A STUDY OF THE ADOPTION OF HYBRID BAJRA CULTIVATION IN AJARPURA VILLAGE OF ANAND TALUKA OF GUJARAT STATE

A THESIS

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(BUDHA DEVA SHUKLA)

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CHAPTER I

THE PROBLEM IN ITS SETTING

Introduction

Of all the problems, economic, social and political with which the country is confronted today, the most vital is the problem of adequately feeding the people. Agriculture in India is not merely a business proposition, it is a tradition, a way of life, which for centuries has shaped the thoughts, outlook and culture of India. But now India's agricultural sector is undergoing a crisis.

We have been facing food shortages for the past several years. These shortages have had their repercussions on our industry and our country's economy as a whole.

In a broadcast to the nation on October 10, 1965, the late Prime Minister, Lal Bahadur Shastri spoke of self-sufficiency in food as being no less important than an impregnable defence system for the preservation of freedom[1].

The main reasons for the continued food shortages are the low-per-acre yield and low rate of productivity. The steadily increasing population is another important reason.

Agricultural productivity and per acre yield can be increased by the use of scientific and technological innovations like improved seeds, recommended doses of fertilizers, plant protection, irrigation and other practices. Results obtained at our agricultural experiment stations and

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[1]Lal Bahadur Shastri, "Food Self-Sufficiency part of Defence Prime Minister's Call to Farmers", Kurukshetra 14:2 (November 14, 1965), 2.

the high yields achieved by some of the progressive farmers in the country have indicated that the technical know-how for obtaining high yields is already available within the country itself. The need is to get this knowledge across to the farming community. This is the challenge of Indian agriculture, a challenge to the democratic institutions of the country in general and to the extension workers in particular.

Gujarat State according to its proposed Fourth Five Year Plan hopes by 1970-71 to push up its additional foodgrains output by 12.66 lakh tonnes. This increase will be shared by paddy 1.32 lakh tonnes, wheat 1.62 lakh tonnes, jowar 1.70 lakh tonnes, bajra 6.77 lakh tonnes, maize 1.07 lakh tonnes and others 0.18 lakh tonnes. Seventy per cent of this increased output is expected to come from hybrid varieties of bajra, jowar and maize. For hybrid bajra alone, the target of increased production is 6.50 lakh tonnes[2].

In 1965-66, the average per acre yield of local Bajra in Gujarat was 191 kg. If this can be stepped up by a minimum of 200 kg. the average yield to be achieved by 1970-71 would be 391 kg. per acre. This yield rate would certainly be within the reach of farmers and therefore, the estimate of 6.50 lakh tonnes of additional production for hybrid Bajra might be regarded as conservative, since some 32 lakh acres of additional area is proposed to be brought

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[2]D.A.Patel, "Is Gujarat's Bajra Programme Ambitious", Yojana, XI:21 (October 29, 1967), 23.

under hybrid Bajra. There is, however, the question whether all the farmers would take to this hybrid variety, whether they would cover all their land with this, and further whether they could do so within five years. Not all the high yielding devices are readily accepted by all the farmers, as was the initial experience with fertilizers.[3]

Unless we transform our traditional agriculture by resorting to the use of modern science and technology, we will not be in a position to achieve self-reliance atleast within the next five years or so. The new strategy in agriculture that has been evolved by our experts is based on the application of modern science and technology.[4]

Increase in per-acre yield of Bajra production must come primarily from the adoption of more productive agronomical practices by the individual farmers. In view of the urgency of the continuing increases in food and agricultural production in Gujarat State, study of the adoption behaviour, rate of adoption and the factors affecting adoption and non-adoption of scientific practices of hybrid bajra cultivation are matter of major concern.

Statement of the Problem

The problem undertaken for the study was the adoption of hybrid bajra cultivation in Ajarpura village of

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[3] Ibid. p.24

[4] C.Subramaniam, "Food Minister's Message", Fertilizers News, II: 1 (January, 1966), 6.

Anand Taluka of Gujarat State. The programme of hybrid bajra cultivation was started in Anand Taluka with the High Yielding Varieties Programme launched in all the States of India including Gujarat State in Kharif 1966-67.[5] However, a few sporadic trials of Hybrid Bajra 115 were done in Anand Taluka as early as 1965 Summer. The study sought to know the adoption behaviour, rate of adoption and the factors responsible for the adoption and problems of non-adoption of Hybrid Bajra Cultivation in Ajarpura village.

Objective of the Study

This study was limited in its scope and sought to discover the adoption behaviour, rate of adoption, and the factors responsible for the adoption and non-adoption of Hybrid Bajra Cultivation from farmers of Ajarpura village of Anand Taluka of Gujarat State. Involved in this general objective, the following are the specific ones:-

1. To determine the factors influencing the adoption of Hybrid Bajra Cultivation.
2. To study the problems related with the adoption of Hybrid Bajra Cultivation.

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[5]B.M.Desai and M.D.Desai, New Strategy of Agricultural Development In Operation, A Case Study of the Kaira District in Gujarat (Vallabh Vidyanagar: Agro-Economic Research Centre, Sardar Patel University, 1968), p.1.

Importance of the Study

The distinguishing feature of the High Yielding Varieties Programme in Gujarat is that hybrid bajra-115 has been evolved within the State, at the Jamnagar Agricultural Research Station. Consequently, hybrid bajra enjoys a place of pride in the High Yielding Varieties Programme of the State. Besides this reason, the other two reasons due to which hybrid bajra enjoys such importance are (i) bajra is an important staple food for a large number of people in the State and (ii) bajra occupied 27 per cent of the area under foodgrains in the State in 1963-64. Hence strategically it was advantageous to stress on the improved variety of bajra. Hybrid bajra claimed the highest share in both the targets of area to be brought under the High Yielding Varieties Programme and their achievement during 1966-67. Even in the targeted area to be brought under the programme during Kharif 1967-68, the share of hybrid bajra was not only the highest but overwhelmingly large, i.e. 92 per cent.[6]

In view of the importance of hybrid bajra cultivation in Gujarat State, it was decided to undertake a study of the programme with reference to propagation of hybrid bajra cultivation in Ajarpura village of Anand Taluka. Though the study deals with a particular case, its relevance to other areas of the State of Gujarat is immediate.

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[6] Ibid. pp. 1-2.

The author believes that the findings of the present study would be of interest both to the academic researchers as well as to the policy makers.

Hypothesis

On the basis of the review of available literature it was hypothesised that all the farmers were not influenced by the same factors of adoption and non-adoption of Hybrid Bajra Cultivation. Individual farmers differed significantly in the adoption and non-adoption of Hybrid Bajra Cultivation due to differences in their caste, age, educational level, area of land operated, social participation, sources of information, supplies etc.

Limitations of the Study

In accordance with the time and resources available the study was conducted subject to the limitation that the area of the study was limited to only one village, namely Ajarpura of Anand Taluka of Kaira district in Gujarat State.

CHAPTER II

REVIEW OF RELATED LITERATURE

On the review of related literature it appears that many studies have been conducted on the various aspects of adoption and non-adoption of innovations in the field of agriculture by individuals and organisations. However, no study as such on the problem undertaken for investigation has been reported so far. A brief account of the literature related to the problem under study has been presented here.

Personal Factors In Relation to the Adoption of Improved Practices

Why some people adopt new ideas and improved agricultural practices more quickly than the others relates in part to the individual himself. Personal and social characteristics of farmers, such as age, educational level, caste etc., have been found to be related to the adoption of improved agricultural practices by farmers.

Age

Lionberger (1964),[7] reported that elderly farmers seem to be somewhat less inclined to adopt improved agricultural practices than younger farmers. The highest

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[7]Herbert F.Lionberger, Adoption of New Ideas and Practices (Ames: The Iowa State University Press Iowa,1964), p.96.

rate of adoption of new improved practices was observed in case of farmers of middle age.

On the basis of a study conducted in village Dahtora of C.D.Block, Bichpuri, Agra, Ratan Chand and Gupta (1966)[8] reported that the age of the farmers may not influence the adoption of improved farm practices.

Hodgdon and Singh (1966)[9], in a case study of "Factors Associated with the Adoption of Recommended Agricultural Practices in Two villages of Madhya Pradesh," found that the larger proportion of adopters in the villages were middle and upper-age-groups of farmers.

Sawhney (1967), on the basis of a study conducted in a rural community in Delhi State, concluded:

> "The farmers of different age groups differed in their use of information sources and media. Generally speaking, with increasing age there was increasing use of localite sources, and diminishing use of personal-cosmopolite and mass media sources. The variations in the use of personal-cosmopolite sources among the various age groups seems due more to differential use of group contact media than of individual contact media."[10]

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[8]Ratan Chand and M.L.Gupta, "A Study of the Adopters of Improved Farm Practices and Their Characteristics," Indian Journal of Extension Education, 1:4 (January, 1966), 264.

[9]Linwood L.Hodgdon and Harpal Singh, Adoption of Agricultural Practices in Madhya Pradesh (Hyderabad:National Institute of Community Development, 1966), pp. 16-17.

[10]M.Mohan Sawhney, "Farm Practice Adoption And The Use of Information Sources And Media In A Rural Community In India," Rural Sociology, 32:3 (September 1967), 321.

Fliegel, et al. (1968)[11], reported:

> "Variables which do not relate to village level adoption of agricultural innovations; even at zero-order level are: age, urban pull, fatalism, land oriented conservatism and education. Our data indicate that leaders who influence village adoption come from all age-groups."

Roy, et al. (1968)[12], on the basis of their study on "Agricultural Innovations Among Indian Farmers", found that age was not related to adoption of improved farm practices. This is partly a function of the fact that they excluded farmers over 50 years of age from the sample. It is, therefore, not too surprising that for the sample of young to middle-aged farmers, age makes no difference to adoption of modern farm practices.

Caste

The second important personal or social characteristic which individually or collectively with other factors affects either the farmers' desire or ability to adopt recommended agricultural practices is the caste.

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[11]Fradrick C.Fliegel et al, Agricultural Innovations In Indian Villages (Hyderabad: National Institute of Community Development, 1968), p.46.

[12]Prodipto Roy, et al.,Agricultural Innovations Among Indian Farmers (Hyderabad: National Institute of Community Development, 1968), p.46.

Desai, and Mehta (1964)[13], on the basis of the results of an intensive field study of Padra Taluka of Baroda district, carried out during 1961-63, reported that out of 42 farmers who adopted improved implements, 71 per cent were Pattidars and 17 per cent Barias. The Brahmins constituted 6 per cent, Rajputs 4 per cent and Muslims only 2 per cent. This is a clear evidence of differential adoption among different castes.

Mulay, and Ray (1965),[14] in their study of "Caste And Adoption of Improved Farm Practices", concluded that the magnitude of adoption of improved seeds was highest among Rajputs and the lowest among Jhimars, Sainies were the highest adopters of fertilizers, improved agricultural implements and plant protection measures. Rajputs ranked lowest in adoption of fertilizers and improved agricultural implements (excluding Jhimars) and Brahmins in adoption of plant protection measures. Insecticide which is one of the important items of plant protection was adopted by all Jhimars.

Ratan Chand, and M.L.Gupta (1966)[15], reported that caste of farmers did not have any relationship with the adoption of improved farm practices.

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[13]M.B.Desai and R.S.Mehta, "Change and Its Agencies In Community Development, Reflections From The Study Of A Community Development Block In Gujarat State", Indian Journal Of Agricultural Economics, XIX (July-December, 1964), pp.147-66.

[14]Sumati Mulay and G.L.Ray, "Caste And Adoption Of Improved Farm Practices", Indian Journal Of Extension Education, I (July, 1965), 111.

[15]Ratan Chand and Gupta, Loc.Cit.

Fredrick C.Fliegel, et al. (1968)[16], observed that traditionally, leadership in Indian villages has been monopolised by upper castes. The higher the caste of the leader, the higher is the adoption of agricultural innovations. The caste, in their study was significantly related to most of the characteristics which influenced adoption.

Mundra, and Batham (1967)[17], in their study on "Impact of caste on Adoption of Improved Farm Practices" found that the acceptance index and area index with regard to improved seeds was higher in higher castes and lowest in lower castes. It was also found that practices which incurred little amount of initial money were adopted quickly also by lower caste people. Majority of non-adopter Brahmins and Mahajans considered killing rats as sin and it was against their caste tradition.

Education

Rahudkar (1962) in his study of "Farmers' Characteristics Associated With The Adoption And Diffusion of Improved Farm Practices" found that more than one-fifth of the farmers were illiterate and more than half of them had not adopted a single farm practice. More than one-third

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[16]Fliegel, et al., Op.cit. pp.73-78.

[17]S.N.Mundra and K.N.Batham, "Impact of Caste On Adoption Of Improved Farm Practices", Indian Journal Of Extension Education, III (September, 1967), 147.

adopted two to four practices and one-twelth adopted seven to eight practices. Farmers with primary and middle school education tended to adopt half of the recommended practices and those with high school and college education were likely to adopt greater number of new practices. In this study, education is positively related to adoption of new farm practices.[18]

Lionberger (1964)[19], reported that generally it is believed that education can cure most ills of society but farmers have not always felt that schooling beyond eighth class was needed for farming. Since favourable attitudes regarding farming may be gained outside the school, correlation between educational standard and adoption of improved farm practices was not always high. Nevertheless, more than eight years' schooling was almost always associated with higher adoption rate than lesser number of schooling years. In this case, as with other factors associated with adoption of improved farm practices, clear cut relations are hard to establish, because years of schooling is related to other factors likely to influence adoption rates as income, age, etc.

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[18]W.B.Rahudkar, "Farmers' Characteristics Associated With The Adoption And Diffusion Of Improved Farm Practices", Indian Journal Of Agricultural Economics, XVII (April-June, 1962), 84.

[19]Lionberger, Op.cit. p. 98.

Singh and Reddy (1965),[20] reported that farmers with higher education mainly depended on formal sources for new farm informations; whereas the farmers with lower educational level depend primarily on informal and secondarily formal sources of information.

Ratan Chand, and Gupta (1966),[21] found that education adds to the innovativeness of a farmer.

Sawhney (1967),[22] observed that with increasing level of education there was increasing use of personal cosmopolite and mass media sources and diminishing use of personal-localite sources. There were small differences between illiterate farmers and those with upto four years of schooling (primary school education) and between middle school (five to eight years' of schooling) and high school and college (more than eight years' schooling) education.

Roy, et.al. (1968),[23] reported that both literacy (can read newspaper) and education (formal education) were significantly associated with adoption. The literate and better educated farmers are more significantly prone to accept innovations in agriculture.

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[20]S.N.Singh and S.K.Reddy, "Adoption of Improved Agricultural Practices by Farmers", Indian Journal of Agronomy, X (March, 1965), 104.

[21]Ratan Chand, and Gupta, Op.cit. p. 262.

[22]Sawhney, Loc.cit.

[23]Roy, et.al., Op.cit. pp.46-47.

Fliegel, et.al., (1968),[24] found insignificant relationship between education and village-level adoption. The reason may be that in past education was not geared to agriculture, hence the educated persons migrated to cities for jobs. If they did not get jobs there, they remained in the village with no interest in agriculture or in any occupation that required manual work.

Situational Factors As Related To Adoption Of Improved Agricultural Practices

Situational factors include individual differences among farmers, excluding personal or social characteristics, with respect to availability of capital resources (land, labour, credit, implements and other supplies). These factors play more important part in adoption of improved practices in countries where supply and service channels are not fully developed as compared to personal characteristics of adopters.

Size of Holding

Deshmukh and Raheja (1963),[25] in their study in Delhi State found that as the size of holding increased, the adoption rate of various improved practices showed an increase.

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[24] Fliegel, et. al., Op.cit., pp.80-82.

[25] V.S.Deshmukh and P.C.Raheja, "Relative Effectiveness of the Demonstrations for Introducing Seeds, Fertilizers and Implements and Factors Associated with the Non-adoption of them", Indian Journal Of Agronomy, VIII (December, 1963), 410.

The acceptance of improved seeds, fertilizers and implements was directly associated with the intensity of programme and socio-economic status of the farmers. Farmers of low socio-economic status comparatively adopted less practices due to their poor resources.

Rahudkar (1964),[26] reported that the farmers who operated larger farms increasingly made use of information media and subsequently adopted more farm practices.

Desai and Mehta (1964),[27] found that families who reported adoption of crop changes in their study had larger size of farm holding.

Lionberger (1964),[28] reported that size of farm is nearly always related to adoption of new practices. Many new technological advances require large scale operations and substantial economic resources for their use. The use of improved practices produces economic benefits which permit expansion of farming operations which in turn makesit economically possible to use more improved farm practices.

Hodgdon and Singh (1966),[29] observed in their study in M.P. that owing largely to the credit situation and dearth of basic production resources, adoption of recommended

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[26]W.B.Rahudkar, "Testing A Culturally Bound Model for Acceptance of Agricultural Practices", Indian Journal of Social Work, XXIV (January, 1964), 267.

[27]Desai and Mehta, Loc.cit.,

[28]Lionberger, Op.cit., p.101.

[29]Hodgdon and Singh, Op.cit., p.9.

practices by cultivators tended to increase as the size of holdings increased. The small farm holders did not get sufficient credit from cooperative banks, Village Level Workers paid little attention to small farmers and moreover small holders believe that new recommended practices are meant for big farmers.

Ratan Chand and Gupta (1966),[30] noted that farmers owning more land adopted more improved practices.

Sawhney (1967),[31] observed that both the size of farm and income seem to be related to differential use of information sources and media. With increasing farm size there was increasing use of cosmopolite sources and diminishing use of personal-localite sources.

Prodipto Roy, et al. (1968)[32] found in their study that farm size was consistently related positively and highly with adoption behaviour. It were the wealthier and larger cultivators who are apt to adopt more improved practices and to adopt any given practice sooner. Availability of capital permits adoption which leads to higher profits and which permits more adoption and so forth, in a beneficient circle.

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[30]Ratan Chand, and Singh, Loc.cit.

[31]Sawhney, Loc.cit.

[32]Roy, et al., Op.cit., pp.30-37.

Membership In Village Institutions

Hodgdon and Singh (1966)[33] found in their study that adoption of improved practices and Co-operative Society membership were virtually inseparable, since membership in sample villages was a pre-requisite to obtaining credit and supplies. Every adopter of recommended practice had received credit.

Sawhney (1967)[34] reported that farmers who were more actively participating in formal organisations used more cosmopolite sources and less localite sources than those who were participating less actively or not at all.

Prodipto Roy, et al. (1968) concluded:

> "We expected that membership and office in formal organisations would relate positively to adoption, a relationship which has frequently been demonstrated. Only 25 per cent of our sample were members of any formal organisation and they were not higher in adoption. Holding office however showed the expected relationship."[35]

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[33]Hodgdon and Singh, Op.cit., p.63.

[34]Sawhney, Op.cit., p.322.

[35]Roy and et.al. Op.cit., p. 51.

Decision Making In Adoption

Rogers (1962) has defined decision making as: "the process by which the evaluation of the meaning and consequences of alternative lines of conduct is made."[36]

Jhungare and Rahudkar (1962)[37] in their study observed that 88 per cent of farmers took decisions themselves without consulting their family members regarding seasonal farm operations in wheat crop. As regards area to be kept under wheat crop, 8 per cent of farmers took decisions in consultation with their sons, and less than 4 per cent farmers considered opinion either of their brothers, parents or wives. It was noticed that influence of family members varied in relation to age and education of the farmer. Most of the skills and knowledge is transmitted to the son when he is young. On the other hand older farmers may be encouraged by their sons to accept new practices, as the sons may gain knowledge from outside contacts, both personal and impersonal. They further observed that illiterate and farmers having primary education took the advice of their parents, brothers, wives and sons, while the farmers having education beyond

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[36] Everett M.Rogers, Diffusion of Innovations (New York: The Free Press of Glencoe, 1962), p.78.

[37] Y.N.Jhungare and W.B.Rahudkar, "The Influence Of Family Members On Decision Making In Farm Operations," The Indian Journal of Agronomy, VI (June, 1962), pp.328-29.

middle school took the decisions themselves. The farmers who took the decisions themselves had adopted more number of improved practices than those whose decision was influenced by their family members. The farmers who consulted the young members of their families adopted more number of practices than those who consulted older members.

Extension Contacts And Information Sources

Social change requires the introduction of change material into a society by the presentation of alternative ideas, practices, or choices to change or supplement existing ones. Contacts with extension workers, information and communication sources, channels, media and methods with which it is brought to the farmers are of crucial importance in facilitating wide adoption of improved farm practices, as well as in fostering the new attitudes involved in change.

Extension Contact

Rogers (1962)[38] found that the greater promotional efforts by county extension agents, the greater was the rate of adoption of innovations by farmers. Change agents have more communication with higher status than with lower-status members of a social system.

Rahudkar (1962)[39] reported that the farmers who adopt more of new techniques use a number of sources. The

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[38]Rogers, Loc.cit.

[39]Rahudkar, Loc.cit.

farmers with progressive outlook regarding adoption of improved techniques use more of impersonal and official sources, while others rely on personal acquaintance as sources of information including village level worker who was also the most useful source of information for the high level adopters. High level adopters were found in better contact with Agricultural Extension Officer than the low-level adopters. Non-adopters had contacts with the personel sources as other farmers and Village Level Worker.

Lionberger (1964)[40] reported that number of sources used or contacts with information sources was positively related to adoption rate. A high positive adoption rate was associated with the use of such sources as county agent, College of Agriculture and Vocational Agriculture teachers. On the other hand the high dependence on relatives and friends as sources of information was usually negatively associated with the adoption of new farm practices.

Singh and Reddy (1965)[41] observed that the farmers with high and medium social participation scores depended on formal sources, whereas, farmers with low social participation scores depended on informal sources of information. Mass media was of relatively little importance to

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[40]Lionberger, Op.cit., p.103.

[41]Singh and Reddy, Loc.cit.

the farmers with lower social participation categories while to those in high category it was the second important source of information.

Rao and Moulik (1966)[42] observed that at awareness and trial stages the most frequently mentioned source was the personal type of formal source like extension workers followed by informal community sources.

Prodipto Roy et.al. (1966)[43] found that the cultivators have most contacts with village level workers and least with Block Development Officer.

Hodgdorf, and Singh (1966)[44] found that the number of farmers who were visited by village level worker and Extension Officers increases as increase in the size of holdings and frequency (average number of visits) is significantly larger for adopters than for non-adopters. This confirms the often expressed belief that the larger farmers are given preferential attention.

Lakshamanna and Satyanarayana (1967)[45] concluded that neighbours and others including village leaders played

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[42]C.S.S.Rao and T.K.Moulik, "Influence Of Sources Of Information On Adoption 0f Nitrogeneous Fertilizers", Indian Journal of Extension Education, II (March-June,1966), 15.

[43]Prodipto Rao, et.al., Op.cit., p.64.

[44]Hodgdon and Singh, Op.cit., p.52.

[45]C.Lakshmanna and M.Satyanarayana, "Sources Of Information In The Adoption Of Improved Agricultural Practices", Indian Journal Of Extension Education, III (September, 1967, 125.

a notable part in the different stages of adoption of different practices. The commercial agency played an important part as source of information for the use of fertilizers.

Fliegel, et.al. (1968)[46] said:

"The policy of Extension agents to introduce new programmes through village leaders is fully justified as shown by the high correlation between extension agencies contact of leaders and village-level adoption of agricultural innovations. Contact with extension agents also makes leaders credit minded, which again was found to be related to the adoption of improved agricultural practices by the village."

Sources Of Information And Communication Channels

Lionberger (1963) reported:

"The media used for transmitting messages include the printed page (news papers, magzines, bulletins, circular letters, etc.), radio, and television. People form habits of depending on different sources for special kinds of information and may be included to attach varying degrees of reliability to them. Some may place more reliance on the written word than the spoken message. Also such media as radio or television may not even be considered as source of information by some people. For instance, in a Missouri study interviewers got the impression that farmers regarded television essentially as a means of entertainment not as a means of getting information about farms. On the other hand, radio was regarded by many as a good place to get upto-date farm information."[47]

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[46] Fliegel, et.al. Op.cit., p.85.

[47] Herbert F.Lionberger, "Individual Adoption Behaviour", Journal Of Co-operative Extension, I (Fall, 1963), pp.159-60.

Singh and Jha (1965)[48] reported that out of various information sources and communication channels used in their study demonstration was the most effective followed by exhibitions, film shows, radio, news papers including leaflets, bulletins and other published matter.

Sharma (1966)[49] reported that demonstration was found to be the most effective communication channel in dissemination of new farm practices. Radio, posters, film-show, exhibition and printed matter were effective in descending order. Mass media except film-shows were mostly used by persons having formal education, high caste, high economic status and high organisational participation. Demonstration and general meetings were mostly used by farmers below 35 years of age, having elementary school education and high organisational participation.

Hira Nand and Jain (1967)[50] in their study in Bichpuri Block Agra on "A Study of Extension Methods Used

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[48]B.N.Singh and P.N.Jha, "Utilization of Sources Of Information In Relation to Adoption Of Improved Agricultural Practices," Indian Journal of Extension Education, I (April-1965), 34.

[49]D.K.Sharma, "Role Of Information Sources And Communication Channels", Indian Journal Of Extension Education, III (December, 1966), 146.

[50]Hira Nand and N.C.Jain, "A Study Of Extension Methods Used by Block Personnel For Extension Improved Agricultural Practices", Indian Journal of Extension Education, III (March-June, 1967), 78.

by Block Personnel," found that radio, local-songs, posters, wall paintings, literature, tours and sight-seeing to be least effective among the sources of information included in their study.

Problems In Relation To Adoption

Adoption of new farm practices is a complex process. A farmer, before finally adopting a new farm practice, has to think so many pros and cons. The main job of extension worker is to help the farmer to become confident about efficiency and feasibility of the recommended practices to him. Once the farmer is convinced about the usefulness of new practice in his local situation, the only limiting factors that come in his way of adoption of the improved practices, are the problems regarding inputs, availability of credit, human labour, etc. In some cases the various problems of supply and cheap credit play an important role in the adoption of new improved practices.It is worth while to investigate into the causes of non-adoption of recommended practices. This helps us in finding out some clues for suggesting remedial measures.

Oppenfeld, Iglesia and Librero (1962)[51] reported in their study conducted in the Philippines that the important reasons for non-adoption of improved agricultural practices

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[51]Horst Von Oppenfeld, Jesus C.Sta.Iglesia and Florentino Librero, "Results Of A Study Of Adoption Of Better Farm Practices In The Philippines," Indian Journal Of Agricultural Economics, XVII (October-December, 1962), 27.

by farmers were: lack of credit facilities or magnitude of capital requirement, lack of facilities - materials and services; (unfavourable) experience, preferences, motives and beliefs; time and effort involved; and, objections of landlords or other institutional restrictions.

Savale (1966)[52] in his study in Maharashtra State found that 27.16 per cent of cultivators did not adopt improved variety of seed due to inadequate supply, untimely or sometimes no supply at all of the required seed. Financial difficulties and high cost of seed was also pointed out by a large proportion of cultivators. The rest 5.85 per cent had doubts in their mind as regarding the suitability and superiority of the recommended variety for the locality. Lack of supply of fertilizer was the major cause expressed by 23.86 per cent of the cultivators, while lack of technical guidance was the reason given by 2.88 per cent of cultivators. In case of insecticides 33 per cent of cultivators expressed lack of guidance, demonstration, appliances for using insecticides and high cost of insecticides as the reasons for non-adoption.

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[52]R.S.Savale, "Technological Change In Agriculture: Study Of Sources Of Its Diffusion, Efficancy Of These Sources And The Economic Factors Affecting The Adoption Of Improved Practices," Indian Journal Of Agricultural Economics, XXI (January-March, 1966), pp.204-5.

Hodgdon and Singh (1966)[53] reported that the farmers without irrigational facilities showed extreme reluctance to adopt improved practices. As for those who had such facilities the area under irrigation fixed the upper limit of land on which recommended practices could be applied. Non-adopters had more unmet-credit needs than adopters. With a few exceptions, it was found that the proportion of farmers reporting their credit needs not fully met, diminished as the size of farm increased. A lack of financial resources was ranked as the single most important individual problem in non-adoption of new farm practices. Some farmers also stated that lack of bullocks and bullock carts, ploughs, poor soil, small holdings, lack of human labour and fragmentation of holding as the problems affecting adoption of recommended practices.

Summary

The adoption behaviour of farmers is not merely influenced primarily by the usefulness, suitability and its applicability of the innovations to their local situations, but many other factors also play an important role in this case. Personal and social characteristics of the farmers have been found to be related in important ways to adoption of improved agricultural practices.

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[53]Hodgdon and Singh, Op.cit., pp. 60-72.

Age of the farmers has been found related to the rate of adoption of improved practices. Highest rate of adoption of improved practices has been noticed in farmers of middle age-group. Older farmers due to their rigid thought are least prone to changes in their current farm practices.

In India caste largely determines the function, the status, the available opportunities as well as the handicaps for an individual. The caste customs and prejudices in many case hinder adoption of improved agricultural practices. Certain castes have traditionally specialized in the cultivation of certain crops and practices. So caste is significantly related to adoption of innovations in India.

Generally it is believed that education can cure most ills of the society but is has been found that education beyond a certain limit does not relate significantly to adoption rate. In India most of the people who receive higher education seek jobs in cities and develop an attitude of dislike to manual work, hence have no real interest in farming even if they live in the vilage. The highest rate of adoption has been amongst farmers who are educated upto 7th class standard.

Situational factors include individual differences among cultivators excluding personal or social characteristics with respect to availability to capital resources. These factors are comparatively more important in developing countries like ours.

Size of holding has been found positively related to adoption of new farm practices. Large farm holding means easy availability of credit and other supply facilities. Smaller holdings are largely subsistence type and do not have capacity to take risks on their small farms besides other many problems of credit and supplies.

It is generally expected that persons connected with working of local institutions as Panchayats and Co-operative societies and holding some office in other formal organisations would be having progressive outlook. Hence adoption rate of such persons may be high as compared to others not associated with formal organisations.

Adoption of new practices involves change of current practices, extra expenditure and more labour in most of the cases and risk taking. Hence, a farmer before taking final decision thinks many pros and cons of the innovation. In this process family members, friends, neighbours etc. play an important role. But generally it has been found that farmers who take decision independently without consulting others are higher in adoption.

For bringing new changes in a society in place of old practices, not only change material is required but also an effective arrangement of presentation of the new ideas is important. Change agents, extension workers, various information sources and communication channels are of prime importance in this case. It has been seen that farmers who

come more in contact with the above change media rank higher in adoption of improved practices as compared to farmers remaining about from these sources.

Adoption of improved agricultural practices generally involves intensive application of various factors of production in the right proportion, at the right time and with easy accessibility. This requires not only technical know-how but proper and timely arrangement of the various inputs. In a country like ours where there is a great deficit of productive resources, these factors prove a great hindrance in the way of adoption of improved agricultural practices. The most important problems which work as stumbling block for farmers have been inadequate financial resources, lack of irrigational resources and small and fragmented holdings.

CHAPTER III

METHODOLOGY

Plan of Study

The most distingushing feature of the High Yielding Varieties Programme in Gujarat State is the extension of hybrid bajra cultivation. In view of the importance of hybrid bajra for the State, this study was undertaken to find out the adoption behaviour in respect of hybrid bajra cultivation in a village where some of the village people have adopted its cultivation. As it was not possible to conduct the study on a district or taluka scale, a case study, design was used in the present study. The study was designed to secure sufficient information (through personnel interview) from the farmers of the selected village about their adoption behaviour, and relationship between various personal, social and situational factors of adopters and non-adopters of the hybrid bajra cultivation programme in order to utilize the results in furthering the programme in other places.

Area of Study

It was decided to carry out the study in the area having most favourable conditions from the point of view of the success of Hybrid Bajra Cultivation. Therefore, Kaira district was selected. This was selected in the light of the fact that Kaira district is known for its fertile land and

progressive outlook of farmers. Within kaira district, Anand Taluka was selected for this study because this Taluka forms a part of the fertile Charoter tract of the district. Within this tract, a medium size village was selected, having progressive and receptive cultivators, average population i.e. near about 3190 and also fulfilling other criteria: as distance from Taluka Head Quarter, location of the village and existence of local institutions. The village Ajarpura fulfilled all the above mentioned criteria with its population 3047, situated on Anand to Chakalasi Road via Bhalej at a distance of 16 Kms from Anand Taluka Head Quarter, having a Service Co-operative Society, Co-operative Milk Producers' Society, Gram Panchayat, Head Quarter of Gramsevak, and Talati (Revenue Worker).

Sampling Procedure

All the Khata-holders (Registered Land Holders) as recorded in revenue records constituted the population. All the Khata-holders were personally interviewed.

Selection of Respondents

The complete list of Khata-holders of Ajarpura village was obtained from the records of Talati of the village. The total number of Khata-holders was 527, comprising farmers of the villages namely Ajarpura, Devkapura, Samarkha, Raghavapura and Kasore. The number of village-wise Khataholders were:

1. Ajarpura ... 388
2. Devakapura ... 1
3. Samarkha ... 89
4. Raghavpura ... 21
5. Kasore ... 28

Out of 527 Khata-holders, seven khata-holders of Ajarpura village were non-cultivating owners because they had utilized their land for other purpose than cultivation, i.e. they built houses. The remaining 520 Khata-holders were interviewed. During the course of personal interview, it was found that certain khata-holders though owned lands in their name, but someone else was managing it on their behalf, hence the persons managing the land were interviewed and the informations of all such cases were pooled in one concerned schedule. Thus the total number of respondents interviewed were 438.

Developing Instrument for the Study

Preparation of the Schedule

In view of rural conditions and villagers' low educational level the use of interview schedule was considered appropriate for obtaining information from the respondents. The schedule was developed keeping in view the personal and social characteristics of the farmers and other situational factors related to adoption and the agronomical practices of hybrid bajra cultivation.

In initial stage the schedule was circulated among the post graduate students who offered Extension Education as major or minor subject and their valuable suggestions were obtained for reliability and validity of the schedule. Several ambiguous items from the schedule were omitted.

The schedule which was originally prepared in English, was translated into Gujarati (language of the local area) so that it could be understood by the common villager and might give right answers.

Preliminary Tryout of the Schedule

The preliminary tryout of the schedule prepared in Gujarati was done for the following reasons:

1. To ascertain whether the construction of the schedule was understood by the respondents.
2. To ascertain whether the meanings of the terms used in the schedule were clear to the respondents.
3. To ascertain whether there was any difficulty in responding the schedule.

The schedule prepared was administered to five farmers of Ajarpura village itself. The reason for selecting the farmers of Ajarpura village for preliminary try out of the schedule was their easy accessibility. At the time of testing, the purpose of interview and study was explained to the interviewees. As a result of this pretesting,

necessary changes were made in the construction and arrangement of the questions.

Collection of Data

All the 438 Khata-holders (actual farmers) were personally interviewed by the author from 25th of July to 12th of August 1968 in the villages of Ajarpura, Devakapura, Kasore, Raghavapura and Samarkha, where the khata-holders of Ajarpura Revenue village were residing. The respondents in majority of the cases were contacted at their residences. In some caes they were contacted at the farms or even at community places and residences of their neighbours and friends. In the first instance the author introduced himself to the individual farmers or was introduced by some other villager known to him and the interviewee. After introduction the purpose of the study and the significance of the respondent's cooperation in the project were explained to him to establish the proper rapport. Thereafter the interview proper was held and responses were marked in the schedule. Every possible effort was made to maintain a homely atmosphere free from discomfort and outside distractions to receive respondent's opinion with the least possible effort of subjectivity and influence. This procedure was followed with all the individual respondents.

Statistical Frame-work for the Analysis of Data

The data collected were tabulated with the help of "Sorting Strip Technique." This method was suitably modified for quicker conting of marginals and cross-tabulation frequencies. Thus 438 such sorting Strips containing coded informations which were transformed from the interview schedules were prepared. This technique made the tabulation quick and easy.

As the total cultivating population was included in the study, no statistical test was necessary. However, percentage was calculated for easy description and interpretation of data.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

The data collected with the help of interview schedule were arranged and analysed in the light of the objectives of the study. The facts and findings of the study have been presented in the following pages.

Data Relating to the Personal Characteristics of the Adopters and Non-adopters

Adoption of improved farm practices, being a complex process, is influenced by various socio-economic and the personal characteristics of the farmers. It was beyond the scope of the present study to include all these characteristics of the farmers influencing adoption process. However, some important factors such as caste, age, education, size of operational holding etc. have been selected and their influence on the adopters and non-adopters of hybrid bajra cultivation have been studied. The findings have been presented in the following pages.

Caste Status of Adopters and Non-adopters

The influence of caste on the adopters and non-adopters was studied under the present investigation. The informations about the caste status of all the respondents were collected and classified under the four

caste groups namely higher caste-Brahmins and Banias, intermediate caste-Patels, Rajputs, Artisans etc., lower caste - Harijans, Bhoi, Vagri and Rohit (Chamar), and others - Muslims and Christians. The responses obtained from the respondents about their caste status have been described in Table I.

TABLE I

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO THEIR CASTES

Caste Status	Adopters		Non-adopters		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Higher Castes	3	23.07	10	76.93	13	100
Intermediate Castes	117	29.47	280	70.53	397	100
Lower Castes	Nil	Nil	13	100	13	100
Others	1	6.66	14	93.34	15	100

Age of the Adopters and Non-adopters

One of the important aspects of the present study was to investigate the factor of age in relation to adopters and non-adopters. The informations were collected from all the respondents about their ages and the same have been presented in Table II.

TABLE II

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO THEIR AGES

Age Status	Adopters (N=121)		Non-adopters (N=317)		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Young farmers (18 to 30 years)	23	32.85	47	67.15	70	100
Middle-age farmers (31 to 45 years)	47	28.31	119	71.69	166	100
Old farmers (46 years and above)	51	25.24	151	74.76	202	100

Educational Background of the Adopters and Non-adopters

With a view to study the influence of education on the adopters and non-adopters, the informations were collected and noted in the interview schedule about the formal education that the farmers received. The data so collected were classified, tabulated and have been presented in Table III.

TABLE III

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO THEIR EDUCATIONAL BACKGROUND

Educational level	Adopters		Non-adopters		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Illiterate	6	7.05	79	92.95	85	100
Upto 7th Class	76	29.00	186	71.00	262	100
Above 7th Class	39	42.85	52	57.15	91	100

Farm Holding Operated and the Adopters and Non-adopters

The size of farm holding cultivated by the farmers is associated with the adoption of the recommended changes in farming. To establish the relationship of various sizes of farms operated by the adopters and non-adopters, the informations were obtained from all the respondents about the size of farm operated by them. The informations thus collected have been tabulated and the same are presented in table IV.

TABLE IV

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO SIZE OF FARM HOLDINGS CULTIVATED BY THEM

Size of operated holding groups	Adopters		Non-adopters		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Up to 5 acres	40	13.60	254	86.40	294	100
Above 5 acres to 10 acres	35	42.68	47	57.32	82	100
Above 10 acres	46	74.29	16	25.71	62	100

Data Regarding Interactional Relationships Between Some of the Personal Characteristics

So far single factors namely caste, age, education, and size of operational holding have been studied. To investigate the combination of two factors simultaneously for instance which one of the combinations of caste and age, caste and size of holding, age and education, and age and size of holding influences the adoption behaviour of farmers in respect of hybrid bajra cultivation, the data collected for single factors were cross-tabulated and the findings have been presented in the following pages.

Relationship Between Caste and Age of the Adopters and Non-adopters

To investigate the relationship between caste and age, data collected with the help of interview schedule were cross-tabulated and the findings have been presented in Table V.

Relationship in Respect of Caste and Size of Holding of Adopters and Non-adopters.

Caste and size of holding both are most important factors individually, but to investigate the combination of these two factors, the data already collected for single factors were cross-tabulated and the results have been presentented in Table VI.

Relationship Between Age and Education of the Adopters and Non-adopters

To study the relationship between age and education informations about age and education already collected were cross-tabulated and the findings have been presented in Table VII.

Relationship Between Age and Size of Holding of the Adopters and Non-adopters

To know the relationship in respect of age and size of holding, the informations about age and size of holding already collected with the help of interview schedule from each adopter were cross-tabulated and the findings have been presented in Table VIII.

TABLE V

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS SHOWING RELATIONSHIP BETWEEN THEIR CASTES AND AGES

Caste \ Age	Young farmers (18 to 30 years)						Middle-aged farmers (31 to 45 years)						Old farmers (46 years and above)						Total of adopters and non-adopters
	Adopter		Non-adopter		Total		Adopter		Non-adopter		Total		Adopter		Non-adopter		Total		
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Higher	Nil	Nil	1	100	1	100	1	33.33	2	66.67	3	100	2	22.22	7	77.78	9	100	13
Intermediate	23	33.33	46	66.67	69	100	45	30.20	104	69.80	149	100	49	26.06	139	73.94	188	100	397
Lower	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	4	100	4	100	Nil	Nil	9	100	9	100	13
Others	Nil	Nil	Nil	Nil	Nil	Nil	1	10	9	90	10	100	Nil	Nil	5	100	5	100	15

TABLE VI

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS SHOWING RELATIONSHIP BETWEEN THEIR CASTES AND SIZE OF HOLDING CULTIVATED BY THEM

Size of farm holding / Castes	Upto 5 acres						Above 5 acres to 10 acres						Above 10 acres						Total of adopters and non-adopters
	Adopter		Non-adopter		Total		Adopter		Non-adopter		Total		Adopter		Non-adopter		Total		
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Higher	Nil	Nil	10	100	10	100	1	100	Nil	Nil	1	100	2	100	Nil	Nil	2	100	13
Intermediate	48	18.04	218	81.96	266	100	35	43.21	46	56.79	81	100	33	66.0	17	34.0	50	100	397
Lower	Nil	Nil	12	100	12	100	Nil	Nil	1	100	1	100	Nil	Nil	Nil	Nil	Nil	Nil	13
Others	Nil	Nil	14	100	14	100	1	100	Nil	Nil	1	100	Nil	Nil	Nil	Nil	Nil	Nil	15

TABLE VII

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO RELATIONSHIP BETWEEN THEIR AGES AND EDUCATIONAL BACKGROUND

Age / Educational background	Young farmers (18 to 30 years)						Middle-aged farmers (31 to 45 years)						Old farmers (46 years and above)						Total of adopters and non-adopters
	Adopter		Non-adopter		Total		Adopter		Non-adopter		Total		Adopter		Non-adopter		Total		
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Illiterate	1	16.66	5	83.34	6	100	3	9.09	30	90.91	33	100	2	4.34	44	95.66	46	100	85
Upto 7th class	3	14.28	18	85.72	21	100	29	28.15	74	71.85	103		44	31.81	94	68.19	138	100	262
Above 7th class	19	44.18	24	55.82	43	100	15	50	15	50	30	100	5	27.77	13	72.23	18	100	91

TABLE VIII

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO RELATIONSHIP BETWEEN THEIR AGES AND SIZE OF FARM HOLDINGS CULTIVATED BY THEM

Size of farm holding \ Age	Young farmers (18 to 30 years)						Middle-aged farmers (31 to 45 years)						Old farmers (46 years and above)						Total of adopters and non-adopters
	Adopters		Non-adopters		Total		Adopters		Non-adopters		Total		Adopters		Non-adopters		Total		
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
Upto 5 acres	11	22.91	37	77.09	48	100	11	10.67	92	89.67	103	100	18	12.58	125	87.42	143	100	294
Above 5 acres to 10 acres	7	53.84	6	46.16	13	100	19	50	19	50	38	100	9	29.03	22	71.97	31		82
Above 10 acres	5	55.55	4	44.45	9	100	17	68	8	32	25	100	24	85.72	4	14.28	28	100	62

Data Regarding Season-wise Adoption, Crops Replaced, Bottlenecks in Adoption, and Qualities of Hybrid Bajra Which Attracted Farmers for Its Adoption

Season-wise Adoption of Hybrid Bajra Cultivation

There are always some persons who adopt first, some who adopt later and some who adopt last and for some practices and ideas, some who never adopt. The rate of adoption in a community or area is usually slow when a practice is first introduced, with a much more rapid rate of acceptance later on. In fact, most of the adoptions occur in the later periods of the adoption cycle.

To investigate when for the first time hybrid bajra cultivation was introduced in the village of Ajarpura and what was the further trend of adoption, the informations from the adopters were collected, classified, tabulated and have been presented in Table IX, and this fact has graphically been represented in Figure 1.

Crops Replaced by Hybrid Bajra Cultivation

To investigate what changes in cropping pattern have been brought on account of adoption of hybrid bajra, the adopters were requested to provide informations about the crops which they preferred to forego in the interest of growing of hybrid bajra. The informations thus collected were classified, tabulated and have been presented in Table X.

TABLE IX

NUMBERS AND PERCENTAGES OF ADOPTERS AND REJECTERS, AND AREA COVERED UNDER HYBRID BAJRA DURING SUMMERS AND MONSOONS

Year/Season	Number of adopters out of 438					Number of rejecters out of 121 adopters				Area covered under hybrid bajra* in acres
	Continued	Readopter	Fresh	Total number of adopters		Fresh rejecters	Other rejecters	Total number of rejecters		
				No	Per cent			No	Per cent	
1965 Summer	-	-	2	2	0.45	Nil	Nil	Nil	Nil	2.50
1965 Monsoon	1	-	-	1	0.23	1	Nil	1	0.82	0.75
1966 Summer	1	1	13	15	3.45	Nil	Nil	Nil	Nil	23.00
1966 Monsoon	6	-	1	7	1.61	8	1	9	7.38	12.00
1967 Summer	6	5	30	41	9.43	1	1	2	1.64	56.00
1967 Monsoon	12	1	22	35	8.05	26	3	29	23.99	49.00
1968 Summer	16	14	49	79	18.17	19	19	38	31.41	108.00
1968 Monsoon	19	4	3	26	5.98	50	45	95	78.51	34.00

* Total area covered during four Summers 189.50 acres
Total area covered during four Monsoons 95.75 acres

FIG. 1

DISTRIBUTION OF AJARPURA VILLAGE FARMERS WITH RESPECT TO THEIR ADOPTION OF HYBRID BAJRA CULTIVATION DURING SUMMERS AND MONSOONS.

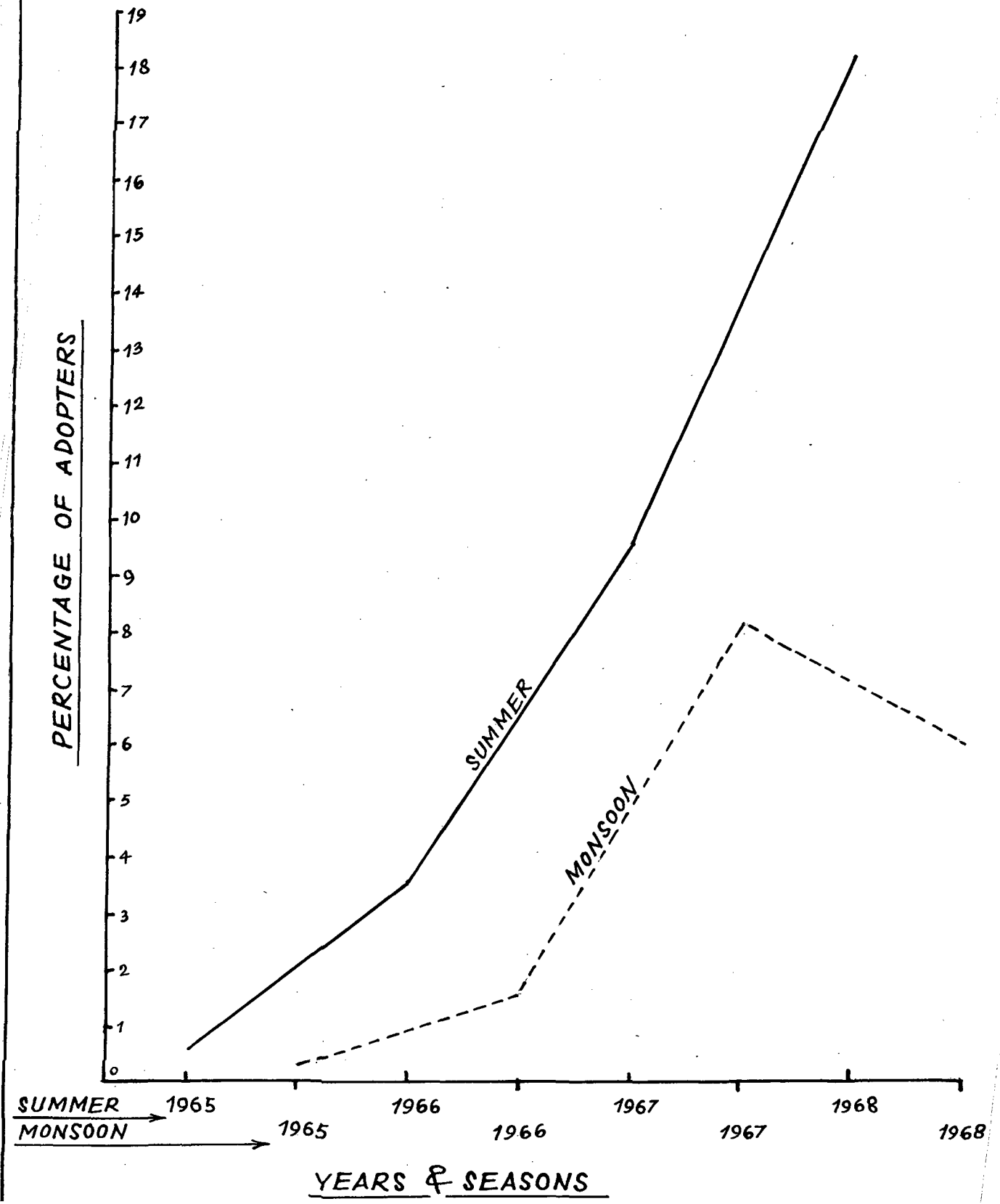

TABLE X

NUMBERS OF ADOPTERS WHO REPLACED OTHER CROPS FOR HYBRID BAJRA IN SUMMERS AND MONSOONS

Year//Season	Number of adopters who increased area under hybrid bajra replacing crops of					
	Tobacco	Potato	Wheat	Kodra	Local bajra	Paddy
1965 Monsoon	-	-	-	-	-	-
1966 Summer	-	-	-	-	-	-
1966 Monsoon	1	1	1	-	-	-
1967 Summer	-	1	-	-	-	-
1967 Monsoon	3	2	-	-	1	-
1968 Summer	2	-	-	-	-	-
1968 Monsoon	1	4	-	1	-	1
Total	7	8	1	1	1	1

Bottlenecks Which Made Adopters to Reject Hybrid Bajra Cultivation

An innovation may be rejected at any stage in the adoption process. Rejection is a decision not to adopt an innovation. Rejection of an idea may be temporary. Rejection of an innovation can also occur after adoption. This behaviour is called a "discontinuance". A discontinuance is a decision to cease use of an innovation after previously adopting.

To investigate the bottlenecks which made adopters to reject the adoption of hybrid bajra cultivation, the informations from the adopters were collected, tabulated and have been presented in Table XI.

TABLE XI

NUMBERS OF FARMERS WHO REJECTED HYBRID BAJRA CULTIVATION DUE TO DIFFERENT BOTTLENECKS AS STATED BY THEM IN SUMMERS AND MONSOONS

Year/Season	Number of farmers who rejected hybrid bajra cultivation due to bottlenecks of							
	Hard stalks	Irrigation	Adulterated seed	Lodging	Timely seed was not available	To take other crops	Low yield in previous trial	Taste of hybrid bajra chapatis is not palatable
1965 Monsoon	1	-	-	-	-	-	-	-
1966 Summer	-	-	-	-	-	-	-	-
1966 Monsoon	4	-	-	2	-	4	1	-
1967 Summer	4	1	-	-	-	2	-	-
1967 Monsoon	14	-	3	7	-	10	1	1
1968 Summer	19	5	4	-	1	5	3	1
1968 Monsoon	32	1	10	13	1	26	8	3
Total	74	7	17	22	2	47	13	5

Qualities Which Attracted Adopters for Growing Hybrid Bajra

Relative advantage is the degree to which an innovation is superior to ideas it supersedes. The degree of relative advantage is often expressed in economic profitability of increases in production, but the relative advantage dimension may be measured in other ways.

To study the qualities of hybrid bajra which attracted farmers, informations from the adopters were collected, tabulated and have been presented in Table XII.

TABLE XII

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO THEIR CHOICES OF QUALITIES OF HYBRID BAJRA AS STATED BY THEM

Qualities which attracted	Number and percentages of adopters	
	Number	Per cent
More yield	121	100
More tillering	41	33.88
Compact ear-head	33	27.27
Less -losses by birds	12	9.91
Early maturity	-	-
Any other quality	-	-

Data Regarding Position in Village Organisations Occupied by the Adopters and Non-adopters

The position occupied by a farmer in various village organisations represents his social status in Indian Culture. The present investigation included as one of its important aspects the study of influence of position occupied in various village organisations on the adopters and non-adopters. Therefore, the data were obtained from the farmers about their position (member, vice-president, president, vice-chairman, chairman etc.) occupied in village organisations such as panchayat, service co-operative society, farmers' club, youth club, bhajan-mandals, milk producers' co-operative society in their village. The same have been tabulated and presented in Table XIII.

TABLE XIII

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO THEIR POSITIONS OCCUPIED IN THEIR VILLAGE ORGANISATIONS

Village organisations	Adopters (N = 121)		Non-adopters (N = 317)	
	Number	Per cent	Number	Per cent
Panchayat	4	3.30	3	0.94
Service Co-operative Society	105	86.77	170	53.62
Farmer's club	-	-	2	0.63
Youth club	8	6.61	4	1.36
Bhajan Mandal	16	13.22	5	1.57
Milk Producers' Cooperative Society	118	97.52	252	79.49

Data Relating to Participation of Family Members, Friends, Neighbours, Relatives and the Self about Farm Matters and the Adoption and Non-adoption

The farming in India is said to be a family enterprize. the extent to which the family members, friends, neighbours and the relatives influence the decision of a farmer for adopting new farm practices determines to a great extent the rate of adoption. The farmers were requested to provide information regarding with whom of their family members, friends, neighbours and the relatives they consulted for adopting the practices selected under study.

Decisions of Adopters and Non-adopters as Influenced by Various Agencies

The informations collected from the adopters and non-adopters about their decisions for adopting agricultural practices as influenced by the various agencies have been presented in Table XIV.

Relationship Between Age and Decision Making of the Adopters

To investigate the relationship between age and decision making of adopters, the data already collected for these two factors in the schedule were cross-tabulated and the same have been presented in Table XV.

TABLE XIV

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO THEIR DECISION-MAKING AS INFLUENCED BY DIFFERENT FAMILY MEMBERS

Decisions influenced by	Adopters (N = 121)		Non-adopters (N = 317)		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Self	78	24.30	243	75.71	321	100
Father	17	54.84	14	45.16	31	100
Brother	14	63.66	8	36.34	22	100
Friends	6	85.71	1	14.29	7	100
Neighbours	5	33.33	10	66.67	15	100
Mother	3	37.50	5	62.50	8	100
Relatives	3	12.00	22	88.00	25	100
Son	2	12.50	14	87.50	16	100
Wife	-	-	-	-	-	-

TABLE XV

NUMBERS AND PERCENTAGE OF ADOPTERS AND NON-ADOPTERS SHOWING RELATIONSHIP BETWEEN THEIR AGES AND DECISION-MAKING BEHAVIOUR

Age / Consultation with	Young farmers (18 to 30 years) (N = 70)				Middle-aged farmers (31 to 45 years) (N = 166)				Old farmers (46 years and above) (N = 202)			
	Adopters		Non-adopters		Adopters		Non-adopters		Adopters		Non-adopters	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Self	9	12.85	23	32.85	28	16.80	96	57.60	41	20.09	124	61.38
Father	8	11.40	9	12.81	8	4.80	4	2.40	1	0.49	1	0.49
Mother	2	2.85	4	5.70	Nil	Nil	Nil	Nil	1	0.49	1	0.49
Brother	2	2.85	3	4.27	9	5.40	2	1.20	3	1.47	3	1.47
Relative	2	2.85	6	8.55	1	0.60	9	5.40	Nil	Nil	7	3.43
Neighbour	Nil	Nil	2	2.85	2	1.20	5	3.00	4	1.96	3	1.47
Friend	Nil	Nil	Nil	Nil	3	1.80	1	0.60	3	1.47	Nil	Nil
Son	Nil	Nil	Nil	Nil	Nil	Nil	2	1.20	2	0.98	12	5.88
Wife	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Data On Contacts With Extension Workers by Adopters and Non-adopters

To induce farmers to adopt improved techniques of agriculture extension workers are badly needed under our conditions. Farmers should remain in continuous contact with the new researches and apply this valuable knowledge in their fields with the help of extension workers, namely Gramsevaks, Extension Officers, Taluka Development Officers (Block Development Officers), and District Officers.

To study the contacts of adopters and non-adopters of hybrid bajra cultivation, with the extension workers, the farmers were requested to provide the informations about the extension workers to whom they contacted to seek information about the hybrid bajra cultivation. The data thus obtained have been analysed and presented in Table XVI.

Data on Sources of Farm Information Used by the Adopters and Non-adopters

In order to study the various sources of farm informations used by the adopters and non-adopters about the agronomical practices selected under study, a list of important information sources included in the schedule and grouped as personal sources: Agricultural scientists, extension workers (Gramsevaks, Extension Officers, Taluka Development Officers etc.), and progressive farmers; and the impersonal sources:

TABLE XVI

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS

IN RESPECT TO THEIR CONTACTS WITH

EXTENSION WORKERS

(Adopters - 121) (Non-adopters - 317)

Number of contacts	Gramsevak				Extension Officer				Taluka Development Officer				District Officer			
	Adopter		Non-adopter		Adopter		Non-adopter		Adopter		Non-adopter		Adopter		Non-adopter	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
0	1	0.82	18	5.67	1	0.82	18	5.67	1	0.82	18	5.67	1	0.82	18	5.67
1	19	15.70	66	20.85	4	3.28	3	0.94	2	1.64	1	0.31	1	0.82	1	0.31
2	24	19.83	49	15.45	5	4.13	3	0.94	2	1.64	2	0.62	0	-	2	0.62
3	70	57.85	184	58.04	12	9.91	4	1.26	6	4.92	1	0.31	1	0.82	1	0.31

research bulletins, leaflets and booklets, news papers, radio etc., were read before the cultivators. They were requested to provide information about which of the above mentioned sources were used by them for adopting improved farm practices included in the study. The data thus obtained have been analysed and the results have been described in Table XVII.

Relationship Between Education and Sources of Information

To investigate how much formal education farmers had seemed to be related to the extent of use of various information sources by them, the data gathered for single factors of education and sources of information were crosstabulated and the results have been presented in Table XVIII.

Data Relating to Production Supplies of Seed, Fertilizers and Pesticides in Respect of their Sources of Supplies, Timeliness, Accessibility, Adequacy, and Terms of Cash or Credit for Fertilizers

Production supplies required by the new agronomical practices for hybrid bajra cultivation have to come mainly from outside the village. The source of supply, timeliness,

TABLE XVII

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO SOURCES OF INFORMATIONS USED BY THEM

Sources of information	Adopters		Non-adopters		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
I Personal Sources						
Agricultural Scientist	8	80	2	20	10	100
Extension Workers	96	46.15	112	53.85	208	100
Progressive Farmers	78	30.23	180	69.77	258	100
II Impersonal Sources						
Research bulletins	3	75	1	25.00	4	100
Leaflets and booklets	41	51.25	39	48.75	80	100
News papers	85	44.27	107	55.73	192	100
Radio	71	44.10	90	55.90	161	100
Other impersonal source if any	Nil	Nil	Nil	Nil	Nil	Nil

TABLE XVIII

NUMBERS AND PERCENTAGE OF ADOPTERS AND NON-ADOPTERS SHOWING RELATIONSHIP BETWEEN THEIR EDUCATIONAL BACKGROUND AND SOURCES OF INFORMATIONS USED BY THEM

Educational Background / Source of information	Illiterate (N = 85)				Upto 7th class (N = 262)				Above 7th class (N = 91)			
	Adopters		Non-adopters		Adopters		Non-adopters		Adopters		Non-adopters	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
I Personal Source												
Agricultural Scientists	Nil	Nil	Nil	Nil	3	1.10	Nil	Nil	5	5.49	3	3.30
Extension Workers	4	4.70	14	16.47	64	24.46	63	23.10	37	40.68	40	43.92
Progressive farmers	4	4.70	34	40.00	51	18.70	103	39.31	33	36.30	42	46.15
II Impersonal Source												
Research bulletins	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	3	3.30	2	2.19
Leaflets and booklets	Nil	Nil	Nil	Nil	20	7.63	20	7.63	26	28.55	20	21.96
News papers	Nil	Nil	3	3.54	48	17.60	78	29.77	36	39.60	42	46.15
Radio	3	3.54	5	5.88	32	12.21	51	18.70	33	36.30	35	38.43
Other impersonal source if any	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

accessibility (nearness), adequacy and terms in the form of cash or credit of these supplies are crucial not only for proper application of recommended practices, but also largely to determine whether adoption will be considered in the first place.

To investigate such an important aspect in adoption, the farmers were requested to provide informations about sources of supply, timeliness, accessibility, adequacy and terms for supply in respect of hybrid bajra seed, chemical fertilizers and pesticides. The informations collected in this respect were classified, tabulated and have been presented in Table XIX.

Data Relating to Agronomical Practices of Hybrid Bajra Cultivation Adopted by Farmers

In view of the crucial importance of adoption of recommended cultural practices including the use of fertilizers in recommended doses on hybrid bajra, first the recommended practices are described as under:

Recommended Cultural Practices for Hybrid Bajra Cultivation

The recommended cultural practices as given in the "Khedut Patrika-44" published by the Information Branch of the Directorate of Agriculture, Gujarat Government are as follows:

TABLE XIX

NUMBERS OF ADOPTERS SHOWING SOURCES OF AVAILABILITY, TIMELINESS, ACCESSIBILITY, ADEQUACY AND TERMS OF SUPPLIES OF SEED, FERTILIZERS AND PESTICIDES AS STATED BY THEM

Supplies	Availability			Timeliness		Accessibility		Adequacy		Terms	
	R.S.*	G.S.+	S.C.S.@	Yes	No	Yes	No	Yes	No	Cash	Credit
Seed	1	16	104	121	Nil	121	Nil	121	Nil	121	Nil
Fertilizers	Nil	Nil	121	121	Nil	-	-	121	Nil	118	3
Pesticides	Market Anand 1			1	Nil	1	Nil	1	Nil	1	Nil

*R.S. stands for Research Station. One person got hybrid bajra seed in 1965 summer from Research Station through his relative who was in government job.

+G.S. stands for Gramsevak. One person got hybrid bajra seed from Gramsevak in 1965 summer which was brought for trial on cultivator's field.

@S.C.S. stands for Service Co-operative Society.

(1) Preparatory tillage: The field may be ploughed once by plough and twice by harrow.

(2) Sowing of Seed: The recommended seed rate is 1.5 kgs. per acre. The distance between two rows and two plants within a row may be kept at 24 and 9 inches respectively.

(3) Manuring: (a) Basal dressing - Prior to sowing 15 carts of farm yard manure, 15 kgs of each P_2O_5 and N in the form of phosphatic and nitrogenous fertilizers may be used per acre.

(b) Top-dressing - 15 kgs of N per acre in the form of nitrogenous fertilizers may be given between rows at 3 to 4 inches away from the plants after about one month of sowing.

(4) Interculturing: Interculturing may be started when the plant becomes 6 to 9 inches high. Five to six interculturings may be done by the time flowers set.

(5) Plant protection measures: When there is a cloudy and moisturous weather, the crop is likely to be attacked by insects. In order to prevent and destroy these insects, an ounce of Ethyl Parathion (50 per cent) EC mixed with water may be sprayed two to three times.

To investigate the extent of adoption of agronomical practices recommended for hybrid bajra cultivation, the farmers were requested to reply the questions in respect of

preparatory tillage, sowing of seed, manuring, interculturing, plant protection measures and in addition to these items, they were also requested to provide information about the period of harvesting and the yield per acre obtained. The data gathered under the above mentioned heads have been described in the following pages.

Preparatory Tillage Adopted by Farmers

To investigate the extent of adoption of preparatory tillage the first requirement of hybrid bajra cultivation, the informations from the farmers were collected on schedule with respect to number of ploughings done by 'desi' plough, tractor and the number of harrowings completed. The data were analysed and have been presented in Tables XX-1A, XX-1B, and XX-1C.

Sowing of Seed Adopted by Farmers

To study, whether the farmers had sown the recommended seed rate, maintained the recommended distance between two rows of hybrid bajra plants, the recommended distance between two plants, and the method of sowing, the informations from the farmers were collected.

The data so gathered were classified, tabulated and have been presented in Tables XX-2A, XX-2B, XX-2C and XX-2D.

TABLE XX-1A

NUMBERS AND PERCENTAGES OF ADOPTERS SHOWING THE NUMBERS OF PLOUGHINGS DONE IN PREPARATORY TILLAGE BY 'DESI' PLOUGH

No ploughing done		Recommended number of ploughing		More than recommended number of ploughings							
0		1		2		3		4		5	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Number	Number	Per cent
6	4.92	18	14.76	67	55.37	23	19.21	4	3.28	3	2.46

TABLE XX-1B

NUMBERS AND PERCENTAGES OF ADOPTERS SHOWING THE NUMBERS OF PLOUGHINGS DONE IN PREPARATORY TILLAGE BY TRACTOR

No ploughing done		Number of ploughings done by tractor					
		1		2		3	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
86	71.21	15	12.39	18	14.76	2	1.64

TABLE XX-1C

NUMBERS AND PERCENTAGES OF ADOPTERS SHOWING THE NUMBER OF HARROWINGS DONE IN PREPARATORY TILLAGE BY THEM

No harrowing done		Less than recommended number of harrowing		Recommended number of harrowings		More than recommended number of harrowing	
0		1		2		3	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
42	34.71	35	28.94	42	34.71	2	1.64

TABLE XX-2A

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO SEED RATES USED PER ACRE BY THEM

Seed rates used by adopters in kgs. per acre					
Less than the recommended seed rate of 1 kg per acre		Recommended seed rate of 1½ kgs per acre		More than the recommended seed rate of 2 kgs. per acre	
Number	Per cent	Number	Per cent	Number	Per cent
11	9.02	94	77.86	16	13.12

TABLE XX-2B

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO ROW TO ROW DISTANCE IN INCHES MAINTAINED BY THEM

Row to row distance in inches maintained by adopters											
Less than the recommended distances maintained by adopters in inches										Row to row recommended distance in inches	
9		12		15		18		21		24	
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
2	1.64	3	2.46	84	69.48	29	23.96	3	2.46	Nil	Nil

TABLE XX-2C

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO PLANT TO PLANT DISTANCES IN INCHES MAINTAINED BY THEM

Less than the recommended plant to plant distances in inches						Plant to plant recommended distance of 9 inches		More than the recommended plant to plant distance of 12 inches	
3		4		6					
Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
38	31.94	36	29.52	30	24.06	17	13.94	Nil	Nil

TABLE XX-2D

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO METHOD OF SOWING FOLLOWED BY THEM

Method of sowing followed by adopters			
Drilling		Transplanting	
Number	Per cent	Number	Per cent
115	95.08	6	4.92

Manuring

An analysis of the composition of imputs used on hybrid bajra by adopters was studied.

At the very outset it may be mentioned that the plant nutrients obtained from both the organic manure and inorganic fertilizers used by the adopters on hybrid bajra have been taken into consideration. All the same it would be unrealistic to expect that farmers would apply the plant nutrient at exactly the recommended rate. In this study, the farmers whose application rate was 5 per cent more or less than the recommended rates of organic manure and inorganic fertilizers have been included in the group 'just about the recommended rate'.

In calculating the plant nutrients the following assumptions have been taken.

To the question of farm yard manure used for basal dressing in terms of cartloads, the following standards have been fixed for standardising the calculation of plant nutrients.

The recommended dose of farm yard manure in terms of cartloads is 15 cartloads per acre.

Less than 15 cart-loads taken as 10 cartloads. The reason being that the range in this group was found 9 to 12 cartloads.

More than 15 cartloads taken as 20 cartloads. The reason being that the range in this group found was 18 to 21 cartloads.

The weight of the cartload of farm yard manure was taken as 1000 lbs.[54]

Farm yard manure containing	0.5 per cent N and 0.2 per cent P_2O_5
Ammonium Sulphate	20.0 per cent N
Urea	44.0 per cent N
Calcium Ammonium Nitrate	20.0 per cent N
Ammo-phos	11.0 per cent N, 48.0 per cent P_2O_5 [55]
Di-ammo-phos	21.0 per cent N, 54.0 per cent P_2O_5
Superphosphate (Single)	16.0 per cent P_2O_5

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[54] K.S.Yawalkar, and J.P.Agrawal, Manures And Fertilizers (Nagpur:Agri-Horticultural Publishing House, 1922), p.22.

[55] Ibid. p.126

The adopters were requested to provide the informations about the organic manure and inorganic fertilizers used, replies were recorded on the schedule. The informations so gathered were calculated, classified, tabulated and have been presented in Table XX-3.

TABLE XX-3

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO RATE OF APPLICATION OF N,AND P_2O_5 THROUGH ORGANIC MANURE AND INORGANIC FERTILIZERS USED ON HYBRID BAJRA BY THEM

(Number of adopters = 121)

Plant nutrients	Just about the recommended rate		More than the recommended rate		Less than the recommended rate		Not applied at all	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
N	8	6.62	72	59.50	38	31.40	3	2.48
P_2O_5	39	32.24	19	15.70	3	2.48	60	49.58

Interculturing Adopted by Farmers

Data regarding the number of intercultural operations done in hybrid bajra fields were gathered and have been reported in Table XX-4.

TABLE XX-4

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO NUMBER OF INTERCULTURINGS ADOPTED BY THEM

Number of interculturing	Number of adopters	
	Number	Per cent
0	12	9.92
1	22	18.18
2	51	42.15
3	32	26.45
4	3	2.48
5	1	0.82
Total	121	100.00

Plant Protection Measures Adopted by Farmers

To investigate upto what extent farmers have adopted plant protection measures, the farmers were requested to provide informations about the seed treatment, attack of diseases, attack of insect pests and measures taken to control them. The replies gathered were classified, tabulated and have presented in Table XX-5.

TABLE XX-5

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO PLANT PROTECTION MEASURES TAKEN FOR SEED TREATMENT, AGAINST DISEASES AND INSECT PESTS

Plant protection measures	Yes		No	
	Number	Per cent	Number	Per cent
(i)(a) Treated seed supplied to farmers	121	100	-	-
(b) Seed treatment done by farmers	-	-	-	-
(ii)(a) Attack of disease	-	-	121	100
(b) Measures taken to control disease	-	-	-	-
(iii)(a) Attack of insect pests	61	50.41	60	49.59
(b) Measures taken to control	1	0.82	120	99.18

Maturity Days after Sowing of Hybrid Bajra as Stated by Adopters

To investigate the maturity period of hybrid bajra the farmers were requested to provide informations

about the maturity days of hybrid bajra. The informations were collected, tabulated and have been presented in Table XX-6.

TABLE XX-6

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO MATURITY DAYS OF HYBRID BAJRA AS STATED BY THEM

Maturity days as stated by adopters	Numbers and percentages of adopters	
	Number	Per cent
80	-	-
85	2	1.65
90	57	47.12
95	20	16.52
100	36	29.75
105	3	2.48
Not yet matured	3	2.48
Total	121	100.00

Yield of Hybrid Bajra per Acre as Stated by Adopters

To investigate the average yield of hybrid bajra in the cultivators' fields per acre, the adopters were requested to provide the informations about the yields

per acre they received after adopting recommended agronomical practices and to express their satisfaction or dis-satisfaction with the yield per acre obtained. The data were collected, classified, tabulated and have been presented in Table XX-7A and XX-7B.

TABLE XX-7A

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO YIELDS PER ACRE OBTAINED AS STATED BY THEM

Yield in kgs per acre	Numbers and percentages of adopters	
	Number	Per cent
200 to 500	7	5.74
501 to 600	8	6.56
601 to 700	14	11.48
701 to 800	5	4.10
801 to 900	14	11.48
901 to 1000	1	0.82
1001 to 1100	28	22.96
1101 to 1200	7	5.74
1201 to 1300	11	9.41
1301 to 1400	11	9.41
1401 to 1500	3	2.46
1501 to 1600	Nil	Nil
1601 to 1700	3	2.46

(Table XX-7A Contd.)

Yield in kgs per acre	Numbers and percentages of adopters	
	Number	Per cent
1701 to 1800	3	2.46
1801 to 1900	Nil	Nil
1901 to 2000	Nil	Nil
2001 to 2100	1	0.82
2101 to 2200	2	1.64
Yield not yet taken	3	2.46
Total	121	100

TABLE XX-7B

NUMBERS AND PERCENTAGES OF ADOPTERS WITH RESPECT TO THEIR SATISFACTION EXPRESSED WITH THE YIELD OF HYBRID BAJRA OBTAINED

Yes		No		Not yet yield obtained	
Number	Per cent	Number	Per cent	Number	Per cent
69	57.02	49	40.50	3	2.48

Barriers which Prevented Farmers from Adoption of Hybrid Bajra Cultivation

To investigate the possible difficulties and barriers which prevented farmers from adoption or partial

adoption of hybrid bajra cultivation, their views were taken simultaneously from adopters as well as non-adopters. The informations gathered were categorised, tabulated and the results have been presented in Table XXI. Out of 121 adopters 35 adopters stated that they did not face any barrier and 86 adopters posed some difficulties.

TABLE XXI

NUMBERS AND PERCENTAGES OF ADOPTERS AND NON-ADOPTERS WITH RESPECT TO BARRIERS WHICH PREVENTED THEM FROM ADOPTION OF HYBRID BAJRA CULTIVATION AS STATED BY THEM

Barriers	Adopters		Non-adopters	
	Number	Per cent	Number	Per cent
i. Financial	24	19.83	134	42.27
ii. Irrigation	17	14.04	56	17.66
iii. Non-availability of unadulterated hybrid bajra seed	3	2.48	1	0.62
iv. Lack of manurial resources	-	-	-	-
v. Non-availability of of pesticides	-	-	-	-
vi. Lack of human labour	-	-	1	0.62

(Table XXI Contd.)

	Barriers	Adopters		Non-adopters	
		Number	Per cent	Number	Per cent
vii.	Lack of useful information about hybrid bajra cultivation	2	1.64	2	1.24
viii.	Hard stalks	34	28.08	98	30.91
ix.	Soil is not suitable	-	-	16	9.92
x.	Late maturity	1	0.82	3	1.86
xi.	Land is far off situated from the village	-	-	14	8.68
xii.	Absentee landlordism	-	-	1	0.62
xiii.	Lodging	8	6.56	-	-

CHAPTER V

INTERPRETATION OF THE FINDINGS

While evaluating the results obtained from this study in chapter IV, it is clear that some of the personal characteristics of the adopters and non-adopters are highly associated with the adoption and non-adoption behaviour in relation to hybrid bajra cultivation in Ajarpura village of Anand Taluka of Gujarat State. With a few exceptions the studies conducted abroad as well as in India have revealed that the caste, age, education, size of farm holdings operated etc. are highly related with the adoption of improved agricultural practices. Though, the physical, socio-economic and the other conditions vary from place to place, the above characteristics are highly related with the adopters of hybrid bajra cultivation in this area also.

Personal Characteristics of Adopters and Non-adopters

Caste. The influence of the caste as one of the social factors, has shown some difference on the adopters. Among the farmers who belonged to relatively higher caste, i.e. Brahmins adopted (23.07 per cent, Table I) the hybrid bajra cultivation. From the intermediate castes such as Patels, Rajputs and artisans etc. adopted 29.47 per cent. Patels and Rajputs in this area are the land cultivating castes. The farmers belonging to the lower castes group of

Harijans, Bhoi, Vagri, Rohit (Chamar) etc. did not at all adopt hybrid bajra cultivation as their frequency is nil in adopters' category. The farmers belonging to 'others' caste group such as Muslims and Christians did not show difference in adoption behaviour as percentage shown against them was (6.66 per cent) very less. Therefore, it may be concluded that more adoption can be expected from intermediate and higher castes in this area.

Age. Table II clearly indicated that among the farmers belonging to young group adopted more (32.85 per cent) the hybrid bajra cultivation as compared to the middle-aged and old farmers' groups having (28.31 per cent) and (25.24 per cent) adopters respectively. The findings of this study support the general view as stated by Lionberger (1964) that younger farmers seem to be more inclined to adopt new farm practices than elderly farmers.

Educational background. Among the 'above 7th class' educational group 42.85 per cent farmers adopted hybrid bajra cultivation followed by the educational group of 'upto 7th class' with 29.00 per cent. From illiterate group only 7.05 per cent adopted hybrid bajra cultivation. Thus, the finding of this study supports the basic belief that more than eight years schooling is almost always associated with higher adoption rate than lower schooling. This study is in line with the reporting of Lionberger (1964).

Size of farm holding operated. Table IV clearly indicated that the hybrid bajra cultivation was adopted more by the farmers cultivating 'above 10 acres' farm holding group (74.29 per cent). There is a highly significant difference among the cultivators of 'above 10 acres.' From the size of operated holding group of 'above 5 acres to 10 acres,' there were 42.68 per cent adopters, and there were only 13.60 per cent adopters from 'upto 5 acres' size of farm group. The finding of this study is consistent with the reporting of Lionberger (1964), stating that size of farm is nearly always positively related to the adoption of new farm practices.

Interactional Relationship Between Some of the Personal Characteristics

Relationship between caste and age. None of the young farmers belonging to higher caste (Table V) adopted the hybrid bajra cultivation. Out of 3 farmers of higher caste and of middle-aged there was 1 (33.33 per cent) adopter. Only 2 (22.22 per cent) adopters emerged out of 9 farmers coming from high caste and having old age.

From the farmers of intermediate caste and of young, middle and old ages there were adopters 23 (33.33 per cent), 45 (30.20 per cent), and 49 (26.06 per cent) out of 69, 149 and 188 farmers of each group respectively.

None of the farmers coming from lower caste and belonging to any three levels of age-groups adopted hybrid bajra cultivation.

Only 1 adopter (10 per cent) out of population of 10 farmers of otners' caste group and of middle aged emerged.

This study shows a trend that the farmers coming from high and intermediate castes, and relatively younger in age are more prone towards higher adoption.

Relationship between castes and size of farm holdings. Adopters 1 (100 per cent), and 2 (100 per cent) emerged from the group of farmers of high caste and cultivating 'above 5 to 10 acres' and 'above 10 acres' of holdings respectively. While none, even from the population of 10 farmers belonging to high caste but cultivating 'upto 5 acres' farm holding (Table VI) adopted.

Farmers 33 (66.00 per cent) out of 50, 35 (43.21 per cent) out of 81, and 48 (18.04 per cent) out of 266 coming from intermediate castes and cultivating 'above 10 acres,' 'above 5 acres and 10 acres', and 'upto 5 acres' of farm holding respectively adopted hybrid bajra cultivation.

None of the farmers from 'lower caste' group and cultivating all the three levels of farm holdings adopted hybrid bajra cultivation.

Only 1 adopter (100 per cent) belonging to 'others' caste and cultivating 'above 5 to 10 acres' of holding emerged, while none from the other two remaining farm holdings and of the same caste adopted.

This study has shown a positive trend of adoption with respect to the larger size of farm holding combined with relatively high caste.

Relationship between age and educational background. From the farmers of illiterate group and of young, middle, and old age there were adopters 1 (16.66 per cent), 3 (9.09 per cent), and 2 (4.34 per cent) out of 6, 33 and 46 farmers of each group respectively (Table VII).

Educated 'upto 7th class' and possessing young, middle and old ages there emerged 3 (14.28 per cent), 29 (28.15 per cent), and 44 (31.81 per cent) out of 21, 103, and 138 population of farmers respectively, adopters of hybrid bajra cultivation.

From the group of 43 young farmers and educated 'above 7th class', 19 (44.18 per cent) adopted the hybrid bajra cultivation. Similarly out of 30 farmers of middle-age and educated 'above 7th class' 15 (50 per cent) adopted. There were 5 (27.77 per cent) of adopters from the group of 18 farmers belonging to old-age group and having the same level of education.

According to this study, middle-aged and young farmers having received education 'above 7th class' have shown comparatively high percentage of adoption.

Relationship between ages and size of farm holding. From the group of farmers cultivating farm holding of 'upto 5 acres' and belonging to young, middle, and old ages, there were adopters 11 (22.91 per cent), 11 (10.67 per cent), and 18 (12.58 per cent) out of 48, 103 and 143 population of farmers (Table VIII).

Similarly, from the group of farmers cultivating farm holding of 'above 5 acres to 10 acres' and attaining age of young, middle and old, there emerged adopters 7 (53.84 per cent), 19 (50 per cent), and 9 (29.03 per cent) out of 13, 38 and 31 farmers.

From the group of farmers operating large size of holding of 'above 10 acres' and having young age, there were 5 (55.55 per cent) adopters. From the group of middle age, old age and cultivating the large size of holding there were 17 (68 per cent) and 24 (85.72 per cent) adopters from the population of 25 and 28 farmers of respective groups.

Young farmers cultivating 'upto 5 acres' and 'above 5 acres to 10 acres' have shown higher percentage of adopters in their respective groups.

Season-wise Adoption, Crops Replaced, Bottlenecks in Adoption, and Qualities of Hybrid Bajra which Attracted Farmers for Its' Adoption

Season-wise adoption. Table IX clearly indicated that in each year right from the introduction of hybrid bajra cultivation in the village, summers were preferred more

than monsoons for adoption of hybrid bajra both from joining more number of fresh adopters and covering more area by the farmers. In Summer 1965, 2 innovators emerged covering 2.5 acres under hybrid bajra, but in the monsoon of the same year 1 innovator temporarily rejected the adoption of hybrid bajra cultivation, consequently there was only 1 grower covering total area of 0.75 acre. In the Summer of 1966, along with 1 continued adopter, 1 farmer readopted and 13 freshers joined, making the total number of adopters as 15 and covering area of 23.00 acres. In the Monsoon of 1966, 6 adopters remained in the field, and 9 dropped and 1 fresh adopter joined the adopters' team making the total of 7 adopters covering 12 acres of area. Similarly in the summer of 1967, 6 adopters continued and 1 dropped temporarily, with these 6 continuances 5 readopters and 30 freshers appeared making the total of 41 adopters covering 56.00 acres. In the monsoon of the same year there remained 35 adopters. Likewise in the Summer of 1968 there were 79 adopters covering 108 acres, but in the monsoon of the same year there was a heavy drop of adopters and only 26 remained in the field. The probable reasons of this heavy drop may be, primarily there was severe attack of insect pests in the previous summer, and there was also a rumour for adulterated seed of hybrid bajra which was being supplied.

One rejecter appeared in the monsoon of 1965, but there was no rejecter in the summer of 1966, The number of rejecters were 9, 1, 29, 38 and 95 for the seasons of

monsoon 1966, summer 1967, monsoon 1967, summer 1968 monsoon 1968 respectively.

Total area of all the summers was 189.50 acres whereas for all the four monsoons was 95.75 acres.

The probable reason for being more number of adopters and area under hybrid bajra during summers may be that there is a general observation that the yield of bajra is more in summers than monsoons. This has been supported by a study conducted at the Farm of Institute of Agriculture, Anand (Gujarat) for 15 years i.e. 1950-51 to 1965-66. The other reason may be that there is no fear of lodging in the summers as is in the monsoons.

Thus all these facts clearly suggest that the extension agency for extending hybrid bajra cultivation campaign under High Yielding Varieties Programme should concentrate more in monsoons than summers.

Crops replaced. The adopters who preferred hybrid bajra cultivation increased area under it in place of tobacco and potato as indicated in Table X. Out of 121 adopters 8 adopters replaced potato crop, 7 tobacco, and 1 each for wheat, kodra, local bajra, and paddy in different seasons.

Bottlenecks in adoption of hybrid bajra cultivation. The adopters stated the bottlenecks due to which they either temporarily or permanently rejected the adoption of hybrid bajra cultivation (Table XI). Rejecters 74 in number stated

that the stalks of hybrid bajra being thick were not found palatable by animals. Rejecters 47 in number dropped hybrid cultivation in one season or the other gave reason that they had to take other crops like tobacco, paddy etc. In monsoons rejecters made lodging as the bottleneck for rejection, the number of such adopters was 22. The enthusiasm of 17 adopters was dampened on account of the rumours of adulteration in the seed of hybrid bajra. Some rejecters advanced low-yield in previous trial, lack of irrigation, not-so-agreeable taste of hybrid bajra as hurdles in the way of adoption of hybrid bajra cultivation.

Qualities of hybrid bajra which attracted adopters. All the adopters 121 (100 per cent, Table XII) were attracted by high yielding quality of hybrid bajra. More tillering quality, and quality of compact ear-head attracted 33.88 per cent and 27.27 per cent of the adopters respectively. The quality of less losses by birds also attracted 9.91 per cent adopters. Not even a single adopter was attracted by the quality of early maturity.

Positions occupied in village organisations. The extent to which farmers occupied positions in various village organisations (Table XIII) such as panchayat, service co-operative society, farmers' club, youth club, bhajan mandals, and milk producers' co-operative society varied significantly among the adopters and non-adopters.

Among the various village organisations, seats in co-operative societies especially in milk co-operative society were occupied by relatively more number of farmers among adopters and non-adopters. The reason for this may be assigned to the fact that the 'Kaira District Co-operative Milk Producers' Union Ltd., Anand, has provided facilities for such co-operative society not only in the village under study but in almost all villages of the district.

Decision-making influenced by different family members of adopters and non-adopters. The information presented in Table XIV revealed that the extent to which the farmers consulted their family members, friends, neighbours and relatives for adopting the new agricultural practices varied with a few exceptions. The farmers belonging to adopters group consulted in the order of preference friends, brothers, fathers, mothers and self. On the other hand the farmers belonging to non-adopters group consulted in the order of preference relatives, sons self, neighbours, mothers, fathers and brothers etc. None of the adopters or non-adopters consulted his wife. This study does not support the popular belief that the farmers who take decision themselves adopt more number of practices than those whose decision is influenced by their family members.

Relationship between ages and decision-making behaviour of adopters. Table XV clearly indicated that adopters belonging to all the levels of age groups were significantly influenced by none but by themselves. Adopters belonging to 'young farmers' group were influenced by themselves (12.85 per cent), followed by the consultation of their fathers (11.40 per cent). From 'middle-aged farmers' group adopters were primarily influenced by themselves (16.80 per cent), followed with the consultation of their brothers (5.40 per cent). In case of adopters coming from 'old farmers' group were highly significantly influenced by themselves (20.09 per cent) followed by their neighbours' consultation only upto 1.96 per cent.

Thus the finding of this study is in line with the finding of Junghare and Rahudkar (1962) stating that the farmers who took decision themselves had adopted more number of practices than those whose decision was influenced by their family members. Another striking feature of this study is that adopters from 'young farmers' group in the second place were influenced by their fathers, whereas middle-aged adopters in the second place were influenced by their brothers and adopters from 'old farmers' group were practically influenced by none but by themselves.

Contacts with extension workers by adopters and non-adopters. With 3 contacts, Gramsevaks were equally used for getting farm informations both by adopters and

non-adopters (57.85 and 58.04 per cents respectively, Table XVII). This shows that the Gramsevaks who are the main link between the research stations and the farmers were sought as in important source of information to the farmers of both the categories. Extension officers and Taluka Development Officer were sought as important sources by adopters (9.91 and 4.92 per cents respectively) as compared to non-adopters who sought informations from the same sources only upto the extent of 1.26 and 0.31 per cents respectively. This may be because of the fact that these farmers belonged to relatively higher socio-economic status and are mostly in touch with the agencies at the Taluka Development Officer and research stations. Contacts with district officers were almost nil for adopters and non-adopters.

Sources of informations. From the group of personal sources farmers using agricultural scientists as source of information, there were 80 per cent adopters (Table XVIII) and 20 per cent non-adopters. There is no significant difference between the adopters and non-adopters utilising extension workers as source of informations, (46.15 per cent and 53.85 per cent). Among the farmers using progressive farmers as source of information, there were 30.23 per cent adopters and 69.77 per cent non-adopters.

From the group of impersonal sources of informations, there were 75 per cent adopters who used research bulletins as source of information. Among the 80 farmers using

informations from leaflets and booklets, there were 51.25 per cent adopters and 48.75 per cent non-adopters. There were 44.27 per cent adopters and 55.73 per cent non-adopters from the group of farmers utilising the information from news papers. From the group of farmers using radio as source of information there were 44.10 per cent adopters.

According to this study, adopters were highly significant in getting informations from agricultural scientists and research bulletins, This may be because of the fact that these farmers were the innovaters or early adopters and belonged to relatively higher socio-economic status and are mostly in touch with the agencies at agricultural research stations and Taluka Development Office.

Relationship between educational background and the sources of informations used. Extension workers, progressive farmers and radio were the only sources of informations used by the illiterate adopters (Table XVIII). From the illiterate farmers' group there were only 4.70 per cent, 4.70 per cent and 3.54 per cent adopters who used extension workers, progressive farmers, and radio respectively as sources of informations.

Adopters educated 'upto 7th class' had used sources of informations in order of preference as extension workers (24.46 per cent), progressive farmers (18.70 per cent), news papers (17.60 per cent), radio (12.21 per cent), leaflets and booklets (7.63 per cent), and agricultural scientists

(1.10 per cent). Thus, it shows that three extra sources namely news papers, leaflets and booklets, and agricultural scientists were used by the 'upto 7th class' educated adopters in addition to what illiterate adopters had used.

From the group of 'above 7th class' educated farmers, there were 40.68 per cent, 39.60 per cent, 36.30 per cent, 36.30 per cent, 28.55 per cent, 5.49 per cent, and 3.30 per cent adopters who used extension workers, news papers, radio, progressive farmers, leaflets and booklets, agricultural scientists and research bulletins respectively in the order of preference. Thus adopters educated 'above 7th class' had utilised one extra at the same time very important source of information namely research bulletins in seeking informations.

None of the adopters belonging to three educational levels had pointed out any other source used against 'other impersonal source if any' head.

Sources of availability, timeliness, accessibility, adequacy and terms of supplies of seed, fertilizers and pesticides. Out of 121 adopters interviewed, 2 persons tried hybrid bajra cultivation as early as in summer 1965. Out of these 2 persons, one person got seeds from Research Station through his relative who is in government job, the other person received seeds from Gramsevak who distributed for trial on cultivator's field. Fifteen farmers also got seeds from Gramsevak in subsequent years. The remaining 104 adopters purchased seeds from service co-operative society (Table XIX).

None of 121 adopters interviewed posed even a solitary complaint that seed was not available in time, or easily and as needed by them. As regards the supply of fertilizers, all the adopters 121 received fertilizers from service co-operative society. They also answered in positive tone about the timeliness, accessibility, and adequacy of fertilizers supplies. Majority, 118 adopters got fertilizers on cash and only 3 on credit. Only 1 adopter purchased pesticides from Anand market in time, easily and in desired quantity.

Agronomical Practices of Hybrid Bajra Cultivation

Preparatory tillage. Among the recommended practices for preparatory tillage, one ploughing and two harrowings were recommended. There were only 4.92 adopters who did not even plough their fields for single time, 14.76 per cent adopters ploughed once, and majority (55.37 per cent) ploughed twice and the rest of the adopters (24.95 per cent) some times had done three to five ploughings (Table XX-1A). Thirty five adopters had used tractors for this purpose (Table XX-1B)

Recommended number of harrowings were followed by 34.71 per cent of adopters (Table XX-1C), on the other hand 34.71 per cent adopters did not at all harrow their fields. Less than recommended number of harrowing (1 harrowing) was done by 28.94 per cent adopters. Two adopters had harrowed thrice the 'more than the recommended number of harrowings' their fields.

The variations so found in this study amply suggest that the gramsevak had not performed their function of educating farmers about the preparatory tillage.

Sowing of seed. Table XX-2A clearly revealed that majority of the adopters (77.86 per cent) had applied recommended seed rate of 1½ kg per acre. Thirteen per cent of the adopters had used more than the recommended seed rate of 2 kgs per acre, while only 9.02 per cent had applied less than the recommended seed rate of 1 kg per acre.

The recommended distance to be kept between two rows of hybrid bajra is 24" (Table XX-2B). None of the adopters had kept this distance. However 2.46 per cent adopters had kept a distance of 21 inches and 23.96 per cent maintained a distance of 18". Majority of the adopters (69.48 per cent) had kept a distance of 15" between two rows of hybrid bajra. The distances of 12" and 9" were kept by 2.46 per cent and 1.64 per cent adopters respectively.

The seed drills used for sowing hybrid bajra have a distance varying from 15 to 21 inches between the two spikes and hence the recommended distance of 24" between two rows was not maintained.

As regards the recommended distance between two plants, only 13.94 per cent of adopters (Table XX-2C) followed the recommended distance of 9". However, 24.6 per cent had kept a distance of 6". Out of the remaining

29.52 per cent and 31.94 per cent of the adopters had kept a distance between 4" and 3" respectively.

On a bulk of the area under hybrid bajra cultivation, seeds were drilled by majority of the adopters (95.08 per cent, Table XX-2D), however, only 4.92 per cent of adopters had transplanted the hybrid bajra.

Application of plant nutrients. In case of nitrogen, there were only 6.62 per cent (Table XX-3) of adopters who applied 'just about the recommended rate of nitrogen. While 59.50 per cent of the adopters had applied more than the recommended rate of nitrogen. At the same time there were 31.40 per cent of adopters who had given less than the recommended rate of nitrogen. Only 2.48 per cent of adopters had not applied Nitrogen at all.

The situation in respect of the application of the phosphatic fertilizers was much worse in that 49.58 per cent of the adopters had not applied phosphatic fertilizers at all. There were 32.24 per cent of adopters who had applied phosphatic fertilizer just about the recommended rate and 15.70 per cent of adopters had applied more than the recommended rate of phosphatic fertilizer. of the remaining 2.48 per cent adopters had applied less than the recommended rate.

The probable reason for low application and no application of plant nutrients may be that most of the

farmers believe that bajra grown on the plots on which the previous crop was tobacco do not need intensive fertilization.

Interculturing. Five to six number of interculturings were recommended. There is only one adopter (0.82 per cent), Table XX-4) whose number of interculturing operations in respect of recommended number of interculturings conformed. Twelve adopters (9.92 per cent) had not intercultured their fields of hybrid bajra at all. There were 22 (18.18 per cent), 51 (42.15 per cent), 32 (26.45 per cent), and 3 (2.48 per cent) adopters who intercultured hybrid bajra fields once, twice, thrice and four times respectively. For adopting such a low rate of interculturing the probable reason may be that the hybrid bajra is grown on the field on which the previous crop was tobacco. It is a well known fact that Bidi tobacco fields are always kept scrupously clean almost by all the cultivators of this area.

Plant protection measures. Without any exception all 121 adopters (100 per cent, Table XX-5) reported that already treated seed was supplied to them, so there was no question of treating the seeds before sowing. None of the adopters had reported attack of disease on hybrid bajra crop for all the eight seasons under study.

There were 61 adopters (50.41 per cent) who reported attack of insect pests (Jassids) on hybrid bajra,

and the severe attack of insects was complained for Summer,1968, Only 1 adopter (0.82 per cent) tried to use control measure but it was not successful.

Maturity days of hybrid bajra. The crop of hybrid bajra 115 generally ripens in about 85 to 90 days. There were 2 adopters (1.65 per cent, Table XX-6) who reported 85 days' maturity period. Adopters 57 in number (47.12 per cent) gave consent for 90 days' maturity days. Adopters 20 (16.52 per cent), 36 (29.75 per cent), and 3 (2.48 per cent) in number told 95, 100 and 105 days as maturity days for hybrid bajra. The remaining 3 adopters (2.48 per cent) had sown hybrid bajra in the current monsoon, the crop not yet matured, so they could not tell the maturity days. The variations in maturity days may be due to crops cultivated in summers and monsoons. There may be also other factors responsible for it. Maturity days for summers and monsoons were not studied categorically, This needs further study. Adopters in general were of the view that hybrid variety matured later than the local variety. This fact was also crystal clear from Table XII where not a single adopter was attracted by the so called early maturity quality of the hybrid bajra.

Yield per acre. As pointed out by Desai and Desai (1968) the average yield ranged between 850 to 900 kgs per acre, majority of the adopters got either average or more than average yield of bajra. There were 7 (5.75 per cent,

Table XX-7A), 8 (6.56 per cent), 14 (11.48 per cent), and 5 (4.10 per cent) adopters who received the yield of 200-500 kgs, 501-600 kgs, 601-700 kgs, and 701-800 kgs per acre respectively. These yields were below the average. Only 14 (11.48 per cent) adopters reaped the average yield. There were 1 (0.82 per cent), 28 (22.96 per cent), 7 (5.74 per cent), 11 (9.41 per cent), 11 (9.41 per cent), 3 (2.46 per cent), 3 (2.46 per cent), 1 (0.82 per cent) and 2 (1.62 per cent) adopters who received more than the average yield of 901-1000 kgs; 1001-1100 kgs, 1101-1200 kgs, 1201-1300 kgs, 1301-1400 kgs, 1401-1500 kgs, 1601-1700 kgs, 1701-1800 kgs, 2001-2100 kgs and 2101-2200 kgs per acre.

There were 3 adopters (2.46 per cent) who have sown hybrid bajra in the current monsoon. The yield could not be estimated.

Satisfaction with the yield obtained. Majority of the adopters 69 (57.02 per cent, Table XX-7B) were satisfied and 49 (40.50 per cent) adopters were not satisfied with the yields they obtained. The remaining 3 adopters (2.48 per cent) have not yet obtained the yield because they have sown hybrid bajra in the current monsoon.

Barriers in the adoption of hybrid bajra cultivation. The most important barriers as stated by the adopters and non-adopters who were interviewed in the adoption of hybrid bajra were in general hard stalks, financial, irrigation and lodging etc. (Table XXI). The barriers emerged from the

answers of the adopters in descending order were hard stalks (28.08 per cent), financial (19.83 per cent), irrigation (14.04 per cent) lodging (6.56 per cent). Non-adopters advanced the barriers in order of precedence as financial (42.27 per cent), hard stalks (30.91 per cent), irrigation (17.66 per cent), soil not suitable (9.92 per cent), and land far off situated from the village (8.68 per cent). There were other barriers like non-availability of unadulterated hybrid bajra seed, lack of useful information about hybrid bajra cultivation, late maturity, etc.

CHAPTER VI

CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Conclusions

In view of the urgency of the continuing increases in food and agricultural production in Gujarat State, particularly in High Yielding Variety Programme relating to hybrid bajra cultivation, a study of the adoption and non-adoption behaviour, rate of adoption and the factors affecting adoption and non-adoption of improved practices of hybrid bajra cultivation was conducted. For carrying out an intensive study, the investigations were confined to a single village, namely, Ajarpura of Anand Taluka in Kaira district of Gujarat State. The salient findings based on this study are as follows:

Personal Characteristics

(1) More number of adopters could be expected to emerge from intermediate and high castes in this area.

(2) Relatively younger farmers were found more inclined to adopt new farm practices than elderly farmers.

(3) Farmers having 'above 7th class' education were associated with higher rate of adoption than lower schooling.

(4) Size of farm was found to be positively related to the adoption of new farm practices.

Interactional Relationship Between Some of the Personal Characteristics

(1) Farmers coming from high and intermediate castes and relatively younger in age were found more prone towards higher adoption.

(2) Positive trend with respect to adoption of improved farm practices, was found with large size of farm holdings combined with relatively high castes.

(3) High rate of adoption was observed from the group of middle-aged and young farmers having received education above 7th class.

(4) Higher percentages of adopters were from the group of young farmers cultivating 'upto 5 acres' and 'above 5 acres to 10 acres' sizes of farm holdings.

Season-wise Adoption, Crops Replaced, Bottlenecks in Adoption, and Qualities of Hybrid Bajra

(1) There were more adopters and more area was covered under hybrid bajra in summers than in monsoons.

(2) Potato and tobacco were replaced by hybrid bajra by some of the farmers.

(3) Majority of the rejecters blamed stalks of hybrid bajra being thick which were not found palatable by animals.

(4) Cent per cent adopters were attracted by high yielding quality of hybrid bajra.

Positions Occupied in Village Organisations; Decision-making; Relationship Between Ages and Decision-making; Contacts with Extension Workers; Sources of Informations; and Relationship Between Educational Background and Sources of Informations

(1) Among the various organisations, seats in co-operative societies specially in milk co-operative society were occupied by relatively more number of adopters then non-adopters.

(2) None of the adopters or non-adopters consulted his wife.

(3) Adopters, in the first place, belonging to young, middle-age and old farmers' groups were significantly influenced by none but by themselves. In the second place young and middle-aged farmers were influenced by their fathers and brothers respectively, but old farmers were practically influenced by none.

(4) Gramsevaks were equally consulted for getting farm informations both by adopters and non-adopters, but Extension Officers and Taluka Development Officers were important sources of informations for adopters. Contacts with the District Officers were practically nil for adopters and non-adopters.

(5) Adopters were highly significant in getting informations from agriculture scientists and research bulletins.

(6) Illiterate adopters utilised extension workers, progressive farmers and radio for seeking farm information. Adopters educated 'upto 7th class' used news papers, leaflets and booklets, and agricultural scientists in addition to what illiterate adopters utilised. Adopters educated 'above 7th class' used research bulletins as sources of informations in addition to what adopters educated 'upto 7th class' had utilised.

Sources of Availability, Timeliness, Accessibility, Adequacy, and Terms of Supplies for Seeds, Fertilizers and Pesticides.

(1) Out of 121 adopters interviewed, 2 farmers tried hybrid bajra cultivation as early as in summer 1965. Out of these 2 farmers, one person got seeds from Research Station through his relative who was in government service, the other person received seeds from Gramsevak who distributed for trial on cultivator's field. Majority of the adopters purchased seeds from service co-operative society.

(2) Most of the adopters received seeds and fertilizers in time in needed quantity through service co-operative society on cash.

Agronomical Practices of Hybrid Bajra Cultivation.

(1) In preparatory tillage adopters in majority followed either recommended number of one ploughing or even more than the recommended number of ploughing, but the recommended number of harrowings were not followed after

ploughing in majority of the cases.

(2) Majority of the farmers had sown recommended seed rate.

(3) None of the adopters maintained the distance of 24" between two rows. Majority of the adopters kept the distance of 15".

(4) Plant to plant distance of 9" was maintained only by a few adopters.

(5) Majority of the adopters either applied recommended or more than the recommended dose of nitrogen, but the situation in respect of the application of phosphatic fertilizers was found hopeless.

(6) Majority of the adopters did not adopt recommended number of interculture operations.

(7) Inspite of the severe attack of insect pests (Jassids) no plant protection measures were taken either by the adopters or by the Department of Agriculture.

(8) Adopters in general were of the view that hybrid variety matured later than the local variety.

(9) Majority of the adopters received either equal to average yield (850 to 900 kgs per acre) or more than the average yield and were satisfied with the yields they received.

Barriers in the Adoption of Hybrid Bajra. The most important barriers as stated by the adopters and non-adopters were in general hard stalks, financial, irrigation and lodging.

Recommendations

(1) Extension agency for extending hybrid bajra cultivation campaign under High Yielding Variety Programme should concentrate more efforts in monsoons than summers.

(2) Adopters, rejecters, and non-adopters stated that stalks of hybrid bajra being thick were not found palatable by animals. This is because of the fact that farmers in this area throw before animals straw in two pieces without chaffing. It is recommended that extension agency should introduce hand, bullock-drawn and power chaffcutters on subsidised rates to farmers. This can ease the situation of fodder wastage and can increase the palatability of the fodder if animals are given chaffed stalks of bajra.

(3) Extension agency must take immediate and effective control measures when there is an attack of insect pests or diseases.

(4) For maintaining the distance of 24" between two rows of hybrid bajra which is very important, seed drills to be used for sowing must have a distance of 24" between two spikes. Such seed drills in the beginning may be introduced by extension agency by arranging method demonstrations.

(5) If the programme is to achieve its intended revolution in the cultivation of bajra in Gujarat State, the extension efforts must be stepped up vigorously and in

so doing much attention must be paid to educate the small and medium sized farm holders to adopt hybrid bajra cultivation along with package of recommended cultural practices.

Suggestions for Further Research

(1) As this study has intensively been taken up from the very inception of hybrid bajra cultivation in Ajarpura village, upto monsoon of 1968, it is suggested that this study should be continued till saturation stage of adoption of hybrid bajra cultivation is attained in the village.

(2) Similar study for other crops like Taichung Native 1, wheat Sonora 64, etc. may be taken up in the same area or in another part of Gujarat State.

B I B L I O G R A P H Y

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A P P E N D I X

A P P E N D I X A

INTERVIEW SCHEDULE USED IN THE STUDY FOR COLLECTION OF DATA FROM THE FARMERS

Interview Schedule

(1) Date _____

(2) Name of the farmer Shri _____

(3) Caste

(4) Age

(5) How many years of schooling have you completed?

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and above.

(6) What is the area of land operated by you?

_____Bighas

(7) Cultivation of Hybrid Bajra 115

(i) Have you ever grown hybrid bajra in your fields?

Yes_____ No_____

(ii) When did you grow hybrid bajra in your field for the first time?

Year_____ Season_____

(iii) (a) How much area have you been covering under hybrid bajra since you adopted the cultivation of hybrid bajra?

Year/Season	Hybrid bajra grown in Bighas

(b) The area under hybrid bajra has been increased in the below mentioned years. At the cost of which crop did you increase the area?

Year/Season	Area increased	Crop

(c) You did not grow hybrid bajra in the following mentioned years, what did prevent you in doing so?

Year/Season	Bottlenecks

(iv) Which of the following qualities did attract you for adoption of hybrid bajra?

More tillering, Compact ear-head, less losses by birds, early maturity, more yield, any other quality _____.

(8) Do you hold any position in any organisation in your village?

Yes_____ No_____

If yes, what are they?

(i) Panchayat

(ii) Service-Co-operative Society

(iii) Farmers' Club

(iv) Youth Club

(v) Bhajan Mandal

(vi) Milk Producers' Co-operative Society

(9) Whom do you consult in making decisions for adopting farm practices?

Father, Mother, Brother, Wife, Son, Friends, Neighbours, Relatives, and Self.

(10) Do you have contacts with extension workers?

Yes_____ No_____

If yes, with whom do you have contacts?

Extension Workers	More Contacts	Less Contacts	Least Contacts
Gramsevak			
Extension Officer			
Taluka Development Officer			
District Officers			

(11) What are the sources of informations through which you know about the improved practices?

I. Personal Sources

(i) Agricultural scientists _____

(ii) Extension workers _____

(iii) Progressive farmers _____

II. Impersonal sources

(i) Research bulletins _____

(ii) Leaflets and booklets _____

(iii) News papers _____

(iv) Radio _____

(v) Other impersonal source if any _____

(12) Supplies

(a) Hybrid bajra seed

(i) From where do you get the seed of hybrid bajra? _____

(ii) Do you timely get the hybrid bajra seed?

Yes_____No_____

(iii) Is the hybrid bajra seed easily available?

Yes_____No_____

(iv) Do you get it in needed quantity?

Yes_____No_____

(b) Fertilizer

(i) From where do you get the chemical fertilizers?

_____

(ii) Do you timely get the chemical fertilizers?

Yes_____No_____

(iii) Do you get fertilizer on cash_____, or,

credit_____.

(iv) Do you get in needed quantity?

Yes_____No_____

(c) Pesticides

(i) From where do you get the pesticides?

_____

(ii) Do you timely get the pesticides?

Yes_____No_____

(iii) Are pesticides easily available?

Yes_____No_____

(iv) Do you get in needed quantity?

Yes_____No_____

(13) Agronomical practices adopted in the previous season

(A) Preparatory tillage

(i) How many ploughings did you give in preparatory tillage?

By desi plough 0, 1, 2, 3

By tractor 0, 1, 2, 3

(ii) How many times did you harrow?

0, 1, 2, 3

(B) Sowing of seed

(i) What was the seed rate in kgs per bigha?

1, 1½, 2

(ii) What distance did you maintain in line to line sowing?

9", 12", 15", 18", 21", 24".

(iii) What was the plant to plant distance maintained by you?

3", 4", 6", 9", 12".

(iv) Whether sown or transplanted?

(C) Manuring

(a) Basal dressing

(i) How many cartloads of farm yard manure or compost per bigha was added in the field?

None, Less than 15 cartloads, 15 cartloads, more than 15 cartloads

(ii) How many kgs of the following fertilizers did you apply per bigha?

(i) Ammonium sulphate _____

(ii) Urea _____

(iii) Calcium Ammonium Nitrate _____

(iv) Ammo-phos _____

(v) Di-ammo-phos _____

(vi) Superphosphate _____

(b) Top-dressing

How many kgs. of the following nitrogenous fertilizers were applied per bigha?

(i) Ammonium sulphate _____

(ii) Urea _____

(iii) Calcium Ammonium Nitrate _____

(iv) Any other _____

(D) Interculturing

How many times did you interculture?

0, 1, 2, 3.

(E) Plant Protection Measures

(i) Did you get already treated hybrid bajra seed?

Yes_____No_____

If no, did you treat it before sowing?

Yes_____No_____

(ii) Was there attack of any disease?

Yes_____No_____

If yes, did you adopt any measure to control it?

Yes_____No_____

(iii) Was there attack of insects?

Yes_____No_____

If yes, did you adopt any measure to control it?

Yes_____No_____

(F) How many days after shwing did you harvest?

80, 85, 90, 95, 100.

(G) (i) How much yield in kgs. did you get per bigha?

_____Kgs.

(ii) Are you satisfied with the yield you got?

Yes_____No_____

(14) What are the barriers which prevent you from adoption of hybrid bajra cultivation?

(i) Financial

(ii) Irrigation

(iii) Non-availability of hybrid bajra seed

(iv) Lack of manurial resources

(v) Non-availability of pesticides

(vi) Lack of human labour

(vii) Lack of usefull information about hybrid bajra cultivation?

(viii) Hard stalks

(ix) Soil is not suitable

(x) Late maturity

(xi) Land is far off situated from the village

(xii) Absentee landlordism

(xiii) Lodging

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