CHAPTER II

REVIEWS OF LITERATURE

The review of literature related to the study has been presented in this chapter.

TRAINING

In a study of the relation of agricultural education to adoption of farm practices by young operators, Estop (1958) found that operators with agricultural training had higher adoption of practices. A controlled analysis was used between the trained and untrained farmers. He also concluded that those with training were significantly higher in percentage as high adopters.

The psychological and analytical dictionary (1960) gives the meaning of training as the totality of instructions, planned circumstances, and directed activity to which one is subjected to induce learning. Flippo (1961) has explained training as "... the act of increasing the knowledge and skill of an employee for doing a particular job. Taylor (1961) elaborated the meaning of training as "... the means to bring about a continuous improvement in the quality of work performed by the staff and the individuals." Milton Bell (1962) gave the definition of employee training as "... the process of aiding employees to gain effectiveness in their present or future work through the development of appropriate habits of thought and action, skill, knowledge and attitudes."

While studying the effect of training on acceptance of new practices among the participating farmers, Alic et al. (1955) concluded that of the 26 participating farmers, 19 adopted one or more recommended farm practices in rice cultivation. They also studied the reasons for adoption of farm practices. The reasons mentioned by the
farmers were:

a) Attendance at the training centre enabled them to learn about the practices.
b) Availability of resources to carry out the practices.
c) Influence of neighbours, relatives, extension workers and landlords.
d) Simple desire to try something new.
e) To find out whether the practice was really better.

The important measure taken to streamline the training programme was the treatment of village level camps as the base level camps which aimed at creating awareness among the farmers about high yielding technology.

Lynton and Pareek (1967) while explaining the concept of training stated that "Training as we see aims at a lasting improvement on the job".

Charmuradia (1967) studied some aspects of Gram Sahayak training. Its impact on the acceptance of improved practices was greater with farmers who had education up to middle school than with the illiterate or those with primary education. The acceptance of improved practices was negligible among the farmers having holding below 5 acres and with those who were not members of any organization. The acceptance of improved practices decreased with the decrease in irrigation. However the acceptance level of farm practices of trained farmers increased with the increase in their contact with extension staff.

Patel and Patel (1968) found that the majority of the trained farmers belonged to higher economic status and were related to village organizations as against the untrained farmers.

Patel et al (1968) stated that the trained and untrained farmers did not secure
equal adoption scores on adoption of improved farm practices.

Joshi et al (1969) while studying the farmers' training programme in Vidharbha found that, the persons who motivated the farmers were gram sevaks, agricultural assistants, extension officers and local leaders respectively. Among them, the village level workers had motivated the farmers to the extent of 87 percent and the extension officers to the extent of 72 percent. They further studied the objectives of farmers who had attended the training camps. About 96 percent trained farmers had attended the training with the object of getting information about improved agricultural practices.

Khuspe (1970) studied the impact of training methods and selection criteria and found that there was significant change in knowledge, attitude and adoption behaviour of trained farmers over the untrained farmers.

Sinha and Sonal (1970) conducted a study in Hisar and concluded that training should be 'practice-oriented' for better impact.

Palled (1972) while studying the impact of farmers' training, functional literacy and farm broadcast found significant differences on agricultural knowledge and attitude towards High Yielding varieties between the participants and non-participants of the production cum demonstration camps.

Raman, Patel and Pandya (1974) conducted a study at Nolsari training centre; they observed that trained farmers had made changes in their cultivation practices.

Raghavan (1978) while studying comparison between progressive farmers' discussion groups (Charchamandals) organized by farmers' training centre,
Coimbatore, found that the adoption of farm technology through farmers discussion group was significantly higher in respect of progressive farmers discussion groups than non-progressive farmers discussion groups.

Programme evaluation organisation (1978) while evaluating the farmers' training programme of kaira district in Gujarat found that the extent of adoption of improved agricultural practices was almost similar with regard to wheat and paddy. Under the high category, as many as 75.9 percent farmers came from the experimental group as compared to 53.1 percent from the internal control and only 3.4 percent belonged to the external control group.

Ryan and Bainswanger (1979) reported that extension has a great temptation to respond primarily to the need at a big farmer by advocating high management technology.

Sude (1990) opined that the training is an application of knowledge, skill and attitude needed to improve one's ability in solving production problem and adopting new practices and techniques at the field level.

Singh and Yadav (1985) the training have significant impact over the adoption of improved agricultural practices on different land holdings. The level of adoption by all categories of trained farmers was found significantly higher than the level of adoption on different holdings of untreated farmers.

Basu and Adhikary (1989) reported that farmers need information in the descending order of cost of cultivation, cropping sequences, type of cropping, right, source of cultivation and requirement of inputs.

Verma (1989) analysed that the farmers preferred to know more about ratoon
management practices followed by seed and varieties for higher sugarcane production and intercropping system, fertilizer management and cultural operations ranking sixth and seventh in their priority list, they were least interested in seed treatment and seed programme.

Madukwe (1993) indicate that the effectiveness rating of supervisors was between 2.34 and 3.66 for four task areas, namely, administration, human relations, coordination, and evaluation. The rating for the remaining two task areas, namely, training and programme planning was low, below 2.34 on a five point rating scale. The overall rating for all the task areas (2.41) was below the arithmetic mean of 2.5. The results indicate that the supervisors were not very effective in the performance of their duties.

KNOWLEDGE:

West Bengal training manual (1955) commented that, "... the important point is that the trainee does not have a problem until he recognizes it as such; he will not think, learn new facts or skills or even listen attentively to lectures until he first recognizes and accepts as his own the problem we are attempting to solve."

Hoffer and Strangland (1958) found that level of knowledge among farmers regarding the improved practices was a significant factor affecting the adoption of improved practices.

Despande (1962) concluded that education had a positive effect in changing the knowledge of the farmers, whereas, age and size of holding did not have any effect.

Shankari (1965) reported a highly significant positive correlation between knowledge of improved practices of vegetable growers and farm size and negative correlation between age and knowledge. His results indicated positive correlation,
between knowledge and education, economic status, and Socio-economic status of vegetable growers.

Singh (1968) while analysing farmers' training programme in Bihar concluded that despite various limitations the training imparted to farmers proved useful in affecting change in knowledge, attitude and adoption behaviour of farmers with respect to improved methods of farming.

Salvi et al. (1969) reported that 70 percent of the farmers were not having much scientific knowledge about improved agricultural practices before attending the training. However, most of the respondents gained knowledge about the farm practices during their training at the farmers' training centre.

Pal (1970) in his study concluded that there was significant difference in knowledge before and after training.

Palled (1972) found significant increase in agricultural knowledge after their training.

Programme evaluation organisation (1974) while evaluating the farmers' training programme in Tanjore district of Tamil Nadu found that the farmers of the experimental group, internal control and external control have exhibited only marginal differences with regard to their extent of knowledge.

Programme evaluation organisation (1975) while evaluating the farmers' training programme of Udaipur district in Rajasthan found that the farmers of experimental group superior to the two control groups in so far as the extent of knowledge of improved practices was concerned.

Somasundaram (1976) while studying small farmers with respect to new
agricultural technology for adoption found that out of the three important discriminating variables, namely, knowledge, attitude and age, knowledge was the most important variable which contributed 41.15 percent for discrimination between adopter and non-adopter small farmers.

Babu (1977) reported that age was negatively associated with the knowledge of rice technology, whereas, education, farm size, socio-economic status were positively and significantly associated with it. With respect to contact with extension agency, which did not show any significant relationship with the among of knowledge about the rice technology.

Programme evaluation organisation (1978) while evaluating the farmers' training programme of Kaira district in Gujarat found that the farmers in the experimental group possessed higher extent of knowledge as compared to the internal and external control groups. The same trend had been noted with regard to paddy crop.

Mishra (1979) while studying the farm entrepreneurship in a backward district of Bihar found that the knowledge of the farm technology was the most dominant variable leading to adoption of the technology.

Jayakrishnan (1984) revealed that the transplanting time and intercultivation were well known to all the respondents. Ignorance of practices like spacing seed rate and plant protection measures was observed to the greater extent.

Savarimuthu (1984) reported that majority (76.67) percent of farm woman possessed medium level of knowledge about maize technology.

Dhas (1985) revealed that majority of the respondents had medium level of
knowledge about coconut cultivation.

Rajkumar (1987) inferred that the majority of farmers possessed medium level of knowledge about improved practices. Victor (1987) reported that the farmers were found to have medium level of knowledge about the cashew technology.

Jain (1987) revealed that majority of sugarcane growers had medium level of knowledge about recommended cultivation technology.

Suthar (1989) observed that majority of small and big rubber growers were found to have low and high level of knowledge respectively.

Ravichandran (1989) found out that the knowledge level of recommended practices in coffee cultivation was more in case of season and time oriented aspects rather than the application of fertilizers and recommended doses of pesticides.

Ray (1980) concluded that 49.17 percent contact farmers were in high knowledge group, 49.17 percent were in medium knowledge group and only 1.66 percent were in low knowledge group.

Nasir (1989) reported that 27.67 percent contact farmers were in the high knowledge group. Whereas, 60.00 percent of them were in medium level group and 13.33 percent were in the low knowledge group.

Arunmozhi (1989) started that 76.00 percent of farm woman had medium level of knowledge, followed by high and low level (14.00 and 10.00 percent) respectively in selected rice technologies.

Suryanarayana (1990) started that 23.00 percent contact farmers had high
knowledge level. 63.00 percent had medium knowledge level and 14.00 percent had low knowledge level.

Sumathi (1990) reported that 40.00 percent of total respondents had medium level followed by 32.00 percent of high and 28.00 percent of low level regarding post harvest technology.

Lisaria and Soni (1991-92) inferred that majority of the contact farmers (74.44 percent) and non contact farmers (84.45 percent) were found in medium level of knowledge, there were 15.56 percent contact farmers as against 2.22 percent non contact farmers who had high level of knowledge while, 10.00 percent of the contact farmers and 13.33 percent of the non contact farmers had low level of knowledge.

Yadav and Narwal (1993) reported that the higher mean knowledge scores of the extension personnel may possibly be due to their continuous and regular trainings and closeness to the information sources and research scientists. Secondly, their rich experience might have contributed to the higher knowledge of wheat production technology.

**MOTIVATION:**

A study on "........ difference in prestige standards and orientation to change in a traditional agricultural setting," conducted by Frederick C. Fliegel (1955) gave the following conclusions:

i) Those farmers who are oriented to recognition through ownership accumulation will seek information which contributes to productivity. Conversely, those who are oriented to recognition through distribution will not seek information which contributes to productivity.

ii) Those who seek information which contributes to productivity
will accept new ideas that enhance productivity;

iii) Those who are oriented to recognition through ownership accumulation will place a high value on formal education;

iv) Those who place a high value on formal education will accept new ideas which enhance productivity;

v) Those who are oriented to recognition through ownership and consumption will have high contact with urban centres;

vi) Those who have high contact with urban centres will accept new ideas which enhance productivity.

The report of the National Council of Applied Economic Research (1966) regarding agriculture and livestock in Rajasthan, for the specific innovation of Mexican wheat gave the following recommendations for adoption: "...... setting up of grades and standards, differential prices of desired grain strains and varieties, penalising of undesirable one together with a system of premia and rewards may prove to be powerful means of popularising the desired changes in crop pattern customs and habits."

Food and Agriculture organisation of the United Nations (1967) while analysing causes for non-adoption of new agricultural practices, found out that most often the major underlying cause was the lack of any real economic incentives for the average farmer to step up his production for the market by adopting these methods. There was no assured outlet for his produce and all too often a large output had led only to fall in prices and sometimes even total loss in returns.

Like wise, Rogers and Svenning (1969) quoting researches conducted in six villages of Columbia and eight villages of U.P. (India), concluded that "...... farm production is positively related to achievement motivation."
Ray et al. (1969) reported a significant correlation between achievement motivation and adoption of agricultural innovations, based on a study conducted in eight villages in India.

Rao et al. (1971) conducted a study on motivation patterns for farmers towards the adoption of high-yielding varieties of wheat and found that economic motivation rendered first with the scale value of 2.260 preceding to national welfare 1.796, innovative 1.221, self-actualisation 1.162, prestige 0.898, security 0.807 and Affiliation 0.801.

Agrawal et al. (1974) while studying self imagee and occupational role perception in relation to work motivation analyzed six factors, viz, dependence, organizational orientation, work group relations, intrinsic motivation, material incentives and jobs situation for carrying out the work satisfactorily.

Mehta (1976) reported that with a view to developing entrepreneurship in the backward district and the marginal craftman and farmers, Gujarat Industrial Development corporation carried out a programme designed for motivational development with selected group of entrepreneurs.

Pareek et al. (1975) stated the achievement motivation as efficiency motivation, which concerns for efficiency and reflects through competition with others or with own standard of performance, an urge to do something unique or to make the maximum utilization of resources around.

Mishra (1979) found that the personal achievement motivation of the respondents in general was poor, in case of social achievement motivation it was found to be more precarious.
Mishra and Singh (1993) found that two most dominant organisational climates were taken into account for perception, dependency cum affiliation was observed to be the most dominant climate as perceived by the trainers of IARI in case of SIT, HAU and IFFCO. The most dominant climate perceived by the trainers was expertise-cum control.

CHARACTERISTICS OF FARMERS ASSOCIATED WITH ADOPTION:

CASTE:

With respect to caste of the farmers and its relationship with adoption, Reddy and Kivlin (1968) observed that by and large, the farmers participated in high yielding varieties programme, had higher ritual caste rank. On the contrary, Rao (1968) did not find significant difference in farmers ritual caste rank and participation in agricultural technology.

Vyas et al. and Singh (1969) concluded that there was significant relationship between caste and participation of farmers in high yielding varieties programme in favour of higher caste.

Roy (1969) reported that the adoption of fertilizers was higher in higher caste than the lower caste farmers.

Choubey (1972) observed that farmers' caste rank and adoption of high yielding wheat varieties technology were significantly related but the relationship was very weak.

Jha and Shaktawat (1972) found out the caste of farmers was not significantly related to the adoption at hybrid bajra.
Subramanyam and Lakshanna (1973) reported that land owner and upper caste farmers adopted more readily recommended farm practices than did tenants and own caste farmers.

Singh (1977) reported that caste was negatively associated with the adoption of high yielding varieties of bajra. Hence, it is postulated in the present study that the caste will be positively associated with their adoption of new technology.

AGE:

It is generally believed that persons of younger age are more innovative and progressive than are older people. There are inconsistent evidence in the literature as regards the influence of age on adoption.

Ryan and Gross (1950), and pal (1970), Choubey (1972) and Ernst (1973) found that age was negatively associated with the adoption of practices.

Coleman (1951) did not find significant correlation between age and adoption.

Dube (1961) reported that the older farmers adopted more improved seeds, fertilizers, and manures than young farmers.

Singh (1974), Chauhan (1976), Chattopadhyay (1976) and Tripathi (1977) did not report significant relationship between age and participation of farmers in high yielding varieties programme. Based on this, it is assumed that there would be an association between the age of farmers and their adoption of high yielding varieties.

Lingan (1981) found that majority of the Tea growers were of middle and old aged.

Muthiah (1982) revealed that the small growers had been distributed almost
equally in the three age groups viz. young, middle and old aged while majority of big growers were young in age.

Singh (1984) reported that majority of the contact and non contact farmers belonged to the age group of 31 to 45 years.

Rao and Reddy (1986) stated that majority of the contact farmers and other farmers belonged to the middle age group.

Jain (1987) reported that 61.57 percent of the Sugar cane cultivators were in middle age (31 to 55 years) group followed by 25 percent in old age (above 55 year) group.

While studying the constraints in coffee cultivation, Ravi Chandram (1989) observed majority of small and big planters were in the group of old and medium age respectively.

Sutha (1989) reported that majority of the rubber growers were found to be young aged and there existed no difference between small and big growers in this regard.

Katarya (1989) reported that Analysis of data pertaining to the age of farmers effect negative and significant association with all three categories of adoption score therefore, it can be inferred that higher the age lower will be the adoption.

Puranik et. al. (1992) observed that majority of the respondents were in the age group of 36 to 50 Year.

Tandel (1993) reported that majority of Sugar Cane growers (80.30 percent)
were found to be in the middle age (31 to 60 years) group.

**EDUCATION:**

Education being the process of bringing desired change in the adoption, it is generally believed to have the effect of widening the mental horizons of a person and thereby prepare him to be receptive to new ideas; that is why the education of the farmers is the most important factor.

Pal (1970) found out the education was not significantly correlated with the change in the behavioural components of the farmers.

Choubey (1972) in his study of high yielding varieties of wheat in Madhya pradesh had reported positive relation between education and adoption.

Singh (1975) revealed that education of farmers was found to be significantly related with adoption behaviour of the farmers for high yielding varieties at wheat.

Jetley (1977) reported positive correlation between education of respondents and adoption.

Lingan (1981) revealed that nearly three fourth of the tea growers were educated and among those educated nearly half of them were educated up to secondary level and a little percentage were educated up to collegiate level.

Muthiah (1982) concluded that the general standard of education of cardamom growers was more among big growers than among small growers.

Perum and Monon (1986) concluded the majority of the contact farmers (58.00 percent) were educated up to secondary.
Ravichandran (1989) reported that majority of respondents studies up to primary level is small planters group and secondary level education in big planters group engaged in coffee plantation.

Sutha (1989) observed a differential trend in the educational level of small and big growers cultivating rubber.

Patel (1990) revealed that nearly three fourth (72.00 percent) of the respondent were educated up to primary and secondary level.

Deswal (1993) studied the majority of the adopters (57.50 percent) and non adopters (65.00 percent) were having secondary and primary level of education respectively.

Tandel (1993) observed that majority of the sugar cane growers belonged to the group of secondary and primary level of education.

**FAMILY TYPE:**

Another important feature of the structure of traditional Indian society is the joint family. Under the impact of industrialization and modernization, the joint family is breaking into nuclear one. It is generally believed that the type of family affects that adoption of recommended farm practices.

Programme evaluation organization (1956 and 1969) reported that family type had no bearing on the extent of adoption. A similar trend of result had been indicated by several research workers.

Mukherjee (1970), Choubey (1972), Singh (1974), Bhutia (1979), Somasundaram (1976), Chattopadhyay (1976), Tripathi (1977), and De (1977) did not reported significant relationship of family type and adoption of high yielding varieties.
Mukhopadhyay (1979) reported that two third of the contact farmers belonged to joint family.

Kaira (1983) revealed that majority of the respondent (61.61 percent) belonged to joint family.

Singh (1984) observed the majority of the contact farmers (56.67 percent) and non-contact farmers (64.44 percent) belonged to nuclear family.

Jain (1987) reported that majority of Sugar Cane cultivators (60.83 percent) belonged to joint family. While only 39.17 percent of the respondents were from the nuclear families.

**FAMILY SIZE:**

Wilkening (1953) reported that family factors were positively related to adoption of farm practices.

Mukherjee (1970) observed that there was a correlation between size of family and adoption behaviour of farmers.

Choubey (1972) and Shahi (1974) also found a positive relation between size of family and adoption of high yielding varieties of wheat.

Singh (1974) revealed that the size of family was not associated with adoption level.

Bhutia (1979) reported that adoption did not depend on family size. Similar findings were reported by Soma Sundaram (1976) Chattopadhyay (1976).
and Tripathi (1977).

Patel (1981) stated that majority (62.68 percent) of the respondents were found in the category of large size of family (above 5 members).

Tripathi (1985) found that majority of the trained farmers (82.00 percent) and untrained (92.00 percent) had above 5 members in their family.

Jain (1987) reported that more than three-fourth of the Sugar Cane growers (78.33 percent) belonged to large size of family (above 5 members).

Deswal (1993) revealed that majority of the adopters (67.50 percent) and non-adopter (57.50 percent) had large family size (more than 5 members).

**OCCUPATION:**

Occupation is related to the income of individuals. Patel (1985) reported that small farmers depended upon secondary occupation. A farmer engaged in such of the occupations which would either fetch him more in come or provide him an opportunity to gain knowledge would adopt new agricultural technology.

Somasundaram (1976) found no significant difference between the adopter and non-adopter farmers.

Singh (1977) reported negative association between occupation and adoption of high yielding varieties of bajra.

Reddy and Reddy (1986) studied that agriculture was the main occupation of contact and other farmers.
Sarkar and Reddy (1986) observed the agriculture was the main occupation of contact as well as non-contact farmers (83.33 percent).

Bhatol (1987) percent found that majority of the respondents (30.6 percent) were completely dependent on farming only. 8.66 percent were dependent on farming and service. While 6.67 percent on farming and labor work and 4.00 percent on farming and business.

Jain (1987) found that 85.83 percent Sugar Cane growers were completely dependent on farming only, followed by 8.34 percent on farming and service. While only 5.83 percent were having farming with business as their occupation.

**INCOME:**

Transfer of Technology requires more inputs in the form of money, labor etc. It is well known fact that economic condition of farmers play an important role.

Ellegel (1969) who compared two income groups found that the low income respondent had adopted fewer of the practices.

Sanaya (1970) that the low income of the farmers was one of the main handicaps in farmers' response to improved from practices.

Choubey (1972) and Bhutta (1974) stated that income was positively and significantly associated with adoption.

Chandrakandal and Subramaniam (1975) and Jelley (1977) reported the same findings. From the above brief examination of the past studies, it can be
postulated in this study that the income of the farmers would be positively and significantly associated with their adoption of new technology.

Vasoya et al. (1983) revealed that more than half (54.00 percent) of the contact farmers had high annual income, 26.00 percent contact farmers had medium annual income and 20.00 percent had low annual income.

Thankar (1986) started the majority of the respondents (53.77 percent) had annual income of above Rs.10,000/-.

Jain (1987) reported that 46.00 percent Sugar Cane growers have their annual income more than Rs.10,000/-. 

Patel (1989) reported that 52.00 percent of the respondents had their annual income above Rs. 12,000.

Deswal (1993) Concluded that majority of the adopters (86.25 percent) and non adopters (70.00 percent) belonged to high income group (above Rs.12,000/)

SOCIAL PARTICIPATION:

Social participation is most important social characteristic of the adopters. The membership in village organization is related with adoption process.

Directorate of economic and statistics (1968) Painted out that the proportion of member of cooperative societies among the participating farmers was larger than that among the non participants.
Vyas et al. (1969) reported that there was significant difference in the membership in cooperative societies between adopters and non-adopters of hybrid bajra. Most of the adopters were members of the cooperative societies.

Nair (1969) has reported similar findings in his study on high yielding varieties programme in Kerala.

Solunkhe and Thorat (1975) stated that there was a significant relationship between the organization and adoption behaviour of small farmers.

Supe and Sarode (1975) stated that there was no significant relationship between social participation and adoption.

Somasundaram (1976) and De (1977) reported positive and significant association between social participation and adoption.

Vaghani (1982) concluded that majority of the adopter (55.00 percent) were members in one village organization followed by membership in more than one organization (20.00 percent).

Jain (1987) reported that majority of Sugar Cane growers (60.83 percent) were members of one organization, followed by the members of one organization, followed by the members of more than one organization (35.00 percent). While 41 percent respondent were holding position in village organisations.

Hence, it is postulated in the present study that the social participation of the farmer will be positively associated with their adoption of new technology.
FARM SIZE:

The size of land holding cultivated by a farmer contributes much in adoption of improved agricultural practices. The size of land holding varies from area to area from number of research studies it can be said that with the increase in size of land holding there is also an increase in number of adopters.

Singh and Sohal (1967) reported that size at holding was significantly related to the acceptance of agricultural practices.

Indian Institute of management, Ahmadabad (1967) in their study of high yielding varieties programme of paddy in Tamil Nadu did not find a significant difference in the size of holding of participating and non-participating farmers.

Agro-economic research centre, VISWA Bharati, Santi Niketan (1969) in their studies on high yielding varieties programme in Cuttack district of Orissa reported that the average size of holding of participants was more than three times bigger than that of the non-participants.

Parthasarthy (1975) in his study of high yielding varieties of rice in west Godawari District of Andhra Pradesh reported that the adoption of modern varieties was associated with farm size in both seasons.

Chauhan (1976) reported that farm size was negatively associated with the adoption of high yielding varieties of wheat same finding were reported by Singh (1977) about high yielding varieties of bajra.

Pathak and majumdar (1978) in the multivariate regression analysis of adoption behaviour of jute farmers reported positive and significant association of farm size with adoption.
Patel (1981) reported that nearly one-third of the respondents (30.28 percent) were found to have land holding up to 2.0 hectares, whereas 29.83 and 24.63 percent respondents were having 2.1 to 4.00 hectares and 4.1 to 6.0 hectares at land respectively, whereas 15.20 percent of the respondents were having more than 6.0 hectares of land.

Lingam (1981) stated that majority of the tea growers operated 1.0 to 2.0 hectare of tea gardens.

Muthiah (1982) observed small cardamom growers operating land holding up to 20 acres were found to be more in numbers than the big growers operating above 20 acres.

Kalra (1983) observed that more than one-third of contact farmers (53.5 percent) had farm size more than 4.00 hectares followed by 16.07 percent between 1.0 to 2.0 hectares and 15.16 percent respondents were from marginal and medium farm size.

Vasoya et al. (1983) concluded that majority (82.00 percent) of the contact farmers had large size of land holding, while only 18.00 percent contact farmers had small size land holding.

Perumal and Menon (1986) revealed that 42.00 percent of the contact farmers had big size farm.

Ravi Chandran (1989) stated that coffee growing in southern states was a small planters crop.

Sinha (1989) observed small rubber growers with up to 15 acres outnumbered the big growers.
According to Mohan (1991) more than 80.00 percent of coffee planters were small planters.

Hence, it is expected in the present study that the bigger the farm size, more will be the adoption of technology.

IRRIGATION:

Source of irrigation facilities has been considered as one of the most important factors for the farmer as the same enables them to adopt improved agricultural technologies, diversified farming and maintaining the animals.

Agro-economic research centre Jabalpur (1968) in their study of high yielding varieties programme for wheat found that the participants has more percentage of area irrigated than non-participants.

This was reported by Agro-economic research centre of Andhra university (1969). In their studies of high yielding varieties programme for Kharif (1970-71) in west and east Godawari Districts they reported that there was no significant differences in the irrigation potentiality of the participants and the non participants.

Studies conducted on high yielding varieties programme by Agro-economic Research centre, Jabalpur, M.P. (1972) revealed that the participants had more irrigation facilities than the non participants. Directorate of economics and statistics, ministry of food and agriculture, Govt. of India (1973) in their studies on high yielding varieties programme for kharif 1971-72 reported that proposition of holding under irrigation was not a discriminating feature of participating cultivators.
Vyas (1976) reported that the wise use of water and water conservation in connection with irrigation involves effective utilization of a total supply of fresh surface water and ground water.

Tripathi (1977) reported that with the increase in irrigation potential technological gap decreased.

Dovrajana (1978) reported that to improve efficiency and to reduce water losses, improvement of water application by improved methods of land levelling are necessary.

Singh (1979) reported that irrigation was positively and significantly associated with package of practices for wheat in low and medium adopter. Correlation coefficient in high adopters was also high but not significant.

Talati (1991) reported that 49.00 percent respondents had canal irrigation facility.

Thakker (1993) observed that more than 80.00 percent of the respondents were provided with irrigation facilities either from tube-well or by canal irrigation. Thus it can be postulated that irrigation would be positively related with the change in package of practices of high yielding varieties of wheat.

FARM POWER:

Sirballabh (1964) observed that farmers possessing animals adopted greater number of improved implements than those not possessing. He further concluded that strong animals with a farmer, led to greater adoption than poor animals.
Radheyanyam (1965) observed that 56 percent of non-adopters of improved implements did not adopt them due to poor draft animals.

Prasad (1967) also made similar observations.

Singh (1977) reported that farm power was negatively correlated with all packages of practices under high yielding varieties of bajra.

FARM AND NON FARM MATERIALS:

These components refer to the position of a farmer in comparison of others. Studies of Wilkening (1952), Marsh and Coleman (1955), Fliegel (1958), Copp et al. (1958), Bakshi (1960), Bose (1960), and Ernest (1973) have shown that the farm assets have direct bearing on the adoption behaviour. Singh (1977) reported that farm implements were found negatively and significantly associated with technological gap of all the packages of practices for high yielding varieties of bajra.

Hence, it is expected that farmers' farm assets would be positively associated with the adoption behaviour.

MEANS OF TRANSPORT:

Singh (1977) reported that means of transport was not found significant but it was sufficient to inform that the trend of relationship was negative with technological gap of bajra. It means that with the increase of transport, the technological gap decreased.

Singh (1979) reported that means of transport was positively and significantly associated with the knowledge. Whereas, it had positive but not significant
association with adoption.

Hence, it is assured in the study that means of transport would be positively associated with the adoption of new agricultural technology.

**FARM EXPERIENCE**

About one-third of small and nearly half of big cardamom growers had medium level of farming experience as found by Muthiah (1982).

Majority of small and big planters were having the experience in coffee cultivation between 10-20 years. According to Ravichandran (1989).

Suthar (1989) stated that irrespective of farm size, the majority of the rubber growers were having a farming experience of more than ten years.

**CROPPING INTENSITY**

High yielding varieties of crops are mostly shorter in duration. Hence, the adopters of these varieties will be in better position to put more crops in their cropping pattern than the non-adopters. This was reported by Vyas et. al (1969) in their studies on the new strategy for agricultural production in Gujarat state. According to them, the intensity of cropping expressed as the percentage of the total cropped area to the operational area was substantially higher for adopter than that of non-adopters.

Singh (1969) in his study on “Adoption of high yielding varieties and investment pattern of additional income in the Delhi territory” observed that the participating and non-participating farmers differed significantly in their intensity of cropping, the extent of adoption of recommended practices by the
participating farmers was also positively and significantly related to their intensity of cropping.

Agro Economic research centre of Andhra University (1969) in their studies on high yielding varieties of Paddy in West and East Godavari district were 24.26 and 18.69 per cent of the net area sown in these two districts respectively.

Tripathi (1977) reported that cropping intensity, whether high or low does not influence technological gap.

Singh (1979) reported that cropping intensity did not associate with the adoption of new agricultural technology.

The review of available research on high yielding varieties programme shows that much attention has not been paid on "cropping intensity" as a factor affecting adoption behaviour of farmers. Thus, it is assumed in the present study that cropping intensity will be positively correlated with the adoption.

**INPUT AVAILABILITY:**

Timely availability of good quality seeds and required doses of fertilizers, water insecticides and pesticides are the core factors in the adoption of new agricultural technology.

Ernest (1973) found that a positive relationship of timely and adequate supply of inputs with adoption. The study conducted by the department of Agricultural Economics, Coimbatore (1974) brought out the problems of providing adequate and timely input supply system.
Shadi Jeleh (1978) reported a significant relation between availability and accessibility of credit systems to adoption behaviour of farmers.

Based on the above brief narration, it has been postulated that the necessary infra-structural facilities for adoption of new technology would be positively related.

EXTENSION CONTACT:

The communication sources are important stimuli to the individual in the adoption process. It provides a link for transfer of technology between the diffusion of an innovation and its final adoption. Thus adoption of innovation is a result of contact with the source of information. There are various sources of information from which the farmers can get information of new technology in agriculture.

Maladiya and Rajwadi (1976) found that most important sources of information were village level workers, relatives, neighbours and radio.

Jain (1987) reported that 70.83 percent sugarcane growers utilized village level worker as their source of information while 87.60 percent sugarcane growers used neighbours, 85.83 percent radio as their sources of information.

Sood (1987) observed that village extension workers and neighbours were major personal sources of information as utilized by both the contact farmers and fellow farmers for Paddy cultivation, while among different impersonal sources radio, Newspaper and Television were more utilized by the respondents.

Thakur et al. (1991) revealed that important sources of information of Mango growers about horticultural development programme were radio, extension workers and Television.
Girase et al. (1991-92) reported that among all the sources of information, Vaw (T & V System) was found most credible and referred by as many as 70.00 percent of the tribal contact farmers.

Nirmal Kumar (1993) reported that the source of information used by the large number of farmers followed by group discussion, co-operative societies and New Papers their percentage being more than 90.00. The other important sources of information used by the farmers in order of preference were relatives, Neighbours, friends, meetings, farm magazines, local leaders, Panchayat Samiti, Gram Panchayat and radio. Other sources were used by comparatively less number of farmers.

LEVEL OF ASPIRATION:

Fliegel (1969) concluded that farm operator in the low income community who intended to continue in farming tended to be relatively at low level of aspiration. He further compared different income groups having different levels of economic aspiration with an index of six practices and found that low income respondents had adopted fewer of the practices.

Fliegel (1960) showed that low income respondents had low aspiration for adoption. But from this it is difficult to conclude that low adopter had low economic aspiration.

Nall (1961) had suggested that level of aspiration is one of the important factor determining the adoption of new practices.

Chattopadhyay (1963) found a highly significant correlation between level of aspiration of Delhi farmers and their extent of adoption of farm technology which suggests that farmer’s level of aspiration is an important psychological variable
for making improvement in farming.

Sinha (1969) reported that the farmers in more developed villages had higher level of aspiration than the farmers in the less developed villages.

Muthayya (1971) had also reported high relationship between farmer's work orientation and their level of aspiration in a study conducted in the villages around Hyderabad in Andhra Pradesh. In another study conducted in the villages of Allahabad district of Uttar Pradesh.

Choubey (1972) and Ernest (1973) reported positive and significant relationship between level of aspiration and adoption.

Chauhan (1978) in his study in detecting change through site found that the increase in the level of aspiration in the production of wheat during the coming three years marked the impact of treatments under study. Similar trends were observed in case of the farmers' level of aspiration in possessing house, agricultural implements, live stock and cattle shed etc.

Chattopadhyaya (1976) and De (1977) reported positive and significant association between level of aspiration and adoption.

Hence, it is assumed in the present study that the level of aspiration of the farmers will be positively associated with their adoption of new technology.

**RISK ORIENTATION**:

The study of Beal and Sibly (1967) conducted in the developed countries have shown that individuals vary in their willingness to take risk.
Ernest (1973) and Ramachandran (1974) have shown that risk orientation was positively related to farmers' communication behaviour.

Singh (1975) reported that the similar association with reference to adoption behaviour.

Shadi Jeleh (1978) while investigating the individual dimensions affecting the adoption of agricultural technology in less developed countries, revealed a positive and significant relationship or risk orientation with adoption.

Balasubramaniam (1980) reported positive and significant associationship between extent of adoption of rice technology and risk orientation.

Selvanayagam (1988) revealed that the adopter small and big rice farmer were found to have significant association with their risk orientation and the adoption of seed storage practices.

Dheramalingam (1990) found that the risk orientation of the adopter small and big farmers influenced their adoption behaviour of weedicide practices.

Hence, an assumption is made that there would be positive association between farmers' risk orientation and their adoption behaviour.

PROBLEMS FACED BY FARMERS IN UTILIZING TRAINING INPUTS

Reddy (1982) studied reasons for not adopting chemical weed control in bajra. He reported that 41 percent of the respondents under study had lack of information and complete knowledge about weed control. Out of 61 percent non-adopters of improved bajra seed, 15 percent had practically no information about their total improved practices of bajra cultivation, 25 percent did not like the
practice, 15 percent had doubts about the superiority of new variety. 15 percent could not afford the cost of the seed, 16 percent could not adopt improved seed due to its non-availability and 12 percent felt that practice was difficult to follow.

Chaudhary (1965) expressed that the causes identified for non-adoptions of improved seeds bring out the superiority of desti seed over improved seed.

Patel (1965) reported that lack of knowledge of agricultural activities, lesser contact with extension agency, lack of availability of seeds and fertilizers at local market, size of land holding and low income were the problems of small adopter farmers.

Singh (1966) observed that 63 percent of the farmers did not get sufficient credit, about 16 percent did not get in time, and about 37 percent did not receive any credit at all. About 68 percent complained that they did not receive enough technical guidance during the execution of the farm production.

Rao (1968) reported that seed treatment could not be adopted fully due to lack of knowledge, non-availability of inputs and lack of finance.

Gupta (1968) observed that water scarcity, financial difficulty and the belief that high doses of fertilizers were not beneficial were the main reasons for the partial adoption of fertilizers in hybrid maize in Aligarh district of Uttar Pradesh.

Veerabhadriah and Dewarki Nath (1970) pointed out that about 60 percent of farmers who did not adopt the recommended quantities of fertilizers cited lack of knowledge about the practice, close and use of fertilizers, whilst
a further 40 percent quoted lack of adequate resources as a reason for non-adoption.

George and Chaukidar (1972) reported non-adoption of the recommended package of practices was partly due to economic reasons like small farm size, difficulties in mechanization and problem of water management and partly on account of socio-psychological factors like knowledge and attitude of farmers.

Chaudhary (1973) reported that small farmers perceived lack of money as the most important problem. The other problems of the small farmers in order of importance were: high cost of fertilizers, non-availability of fertilizers in village, lack of adequate knowledge about fertilizers, block personnel taking too much time in giving delivery of fertilizers, use of fertilizers deteriorated quality of land, adulteration in fertilizers, lack of transport facilities and supply of short-weights of fertilizers bags.

Singh (1977) reported the following problems in adoption of high yielding varieties of bajra.

1) Lack of irrigation and non-availability of appropriate water in time.
2) Lack of knowledge in chemical weeds control, use of fertilizers, diseases and their control.

EXTENT OF ADOPTION OF RECOMMENDED AGRICULTURE TECHNOLOGY:

Jain (1987) reported that two third (66.6 percent) Sugar Cane growers belongs to medium level of adoption. Followed by high level of adoption (18.33 percent). While only 15.00 percent respondents were found to have low level of adoption.
Kher (1991) revealed the nearly two third (63.00 percent) of the respondent had medium adoption level, while 15.00 percent possessed high adoption level.

Deswal (1993) stated that majority of the adopters (78.75 percent) were having medium extent of adoption of recommended plant protection measures in kharif rice followed by 11.25 percent having low extent of adoption and 10.00 percent were having high extent of adoption.

Tendal (1993) concluded that majority of the Sugar Cane growers (59.10 percent) had medium level of adoption while 21.20 percent, 19.70 percent had high and medium extent of adoption respectively.

Relationship between personal social and economic characteristics of the respondents and their extent of adoption of recommended Agricultural technology.

Personal and socio-economic characteristics differ from farmer to farmer. The characteristic of the farmer is one of the factor influencing the extent of adoption of improved agriculture technology.

AGE AND ADOPTION:

Wagh (1975) found that age showed significant association with adoption.

Reddy and Reddy (1980) reported that age was negatively related with adoption of improved paddy cultivation practices.

Patil and Waghdhare (1989) revealed that age of banana growers was significantly associated with adoption of banana cultivation technology.
Sakharkar et al. (1992) reported that there was no relationship between farmer's extent of adoption of improved practices and their age.

**EDUCATION AND ADOPTION:**

Patel (1982) reported that formal education of respondents had positive and highly significant association with their level of adoption.

Singh (1984) revealed that there was significant relationship between education and extent of adoption of improved package of practices in case of contact and non-contact farmers.

Jain (1987) found that there is significant relationship between the education of sugar cane cultivators and their extent of adoption of recommended cultivation technology.

Patil and Waghaare (1989) studied that education of banana growers was found to be significantly associated with adoption of banana cultivation technology.

Kher et al. (1991) observed that education has positive relationship with adoption of improved azolla cultivation practices.

**FAMILY TYPE AND ADOPTION:**

Thakrar (1986) reported that there was no relationship between family type and adoption.

Bhotol (1987) revealed that family type was not significantly related to the adoption of improved paddy technology.

Jain (1987) found that family type was not significantly related to the
option of recommended Sugar Cane cultivation technology.

Patel (1989) observed that there was no significant association with adoption of castor and type of family of trained farmers.

**FAMILY SIZE AND ADOPTION:**

Thakrar (1986) revealed that adoption of summer groundnut technology was not associated with family size.

Jain (1987) found that adoption of Sugar Cane cultivation technology was not associated with family size.

Patel (1989) inferred that extent of adoption of castor had no significant association with size of family of trained farmers.

Deswal (1993) reported that extent of adoption of plant protection measures in kharif rice had no significant association with size of family.

**SOCIAL PARTICIPATION AND ADOPTION:**

Singh (1984) found that there was relationship between social participation and adoption of improved crop practices of contact farmers.

Tripathi (1985) observed that there was no relationship between social participation and extent of adoption.

Bhatol (1987) generalised that there was significant relationship between social participation and adoption of recommended paddy cultivation practices.
Sakhar Kar et al. (1992) reported that there was highly significant relationship between social participation and adoption of recommended soybean cultivation technology.

FARM SIZE AND ADOPTION:

Vaghani (1982) revealed that there was highly significant influence of size of land holding on adoption of recommended summer ground nut technology.

Jain (1987) found that there was highly significant relationship between size of land holding and adoption of recommended Sugar Cane cultivation technology.

Reddy and Reddy (1986) found that farm size was highly significant related with adoption.

Patil and Waghdhare (1989) generalised that farm size of banana growers was found to be significantly associated with the adoption of banana cultivation technology.

Anonymous (1992) reported that the adoption of phosphatic fertilizer on paddy crop was found to be significantly associated with size of land holding.

ANNUAL INCOME AND ADOPTION:

Bhatol (1987) found that extent of adoption of castor had positive and highly significant correlation with annual income.

Jain (1987) reported that adoption of recommended Sugar Cane cultivation technology had highly significant correlation with annual income.
Patil (1989) found that extent of adoption of castor had positive and highly significant correlation with annual income.

Deswal (1993) concluded that annual income of the adopters of plant protection measures in kharif rice was not significantly related with their extent of adoption.

OCCUPATION AND ADOPTION

Subramanyam and Sripaul (1977) reported that occupation was significant factor in differentiating one group of farmers from another.

Jain (1987) started that there was significant relationship between occupation and extent of adoption of recommended Sugar Cane cultivation technology.

Patel (1989) revealed that extent of adoption of castor had no association with the occupation of trained farmers.

RELATIONSHIP BETWEEN KNOWLEDGE LEVEL OF THE RESPONDENTS AND THEIR EXTENT OF ADOPTION:

Jaiswal (1985) reported that there was a significant and positive correlation between level of knowledge and level of adoption recommended technology.

Jain (1987) found that there was a significant and positive association between level of knowledge and adoption of recommended Sugar Cane cultivation technology.

Patel (1989) revealed that the extent of adoption of castor had positive and significant correlation with knowledge level of trained farmers.
Tandel (1993) reported that the extent of adoption of Sugar Cane technology had a positive and significant association with knowledge level of respondents.

CONSTRAINTS IN ADOPTION OF RECOMMENDED CULTIVATION TECHNOLOGY:

Constraints play a vital role in the adoption process of transfer of technology for better result to any extension approach. It is very essential to minimize the constraints in the adoption process as far as possible. As such constraints in the flow of Technology should be studied carefully and efforts should be made for repaid transfer of technology. Findings and views at different investigations are reproduced as under.

Jain (1987) found that the main constraints faced by the Sugar Cane growers were high cost of inputs, high irrigation charge, lack of transport facility, lack of timely irrigation, non-availability of credit in time and late harvesting.

Patel (1989) concluded that main constraints in adoption of recommended hybrid were high cost of fertilizers and pesticides, not getting remunerative price of the product and irregular supply of electricity.

Tandel (1993) reported that the main constraints faced by the Sugar Cane growers were not getting remunerative price of the product, irregular supply of electric current, non-availability of timely credit, high cost of inputs and irregular canal water supply.

SUGGESTIONS GIVEN BY THE RESPONDENTS TO OVERCOME THE CONSTRAINTS

Thumar (1981) suggested that the important suggestions endorsed by
the ground nut growers were timely supply of fertilizers. Cost of fertilizers should be low, providing information about improved varieties, weed control, soil testing and plant protection practices.

Munchwa (1984) suggested that important suggestions reported by the rainfed wheat growers were:

Requirement of more research work for best quality of rainfed wheat improved seed should be available from government agency in required quantity. Extension contact should be frequent and to evolve water stress resistance variety for 'Bhal' area.

Tandel (1993) concluded that the important suggestion endorsed by Sugar Cane growers for improving the productivity of the Sugar Cane crop were:

1) Sufficient and timely credit facility.
2) Developing high yielding well and red rot resistant variety.
3) Importing training of New production technology.
4) Reducing price of inputs.
5) Providing satisfactory price to the product and
6) Regular supply of electricity for irrigation purposes.