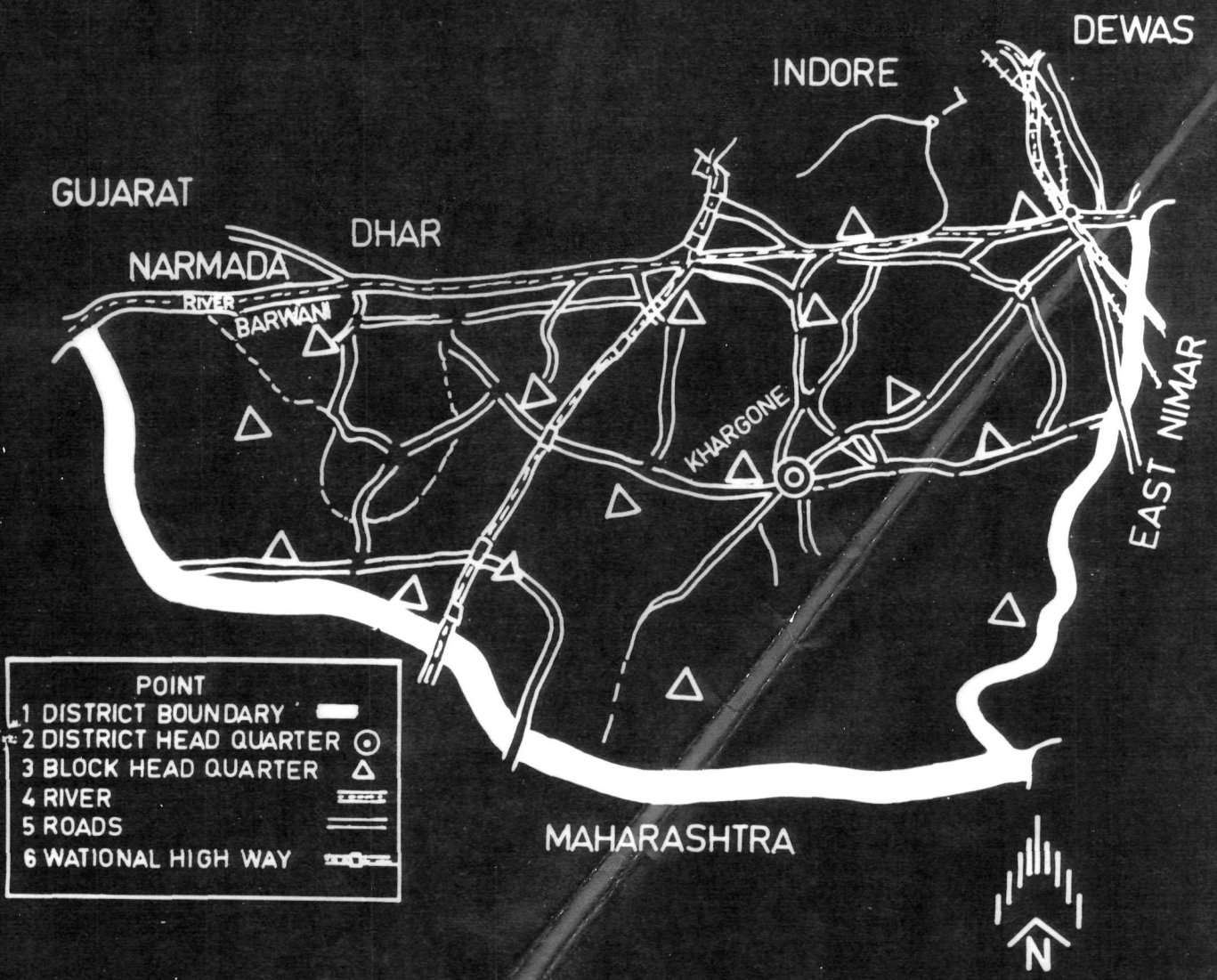


FIGURE -1 MAP OF WEST NIMAR DISTRICT
 SHOWING
 DISTRICT AND BLOCK HEAD QUARTERS

3.2.c Selection of the villages:

The study was conducted in West Nimar District of Madhya Pradesh State. Out of 8 tribal development blocks in the West Nimar District, Barwani tribal development block was selected for the study. The list of the villages of the block was collected from the block office. Out of these 92 villages, 15 villages were randomly selected. The location of the villages has been shown vide Fig. 2.

3.3 Sampling of the study

For sampling, concerning village level workers were requested for the list of wheat growers in the selected villages. Out of total wheat growers in the selected villages only 150 (one hundred fifty) consisting 10 wheat growers for each of the selected villages were chosen randomly by random number for interviewing. Name of the villages and village-wise distribution of the respondents in the sample and responses made are presented in Table 2.

3.4 Tools and Techniques

The tool used for the study was interview schedule. Keeping in view the objectives of the study the interview schedule was prepared and circulated among the concerned professors, Associate Professors and Post-graduate students

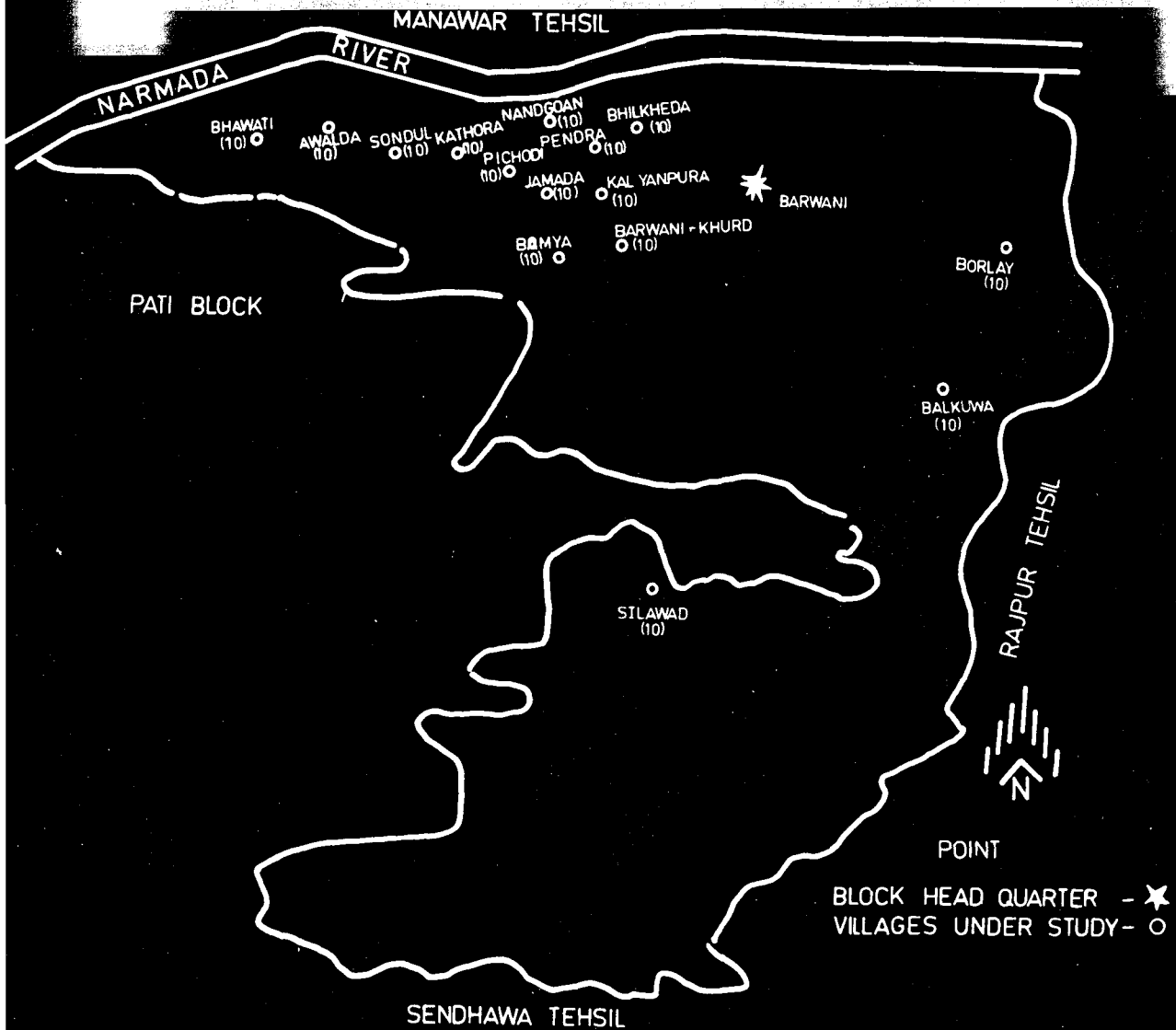


FIGURE : 2 MAP OF BARWANI TRIBAL DEVELOPMENT BLOCK SHOWING VILLAGES UNDER STUDY

TABLE 2
VILLAGEWISE DISTRIBUTION OF THE RESPONDENTS
SELECTED AND INTERVIEWED

Sr. No.	Name of the village	Respondents selected	Respondents actually interviewed
1	Barwani Khurd	10	10
2	Kalyan Pura	10	10
3	Bhilkheda	10	10
4	Pichodi	10	10
5	Nandgoan	10	10
6	Jamada	10	10
7	Awalda	10	10
8	Sondul	10	10
9	Kathora	10	10
10	Bhavati	10	10
11	Pendra	10	10
12	Bomya	10	10
13	Balkuwa	10	10
14	Borlai	10	10
15	Silawad	10	10
Total		150	150

majoring in Extension Education at Gujarat Agricultural University, Anand Campus, Anand, with a request for suggestions and opinions. On the basis of their suggestions and opinions the interview schedule was revised.

3.5 Pretesting of the Schedule

Pretesting of the interview schedule was carried out with ten wheat growers of village Bhikheda who were not selected in the final sample. The respondents were explained about the interview and the purpose of the study. On the basis of the experience gained wording of the questions and statements were corrected and modified in the final format of the schedule. The final approved interview schedule has been given in Appendix I.

3.6 Collection of the Data

The data were collected by personal interview from 150 respondents in 15 villages of Barwani tribal development block during second week of June to first week of July, 1980. Before the interview, the investigator introduced himself to the respondents and the objectives of the study were explained to them with a view to facilitate in giving correct responses. The questions from the schedule were asked one by one and their responses were recorded. Every possible care was taken

to maintain congenial atmosphere to get unbiased opinions of the respondents. Help of local leaders like Sarpanch, Chairman of co-operative society were sought by the investigator for personal approach. The respondents were contacted at their home or at community place and in some cases on their farm.

3.7 Statistical Frame work Used for Analysis of Data

All the responses recorded in the interview schedule were transferred to the mastersheet to describe socio-economic characteristics of the farmers, sources of information used by them, knowledge about the improved wheat technology, extent of adoption of wheat technology by them, constraints faced by them in adoption and suggestions made by them to overcome the constraints faced by them. For these various items frequencies were marked and percentage were calculated.

3.7.a Socio-economic status scale (SES):

The scale measuring socio-economic status of Indian farm families developed by Pareek and Trivedi¹ (1963) was used with some modifications. After applying the scale, score for each of the farmers was obtained. The details of scale item are as under:

¹ U. Pareek and G. Trivedi, Manual of the Socio-economic Status Scale: Rural (New Delhi-6, Manasayan, 1963).

(a) Education:

	<u>Score</u>
Illiterate	0
Can read and write	2
Primary education	3
Secondary education	4
Higher education	5

(b) Occupation:

Labour work	1
Family occupation	2
Business	3
Service	4
Farming	5

(c) Land holding:

Landless	0
Upto 5.00 acres	1
5.00 to 10.00 acres	2
Above 10.00 acres	3

(d) Family type:

Nuclear family	1
Joint family	2

(e) Family size:

Upto 5 members	1
More than 5 members	2

Score**(f) Housing facilities:**

No house	0
Hut	1
Kaccha house (made out of mud)	2
Brick house (made with mud)	3
Pucca house (made with cement)	4
Bungalow	5

(g) Income:

Upto Rs. 1000/annum	1
Rs. 1000 to 2000/annum	2
Rs. 2001 to 3000/annum	3
Above Rs.3000/annum	4

(h) Animal power:

No animal power	0
1 to 2 animals	2
3 to 4 animals	4
5 animals and above	6

(i) Social participation

Member of one organisation	1
Member of more than one organisation	2
Holding position	3
Local leader	4

3.7.b Scoring procedure:

As per the suggestions given in the SES scale, the total score was calculated for every respondent by summing up the scores of each items on the SES scale. Later on all respondents were grouped into three SES categories as follows:

- (i) High Socio-economic Status (HSES)
- (ii) Medium Socio-economic Status (MSES)
- (iii) Low Socio-economic Status (LSES)

The statistical procedure adopted for grouping the above three categories is as follows. Firstly the deviations were computed from the mean for each respondents score. All the deviations were squared and lastly the standard deviation was estimated as per given formula².

$$\text{Standard deviation} = \sqrt{\frac{(X_1 - \bar{X})^2}{n - 1}}$$

where, X_1 = Individual score

\bar{X} = Mean

n = number of respondents

To form the SES categories, the maximum and minimum score limit was computed by following formula:

² R.S. Chandel, "A Hand Book of Agricultural Statistics", (Kanpur: Achal Prakashan Mandir, 1962), p. 87.

<u>Form of SES</u>	<u>Limit</u>
(a) High	$\bar{X} + S.D.$
(b) Medium	In between upper and lower limit
(c) Low	$\bar{X} - S.D.$

3.7.c Accessibility of various sources of information:

The methodology adopted for knowing the accessibility of various sources of information was simple ranking system. Each farmer was asked to mention the score of information in order of accessibility. The rank value was then calculated by giving an arbitrary score 3, 2 and 1 for the first, second and third preference respectively. Afterwards total rank score for each source was calculated.

<u>Preference</u>	<u>Score value</u>
First	3
Second	2
Third	1

3.7.d Recommended wheat technology:

On the basis of Lab to Land Manual³ prepared by ICAR and in consultation with the staff of Deputy Director of Agriculture, West Nimar of Madhya Pradesh State following recommended technology was set for study as yardstick.

³ Lab to Land (New Delhi: Indian Council of Agricultural Research, 1979), pp.15-17.

- (a) Wheat variety: Kalyan Sona (H.D.M. 1593),
Sonalika (H.D.M. 1553),
Shara (H.D. 1926),
Jairaj (H.D. 4530)
- (b) Preparatory tillage:
Bakharing : 2-3 soon after the harvest of the kharif
crop
Pata : 1 prior to sowing
- (c) Seedrate, sowing time and spacing:
(i) Seedrate : 100-125 kg/ha
(ii) Sowing time :
(i) For early sowing : 1st week of November to
30th November
(ii) For late sowing : 1st December to 15th
December
(iii) Spacing row to row: 20-30 cms
- (d) Seed and soil treatment:
(i) Chemicals to be used for seed treatment:
Agrosen G.N. or Cerosen : 2½ - 3 g/ha
(ii) Chemicals to be used for soil treatment:
Aldrin 5% or B.H.C. 10% : 25 kg/ha

(e) Application of chemical fertilizers:

(i) Basal doze : Nitrogen : 50 kg/ha
Phosphorus : 50 kg/ha
Potash : 30 kg/ha

(ii) Top dressing:

First topdressing : Nitrogen : 25 kg/ha at 1st
irrigation

Second topdressing: Nitrogen : 25 kg/ha at 2nd
irrigation

(f) Water management:

First irrigation : 18-20 days after sowing
Second irrigation : 40-45 days after sowing
Third irrigation : 60-65 days after sowing
Fourth irrigation : 80-85 days after sowing
Fifth irrigation : 95-100 days after sowing
Sixth irrigation : 110-115 days after sowing

(g) Weed control:

Time of operation : 4-6 weeks after

Name of weedicide : 2-4-D

Quantity of weedicide : 1000-1200 g/ha in 10,000
litres water

(h) Plant protection measures:**(i) Dose of chemicals for rust and blight control:**

Dithan Z-78 : 1,750 - 2500 g/ha at an interval
of 15 days

(ii) Dose of chemicals for white ant control:

BHC 10% or Aldrin 5% dust : 25 kg/ha

(iii) Dose of chemicals for stemfly control:

Lindanor carboryl dust : 20 kg/ha

(iv) Dose of chemical for rats control:

Poison baits of Zinc phosphide : 1:33

+ wheatflour

3.7.e Measurement of extent of knowledge:

Measurement of knowledge of tribal farmers in respect of new agricultural technology was done by the scale derived by Jha and Singh⁴ (1970) with due modification to suit the local condition of the area under study. Scoring was done on the basis procedure mentioned in the original scale. Stratification of tribal farmers as high, medium and low was done on the basis of following mentioned statistical procedure. Firstly, the deviation were computed

⁴ P.N. Jha and K.N. Singh, "A Test to Measure Farmer's Knowledge About High Yielding Variety Programme" Interdiscipline, Vol. 7, No.1 (January-April, 1970), pp.65-67.

from the mean for each respondents score. All deviation were squared and lastly the standard deviation (S.D.) was estimated as per formula⁵ given below:

$$S.D. = \sqrt{\frac{(X_1 - \bar{X})^2}{N - 1}}$$

where, X_1 = Individual score

\bar{X} = Mean

N = Total number of respondents

To form the knowledge level categories, the maximum and minimum score limit was computed by following formula:

<u>Form of knowledge</u>	<u>Limit</u>
(a) High	$\bar{X} + S.D.$
(b) Medium	In between upper and lower limit
(c) Low	$\bar{X} - S.D.$

In general, to study the knowledge index, the following given formula have been mentioned in the manual of knowledge scale.

$$K_1 = \frac{X_1 + X_2 + \dots + n}{N} \times 100$$

where, K_1 = Knowledge index

$X_1 + X_2 + \dots + n$ = Total number of correct and 'yes' responses

N = Total number of item in the test

⁵ R.S. Chandel, loc. cit.

3.7.f Measurement of extent of adoption:

Twelve selected improved practices of wheat cultivation were taken to know the adoption index. The formula developed by the All India Co-ordinated Research Programme in Extension Education, Indian Agricultural Research Institute (IARI), New Delhi was used to know the adoption index. The formula applied was:

$$\text{Adoption index} = \frac{\text{Actual adoption of practices}}{\text{Recommended practices}} \times 100$$

For quantifying the data, scores were given to sub-practices in all the twelve practices given one score to each sub-practice, and adoption index was calculated for each respondent. Moreover frequency and percentage of sub-practices and main practices were calculated for extent of adoption.

Later on for grouping the respondents into different categories of adoption, the following statistical procedure was adopted.

Firstly, deviations from the mean for each respondents score were computed. All deviation were squared and then standard deviation was estimated as per formula⁶ given as under:

$$S.D. = \sqrt{\frac{(x_1 - \bar{x})^2}{n - 1}}$$

⁶ R.S. Chandel, loc. cit.

where, S.D. = Standard deviation

X_1 = Individual score

\bar{X} = Mean

n = Total number of respondents

Next, the categories high, medium and low were formed by computing maximum and minimum score as below:

<u>Categories of adoption</u>	<u>Score limit</u>
High	$\bar{X} + S.D.$
Medium	In between upper and lower limit
Low	$\bar{X} - S.D.$

3.7.g Constraints in transfer of wheat technology:

For measuring the constraints in transfer of wheat technology, a simple ranking system was applied. Each respondent was asked to mention his constraints in different improved practices in order of preference. The rank value was then calculated by giving an arbitrary score 3, 2, 1 and 0. Afterward total rank score for each constraints was calculated as under:

<u>Preference</u>	<u>Score value</u>
(a) Very much (VM)	3
(b) Much (M)	2
(c) Less (L)	1
(d) Not at all (NAA)	0

Responses regarding the practice-wise constraints were grouped in four categories as (i) Educational constraints, (ii) Economical constraints, (iii) Socio-cultural constraints and (iv) Practical constraints.

Stratification of tribal farmers according to constraints faced by them were worked out by calculating upper and lower limit with the help of mean score (\bar{X}) and Standard deviation (SD) as under:

<u>Constraints level</u>	<u>Limit</u>
(a) High	$\bar{X} + S.D.$
(b) Medium	In between upper and lower limit
(c) Low	$\bar{X} - S.D.$

For calculating standard deviation the following formula⁷ was applied.

$$S.D. = \sqrt{\frac{(X_1 - \bar{X})^2}{N - 1}}$$

where, S.D. = Standard deviation

X_1 = Individual score

\bar{X} = Mean

N = Total observation (Total number of respondents)

3.7.h Relationship between different variables:

In order to find out the relationship between different variable like socio-economic characteristics with the adoption

⁷ R.S. Chandel, loc. cit.

level, knowledge level with the adoption level and similarly constraints level with adoption level etc. The Chi-square (χ^2) value was calculated by using the following formula⁸.

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

where, E = Expected frequency

O = Observed frequency

For calculating expected frequency (E) of a cell following formula⁹ was administered.

$$E_{ij} = \frac{R_i C_j}{N}$$

where, E_{ij} = Expected frequency for cell belonging to i^{th} row and j^{th} column.

R_i = i^{th} row total

C_j = j^{th} column total

3.8 Definitions of the Term Used

- 1. Constraints:** This refers to the item of difficulty faced by the farmers in adoption of new agricultural technology.

⁸ R.S. Chandel, Op. cit., pp.228-247.

⁹ R.S. Chandel, Op. cit., pp.294-380.

2. Knowledge: Knowledge is a result or product of knowing information or understanding. It can be acquired through experience to develop practical ability of Skill¹⁰.
3. Adoption: Adoption is a decision to continue full use of an innovation¹¹.

¹⁰ The Reader's Digest, Association, The Readers Digest Great Encyclopedia Dictionary (New York: The Readers Digest Association, 1966).

¹¹ E.M. Rogers, "Diffusion of Innovation". The Free Press of Glencoe, New York, 1962.

Chapter IV

RESULTS AND DISCUSSION

The previous chapter noted the research design, tools and techniques, followed for conducting the present investigation. The collected data from the tribal wheat growers were classified and tabulated in light of the objectives of the study which have been presented in the following heads:

- 4.1 Socio-economic characteristics of the tribal farmers
- 4.2 Sources of information utilised by the tribal farmers for the wheat technology
- 4.3 Knowledge level of the tribal farmers for the recommended wheat technology
- 4.4 Extent of adoption of recommended practices for wheat cultivation
- 4.5 Constraints expressed by tribal farmers in transfer of wheat technology
- 4.6 Relationship between socio-economic characteristics of tribal farmers and their adoption level for wheat cultivation
- 4.7 Relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level

4.8 Relationship between adoption level of tribal farmers and their constraints expressed by them in transfer of wheat technology

4.9 Suggestions of the tribal farmers to overcome the constraints in transfer of wheat technology

4.1 Socio-economic characteristics of the tribal farmers

The process of transfer of all kind of inventions and innovation aimed of increasing the agricultural production in the tribal area is influenced by various socio-economic characteristics like, age, education, occupation, size of land holding, size of family, type of family, house holding, annual income, animal power and social participation. These most important characteristics have been studied and are presented in Table 3.

TABLE 3

DISTRIBUTION OF THE RESPONDENTS ACCORDING TO THEIR SOCIO-ECONOMIC CHARACTERISTICS (N = 150)

Socio-economic characteristics	Respondents	
	Number	Percentage
1	2	3
1. Age:		
Young farmers (Upto 30 years)	10	6.67
Middle age (31 to 50 years)	126	84.00
Old age (Above 50 years)	14	9.33
Total	150	100.00

Table 3 contd....

	1	2	3
2. <u>Education:</u>			
Illiterate		90	60.00
Can read and write		32	21.33
Primary		28	18.67
Total		150	100.00
3. <u>Occupation:</u>			
Farming		126	84.00
Farming and others		24	16.00
Total		150	100.00
4. <u>Size of land holding:</u>			
Upto 2.5 acres		2	1.33
More than 2.5 but upto 5 acres		22	14.67
More than 5.00 but upto 10 acres		72	48.00
More than 10 acres		54	36.00
Total		150	100.00
5. <u>Size of family:</u>			
Small size (Upto 5 members)		14	9.33
Medium size (More than 5 but upto 10 members)		89	59.34
Large size (Above 10 members)		47	31.33
Total		150	100.00

Table 3 contd.....

	1	2	3
6. <u>Type of family:</u>			
Nuclear	67	44.67	
Joint	83	53.33	
Total	150	100.00	
7. <u>House holding:</u>			
Kachha house	115	76.67	
Mixed house	35	23.33	
Total	150	100.00	
8. <u>Annual income:</u>			
Upto Rs.1000	18	12.00	
Rs.1001 to 2000	81	54.00	
Rs.2001 to 3000	50	33.33	
Above Rs.3000	1	0.67	
Total	150	100.00	
9. <u>Animal power:</u>			
3 to 4 animals	2	1.33	
5 and above 5 animals	148	98.67	
Total	150	100.00	

Table 3 contd.....

	1	2	3
10. <u>Social participation:</u>			
Member of one organisation	40		26.67
Member of more than one organisation	100		66.66
Holding position	3		2.00
Local leaders	7		4.67
Total	150		100.00

4.1.a Age:

Age of the tribal farmers is an important socio-economic characteristics which influence the process of transfer of wheat technology. Therefore, the total respondents were grouped into the age groups (i) young age farmers (upto 30 years), (ii) middle age farmers (31 to 50 years) and (iii) old age farmers (above 50 years). The data with respect to age are presented in Table 3.

The data presented in the Table 3 shows that majority of the respondents 126 (84.00 per cent) were found to be in the age group of 31 to 50 years i.e. middle age group whereas, the old age group i.e. age above 50 years constituted 9.33 per cent and young age group i.e. age upto 30 years (6.67) per cent. Thus it can be seen that more than 50 per cent of the respondents were in the middle age group followed

by old and young age group respectively. The possible reason for this would be that farmers having middle age groups have better experience of different farm practices than other age group farmers. This finding is in the line with the finding reported by Ankush (1976) and Tej Bahadur, Reddy and Veera Swamy (1976).

4.1.b Education:

Education in a society is a primary condition for its socio-economic development. Any programme of development can not succeed unless the society gets educated and the individual become aware of their own needs and a need for development.

With a view to study the influence of education on transfer of wheat technology among tribal farmers the information about formal education received by them was collected and on the basis of that, respondents were classified into three groups (i) illiterate, (ii) can read and write and (iii) primary (1 to 5th standard). The data with respect to formal education are presented in Table 3.

Table 3 shows that majority of the respondents 90 (60.00 per cent) were found to be in the illiterate group. The respondents who can read and write were found to be

21.33 per cent while only 18.67 per cent of the respondent were literate having primary education upto 5th standard.

The possible reason for low level of education among tribal farmers would be that due to low economic conditions and have no schooling facilities at the time. Hence, there were more number of respondents in the lower level of education. Similar findings were reported by Dubey and Bahadur (1966), Dubey (1971) and Earnest (1973).

4.1.c Occupation:

The occupation of the respondents is also an important factor which influence the transfer of wheat technology. Agriculture being the main occupation of the tribal people for a fairly large section of population. The data with reference to the occupation are presented in Table 3.

The data presented in the same Table (3) reveals that majority of the respondents 126 (84.00 per cent) were fully dependent on farming whereas only 16.00 per cent of the respondents were depended on farming and others. This finding is in line with the finding reported by Dubey (1971), Vidyarthi (1973) and Singh and Singh (1973).

4.1.d Size of land holding:

The size of land holding is an important factor affecting the transfer of new technology which have been pointed out by various previous researchers. To confirm this, this study was undertaken. On the basis of total size of land holding owned by a tribal farmers they were classified under the following size of land holding.

- i. Upto 2-5 acres (marginal farmers),
- ii. more than 2.5 but upto 5 acres (small farmers),
- iii. more than 5 but upto 10 acres (medium farmers) and
- iv. more than 10 acres (big farmers).

Data with respect to land holding are presented in Table 3.

The same Table 3 reveals that the majority of respondents 72 (48.00 per cent) were found to have a land holding more than 5 acres but upto 10 acres. Whereas 54 respondents (36.00 per cent) were having more than 10 acres of land holding. 22 respondents (14.67 per cent) were land holding more than 2.5 but upto 5 acres and 2 respondents (1.33 per cent) were having only upto 2.5 acres land holding. This finding is in the similar line with the finding of Bhati and Swarup (1974) and Patel (1978).

4.1.e Size of family:

In respect of size of family, respondents were classified under three categories, (i) small size (upto 5 members), (ii) medium size (more than 5 but upto 10 members) and (iii) large size (above 10 members). The data collected and analysed are presented in Table 3.

Further, the same table reveals that majority of the respondents 89 (59.34 per cent) belonged to the family having more than 5 but upto 10 members, 47 and 14 respondents were found to be in that having above 10 members and upto 5 members respectively. This finding is in concurrence with those reported by Banerjee (1976) and Patel (1978).

4.1.f Type of family:

Family type is an important social factor. There are two types of families i.e. nuclear and joint families. A nuclear family consists of husband, the wife and their minor children. A joint family consists of more than one family on the basis of close blood relations and common residence. The data with reference to type of families are classified and presented in Table 3.

It is evident from Table 3 that majority of the respondents 83 (55.33 per cent), belonged to joint families

while only 67 (44.67 per cent) were having nuclear families. This indicated that the majority of the wheat growers had a joint family. Similar findings were reported by Banerjee (1976) and Patel (1978).

4.1.g House holding:

House holding is also one of the important factor in relation to transfer of wheat technology among tribal farmers. Classification of the respondents under the following categories were made on the basis of their house holding:

- i. Kuchha house holding (made out of mud) and
- ii. Mixed house holding (made of bricks and mud).

The data with reference to house holding are presented in Table 3.

The same Table 3 reveals that majority of the respondents 115 (76.67 per cent) were having kuchha house holding (made out of mud), while only 35 respondents (23.33 per cent) were having mixed house holding (made of bricks and mud). This finding is in similar line with the finding of Tamboli (1979).

4.1.h Annual income:

Taking into account the low productivity of the tribal holding, they were classified under four categories (i) Upto

Rs.1000/annum, (ii) more than Rs.1000 but upto 2000/annum, (iii) more than Rs.2000 but upto 3000/annum and (iv) more than 3000/annum. The data with respect to annual income are presented in Table 3.

The Table 3 shows that majority of the respondents 81 (54.00 per cent) were having annual income more than Rs.1000 but upto 2000/annum. 50 respondents (33.33 per cent) were having more than Rs.2000 but upto 3000/annum, 18 respondents (12.00 per cent) were having annual income upto Rs.1000 and only 1 respondent (0.67 per cent) was having income above Rs.3000/annum. Similar finding were reported by Bhati and Swarup (1974).

4.1.1 Animal power:

Animal husbandry plays an important role in tribal economy as tribals can profitably raise their livestock to subsist their livelihood. But due to poverty and ignorance, they have not been able to develop their animals on economic lines.

On the basis of possession of animals, respondents were classified into two categories (i) 3 to 4 animals, and (ii) 5 and above 5 animals. The data with reference to animal power are presented in Table 3.

The same Table 3 shows that majority of the respondents 148 (98.67 per cent) had 5 and above animals whereas only 2 respondents (1.33 per cent) had 3 to 4 animals.

The results clearly indicate that adivasis of the area have liking for keeping animals for their agricultural purposes. Another possible reasons of this finding would be that the majority of the respondents might have realised the necessity of animals in wheat cultivation requiring in preparatory tillage and sowing in time.

4.1.j Social participation:

The social participations of the respondent is also an important factor which influence the transfer of wheat technology among tribal farmers. Classification of the respondents under the following categories were made on the basis of their social participation.

- i. Member of one organization,
- ii. member of more than one organization,
- iii. holding position, and
- iv. local leaders.

The data with reference to social participation presented in Table 3.

The same Table 3 reveals that majority of the tribal respondents 100 (66.66)per cent) were member of two organisation

i.e. panchayat and co-operative. This followed by low participation respondents (member of only one organisation) 40 (26.67 per cent), 3 respondents (2.00 per cent) held position and only 7 respondents (4.67 per cent) were local leaders. The above table clearly indicate that the tribal farmer's participation was more in co-operative and other Commercial Bank than in the village panchayat. The possible reason might be that the tribal farmers always economically handicapped. The credit needs of the tribal farmers turns to him to co-operative bank and other commercial bank too. This finding is in similar line with the finding reported by Kalamegam (1975).

4.1.k Socio-economic status:

In the present study an attempt has been made to find out the socio-economic characteristics of the respondents and thereby determine their socio-economic status. The respondents were classified into three categories with the help of mean and standard deviation as discussed in the Chapter III. The data in this regard are presented in Table 4.

TABLE 4
SOCIO-ECONOMIC STATUS OF THE RESPONDENTS

(N = 150)

Socio-economic status level	Score	Respondents	
		Number	Per cent
High	Above 26	22	14.66
Medium	22 to 26	94	62.67
Low	Below 22	34	22.67
Total		150	100.00

 \bar{X} (Mean) = 24.00

S.D. = 2.16

It is evident from the data presented in Table 4 that maximum number of the respondents 94 (62.67 per cent) were found in the Medium Socio-Economic Status (MSES) followed by 34 respondents (22.67 per cent) having Low-Socio-Economic Status (LSES). Only 22 respondents (14.67 per cent) were in the group of High Socio-Economic Status (HSES).

From the data given in Table 4 an inference may be drawn that the respondents predominantly consisted of the middle class farmers. This finding is in the similar line with the finding of Zaheer (1975).

On the basis of the above finding, the null hypothesis that there is no difference in the socio-economic status of the tribal farmers was rejected.

4.2 Sources of Information Utilized by the Tribal Farmers for the Wheat Technology

The main thrust of all the tribal agricultural development programmes is to spread farm technology in tribal area through different communication sources. Though pattern of source utilization among tribal farmers is likely to be different from the non-tribal because of the culture and personality of tribals. Therefore, the study was planned to know the source utilization pattern among tribal farmers and to know their credibility of different sources of farm information.

The data with respect to source of information of the tribal farmers are presented in Table 5.

The data obtained on the source utilization by tribal farmers are presented in Table 5. The findings revealed that the informal source tribal farmers mainly utilized was their neighbours (88.00 per cent) as source of information for obtaining information about selected practices. The tribal leader was the next important source for them (78.66 per cent). Among the formal sources, village panchayat (73.33 per cent) co-operative personnel (59.33 per cent) and villages level worker (53.33 per cent) were prominently stated by the tribal

TABLE 5
UTILIZATION OF FARM INFORMATION SOURCE BY TRIBAL FARMERS

N = 150

Sources of information	Number	Percentage
A. <u>Formal:</u>		
Village Level worker	80	53.33
Agricultural Extension Officer	21	14.00
Block Development Officer	1	00.67
Village Panchayat	110	78.33
Co-operative Personnel	89	59.33
B. <u>Informal:</u>		
Neighbourers	132	88.00
Friends and relatives	108	72.00
Tribal leaders	118	78.66
C. <u>Mass media:</u>		
Demonstration	23	15.33
Radio	27	18.00
Magazine	4	2.66
News paper	1	00.67

farmers. With respect to mass media sources it was observed that all of these sources were least used. Only 18 per cent farmers used radios the source of farm information, while 15.33 per cent of them obtained it through demonstrations. The percentage of tribal farmers using printed media like magazine and news paper was negligible. High illiteracy among tribal farmers and nonavailability of news papers and farm magazines due to poor economic condition could be the reason for less utilization of printed media by tribals.

TABLE 6
PERCEIVED SOURCES CREDIBILITY

Source	Average source	Rank of creditibility
Neighbour	2.21	1
Tribal leader	2.15	2
Village panchayat	2.10	3
Extension personnel (Agri./Co-operative/Bank)	1.75	4
Radio	1.66	5
Demonstration	1.60	6
Printed matter	1.00	7

Data pertaining to source credibility are presented in Table 6. It was observed that tribal farmers perceived farm information as most credible if it comes through their neighbours or tribal leaders of their own caste panchayat. The main difficulty with a tribal farmers was that he was hesitant and sometimes reluctant to establish contact. With the extension personnel through the extension personnel like Agricultural and co-operative workers were most frequently contacted while the private and other block extension agencies were least contacted, the mass media source like radio, demonstration and printed matters were less credible as source of farm information due to largely limited and poor economic conditions. The similar findings are also reported by Menon (1970), Sachchidananda (1974), Singh, Singh and Pal (1976) in their studies.

On basis of the above finding, the null hypothesis that there is no difference between sources of information used by the tribal farmers with respect to high yielding variety of wheat was rejected.

4.3 Knowledge Level of the Tribal Farmers for the Recommended Wheat Technology

The present study was also planned to know the level of knowledge of tribal respondents and thereby determine the

level of knowledge of the tribal farmers with respect to wheat technology. As discussed in Chapter III the knowledge scale developed by Jha and Singh (1970) has been used as such on the basis of information needs, the kind of information sought by tribal farmers. After calculating the total score obtained by each former, they were categorised and placed in the respective level group. The grouping of the respondents thus made has been shown in Table 7.

TABLE 7
DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR
KNOWLEDGE LEVEL

(N = 150)

Level of knowledge	Score	Respondents	
		Number	Per cent
High	Above 28.13	18	12.00
Medium	19.47 to 28.13	114	76.00
Low	Below 19.47	18	12.00
Total		150	100.00

$$\bar{X} = 23.80$$

$$S.D. = 4.33$$

The data presented in Table 7 reveal that the respondents belonging to medium level of knowledge categories were in majority (76.00 per cent). The respondents belonging to low and high level of knowledge were equal in number i.e. 12.00 per cent and 12.00 per cent respectively.

Thus the Table 7 gives an account of the level of knowledge of the tribal farmers with respect to wheat cultivation. From the data an inference may be drawn that the major respondents were belonging to medium level knowledge category. The present finding partially coincide with Benerjee (1976) and Patel (1978) who stated that majority of the respondent's knowledge regarding the improved agricultural practices was low.

On the basis of above finding, the null hypothesis that there is low knowledge level among tribal farmers about the recommended technology for wheat cultivation was partially rejected.

4.4 Extent of Adoption of Recommended Practices for Wheat Cultivation

In order to find out the extent of adoption of recommended practices for paddy cultivation, the respondents were asked to give information about the package of practices adopted by them. The detail analysis was carried out and is presented in Table 8.

TABLE 8
DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR ADOPTION
OF THE RECOMMENDED PRACTICES FOR WHEAT CULTIVATION

Sr. No.	Recommended practices	Respondents	
		Number	Per cent
1	2	3	4
1	<u>Preparatory tillage</u>	150	100.00
	As per recommendation	127	84.67
	Below recommendation	23	15.33
2	<u>Soil treatment</u>	150	100.00
	As per recommendation	11	7.33
	Practice not followed	139	92.67
3	<u>Use of seed</u>		
	i) <u>Seed variety used</u>	150	100.00
	As per recommendation	31	20.67
	Practice not followed	119	79.33
	ii) <u>Seed rate</u>	150	100.00
	As per recommendation	101	67.33
	Below recommendation	49	32.67
4	<u>Seed treatment</u>	150	100.00
	As per recommendation	8	5.33
	Practice not followed	142	94.67

Table 8 contd....

1	2	3	4
5	<u>Time of sowing</u>	150	100.00
	As per recommendation	127	84.67
	Below recommendation	2	1.33
	Above recommendation	21	14.00
6	<u>Method of sowing</u>	150	100.00
	Dibbling method	0	0.00
	Line sowing method	150	100.00
7	<u>Spacing</u>	150	100.00
	As per recommendation	123	82.00
	Below recommendation	17	11.33
	Above recommendation	10	6.67
8	<u>Manuring</u>	150	100.00
	As per recommendation	11	7.33
	Below recommendation	103	68.67
	Above recommendation	4	2.67
	Practice not followed	32	21.33
9	<u>Chemical fertilizers</u>	150	100.00
	As per recommendation	1	0.67
	Below recommendation	149	99.33
10	<u>Plant protection measures</u>	150	100.00
	As per recommendation	-	-
	Below recommendation	31	20.67
	Practice not followed	119	79.33

Table 8 contd....

1	2	3	4
11	<u>Irrigation</u>	150	100.00
	As per recommendation	62	41.33
	Below recommendation	88	58.67
12	<u>Weed control</u>	150	100.00
	As per recommendation	0	0.00
	Practice not followed	150	100.00

4.4.a(1) Preparatory tillage:

The data presented in Table 8 indicate that majority of the tribal farmers 127 (84.6 per cent) were followed preparatory tillage as per recommendation. Only 15.33 per cent followed below recommended. This might be due to lack of knowledge about its importance. Other possible reasons might be unsuitability of land, lack of improved implement and lack of irrigation facilities.

4.4.a(2) Soil treatment:

The same Table 8 reveals that only 11 respondents (7.33 per cent) had treated their soil with fungicide whereas majority of the respondents 139 (92.67 per cent) had not used any fungicide for soil treatment. The probable reason for this might be either their unawareness about its importance or lack of knowledge about it.

4.4.a(3) Use of seed:

(i) Seed variety: A perusal of the data in Table 8 shows that only 31 respondents (20.67 per cent) had adopted fresh seed of recommended varieties of wheat seed, while rest of the respondents (79.33 per cent) were found to use his own old seed of wheat variety. The probable reason in respect of these 119 respondents for this might be their lack of knowledge or financial incapability or lack of other facilities.

(ii) Seed rate: Data presented in the same Table 8 indicate that majority of the respondents 101 (67.33 per cent) had adopted seed rate as recommended, only 49 respondents (32.67 per cent) were adopted below recommended seed rate for their wheat crop. The probable reason for using below recommended seed rate might be lack of knowledge about this improved practices.

4.4.a(4) Seed treatment:

Data in Table 8 reveal that seed treatment as per recommendation was followed by only 8 respondents (5.33 per cent), while rest of the respondents (94.67 per cent) were found not to adopt this practice. The probable reason for this might be their unawareness and lack of technical guidance to dispell their ignorance about the importance of seed treatment.

4.4.a(5) Time of sowing:

Table 8 shows that majority of the respondents 127 (84.67 per cent) followed recommended sowing time. Further, it reveals that 21 (14.00 per cent) and 2 (1.33 per cent) respondents were those who had sown wheat seed after and before recommended time for sowing respectively. The probable reason for this might be lack of technical guidance and lack of knowledge about time of sowing of different wheat varieties.

4.4.a(6) Method of sowing:

A perusal of data in Table 8 reveals that cent per cent of the respondents had adopted line sowing method for sowing. None of them had adopted the dibbling method of wheat sowing. The probable reason for this might be lack of knowledge of the respondents.

4.4.a(7) Spacing:

Data in Table 8 shows that spacing as recommended were followed by 123 respondents (82.00 per cent), while 17 respondents (11.33 per cent) were followed spacing below recommended, whereas only 10 respondents (6.67 per cent) were followed spacing above recommended. The probable reason for not to adopt recommended spacing might be lack of knowledge about it.

4.4.a(8) Manuring (both organic and inorganic):

Data presented in Table 8 reveal that majority of the respondents 103 (68.67 per cent) had applied manure below the recommended dose of manuring. Only 11 (7.33 per cent) and 4 (2.67 per cent) respondents were those who applied manure as per recommendation and above the recommendation respectively. The data also reveal that 32 (21.33 per cent) respondents did not apply any manure in the field. The probable reason for this might be lack of manure or their unawareness about the importance of manuring.

4.4.a(9) Chemical fertilizer:

The data presented in Table 8 indicate that majority of the respondents 149 (99.33 per cent) used fertilizers as below recommendation, whereas, only 1 respondent (0.67 per cent) followed recommended dose for wheat crop. The probable reason for this might be the lack of knowledge, lack of finance, the lack of technical guidance and the lack of irrigation facilities.

4.4.a(10) Plant protection measures:

The same Table 8 indicates that majority of respondents 119 (79.33 per cent) were found nonadopters, whereas 31 respondents (20.67 per cent) were those who adopted plant protection measures below recommendation,

while none of the respondents adopted plant protection measures as per recommendation for wheat crops. The probable reason for this might be lack of knowledge, lack of technical guidance, high cost of chemical and financial handicap.

4.4.a(11) Irrigation:

The Table 8 shows that majority of the respondents 88 (58.67 per cent) had followed irrigation schedule below recommended while 62 (respondents (41.33 per cent) were followed it as per recommendation. The reason for this might be either lack of irrigation facilities or their unawareness about the irrigation schedule.

4.4.a(12) Weed control:

It is evident from the above Table 8 that cent per cent of the respondents had not adopted weed control operation. The probable reason for this finding might be lack of knowledge, lack of technical guidance, high cost of chemicals, high labour charges and financial handicap.

4.4.b Level of adoption of recommended wheat technology among tribal farmers:

A study was also made to find out the overall adoption level of the recommended wheat technology. The data collected were analysed and grouped into three categories with the help

of two statistical parameters i.e. mean and standard deviations. The analysed and grouped data are presented in Table 9.

TABLE 9
DISTRIBUTION OF THE RESPONDENTS ACCORDING
TO THEIR ADOPTION LEVEL (N = 150)

Level of adoption	Score	Respondents	
		Number	Per cent
High	Above 54	14	9.33
Medium	30 to 54	113	75.33
Low	Below 30	23	15.34
Total		150	100.00

$$\bar{X} = 42.00 \quad \text{S.D.} = 12.00$$

The Table 9 shows that majority of respondents 113 (75.33 per cent) had medium level of adoption, while 23 (15.34 per cent) and 14 (9.33 per cent) respondents had low and high level of adoption respectively.

Thus, it reveals that about three fourth (75.33 per cent) of respondents were found to be in the group of medium level of adoption, indicating that majority of wheat growers did not adopt all the practice recommended for wheat cultivation. Low or high level of adoption and higher

medium and low level of adoption might be due to high cost of inputs and not taking a risk of investing more due to lack of information. The other reason might be lack of knowledge and technical guidance.

On the basis of above findings the null hypotheses that there is low extent of adoption of recommended practices for wheat cultivation among tribal farmers was rejected.

4.5 Constraints Expressed by Tribal Farmers in Transfer of Wheat Technology

Constraints in transfer of wheat technology may be long list, however, it may be minimized. Constraints are interrelated within themselves. Inadequate production is the resultant of lack of sufficient irrigation facilities, lack of sufficient productive land, various inputs etc. Further, lack of productive land, inputs and irrigation facilities are owing to lack of capital. It is very difficult task to list out the constraints. However, an effort has been made in this regard.

4.5.a Practice-wise constraints and their relative positions:

The respondents were requested to express the constraints faced by them in adopting different practices

of wheat cultivation in order of importance viz. very much (V), much (M), low (L) and not at all (NAA). Responses regarding the practice-wise constraints were grouped in four categories as (i) educational constraints, (ii) economical constraints, (iii) socio-cultural constraints and (iv) practical constraints.

(i) Educational constraints: These include constraints like lack of knowledge, lack of technical guidance, and ignorance of the practices.

(ii) Economical constraints: These include constraints like lack of money to purchase required requisites, high cost of the inputs or more cost of the practice, nonavailability of finance in time etc.

(iii) Socio-cultural constraints: These include constraints like (a) farmer's tendency of not using the practice or the method until other farmers in his social system use the same, (b) neighbours are not adopting, (c) farmer's belief that high yield entirely depends upon Gods will rather than use of improved seeds or fertilizers and (d) farmers's belief that to kill insects is to suffer the gnawing of remorse. Diseases of plants are nothing but an astonishing event of nature and to fight against these events is to suffer the gnawing of compunction etc.

(iv) Practical constraints: These include constraints like shortage of H.Y.V. seeds and other inputs. The susceptibility of improved varieties to diseases and pests, lack of irrigation facilities after the application of fertilizers, lack of finance, agricultural inputs, implements, dusters and sprayers, unproductive and small size of land holding.

Afterwards practice-wise constraints were pooled together to find out the total constraints. The collected data of practice-wise constraints were analysed and are given in Table 10.

4.5.a(1) Constraints related to preparatory tillage:

Data collected from the respondents in respects of constraints in tillage operation are given in Table 10.

It can be seen from the Table 10 that educational constraint was main constraints which scored highest mean score of 51.50 and ranked first in preparatory tillage. Socio-cultura, practical and economical constraints were scored 27.66, 21.50 and 2.66 mean scores and ranked second, third and fourth respectively. This clearly indicates that the lack of knowledge is the main constraints in preparatory tillage operation. The reason for this might be lack of technical guidance provided by extension personnel.

TABLE 10

RELATIVE POSITION OF DIFFERENT CONSTRAINTS FACED BY THE
RESPONDENTS IN TRANSFER OF WHEAT TECHNOLOGY
(N = 150)

Sr. No.	Constraints related	Number and mean score of respondents					Position within the set	Overall ranking
		VM	M	L	Total	Mean		
1 Preparatory tillage								
	Educational	77	37	4	118	51.50	I	
	Economical	2	4	2	8	2.66	IV	
	Socio-cultural	38	22	8	68	27.66	II	
	Practical	28	19	7	54	21.50	III	
	Total					25.83		II
2 Soil treatment								
	Educational	83	40	6	129	55.83	I	
	Economical	1	1	2	4	1.16	IV	
	Socio-cultural	28	12	8	48	20.66	II	
	Practical	12	2	4	18	7.83	III	
	Total					21.24		V
3 Use of seed								
	Educational	42	22	6	70	29.33	I	
	Economic	27	12	1	40	17.66	III	
	Socio-cultural	22	18	5	45	17.83	II	
	Practical	12	10	8	30	10.66	IV	
	Total					18.88		XII
4 Seed treatment								
	Educational	50	21	30	101	37.00	I	
	Economical	8	6	1	15	6.16	IV	
	Socio-cultural	25	17	8	50	19.50	II	
	Practical	20	13	2	35	15.00	III	
	Total					19.41		XI

Sr. No.	Constraints related	Number and mean score of respondents					Position within the set	Overall ranking
		VM	M	L	Total	Mean		
5	<u>Time of sowing</u>							
	Educational	50	21	30	101	37.00	I	
	Economical	8	6	1	15	6.16	IV	
	Socio-cultural	25	17	8	50	19.50	II	
	Practical	20	13	2	35	15.00	III	
	Total					19.42		X
6	<u>Method of sowing</u>							
	Educational	50	12	1	63	29.16	I	
	Economical	26	12	1	39	17.16	IV	
	Socio-cultural	32	6	1	39	18.16	III	
	Practical	33	15	1	49	21.66	II	
	Total					21.55		IV
7	<u>Spacing</u>							
	Educational	92	47	10	149	63.33	I	
	Economical	-	-	-	-	-	-	
	Socio-cultural	31	8	1	40	18.33	II	
	Practical	-	-	-	-	-	-	
	Total					40.83		I
8	<u>Manuring</u>							
	Educational	45	22	18	85	32.83	I	
	Economical	24	16	4	44	18.00	III	
	Socio-cultural	10	8	2	20	8.60	IV	
	Practical	30	22	3	55	22.83	II	
	Total					20.41		VIII

Sr. No.	Constraints related	Number and mean score of respondents					Position within the set	Overall ranking
		VM	M	L	Total	Mean		
9	<u>Fertilizer</u>							
	Educational	29	51	2	82	31.83	I	
	Economical	46	22	4	72	31.00	II	
	Socio-cultural	19	6	3	28	12.00	III	
	Practical	12	7	1	20	8.50	IV	
	Total					20.83		VII
10	<u>Plant protection</u>							
	Educational	51	32	2	85	36.50	I	
	Economical	18	11	1	30	12.83	IV	
	Socio-cultural	28	22	1	51	21.50	II	
	Practical	35	6	3	44	20.00	III	
	Total					22.70		III
11	<u>Irrigation</u>							
	Educational	32	31	10	73	28.00	I	
	Economical	24	10	2	36	15.66	III	
	Socio-cultural	18	7	3	28	12.83	IV	
	Practical	31	18	4	53	22.16	II	
	Total					19.66		IX
12	<u>Weed control</u>							
	Educational	43	27	5	75	31.33	I	
	Economical	18	12	2	32	13.66	IV	
	Socio-cultural	30	19	11	60	23.16	II	
	Practical	21	14	2	37	15.50	III	
	Total					20.91		VI

VM = Very much, M = Much, L = Low
 Score VM = 3, M = 2, L = 1

These constraints are same with the constraints stated by Kumuluddin Sahib (1978) who reported that the tribals had no improved iron plough and other improved agricultural implements nor, any one know how to plough their field by these improved implements. The tribal lacked the basic skill in field preparation and this required proper training.

4.5.a(2) Constraints related to soil treatment:

Data collected from the respondents in respect of constraints in soil treatment technology are given in Table 10.

A perusal of the data from the Table 10 reveals that educational constraints was main constraint, which scored highest mean score of 55.82 and ranked first in soil treatment practice. Socio-cultural, practical and economical constraints scored 20.66, 7.33 and 1.16 mean scores and ranked second, third and fourth respectively. This clearly indicates that lack of knowledge about the soil treatment practice was the main constraints. The probably reason for this might be lack of extension efforts to orient the tribal farmers towards improved agricultural practices.

These constraints are same with the constraints stated by Mohapatra and Debi (1973) who reported that the

lack of extension efforts was the main constraints in transfer of agricultural technology.

4.5.a(3) Constraints related to use of HYV and improved seed:

Table 10 reveals that the major constraints in using HYV improved wheat seed was educational, which scored highest mean score of 29.33 and ranked first socio-cultural, economical and practical constraints were scored 17.83, 17.66 and 10.66 and ranked second, third and fourth. This clearly indicates that the lack of knowledge and lack of technical guidance about new varieties of wheat is the main constraints in use of seed variety. The reason for this might be that no systematic efforts appears to have been made by the extension agencies to rope in the tribal cultivators to adopt scientific methods of cultivation. These constraints are same with the constraints stated by Singh (1970) and Mathur (1975) who reported that lack of systematic efforts, lack of education and knowledge among the tribal population was the main constraints in transfer of agricultural technology.

4.5.a(4) Constraints related to seed treatment:

As regards the use of seed treatment, the same Table 10 shows that educational constraints was the main constraints which scored highest mean score of 37.00 and



ranked first socio-cultural, practical and economical constraints were scored mean score of 19.15, 15.00 and 6.16 and ranked second, third and fourth respectively. This clearly indicates that lack of knowledge about the new technology is the main constraint in seed treatment. The probable reason for this might be lack of technical guidance with regards to seed treatment practice. These constraint are same with the constraints stated by Dube (1977), who reported that the lack of technical guidance with regards to improved agricultural technology was the main constraints.

4.5.a(5) Constraints related to time of sowing:

The same Table 10 indicates that educational constraints was the main constraints in time of sowing, which scored highest mean score of 31.83 and ranked first. Socio-cultural, economical and practical constraints were scored 23.66, 15.66, and 2.33 and ranked second, third and fourth respectively. This clearly indicates that the lack of knowledge about time of sowing practice of wheat cultivation is the main constraints. The reason for this might be lack of technical guidance with regards to time of sowing. These constraints are same with the constraints stated by Dogra (1977), who reported that the lack of

technical guidance was one of the most important constraints in transfer of agricultural technology among tribal farmers.

4.5a(6) Constraints related to method of sowing:

It can be seen from the Table 10 that educational constraints was the main constraints for method of sowing which scored highest mean score of 29.16 and ranked first. Practical, socio-cultural and economical constraints were scored mean score of 21.66, 18.16 and 17.16 and ranked second, third and fourth respectively. This clearly indicates that lack of knowledge is the main constraints in method of sowing. The probable reason for this might be lack of technical guidance with regards to method of sowing.

These constraints are same with the constraints stated by Jaiswal and Kolte (1975), who reported that lack of technical guidance was the main barriers in the way of diffusion of farm innovations among the tribal farmers.

4.5.a(7) Constraints related to spacing:

A perusal of the data from the Table 10 reveals that educational constraints was the main constraints for spacing, which scored highest mean score of 63.33. Socio-cultural was scored 18.33 and ranked second. This clearly indicates that the lack of knowledge about spacing practices of wheat

cultivation is the main constraints. The reason for this might be lack of technical guidance with respect to spacing. These constraints are same with the constraints stated by Patel (1978) who reported that the lack of technical guidance was one of the most important constraints in transfer of agricultural technology among tribal farmers.

4.5.a(8) Constraints related to use of organic manures :

As regards use of organic manure, the same Table 10 shows that educational constraints was the main constraints which scored highest mean score of 32.83, practical economical and socio-cultural constraints were scored mean score of 22.83, 18.00 and 8.00 and ranked second, third and fourth respectively. This clearly indicates that lack of knowledge about the manuring is the main constraints. The reason for this might be lack of technical guidance with regards to manuring and the shortage of right type of manures. These constraints are same with the constraints stated by Dubey (1964) who stated that the little scientific knowledge regarding improved agricultural practices among tribal farmers were one of the major constraints.

4.5.a(9) Constraints related to use of chemical fertilizer:

From the above Table 10 it is evident that educational constraints was the main constraints which scored highest mean

score of 31.83. Economic, socio-cultural and practical constraints were scored mean score of 31.00, 12.00 and 8.50 and ranked second, third and fourth respectively. This clearly indicates that lack of knowledge, lack of technical guidance and high cost of chemical fertilizers were deeply expressed by the respondents as major constraints in application technology of chemical fertilizers. The possible reason for first two constraints might be negligence on the part of extension workers and failure of extension service. The reason of high cost of chemical fertilizers might be more demand and less supply and high cost of production. This finding is conformity with the findings reported by Mohapatra and Debi (1973). The field survey report on the Kathodis tribal community of Gujarat (1974) and Dogra (1977).

4.5.a(10) Constraints related to plant protection measures:

In the same Table 10 the data collected from the respondents in respect of constraints related to plant protection measures indicate that educational constraints was the main constraints which scored highest mean score of 36.50. Socio-cultural, practical and economical constraints were scored mean score of 21.50, 20.00 and 12.83 and ranked second, third and fourth respectively. This clearly indicates that lack of knowledge and lack of technical guidance wer

major problems in adoption of plant protection measures faced by respondents. The other constraints expressed by them were nonavailability of plant protection equipments, high cost of chemicals, lack of finance nonavailability of chemicals and complicated technique. The possible reason for lack of technical guidance and lack of knowledge might be the negligence in duties on the part of the extension workers as well as systematic functioning of the extension services. This finding is confirmity with the findings reported by Singh (1970), Mathur (1975) and Dubey (1977).

4.5.a(11) Constraints related to irrigation:

As regards irrigation, the same Table 10 reveals that educational constraints was the main constraints which scored highest mean score of 28.00. Practical economical and socio-cultural constraints were scored mean score of 22.16, 15.16 and 12.83 and ranked second, third and fourth respectively. This clearly indicates that lack of irrigation facilities and shortage of irrigation water were the major constraints related to irrigation. The reason for this might be lack of technical guidance with respect to irrigation. This finding is in conformity with the findings reported by Garg (1975) and Patel (1978).

4.5.a(12) Constraints related to weed control:

The data collected from the respondents in respect of constraints of weed control are given in Table 10.

In the same Table 10 the data indicate that educational constraints was the main constraints which scored highest mean score of 31.33. Socio-cultural practical and economical constraints were scored mean score of 23.16, 15.50 and 13.66 and ranked second, third, and fourth respectively. This clearly indicates that lack of knowledge and ignorance of the practices were deeply expressed by the respondents as major constraints in application technology of weed control. The other constraints expressed by them were not using the practice until other farmers in his social system use the same, high cost of weedicide and lack of finance. The probable reasons for lack of knowledge and ignorance might be lack of technical guidance with respect to improve practices of weed control. The finding is conformity with the finding reported by Dubey (1977) and Tamboli (1979).

On the basis of above findings regarding practice-wise constraints in transfer of new technology for wheat cultivation, the null hypothesis that constraints in transfer of wheat technology among tribal farmers do not differ from practice to practice was rejected.

4.5.a(13) Constraints level faced by the wheat growers:

To find out the overall constraints, the practice-wise constraints faced by the individual wheat growers were pooled together and the respondents were classified into three categories having high, medium and low constraints with the help of two statistical parameters namely mean (\bar{x}) and standard deviation (SD) as discussed in Chapter III. The analysed and grouped data are presented in Table 11.

TABLE 11

DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR CONSTRAINTS
FACED IN TRANSFER OF WHEAT TECHNOLOGY
(N = 150)

Level of constrains	Score	Respondents	
		Number	Per cent
High	Above 47	15	10.00
Medium	33 to 47	123	82.00
Low	Below 33	12	8.00
Total		150	100.00

$$\bar{X} = 40, \quad S.D. = 7.00$$

Data presented in Table 11 indicate that majority of the respondents 123 (82.00 per cent) had medium level of constraints whereas 15 (10.00 per cent) and 12 (8.00 per cent) respondents were found to be in the group of high and low levels of constraints respectively.

It is observed from above data that majority of the respondents had medium constraints level followed by those respondents who had high and low constraints levels. The reason for this might be that majority of the respondents might be of medium adoption and of middle status.

4.6 Relationship between socio-economic characteristics of tribal farmers and their adoption level for wheat cultivation

4.6.a Relationship between socio-economic status and adoption:

The data collected regarding socio-economic status of tribal farmers and their adoption level for wheat cultivation were further analysed to find out the relationship and is presented in Table 12, and depicted in Fig. 3.

TABLE 12
RELATIONSHIP BETWEEN SOCIO-ECONOMY STATUS AND
ADOPTION LEVEL OF RESPONDENTS

Socio-economic status	Adoption level of the respondents				Value of χ^2
	High	Medium	Low	Total	
High	2 (5.88)	31 (91.18)	1 (2.94)	34 (100.00)	d.f. = 4
Medium	11 (11.70)	69 (73.40)	14 (14.90)	94 (100.00)	13.28**
Low	1 (4.55)	13 (59.09)	8 (36.36)	22 (100.00)	
Total	14 (9.33)	113 (75.33)	23 (15.34)	150 (100.00)	

Figures in parenthesis represent percentages.

*Significant at 0.05 level

**Significant at 0.01 level

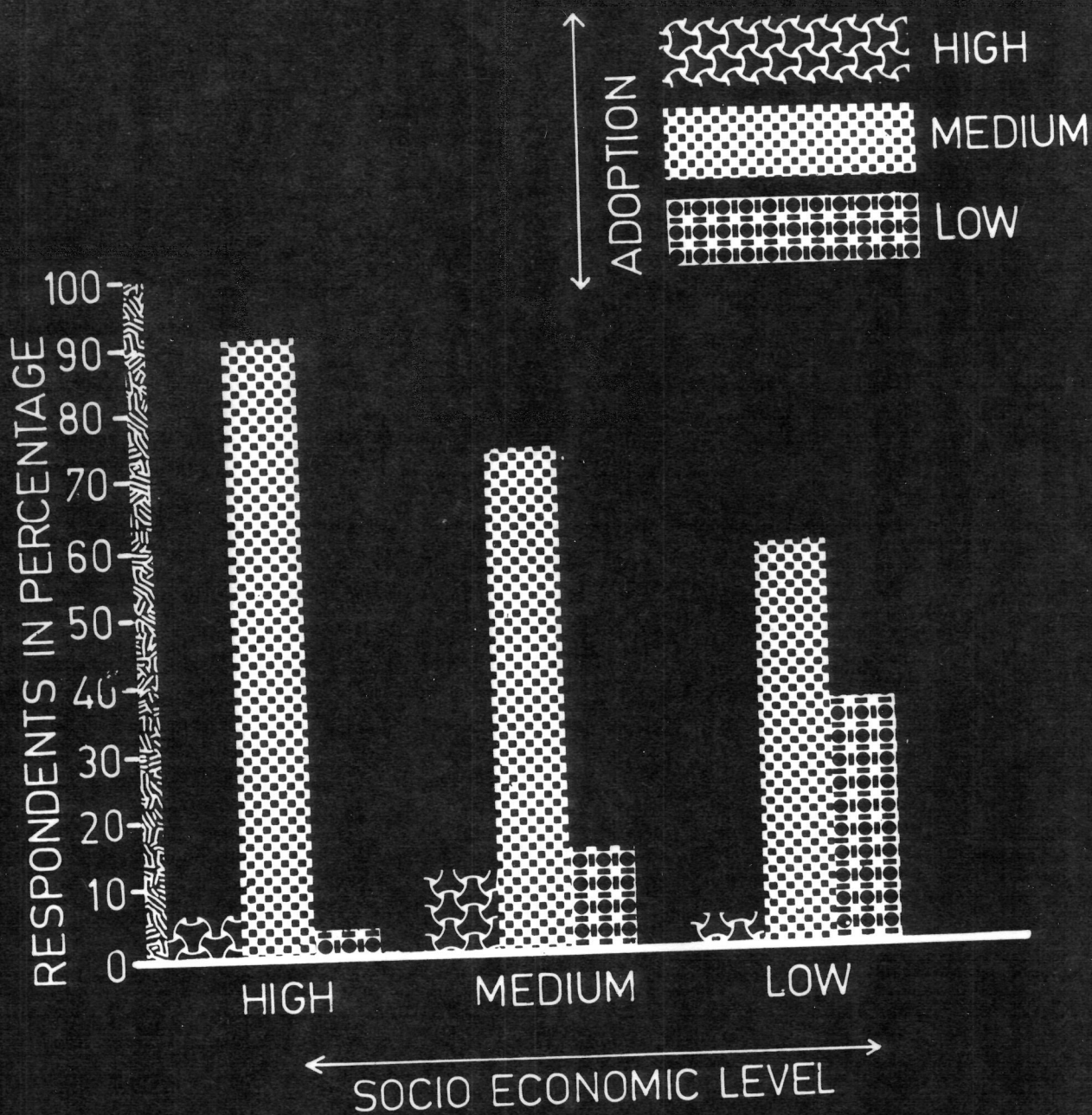


FIGURE -3: RELATIONSHIP BETWEEN SOCIO ECONOMIC STATUS, LEVEL OF THE RESPONDENTS AND THEIR ADOPTION LEVEL

Data presented in Table 12 shows that majority of the respondents (5.88 per cent) with higher status were high adopters and 91.18 and 2.94 per cent as medium and low adopter respectively. Whereas the majority of the respondents (73.40 per cent) with medium status were medium adopter and 14.90 and 11.70 per cent as low and high adopter respectively. Majority of the respondents (36.36 per cent) with low status were low adopters, (59.09 per cent) were medium adopters and rest 4.55 per cent as high adopters.

From Table 12 it is also evident that the chi-square (X^2) value (13.28 at 4 d.f.) has showed a positive and significant relationship between adoption of recommended technology for wheat cultivation and socio-economic status of the respondents. Thus the result indicates that the adoption of recommended technology is dependent on the socio-economic status of the respondents. The probable reason might be that those respondents who have high social status and sound economic position are always prepared to take or adopt new technology as they are capable to resist incidental risk and the rest with new practices. Therefore, the relationship was found to be significant. This finding is in concurrence with those reported by Tripathi and Mishra (1971), Sachchidananda (1972) and Earnest (1973).

On the basis of above findings the null hypothesis that there is no relationship between socio-economic status of tribal farmers and their extent of adoption of recommended technology for wheat cultivation was rejected.

4.6.b Relationship between socio-economic characteristics and adoption:

Keeping in view the above result a detailed analysis of the data was done to find out which socio-economic characters have significant relationship with the adoption of new technology. For this study some selected socio-economic characteristic viz., age, education, farm size, income and social participation were taken into consideration. Grouping of all characteristics into different categories was done and relation of adoption with these was worked out with the help of chi-square (χ^2) test which is presented in Table 13.

Data presented in Table 13 reveals that the relationship between different socio-economic characteristics of respondents and their level of adoption are different. So each of these is discussed below.

TABLE 13

SELECTED SOCIO-ECONOMIC CHARACTERISTICS IN RELATION TO
ADOPTION LEVEL OF THE RESPONDENTS

(N = 150)

Sr. No.	Socio-economic characteristics	Adoption level of the respondents				Value of χ^2
		High	Medium	Low	Total	
1. Age						
	Young age (Upto 30 yrs)	0 (00.00)	8 (80.00)	2 (20.00)	10 (100.00)	9.30 d.f. = 4
	Middle age (31 to 50 yrs)	10 (7.94)	95 (75.40)	21 (16.66)	126 (100.00)	
	Old age (Above 50 yrs)	4 (28.57)	10 (71.43)	0 (00.00)	14 (100.00)	
	Total	14 (9.33)	113 (75.34)	23 (15.33)	150 (100.00)	
2. Education						
	Illiterate	8 (18.89)	70 (77.77)	12 (13.34)	90 (100.00)	5.21 d.f. = 4
	Can read and write	3 (9.38)	26 (81.24)	3 (9.38)	32 (100.00)	
	Upto primary	3 (10.71)	17 (60.71)	8 (28.58)	28 (100.00)	
	Total	14 (9.33)	113 (75.34)	23 (15.33)	150 (100.00)	
3. Size of land holding						
	Upto 2.5 acres	-	2 (100.00)	-	2 (100.00)	23.21 d.f. = 4
	2.6 to 5.00 acres	1 (4.55)	11 (50.00)	10 (45.45)	22 (100.00)	
	5.1 to 10 acres	5 (6.94)	56 (77.78)	11 (15.28)	72 (100.00)	
	More than 10	8 (14.80)	44 (81.50)	2 (3.70)	54 (100.00)	
	Total	14 (9.33)	113 (75.34)	23 (15.33)	150 (100.00)	

Table 13 contd.

Sr. No.	Socio-economic characteristics	Adoption level of the respondents				Value of χ^2
		High	Medium	Low	Total	
4 Annual income						
	Upto Rs.1000	1 (5.56)	-	17 (94.44)	18 (100.00)	
	Rs.1001 to 2000	5 (6.18)	76 (86.42)	6 (7.40)	81 (100.00)	** 103.61
	Rs.2001 to 3000	8 (16.00)	42 (84.00)	-	50 (100.00)	d.f.=6
	Above Rs.3000	-	1 (100.00)	-	1 (100.00)	
	Total	14 (9.33)	113 (74.34)	23 (15.33)	150 (100.00)	
5 Social participation						
	Member of one organisation	2 (5.50)	33 (82.50)	5 (12.00)	40 (100.00)	
	Member of more than one organisation	12 (12.00)	76 (76.00)	12 (12.00)	100 (100.00)	** 30.38 d.f.=6
	Holding position	-	3 (100.00)	-	3 (100.00)	
	Local leader	-	1 (14.29)	6 (85.11)	7 (100.00)	
	Total	14 (9.33)	113 (75.34)	23 (15.33)	150 (100.00)	

Figures in parenthesis represent percentages.

*Significant at 0.05 level

**Significant at 0.01 level

4.6.b(1) Relationship between age and adoption:

A perusal of data presented in Table 13 indicate that majority of the respondents (80.00 per cent) belonging to the young age group (upto 30 years) were medium adopters, whereas rest of them 20.00 per cent were low adopters, while none of the young age respondents was high adopters. The next higher adopters (7.94 per cent) were from middle age respondents (31 to 50 years) and the rest of them 75.40 and 16.66 were medium and low adopters. while in the old age the percentage of high and medium adopters were 28.57 and 71.43 per cent respectively. while none of the old age respondents was low adopters.

The chi-square value (9.30 at d.f. 4) was found nonsignificant at 0.05 level. This indicates that there is no relationship between the age and adoption of recommended technology for wheat cultivation. This finding is partially correlated with the finding of Ankush (1976) and Tej Bahadur, Reddy and Veera Swamy (1976).

4.6.b(2) Relationship between education and adoption:

The same Table 13 shows that the majority of respondents (10.71 per cent) having education upto the primary standard were high adopters and rest of them

60.71 and 28.58 per cent were medium and low adopters respectively. Whereas, majority of the respondents 81.24 per cent belonging to the group which can read and write only were medium adopters, the rest 9.38 per cent and 9.38 per cent were high and low adopters respectively. While 18.89 per cent illiterate was high adopters and rest of the 77.77 and 13.34 per cent of them were medium and low adopters.

The chi-square value (5.21 at 4 d.f.) was found non-significant at 0.05 indicating that there is no significant relationship between adoption and education standard of the wheat growers. However, education has some effect on adoption of wheat technology as per above finding. This finding is contrary to other finding reported by Earnest (1973), Kishore and Rai (1974) and Garg (1975).

4.6.b(3) Relationship between size of land holding and adoption:

Data presented in Table 13 shows that the majority of respondents (14.80 per cent) having more than 10 acres of land were high adopters of recommended practices for wheat cultivation, whereas the rest 81.50 per cent were medium adopters. There was only 3.70 per cent low adopters among big land holders, while majority of the respondents

(77.78 per cent) were medium adopters having 5 to 10 acres of land, the rest 6.94 and 15.28 per cent were high and low adopters respectively. Further the data show that among those having 2.6 to 5.00 acres of land, majority of respondents 45.45 per cent were low adopters, the rest 50.00 and 4.55 per cent of this group were medium and lowest high adopters. Among those having less than 2.6 acres of land majority of respondents (100.00 per cent) were medium adopters. While none of them were high and low adopters. Thus, the data clearly reveal that there is great variation in adoption according to the size of land holding.

The chi-square value (23.21 d.f. 6) was found significant at 0.01 level. So the test result indicates that there is highly significant relationship between size of land holding and adoption of recommended technology for wheat cultivation. It is clear from Table 13 that as there is increase in size of land there is increase in adoption also. The possible reason for this might be the better economic position to meet the expenditure as well as capacity to take risk in investment of capital in adoption of recommended technology for wheat cultivation. This finding is in consonance with the finding reported by Sachchidananda (1972) and Madalia and Rajwadi (1976).

4.6.b(4) Relationship between annual income and adoption:

The same Table 13 shows that the majority of the respondents 5.56 per cent who had upto Rs.1000 annual income were high adopters whereas the rest of them 94.44 per cent were low adopters only. In the case of those who had Rs.1000 to 2000/annum income were found to be largest medium and 1000 high adopters whereas only 7.40 per cent were low adopters in that group. It also shows that majority of the respondents (84.00 per cent) with the group having annual income of Rs.2000 to 3000 were medium adopters and rest 16.00 per cent were low adopters while 100.00 of the respondents within the group having annual income above Rs.3000 was medium adopters.

The chi-square value (103.61 d.f.6) was found highly significant at 0.01 level. Thus, the test results indicate that there is highly significant relationship between the high adopters and the annual income. In the support of this finding no related literature could be available.

4.6.b(5) Relationship between social participation and adoption:

Data presented in Table 13 shows that majority of the respondents (12.00 per cent) being member of more than one organizations were high adopters whereas rest of them 76.00

and 12.00 per cent were medium and low adopters. The next higher percentage (5.50) of respondents belonging to members of one organisation were high adopters and the rest 82.50 per cent and 12.00 per cent were found to be medium and low adopters respectively. It also reveals that cent per cent respondents of position holding group were found to be medium adopters, while none of the local leader was high adopters, 14.29 and 85.71 per cent of them were medium and low adopters.

The chi-square value (30.88 at d.f. 6) was found significant at 0.01 level. This result indicates that there is highly significant relationship between social participation and adoption of recommended technology for wheat cultivation. This finding is similar to the finding of Tripathi and Misra (1971), Earnest (1973) and Kalamegam (1975).

4.7 Relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level

The data in respect of knowledge level of the tribal farmers for the recommended wheat technology and their adoption level was further analysed to find out the relationship between knowledge and adoption. The analysed data are presented in Table 14 and depicted in Fig. 4.

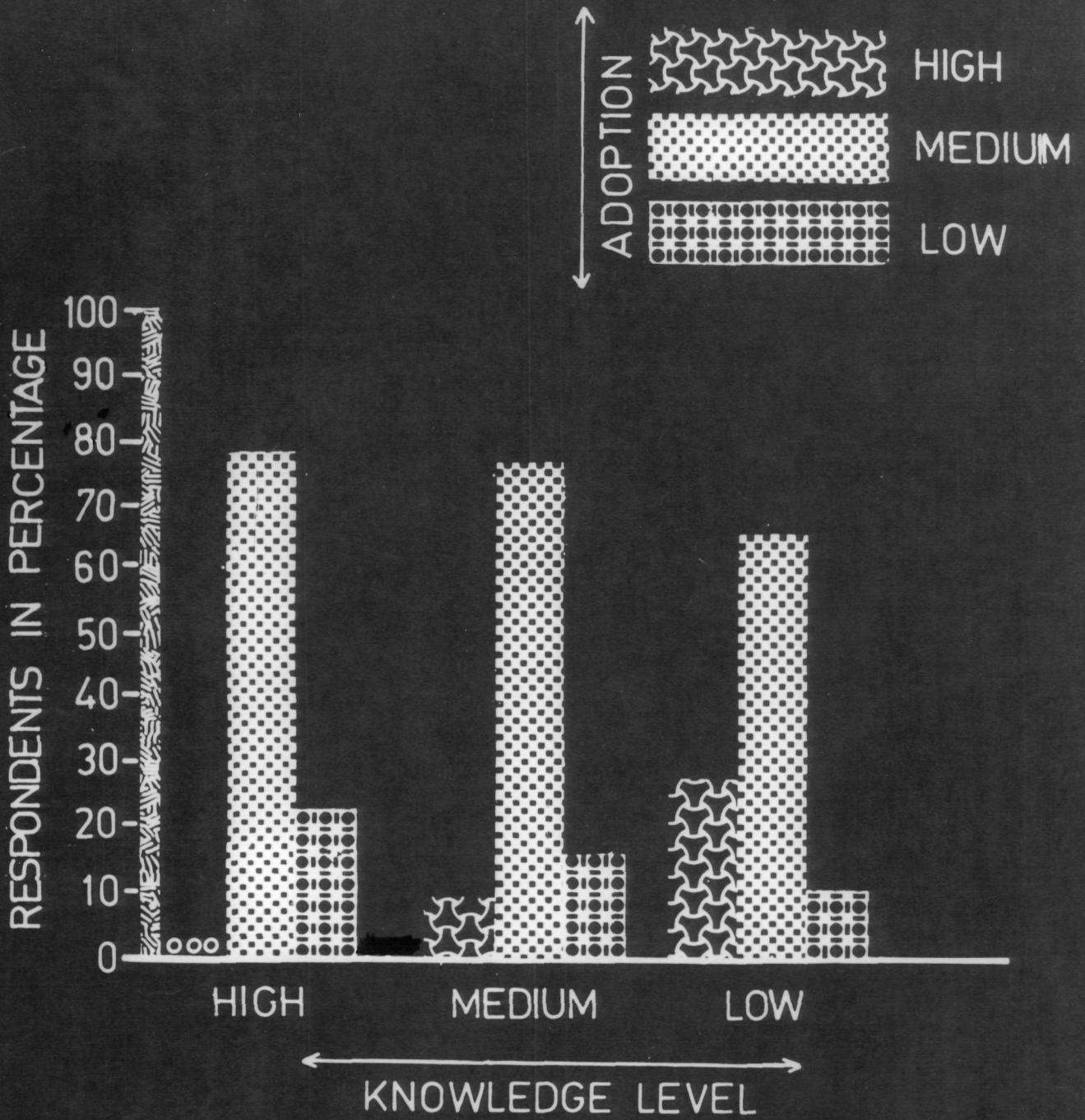


FIGURE 4 RELATIONSHIP BETWEEN KNOWLEDGE LEVEL OF THE RESPONDENTS AND THEIR ADOPTION LEVEL

TABLE 14
RELATIONSHIP BETWEEN KNOWLEDGE OF RESPONDENTS ABOUT WHEAT
TECHNOLOGY AND THEIR ADOPTION LEVEL

(N = 150)

Knowledge level	Adoption level and number of respondents				Value of χ^2 (d.f.4)
	High	Medium	Low	Total	
High	0 (00.00)	14 (77.78)	4 (22.22)	18 (100.00)	* 10.39
Medium	9 (7.90)	87 (76.31)	18 (15.79)	114 (100.00)	
Low	5 (27.68)	12 (66.67)	1 (5.65)	18 (100.00)	
Total	14 (9.33)	113 (75.34)	25 (15.33)	150 (100.00)	

Figures in parenthesis represent percentages.

*Significant at 0.05 level

**Significant at 0.01 level

The data presented in Table 14 indicates that majority of the respondents (77.78 per cent) having high knowledge were found to be medium adopters whereas the rest 22.22 per cent were low adopters, while none of the respondent was high adopters. Majority of the respondents (76.31 per cent) of medium knowledge were medium adopters and 7.90 and 15.79 per cent of them were high and low adopters. Further, it reveals that in case of those having

low knowledge, the respondents (27.68 per cent) were found to be high adopters and 66.67 and 5.65 per cent were found to be medium and lowest adopters.

The chi-square value (10.39 d.f. 4) was found significant at 0.05 level. Thus it indicates that there is significant relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level. The reason for this might be that the tribal farmers having more knowledge might have faced less constraints in adoption of wheat technology. This finding is in support of those reported by Sinha (1973), Kamaluddin Sahib (1978), Somasundram and Singh (1978). On basis of the above findings the null hypothesis that there is no relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level was rejected.

4.8 Relationship between adoption level of tribal farmers and their constraints expressed by them in transfer of wheat technology

The data collected regarding adoption level of respondents and the constraints expressed by them in transfer of wheat technology were further analysed to study the relationship between these. Data thus analysed, are presented in Table 15 and depicted in Fig. 5.

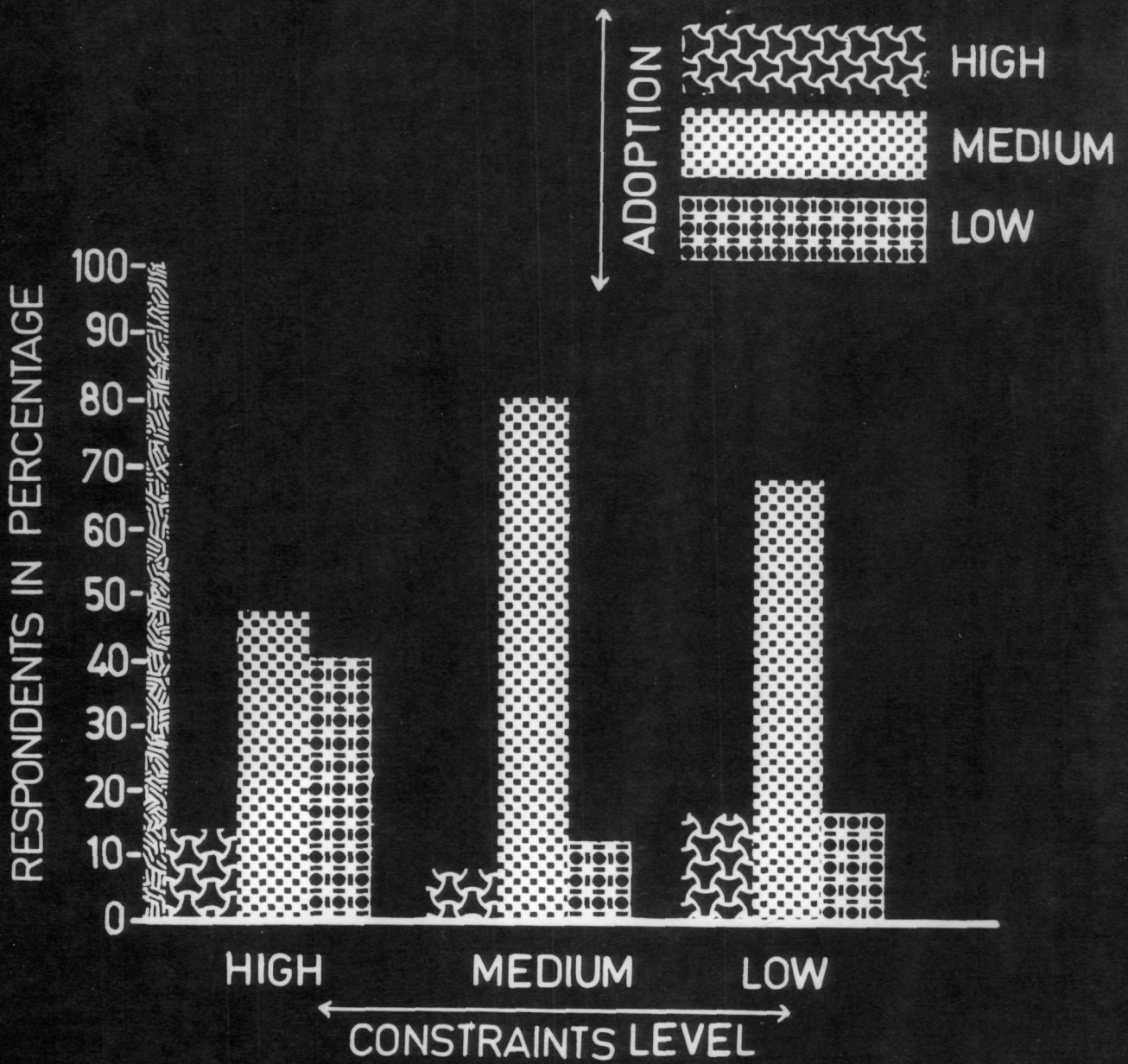


FIGURE 5 RELATIONSHIP BETWEEN CONSTRAINTS LEVEL OF THE RESPONDENTS AND THEIR ADOPTION LEVEL

TABLE 15
RELATIONSHIP BETWEEN ADOPTION LEVEL OF THE RESPONDENTS
AND CONSTRAINTS FACED BY THEM

(N = 150)

Level of constraints	Adoption level and number of respondents				Value of χ^2 d.f. 4
	High	Medium	Low	Total	
High	2 (13.33)	7 (46.67)	6 (40.00)	15 (100.00)	* 9.95
Medium	10 (8.13)	98 (79.67)	15 (12.20)	123 (100.00)	
Low	2 (16.67)	8 (66.66)	2 (16.67)	12 (100.00)	
Total	14 (9.33)	113 (75.34)	23 (15.33)	150 (100.00)	

Figures in parenthesis represent percentage.

*Significant at 0.05 level

**Significant at 0.01 level

The data presented in Table 15 reveals that majority of the respondents (16.67 per cent) of the group having low constraints were high adopters and the rest 66.66 and 16.67 per cent were medium and low adopters, while the majority of the respondents (46.67 per cent) of those who have high constraints were medium adopters and the rest 40.00 and 13.33 per cent were low and high adopters. In case of those having medium constraints 8.13, 79.67 and 12.20 per cent were high, medium and low adopters respectively.

The chi-square value (9.95 at d.f. 4) was found significant. Thus, the result of the test indicates that there is significant relationship between adoption level of wheat growers and the constraints express by them in transfer of wheat technology. The possible reason for this might be that the wheat growers having low constraints might have better economic status, irrigation facilities as well as better knowledge about new technology. The findings of Patel (1970), Kalappa (1971), Jaiswal and Kolte (1975) supported the above findings. On the basis of the above findings the null hypothesis that there is no relationship between adoption level of tribal farmers and the constraints expressed by them in transfer of wheat technology was rejected.

4.9 Suggestions of the tribal farmers to overcome the constraints in transfer of wheat technology

Suggestions of the tribal farmers to overcome the constraints in transfer of wheat technology were invited to improve the present level of adoption. The data thus collected were analysed and frequencies were counted and percentage were worked out. The data in this respect are presented in Table 16.

TABLE 16
DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR
SUGGESTIONS TO OVERCOME CONSTRAINTS

(N = 150)

Sr. No.	Suggestions	Respondents		
		Number	Percentage	Rank
1	Technical guidance should be given well in advance of every practice of wheat cultivation	143	95.33	I
2	Reasonable price of inputs	132	88.00	IV
3	Prompt and timely supply of credit	120	80.00	VI
4	Quick and timely supply of inputs	129	86.00	V
5	Suitable steps should be taken to increase irrigation potentiality	139	92.67	II
6	Subsidy on inputs	138	92.00	III
7	Arrangement of exhibiting/ demonstration	17	11.33	VII
8	Regular electricity power supply	12	8.00	VIII

A perusal of the data presented in Table 16 reveals that majority of the respondents (95.33 per cent) were in opinion that technical guidance to be given well in advance

of every practice of wheat cultivation. While 92.67 per cent, 92.00 per cent and 88.00 per cent of the respondents emphasized on increasing irrigation potentiality by suitable steps, subsidy in inputs and reasonable price of inputs.

The next notable suggestions given by 36.00 per cent and 30.00 per cent respondents were quick and timely supply of inputs and credit. Whereas, 11.33 per cent of respondents suggest that arrangement of exhibition/demonstration were the remedy to constraints. While 8.00 per cent of respondents pointed out that there should be regular supply of electric power.

Chapter V

SUMMARY AND CONCLUSIONS

This chapter deals with a brief description of the study with respect to summary, major findings, conclusions, suggestions for action and suggestions for further study.

Indian agriculture is on the way of changes from traditional farming to scientific cultivation. Production of food grains has not looked back since then from 72 million tonnes in 1965-66 to 130.5 million tonnes in 1978-79. The latest figures exceed this figure which is a very welcome thing. With the introduction of improved agricultural technology and high yielding varieties of seeds, the production of food grains, cereals and other important crops continues to increase, year after year. India possesses the largest area of the world wheat area and is fourth producer of wheat, but likely at the bottom as far as its yield per hectare is concerned.

Wheat, the second most important crop in India, occupies 19 million hectares, and the annual production is around 26 million tonnes. Wheat is also grown as a major crop in Madhya Pradesh which occupies the second largest area about 3 million hectares. The wheat production in

Madhya Pradesh is around 3 million tonnes and yield per hectare is around 952 kg/ha which is very low in comparison to major wheat producing state.

Among various wheat producing districts of the state, West Nimar district is important one, the average yield of wheat in the district is notoriously low (in comparison of national and state averages). Barwani tribal development block of the district plays major role in wheat production. The main sources of livelihood of the tribal population of this area is agriculture which is practised on traditional line. The use of modern wheat technology and inputs and the adoption of high yielding varieties have not percolated in the tribal area to any appreciable extent, consequently wheat productivity is low as compared to district and the state. It is generally observed that the new agricultural farm technology is being increasingly adopted by medium and big farmers. But as small, marginal and tribal farmers constitute the bulk of agricultural population and they mainly practice tradition bound subsistence farming, there is a great need for the adoption of new farm technology by these farmers so that the production and income levels can be raised. It would be worthwhile to study the causes hindering tribal farmers in

adopting the new farm technology. Identification of the constraints faced by the tribal farmers will help to search appropriate to help them to adopt new agricultural technology. With a view to find out the socio-economic characteristics of the tribal wheat growers, sources of farm information, knowledge and adoption level as well as the constraints faced by the tribal wheat growers in adopting the recommended wheat technology, the present study entitled "the constraints in transfer of wheat technology in Barwani tribal development block of West Nimar district in Madhya Pradesh" was undertaken with the following objectives.

5.1 Objectives of the study

- 5.1.a To study the socio-economic characteristics of the tribal farmers.
- 5.1.b To study the sources of the information utilized by the tribal farmers for the recommended wheat technology.
- 5.1.c To ascertain the knowledge of the tribal farmers for the recommended wheat technology.
- 5.1.d To find out the adoption level of the recommended practices for wheat cultivation among tribal farmers.

- 5.1.e To study the constraints expressed by tribal farmers in transfer of wheat technology.
- 5.1.f To study the relationship between socio-economic characteristics of tribal farmers and their adoption level for wheat cultivation.
- 5.1.g To ascertain the relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level.
- 5.1.h To study the relationship between adoption level of tribal farmers and their constraints expressed by them in transfer of wheat technology.
- 5.1.i To study the suggestions of the tribal farmers to overcome the constraints.

5.2 Hypotheses

Against the above referred objectives of the study following null hypotheses were formulated and tested against the data collected.

- 5.2.a There is no difference in socio-economic status of the tribal farmers.
- 5.2.b There is no difference between sources of information used by the tribal farmers with respect to high yielding variety of wheat.

- 5.2.c There is low of knowledge level among tribal farmers about the recommended technology for wheat cultivation.
- 5.2.d There is low extent of adoption of recommended practices for wheat cultivation among tribal farmers.
- 5.2.e The constraints in transfer of wheat technology among tribal farmers do not differ from practice to practice.
- 5.2.f There is no relationship between socio-economic status of tribal farmers and their extent of adoption of recommended technology for wheat cultivation.
- 5.2.g There is no relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level.
- 5.2.h There is no relationship between adoption level of tribal farmers and the constraints expressed by them in transfer of wheat technology.

5.3 Review of literature

Related literature on topic was collected by consulting pertaining literature which have been grouped in following heads:

- 5.3.a Socio-economic characteristics of the adopters.
- 5.3.b Sources of information used in transfer of technology.
- 5.3.c Knowledge of new technology and its relationship with adoption of technology.

- 5.3.d Adoption of recommended crop technology.
- 5.3.e Relationship between socio-economic characteristics and adoption of recommended technology.
- 5.3.f Constraints in transfer of crop technology.
- 5.3.g Suggestions for overcome the constraints in transfer of crop technology.

5.4 Methodology of the Study

- 5.4.a The study was undertaken at the Barwani tribal development block of West Nimar district in Madhya Pradesh State. For sampling procedure random sampling technique was followed. Thus 15 villages were randomly selected. At the second stage concerning village level workers were requested for the list of wheat growers in the selected villages and 10 wheat growers for each of the selected villages were chosen randomly by random numbers for interviewing. Thus the sample size was consisted of 150 respondents.
- 5.4.b For collection of data personal interview schedule was prepared and necessary modification construction and arrangement of question were made after pretesting. Then the desired data were collected with the help of personal interview schedule on individual contact basis.

- 5.4.c The socio-economic characteristics of the tribal farmers were studied and on the basis of socio-economic status scale, their socio-economic status was decided. The classification of farmers as their status was done with the help of two statistical parameters i.e. mean (\bar{X}) and standard deviation (SD).
- 5.4.d A simple ranking technique was applied for knowing accessible information sources and media.
- 5.4.e Measurement of knowledge of farmers in respect of new wheat technology was done by administration of knowledge scale developed by Jha and Singh (1970).
- 5.4.f To measure the adoption index the formula developed by the "All India Co-ordinated Research Programme in Extension Education", Indian Agricultural Research Institute, New Delhi was used.
- 5.4.g A simple ranking system was applied for knowing the main constraints in transfer of wheat technology.
- 5.4.h Relation of adoption with socio-economic status, knowledge and constraints was worked out with the help of χ^2 (chi-square) test.

5.5 Major findings of the study

5.5.a Socio-economic characteristics of the tribal farmers:

- 5.5.a(1) Majority of the respondents (84.00 per cent) belonged to middle age group followed by oldage group (9.33 per cent).
- 5.5.a(2) Majority of the respondents (60.00 per cent) were found to be in the illiterate group followed by those respondents who can read and write (21.33 per cent) and literate farmer (18.67 per cent).
- 5.5.a(3) Majority of respondents (84.00 per cent) had farming occupation followed by those (16.00 per cent) who had farming and others.
- 5.5.a(4) Majority of the respondents (48.00 per cent) had land holding size of 5 to 10 acres followed by those having more than 10 acres of land holding (36.00 per cent).
- 5.5.a(5) Majority of respondents (59.34 per cent) belonged to the family having more than 5 but upto 10 members.
- 5.5.a(6) Majority of respondents (55.39 per cent) had to joint family whereas only 44.67 per cent belonged to nuclear family.

5.5.a(7) Majority of the respondents (76.67 per cent) had kuchha house (made of mud). This was followed by those (23.33 per cent) who had mixed house (made of bricks and mud).

5.5.a(8) Majority of the respondents (54.00 per cent) had their annual income upto Rs.2000 followed by 2000 to 3000 (33.33 per cent) and above Rs.3000 (0.67 per cent).

5.5.a(9) Majority of the respondents (93.67 per cent) had 5 and above animals. This was followed by those (1.33 per cent) who had 3 to 4 animals.

5.5.a(10) Majority of the respondents (66.66 per cent) were member of two organisation followed by membership in one organisation (26.67 per cent) and position holders (2.00 per cent).

5.5.a(11) Majority of the respondents (62.67 per cent) were found in middle socio-economic status group. This was followed by those (22.67 per cent) who had low socio-economic status.

5.5.b Sources of information utilized by the tribal farmers for the wheat technology

Village panchayat, co-operative personnel and village level worker were major accessible formal information sources

to 78.33 per cent, 59.33 per cent and 53.33 per cent of the respondents respectively. While in case of informal sources neighbours, tribal leader and friends and relatives were major sources for 88.00 per cent, 78.66 per cent and 72.00 per cent of the respondents respectively. Radio and demonstrations were accessible mass media to 18.00 per cent and 15.33 per cent of the respondents respectively.

5.5.c Knowledge level of the tribal farmers for the recommended wheat technology:

Majority of respondents (76.00 per cent) were found to have medium knowledge level whereas 12.00 per cent with low knowledge level were next in order.

5.5.d Extent of adoption of recommended:

5.5.d(1) Majority of the respondents adopted preparatory tillage (84.67 per cent) seed rate (67.33 per cent), time of sowing (84.67 per cent), method of sowing (100.00 per cent), spacing (82.00 per cent) as per recommendation. While majority of the respondents did not adopt soil treatment (92.67 per cent), seed variety (79.33 per cent), seed treatment (94.67 per cent) manuring (21.33 per cent), plant protection measures (79.33 per cent), weed control (100.00

per cent), as per recommendation. Whereas, majority of the respondents adopted below recommendation manuring (68.67 per cent), chemical fertilizers (99.33 per cent), irrigation (58.67 per cent).

5.5.d(2) Majority of respondents (75.33 per cent) were found to be in the group of medium adopters of wheat technology followed by those (15.34 per cent) who are low adopters.

5.5.e Constraints expressed by tribal farmers in transfer of wheat technology

5.5.e(1) Relative position of constraints practice-wise

It was found that majority of the respondents faced maximum constraints in adoption of spacing technology which ranked first. The main constraints in spacing were educational constraints like lack of knowledge, technical guidance and socio-cultural constraints like neighbours are not adopting, ranked first and second respectively. The practice-wise which embodied major constraints in that order were, preparatory tillage, plant protection, method of sowing, soil treatment, weed control, fertilizer, manuring, irrigation, time of sowing, seed treatment, use of H.Y.V. seed which ranked second, third, fourth, fifth, sixth, seventh, eight, nine, tenth,

eleventh and twelve respectively. The major constraints in above practices were educational and economical constraints (in 9 number practice), educational and socio-cultural constraints (in 1, 2, 3, 4, 5, 10 and 12 number practices) and educational and practical constraints (in 6, 8 and 11 number practices), which ranked first and second in concerned practices.

On the basis of further analysis it was found that lack of technical guidance and lack of knowledge were main constraints in all twelve practices. Other major constraints were nonavailability and high cost of inputs like organic manure, seed, fertilizers and chemicals, high labour charges, lack of finance, lack of improved implements and lack of irrigation.

5.5.e(2) Constraints level faced by the wheat growers:

Majority of the respondents (82.00 per cent) were found to be in group of medium level of constraints followed by those (10.00 per cent) belonging to the group having high level of constraints.

5.5.f Relationship between various variables:

5.5.f(1) Relationship between socio-economic characteristics of tribal farmers and their adoption level for wheat cultivation:

Among different socio-economic characteristics age, and education were found nonsignificant indicating that there is no association with adoption level, whereas size of land holding, annual income, social participation and socio-economic status were found significant at 0.01 level.

5.5.f(2) Relationship between knowledge level of the tribal farmers for the recommended wheat technology and their adoption level:

The chi-square value ($\chi^2 = 10.39$) regarding adoption in relation to knowledge level was found significant indicating that there is significant relationship between adoption and knowledge level of tribal farmers for the recommended wheat technology.

5.5.f(3) Relationship between adoption level of tribal farmers and their constraints expressed by them in transfer of wheat technology:

The chi-square value ($\chi^2 = 9.95$) found significant at 0.05 level indicating significant relationship between adoption and constraints level.

5.5.g Suggestions of the tribal farmers to overcome the constraints in transfer of wheat technology

Technical guidance to be given in advance of every practices of wheat cultivation at all level, steps to increase irrigation potentiality, subsidy in inputs, reasonable price of inputs, quick and timely supply of inputs, credits and arrangement of exhibition/demonstration in tribal areas were the major suggestions stressed by majority of the respondents.

In compendium, all the eight null hypotheses were rejected in light of findings of the study.

5.6 Conclusions

5.6.a Putting together the findings pertaining to the socio-economic characteristics of the tribal farmers with respect to wheat cultivation, it can be concluded that the majority of the respondents were from middle group. Therefore such characteristics should be considered while tapping other tribal farmers to introduce wheat technology in other areas of the state.

5.6.b Among different sources and media their own panchayat, neighbours, and radio were accessible sources to the tribal farmers, therefore such sources and media should be utilized by the extension workers to transfer wheat technology.

- 5.6.c Putting together findings pertaining to the socio-economic characteristics of the respondents and adoption, it can be concluded that size of land holding, annual income, social participation and socio-economic status were significant independent variables for adoption of new technology.
- 5.6.d Since adoption level was associated with knowledge level of the farmers more and more knowledge be given to farmers by extension agency.
- 5.6.e Since the majority of respondents could not adopt recommended practices like seed and soil treatments, seed variety, organic manuring, application of chemical fertilizers, plant protection measures and weed control, special training courses on such aspects should be organised to tribal farmers.
- 5.6.f Perhaps the most significant conclusion emerging out from this study is that the main constraints in transfer of wheat technology were lack of knowledge and lack of technical guidance. Other major constraints were found to be nonavailability and high cost of inputs like organic manure, seed, fertilizers and chemical, high labour charges, lack of irrigation, finance and improved

implements. Therefore, suitable measures should be taken with co-operation of developmental strategies and programmes for tribal areas to overcome such constraints at the earliest to boost wheat production.

The broad picture emerging out from all the above findings and conclusions of this study obviously indicate that there was urgent need to arrange systematic training for wheat growers on various aspects of its cultivation for maximising wheat production. It was also felt necessary to make arrangements of timely input supply at reasonable rate.

5.7 Suggestions for Actions

Following suggestions should be considered to overcome the constraints in transfer of wheat technology in full in tribal areas:

- 5.7.a. Middle aged tribal farmers may be approached for transfer of wheat technology rather than old and young ones.
- 5.7.b Efforts should be made first to contact literate tribal farmers to train in wheat technology for quick adoption. Meanwhile, steps should be also taken to make illiterate tribal farmers convinced about improved wheat practices by educational-cum-training programmes.

- 5.7.c To increase irrigation potentialities, an attempt should be made in full to provide ground water, and other appropriate schemes should be taken up by Minor and Medium Irrigation Departments.
- 5.7.d Tribal farmers should be provided with adequate agricultural implements.
- 5.7.e Adequate credit should be given to the farmers at the right time at a minimum rate of interest to facilitate them to purchase different inputs and chemical fertilizers to increase the production.
- 5.7.f Inputs should be provided to the tribal farmers on subsidy basis as they are not viable and capable of purchasing them.
- 5.7.g For easy and timely supply of inputs, there should be sufficient number of accessible sale centres which should be supervised by competent authority.
- 5.7.h To remove their ignorance, superstitions and misconceptions it is suggested that a bigger number of demonstrations be organised on the fields of these tribal farmers to educate them in identification of pests and diseases and also to familiarise them with the improved methods or techniques of wheat cultivation.

- 5.7.i There should be systematic organisation of training, programme to give technical guidance and increase knowledge of farmers about recommended wheat technology. The farmers should be convinced of proper use of fertilizer and plant protection measures by effective extension service.
- 5.7.j Adequate facilities in marketing of the new varieties have to be provided to the tribal farmers.
- 5.7.k The price of the seeds of new varieties should be within the reach of the tribal farmers to adopt them in full.

The above suggestions are made to help tribal farmers (of all categories) to adopt the recommended wheat technology in full so that the rate of productivity and production both can be raised.

5.8 Suggestions for Further Research

It is suggested that following, further studies may be carried out in this regard. These may prove beneficial.

- 5.8.a Similar and comparative investigation may be conducted in other tribal areas of west Nimar district for wheat crop so that the results of this study will be strengthened.

5.8.b Similar studies may be conducted for other crops to find out the constraints in transfer of new technology for that crops.

5.8.c Other independent variables and different package of practices concerned with constraints may also need to be studied.

REFERENCES

Books and other publications

- Anonymous, (1970). "Survey Report on Tribal Development Block", Bulletin of the Tribal Research and Development Institute, Bhopal, Vol. VIII, No.1 and 2 (June-December, 1970), pp. 19-113.
- Anonymous, (1974). Research Report on the Kathodis of Gujarat (Ahmedabad: Tribal Research and Training Institute, Gujarat Vidyapeeth).
- Bose, Saradindu. (1975). "Agriculture in Tribal Society" in Integrated Tribal Development Planning edited by V.R.K. Paramahansa, Hyderabad: National Institute of Community Development.
- Chandel, R.S. (1962). "A Hand Book of Agricultural Statistics", Ashal Prakashan Mandir, Parmet, Kanpur.
- Chouse, Ghulam. (1975). "Preparation of Integrated Tribal Development Project: Approach and Methods", in Integrated Tribal Development Planning, edited by V.R.K. Paramahansa, Hyderabad: National Institute of Community Development.
- Nathur, P.C. (1975). "Jaunsar-Bawar-Rawin: Areas in the District of Dehra Dun, Tehri and Uttar Kashi (U.P.)- A note on a Survey", in Integrated Tribal Development Planning, edited by V.R.K. Paramahansa, Hyderabad: National Institute of Community Development.

- Mishra, Girish K. (1975). "Spatial Planning for Tribal Area in Keonjhar District", in Integrated Tribal Development Planning, edited by R.K. Paramahansa, Hyderabad: National Institute of Community Development.
- Parsek, Udai and Trivedi G. (1963). Manual of the Socio-economic Status Scale: Rural, New Delhi-6: Manasayan.
- Patel, B.N. (1972). "policy Measures for Tribal Agriculture" in Agro-Economic Problems of Tribal India, edited by M.L. Patel, Bhopal: Progress Publisher, pp.15.
- Pawar, Jagannathrao Rao (1972), "Tribal Agriculture in Northern Gujarat", in Agro-Economic Problems of Tribal India, edited by M.L. Patel, Bhopal: Progress Publisher, pp.59.
- Patel, K.V. and Krishna Swami, M.S. (1974), "Problems of Tribal Agriculture in the context of Dryfarming - A case study of selected Villages in the Panchmahals District of Gujarat", Rural Development for weaker Section, Bombay: The Indian Society of Agricultural Economic, pp.79-89.
- Rogers, E.M. (1962), "Diffusion of Innovation", The Free Press of Glencoe, New York.

Singh, I.P. (1972), "Credit Requirements of Tribal Cultivators in West Nimar District (M.P.)" in Agro-Economic Problems of Tribal India, edited by M.L. Patel, Bhopal: Progress Publisher, pp.34.

Sachchidanda, (1972), "Social Dimension of Agricultural Development", Delhi: National Publishing House.

Zaheer, M. (1975), "Welcome Address", in Integrated Tribal Development Planning, edited by V.R.K. Paramahansa, Hyderabad: National Institute of Community Development, pp.3.

Journals

Burman, B.K., Roy and Sharma, P.S. (1970). "Tribal Agriculture in India", A paper presented at the 30th Annual Conference of the Indian Society scheduled held at U.P. Agril. Uni., Pantnagar, 23-25 October, 1970, c.f. Indian Journal of Agricultural Economic XXV: 149-160.

Bhati, J.P., Moorti, T.V. and Singh, L.R. (1973). A Multi Dimensional Approach to Development of Tribal Agricultural in Tarai Region of U.P.". A paper presented at the 33rd Annual Conference of the Indian Society of Agricultural Economic, Rajendranagar, Hyderabad (A.P.), 26-28 December, 1973, c.f. Indian Journal of Agricultural Economic, XXVIII.

- Bhati, J.P. and Swarup, R. (1974). "Economic Problems of Tharu Tribals", Kurukshetra, XXVIII:9.
- Dubey, B.K. and Bahadur, F. (1966). "Agriculture", in A Study of the Tribal People and Tribal Areas of Madhya Pradesh, VI:22-23.
- Dubey, S.N. (1971). "Tribal Welfare Programme: An Analysis of Their Organisation and Administration", The Indian Journal of Social Welfare, XXXII:207-222.
- Desai, J.C. (1976). "A Wind of Change Among Tribals", Kurukshetra, XXIV:13.
- Dubey, S.C. (1977). Communication in Economic Development, A paper prepared for the East West Centre Seminar on Communication and Innovation in Development Policy, held at Honolulu (Minco), August-September, 1964, cited by A.P. Saxena, "Backward Area Development: Issues in Administrative Planning", The Indian Journal of Public Administration, XXIII:458-459.
- Goswami, P.C. and Sharma, P.D. (1970). Problems of Agricultural Development in Tribal Area. A paper presented for discussion at the 30th Annual Conference of the Society scheduled, held at U.P. Agril. Uni., Pantnagar, 23-25 October, 1970 cited from Indian Journal of Agricultural Economic, XXV:140.

- Gupta, R.P. (1974). "Agricultural Credit for the Tribals"
Kurukshetra, XXIII:5.
- Garg, S.G. (1975). "Problem of Small Farmers", Kurukshetra,
XXXIII:6-7.
- Husan, Amir. (1977). "Indebtedness among the Buxas of
Nainital", Kurukshetra, XXV.
- Jha, P.N. and Singh, B.N. (1966). Utilization of Sources
of Farm Information as Related to Characteristics
of Farmers. Indian Journal of Extension Education
I:301.
- Jaiswal, N.K. and Kolte, N.V. (1976). Perspective on Tribal
Development and Administration, Hyderabad: National
Institute of Community Development, 1975, cited by
J.V. Ferreira, "Book Review", The Indian Journal
of Social Welfare, XXXVII:230-231.
- Kalappa, A. (1971). "Tribal Development in Mysore",
Kurukshetra, XIX:2-4.
- Kishore, Devesh and Rai, S.J. (1974). "Literacy and
Adoption of Improved Farm Practices", Indian
Journal of Adult Education, XXXV:94.
- Kolte, N.V. and Raju, K.N. (1975). "problems of Small
Farmers Development and its Institutional Aspects",
Behavioural Science and Community Development,
IX:53.

- Kamaluddin Sahib, M. (1978). "Transformation of Tribal, Kurukshetra, XXVI:40-41.
- Mohapatra, K. and Debi, Karanbad, K. (1973). "Shifting Cultivation in Orissa", Adibasi, XIV:11-28.
- Maurya, B.P. (1974). "Development of the Tribals", The Maharashtra Co-operative Quarterly, LVII:324-329.
- Misra, B. and Rajguru, G. (1975). "Adoption Behaviour of Small Farmers", Kurukshetra, XXIV:6.
- Madalia, V.K. and Rajwadi, R.V. (1976). "Adoption of Agricultural Innovations: A Study", Kurukshetra, XXIV:14-15.
- Patel, M.L. (1970). "Agro-Economic Survey of Tribal Mandla", Indian Journal of Agricultural Economic, XXV.
- Raghava Rao, D.V. (1975). "Institutional Frame work Agricultural Development in Tribal Area", Community Development and Panchayati Raj Digest, VI:145-151.
- Sisodia, J.S. et. al. (1970). "Agricultural Development in Tribal M.P.", Indian Journal of Agricultural Economic, XXV:190.
- Singh, Daulat and Singh, Baldeo. (1973). "Problems of Small Farmers", Rural India, XXVII:91-92.
- Sinha, S.P. (1973). "Planned Change in Tribal Areas", The Indian Journal of Public Administration, XIX:363-373.

- Swaminathan, M.S. (1974). "Social and Educational Requirements of New Technology in Agriculture", Indian Journal of Adult Education, XXXV:4-13.
- Sheta, N.B. (1978). "Agricultural Training Needs of Tribal Farmers in Maharashtra", Indian Journal of Extension Education, XIV:65-67.
- Sundram, Soma and Singh, S.N. (1978). "Factors Affecting the Knowledge of Adopters and Non-adopters Small Farmers", Indian Journal of Ext. Edu., XIV:32.
- Tripathi, S.L. and Mishra, Chhotelal. (1971). "Social-Personal Factors and New Ideas in Farming", Rural India, XXXIV:88.
- Vidyarthi, L.P. (1973). "Strategy for Tribal Development in India", Adibasi, XV:78.
- Vyas, N.N. (1975). "Integrated Tribal Development in Rajasthan", Kurukshetra, XXIII:10.
- Viswanathan, N. et al. (1975). "Utilization of Sources of Information by Small Farmers", The Madras Agricultural Journal, 62:684.

Newspaper and Report

- Dogra, Bharat. "Development: A Micro-study - Cake for the Rich and Cumbs for Poor", Indian Express, (Ahmedabad), Vol.XLL, No.288 (October,14), 1977.

Dubey, S.C. "Indian's Changing Villages", cited by K. Kesava Rao, "A Nellore Experiment", Indian Express, (Ahmedabad), Vol.XLVI, No.163 (May, 11), 1978.

Mrs. Gandhi, Indira. "Call to Social Institution", Times of India, (July, 18), 1980.

Kumar, K. "Extension: Weakest Link in Indian Agriculture", Indian Express, (Ahmedabad), p.9 (March, 30), 1978.

Seminar Papers

Bahadur, Tej et al. Differential Profile of Small Farmers. A paper presented to the National Seminar on New Agricultural Technology and Extension Strategy for Small and Marginal Farmers, Punjab Agricultural University, Ludhiana (1976).

Unpublished Thesis

Ankush, G.B. "To Study the Small Farmer, Their Aspiration, Needs and Problems, Related to Improve Agricultural Technology", Unpublished Master's Thesis, Marathwada Agricultural University, Parbhani, 1976.

Dwarkinath, R. "Adoption Incentives of Packages of Practices of High Yielding Varieties in Mysore State", Unpublished Ph.D. Thesis, Cornell University, 1973.

Earnest, R.S. "The Study of Differential Utilization Behaviour of Small and Big Farmers and the Communication Strategy", Unpublished Ph.D. Thesis, I.A.R.I., New Delhi, 1973.

- Kalamegam, E.V. "A Study on the Communication Behaviour of Small Farmers in Progressive and Less Progressive Village", Unpublished Master's Thesis, Tamil Nadu Agricultural University, Coimbatore, 1975.
- Menon, R.K. "A Study on Small Farmers with Regards to Their Participation in Extension Methods and Utilization of Assistance...", Unpublished M.Sc.(Agri.) Thesis, AC and RI, Coimbatore, 1970.
- Porwal, G.R. "Study of the Problems of Small Farmers in Adoption of New Technology", Unpublished M.Sc.(Agri.) Thesis, Marathwada Agricultural University, Parbhani, (M.S.), 1974.
- Patel, M.B. "An Investigation on Extension work in the Integrated Tribal Development Project Area of Panchmahals District", Unpublished Master's Thesis, Gujarat Agricultural University, Anand Campus, Anand, 1978.
- Tamboli, L.N. "Training Needs of the Tribal Farmers in Relation to High Yielding Varieties of Paddy in Dumka Sub Division of Bihar State", Unpublished Master's Thesis, Gujarat Agricultural University, Anand Campus, 1979.

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APPENDIX I

RESEARCH PROBLEM

THE CONSTRAINTS IN TRANSFER OF WHEAT TECHNOLOGY

INTERVIEW SCHEDULE FOR WHEAT GROWERS

Interview schedule No. _____ Date: _____

Name of the respondent: _____

Village _____ Block _____

PART I

SOCIO-ECONOMIC CHARACTERISTICS
OF THE TRIBAL FARMERS

1. Age: (i) Young age (Upto 30 years)
(ii) Middle age (31 to 50 years)
(iii) Old age (Above 50 years)
2. Education: (i) Illiterate
(ii) Can read and write
(iii) Primary
3. Occupation: (i) Farming
(ii) Farming and others
4. Size of land holding: (i) Upto 2.5 acres
(ii) More than 2.5 but upto 5 acres
(iii) More than 5.00 but upto 10 acres
(iv) More than 10 acres
5. Size of family: (i) Small size (Upto 5 members)
(ii) Medium size (More than 5 but
Upto 10 members)
(iii) Large size (Above 10 members)

6. Type of family: (i) Nuclear
(ii) Joint
7. House holding: (i) Kachha house
(ii) Mixed house
8. Annual income: (i) Upto Rs.1000
(ii) Rs.1001 to 2000
(iii) Rs.2001 to 3000
(iv) Above Rs.3000
9. Animal power: (i) 3 to 4 animals
(ii) 5 and above 5 animals
10. Social participation: (i) Member of one organisation
(ii) Member of more than one organisation
(iii) Holding position
(iv) Local leaders

PART II

11. SOURCES OF INFORMATION UTILISED BY THE TRIBAL FARMERS FOR THE RECOMMENDED WHEAT TECHNOLOGY

Sr.No.	Sources of information	Adoption degree			
		VM	M	L	NAA

A. Formal sources of information

1. Village level worker
2. Extension Officer (Agriculture)
3. Block Development Officer
4. Village panchayat
5. Co-operative personnel

B. Informal sources of information

- 1 Neighbour
- 2 Friends and relatives
- 3 Tribal leaders

C. Mass media

- 1 Demonstration
- 2 Radio
- 3 Magazine
- 4 News paper

PART III**INFORMATION ABOUT NEW TECHNOLOGY FOR WHEAT CULTIVATION****12. Preparatory tillage:**

- a) what is the recommendation for preparatory tillage in wheat cultivation?
 - i) Ploughing time _____
 - ii) Number of ploughing _____
 - iii) Harrowing _____
- b) How many times did you plough your land for wheat cultivation in previous year?
 - i) Ploughing: Time _____ Number _____
 - ii) Harrowing: _____
- c) which are the constraints in transfer of wheat technology regarding preparatory tillage?

Constraints	VM	M	L	NAA
1) Lack of knowledge				
ii) Lack of improved implement				
iii) Unsuitability of land				
iv) High labour charge				
v) Lack of technical guidance				
vi) Neighbour are not adopting				

13. Soil treatment:

a) Do you know about soil treatment? Yes / No
if 'Yes'

Name of chemical rate

b) Did you adopt soil treatment? Yes / No
if 'Yes'

What chemical did you use? _____

At what rate? _____

c) Which are the constraints in transfer of wheat technology regarding soil treatment

Constraints

VM M L NAA

- i) Lack of knowledge
- ii) Lack of technical guidance
- iii) Nonavailability of chemicals
- iv) High cost of chemicals
- v) Neighbour are not adopting

14. Seed variety:

a) What are the recommended varieties of wheat?

Name of varieties

Seed rate

b) What variety of wheat seed did you use in previous year?

Name of variety

Seed rate

c) which are the constraints in adoption of HYV wheat seed?

Constraints	VM	M	L	NAA
i) Nonavailability of seed				
ii) Shortage of HYV seed				
iii) High cost of seed				
iv) Lack of finance				
v) Lack of knowledge				
vi) Lack of technical guidance				
vii) Neighbour are not adopting				

15. Seed treatment:

a) Do you know about seed treatment? Yes / No
 if 'Yes'

Name of chemicals	rate
_____	_____
_____	_____

b) Did you adopt seed treatment? Yes / No
 if 'Yes'

What chemical did you use?	_____
At what rate?	_____

c) which are the constraints in transfer of wheat technology regarding seed treatment?

Constraints	VM	M	L	NAA
i) Lack of knowledge				
ii) No technical guidance				
iii) Nonavailability of chemicals				
iv) Neighbour are not adopting				
v) Lack of finance				

16. Time of sowing:

- a) What is the recommended time for wheat sowing? _____
- b) when did you sow wheat seed in previous year? _____

- c) Which are the constraints in transfer of wheat technology regarding time of sowing?

Constraints

VM M L NAA

- i) Nonavailability of seed in time
- ii) Nonavailability of finance in time
- iii) Lack of knowledge
- iv) Neighbour are not adopting

17. Method of sowing:

- a) What is the recommended method of sowing for wheat crop? _____

- b) What method did you use for sowing? _____

- c) Which are the constraints in transfer of wheat technology regarding method of sowing?

Constraints

VM M L NAA

- i) More labour required
- ii) Nonavailability of finance in time
- iii) Lack of knowledge
- iv) High cost of labour
- v) Nonavailability of labour
- vi) Neighbour are not adopting

18. Spacing:

- a) What is the recommended spacing for wheat sowing? _____

- b) At what space did you sow wheat seed in previous year? _____

- c) Which are the constraints in transfer of wheat technology regarding sowing spacing?

Constraints

VM M L NAA

- i) Lack of technical guidance
- ii) Lack of knowledge
- iii) Neighbour are not adopting

19. Application of organic manures:

- a) What is the recommended dose of FYM/Compost?
 _____ cart load/acre
- b) How much FYM/Compost did you apply in the wheat field? _____ cart load/acre
- c) Which are the constraints in application of recommended organic manure?

Constraints

VM M L NAA

- i) Nonavailability of organic manure
- ii) High cost of manure
- iii) Labourious work
- iv) High cost of technique
- v) Lack of knowledge

20. Application of chemical fertilizer:

- a) What is the recommended dose of fertilizers for wheat cultivation?

i) Basal dose

Name of fertilizer

Kg/ha

ii) For top dressing

Name of fertilizer

kg/ha

time

iii) For spray

Name of fertilizer

kg/ha

time

b) At what rate did you apply chemical fertilizers in wheat field last year?

i) Basal dose

Name of fertilizer	kg/ha
_____	_____
_____	_____
_____	_____

ii) For top dressing

Name of fertilizer	kg/ha	time
_____	_____	_____
_____	_____	_____
_____	_____	_____

c) Which are the constraints in transfer of wheat technology regarding application of chemical fertilizers?

Constraints

VM M L NAA

- i) High cost of fertilizers
- ii) Nonavailability of fertilizer
- iii) Lack of knowledge
- iv) Lack of technical guidance
- v) Lack of finance
- vi) Neighbour are not adopting

21. Plant protection measures:

a) Do you know the recommended plant protection schedule for wheat cultivation?

Yes/No

if 'Yes'

Name of disease & pest	Name of chemical	rate	time
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- b) Did you adopt plant protection measures in wheat cultivation? Yes/No
if 'Yes'

Name of disease & pest	Name of chemical	rate	time
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- c) Which are the constraints in transfer of wheat technology regarding plant protection measures?

Constraints	VM	M	L	NAA
i) High cost of chemicals				
ii) Nonavailability of chemicals				
iii) Lack of knowledge & technical guidance				
iv) Complicated technique				
v) Neighbour are not adopting				

22. Irrigation:

- a) Do you know the recommended irrigation schedule for wheat cultivation? Yes/No
if 'Yes'

Number of irrigation	time
_____	_____

- b) How many times are you irrigating your crop?

Number of irrigation	time
_____	_____
_____	_____
_____	_____

c) Which are the constraints in transfer of wheat technology regarding irrigation?

Constraints

VM M L NAA

- i) High cost of technique
- ii) Shortage of irrigation
- iii) High charges of water
- iv) Electric current not properly
- v) Problem of electric line
- vi) Lack of knowledge

23. Inter-cultivation operation:

a) What do you know about recommended inter-cultivation operation? _____

b) How many times are you weeding your crop? _____

c) Which are the constraints in transfer of wheat technology regarding inter-cultivation operation?

constraints

VM M L NAA

- i) High cost of inputs
- ii) Nonavailability of inputs
- iii) Lack of knowledge
- iv) Lack of finance
- v) Neighbour are not adopting

PART IV

24. What are the remedial measures you would suggest to overcome these constraints?

- i) Technical guidance to be given well in advance of every practice of wheat cultivation
- ii) Reasonable price of inputs
- iii) Prompt and timely supply of credit
- iv) Quick and timely supply of inputs
- v) Suitable steps should be taken to increase irrigation potentiality
- vi) Subsidy on inputs
- vii) Arrangement of exhibition/demonstration
- viii) Regular electricity power supply