REVIEW OF LITERATURE

This chapter provides a detailed account of the researches done in the past on the problem under study researches. Keeping in view the objectives of the study the review has been attempted on four major areas allied to the problem and have been presented in the forgoing pages in the four sections, as under:

1. Technological gap in adoption of recommended practices in scientific cultivation of the different crop.
2. Technological gap in respect of knowledge and adoption
3. Factors associated with technological gap.
4. Constraints in the process of adoption of recommended practices.
5. An effort has been made to search the related literature thoroughly so as to present the findings of past studies. Keeping this in view the objectives of this investigation, the findings of some important and relevant studies are given here.

Section-1: Technological gap in adoption of scientific cultivation of the different crops

Khan et al (1968) reported the increase yield of wheat after green manuring with dhiancha-sanai and yield attributing characteristics length of ear head, grain weight compared with those where grain yield was obtained from wheat after legume.
Shukla (1977) observed that 7.77 percent and 6.80 percent of the adopters used seed rate above and below the recommended rate respectively. Regarding sowing distance, he observed that 9.71 percent and 4.80 percent of the adopters used spacing distance lesser and more than recommendation.

Pandey (1975) suggested that production might increase by adopting high yielding varieties, timely and adequate use of fertilizers, plant protection measures, proper irrigation.

Verma and Hegde (1979) observed that lack of suitable plant type, fertilizer use irrigation, potential relative prices and post harvest technologies were mainly responsible for low yield of rice.

Sinha and Sinha (1980) suggested that the credit should be provided to the farmers in the time so that they can purchase agriculture inputs like seeds, fertilizers, insecticide, pesticide, in time. Sohal and Saini (1987) assessed a reduction of 59 percent in cane yield in checked weeds fields at the G.B. Pant University research farm.

Lakpal et al (1994) reported that sowing time in rice cultivation lay a significant role in increasing yield. Bio fertilizer and organic manures together can make a significant contribution in maintaining soil health.

Saddiq (1999) on the basis of a detailed study on rice, recommended as follows.

(I) Low cost nutrient management

“The conjunctive use of organic (green manure or farm yard manure) and in organic nitrogenous fertilizer (Urea, L.C.U. etc.) Increases the yield level by 15-18%. The application neem- gypsum and mussori rock phosphate (MRP) coated urea is significantly superior to prilled urea applied recommended splits and comparable to U.S.G applied in single dose”.

(II) Integrated pest management

1. Soaking sprouted seed in 0.2 percent cholorophyriphos for three hours before using against pests like gall midge in the nursery.

2. Root dipping in 0.2 percent cholorophyriphos for 12 hours (or 2.02 percent chlophyricphos + one percent urea for three-hour) that provide protection for 15-30 days against stem borer gall midge whorl maggot and like.

3. Placement carbofuron in the root zone for prolonged protection against major pests.

4. Soil incorporation of carbofuron before sowing or transplanting of rain fed lowland rice followed by need based spray of quinolphos/monocrotophos against the stem borer.
(III) Diversification of cropping systems.

Reported that significantly, rice and wheat rotated with a legume or rice wheat and rice - rice combined with a legume is economically more profitable & ecologically harmonious and diversification adds strength to the farmer in term if sustainability.

Kumar (2001) nearly 75 percent of farmers perceived that the improved sugarcane production technology is moderately to highly profitable with nearly fifty percent farmers perceiving it as highly profitable.

SECTION -2: Technological gap in respect of knowledge and adoption

The technological gap, indeed, may vary from one practice to another because of certain considerations. Therefore, an account of research carries out regarding technological gap related to different important components of crop cultivation have been reproduced as following.

Nair (1969) reported that the adoption of paddy technology was for below the recommended levels, only 11 percent of the treatment. The nitrogenous fertilizer was applied by 99 percent, but majority applied only less than half of the recommended doses. Only 6 percent of the participating farmers applied full recommendations.

Tripathi (1977) found that the gap in seed treatment in rice was 10 percent in low category farmers and 32.50 percent in the high category farmers.

Patil et al (1995) observed that majority of farmers (60.94 percent) did not treat their seed at all.

Gupta (1968) concluded in his report on high yielding varieties programme for Mexican wheat in Saharanpur district of Uttar Pradesh pointed out that against the recommended seed rate of 100-kg/ha only 77 kg/ha was used by the farmers.

Nair (1969) pointed out in his study of high yielding varieties programme in Kerala State observed that 40 percent of the farmers adopted the recommended seed rate in rice.

Patil (1995) reported that majority of farmers (63.02 percent) used higher seed rate in paddy.

Supe et al. (1983) the plant protection population of 18,000 to 19,000 is required for obtaining high yield of cotton per hectare. This population can only be maintained if 4 kg of seed is sown per hectare. They observed that 4 kg per hectare seed was used by only few farmers. Three-fourth cotton growers followed the spacing recommendation.
Nair (1969) in a study conducted in Kerala pointed out that 90 percent of the farmers applied nitrogenous fertilizers, but the majority applied only less than half the recommended dose.

Karim and Mehboob (1974) while analyzing the adoption of fertilizer in Bangladesh, reported that 50 percent of the growers applied urea. About one sixth of the growers adopted phosphate and only 5 percent of them adopted potash.

Tripathi (1977) observed that the gap of nitrogen application was 15 percent in low category, whereas it was 61.57 and 23 percent in moderate and high categories.

Bhilegaonkar (1976) found that the average use of fertilizer in terms of nutrients in kg per acre was far below the recommended level. Similar trend was observed in a study carried out by Karim and Mahboob (1974).

Feder and Slade (1986) in their study conducted in Karnal district of Haryana observed that the advantages of using nitrogen were well known among farmers as overall, proportion of users exceeded 95 percent. There was practically no difference between the smaller or larger farmers or between contact and non-contact farmers. The situation was different for other nutrients only 42 percent of the contact farmers used phosphate fertilizers and the rate of adoption among larger contact farmers was significantly higher than the rate of adoption by smaller farmers. Adoption of phosphoric fertilizers by non-contact farmers was significantly lower i.e. only 23 percent.

Tripathi (1977) reported that 33 percent of the farmers were in low technological gap category, whereas a majority of them i.e. 63 percent were in moderate gap category and the remaining were found in high gap category.

Pal (1975) reported adoption of plant protection practices by only 8 percent farmers in Agra district. The poor extent of plant protection measures in wheat was also reported by Singh et. al (1972)

Trivedi (1964) found that almost all the tribal farmers (98 percent) were having medium to high-level technological gap.

Tyagi (1988) observed that over all technological gaps of all the respondents in study area was determined 49.5 percent. The highest gap was denoted in plant protection measure was determined 81.22 percent in protection from disease, 76.62 percent in protection from weed and 61.55 percent gap in protection from pests.
Bavlathi, V.G. and Sundarswamy, B. (1990) finding that the training should be given to large number of farmers about improved farming practices for higher adoption since that adoption of improved farming practices was significantly associated with extension participation.

Patil and Deshmukh (1995) concluded an adoption of new rice technologies is an economically viable proposition this would improve economic condition of rice growers.

Singh and Sharma (1990) reported that the recommended irrigation practices were followed by 31.39 percent of those total respondents. This data on weed control showed a technological gap of 60.83 and 46.96 percent.

Prasad and Mahipal (1991) reported the adoption level as well as technological gap was found to be medium among the respondents indicating the non adoption of recommended practices.

Prasad and Mahipal (1991) reported the option level as well as technology was favored to be medium among the respondents indicating the non-adoption of some of the recommended practice.

Ananda Rao and Punna Rao (1993) knowledge gap should be reduced from medium to low level so as to make all the farmers to get adequate knowledge and training with regard to recommended technology.

Nikhade, Bhople and Kale (1995) the adoption gap about the use of recommended technology of cotton among cotton growers was found to be about 30 percent, which was quite high.

Ajore and Singh (1996) the lower adoption gap could be obtained through appropriate method like effective training to the farmers, carrying out demonstration on the farmers’ fields.

Kumar (2001) found that maximum technological gap exist among the farmers having low extension contacts and the comparatively less technological gap was noticed among farmers having high extension contacts. The technological gap ranged from 37.0 percent to 81.08 percent, 19.67 to 72.09 percent and 6.14 percent to 59.82 percent for farmers with low, medium and high extension contacts.

Section–3: Socio-Eco-Personal variables associated with technological gap

The study under this head includes various variables like, age, education, cast, family size, social participation, socio economic status, scientific organization found related with the adoption of improved agriculture practices and associated with technological gap.

relationship between age and adoption behavior of farmer they also revealed that education of farm
operators was positively associated with the adoption of improved techniques.

Rao (1968) found that the age was negatively correlated to knowledge of package of practices for H.Y.V.
of rice, although it was not significant in respect of package concept. Chattopadhyay (1976) did not find
any significant relationship between age, family size, family type and participation of farmers in high
yielding varieties programme

Muthain, Perumal and Somasundaran (1978) reported that the age did not influence the adoption of
recommended farm practice.

Joshi and Sinde (1984) concluded that the age placed a significant role in adoption of H.Y.Vs. Supe et al
(1990) observed that the age farmers had no relation with their adoption behavior. Anita and Singh
(1995) suggested that the younger age group persons be assigned the task of field of work.

Tyagi (1999) found that age had negative and significant correlation with the technological gap in case
of medium and large farmers.

Kumar (2001) concluded that age was negatively and significantly correlated with education and had
positive association with complexity of technology

Parthsarthy et al (1975) reported that a non-significant relation between level of farmers education and
extent of technological gap.

Mishra and Sinha (1981) reported positive and significant association of technological know-how with
education and social participation, whereas, negative and significant correlation between technological
know-how and knowledge was observed. However, no significant association of technological know-
how with material possession and risk preference was found. Tyagi and Tyagi (1988) concluded that
education and credit orientation were the most important determinants of technological gap in case of
small farmers. However, credit orientation was found to be the most important factor of technological
gap with regard to medium farmers. And in case of large farmers, education was found to be the most
important factor.

Rade at al (1990) observed that as the education level goes on increasing the percentage of the farmers
in high level of constraint goes on decreasing.

Tyagi (1999) found that technological gap has significant and negative correlation with education in
case of small, medium and large farmers.
**Kumar (2001)** concluded that education have positive association with extension contact. The higher education develops the intellectual domain, which most probably makes the farmers able to establish contact with varied sources for obtaining more and more information.

**Moulick and Ray (1965)** found significant relationship between cast and participation in H.Y.V programme among the higher caste farmers.

**Shyam et al (1965)** observed that size of a family is positively associated with the adoption of improved farm practices.

**Mukharjee (1970)** did not find any significant relationship between age, family size and family type in H.Y.V.P.

**Katarya (1989)** family size did not show any significant relationship with adoption.

**Tyagi (1999)** observed that size of family was significantly and negatively associated with technological gap in case of large farmers but it was not having any influence on technological gap in case of small and medium farmers.

**Bhoite Nikalze (1983)** found that social participation was positively and significantly associated with adoption of improved package of practices.

**Singh (1984)** reported a significant association between social participation and adoption of improvement agricultural practices. However, Sharma (1986) found that there did not exist a relation of significant level between social participation and adoption of recommended practices.

**Singh and Patel (1988)** reported that a significant relationship between social relationship of contact farmer and their extent of adoption.

**Rade et al (1990)** social participation did not show significant with the level of constraints in adoption.

**Tyagi (1999)** observed that social participation was negatively and significantly associated with technological gap in case of small and large farmers but in case of medium farmers it did not show any effect with technological gap.

**Kumar (2001)** social participation was found to have established positive and significant relationship with domestic possession.

**Rao (1968)** revealed that economic status was positively related to adoption. Patel and Singh (1970) Sinha (1969) and Muthyya (1971) observed that socio-economic status and adoption of agriculture technology as significantly related.
**Supe et al (1990)** reported significant relationship between adoption and socio-economic status of the cry land farmers.

**Tyagi (1999)** observed that socio-economic status was negatively and significantly correlated with technological gap in case of small and medium farmers but in case of large farmers it remained uninfluenced.

**Singh (1977)** reported that not a single respondents was found to have low level of risk bearing capacity about 56.5 and 43.5 percent farmers have shown high level of risk bearing capacity. The association between risk bearing capacity and adoption behavior of the respondent was found highly significant and shown that there is direct correlation between these two variables.

**Ramamoorthy and Bhaskaran (1974)** reported the rate of adoption of improved agricultural practices tended to increase with size of holding.

**Cattopadhayay (1976)** found that the size of the land holding was negatively and significantly associated with the technological gap.

**Kumar (2001)** the variable of farm size was found to be positive and significantly correlated with mass media-exposure indicating thereby the large farmers exposed themselves with mass media and adopted improved technology.

**Roser and Shoemaker (1971)** indicated a strong association between leadership and innovations based on diffusion studies.

**Ogunfiditime (1981)** observed that education economic status, farms size leadership social interaction and extension credibility of the new improved maize variety.

**Kaleeland Ramesh Baby (1995)** reported that leadership is often regarded as the single most critical factor in the success, or failure of as institution.

**Tyagi (1999)** concluded that credit orientation have negative and significant association with technological gap in case of small, medium and large farmers.

**Trivedi and pareek (1963)** reported that majority of the farmers belonged to (46.67 percent) the category of those with high listening behaviour to study the extension contacts.

**Singh and Baldev (1990)** finding that the contact of extension agencies and mass media were found to play major role in influencing knowledge attitude and adoption behavior of the farmers.

**Veeraswamy, Satapathy and A.Rao (1994)** were of views departmental meetings, training camps,
extension publication have helped extension personnel to acquire scientific and technical information on rice technology.

Tyagi (1999) concluded that extension contact, source credibility were negatively and significantly correlated with technological gap in case of small, medium and large farmers.

Kumar (2001) the technological gap regarding recommended varieties of sugarcane was found to have been influenced negatively and significantly by the independent variables of education, farm size, and power, extension contact, mass media exposure, investment orientation, profitability, practicability and knowledge of technology.

Vekaria, Patel and Mahajn (1993) reported that the majority of the farmers had favorable attitude towards agriculture technology were positively and scientifically related with the in put use behavior of all the categories of the farmers.

Bharathi, Dhadave, Chandran and Mahajula (1995) the attitude score of the woman respondents indicate that they had more conservative approach as regard to caste interaction with the attitude.

Tyagi (1999) observed that attitude has significant and negative correlation with technological gap in respect of small, medium and large farmers.

Mishra (1982) reported about 48.01 percent the technological gap in sugarcane cultivation. It was calculated 75-80 percent in cane protection, 69.08 percent on choice of suitable varieties, 68.80 percent in ratoon management, 59.4 percent in requirement of manure and fertilizers, 49.1 percent in manure application, 25.06 percent in harvesting and 7 percent irrigation management.

Supe, Waghdhare and Paturkar (1983) observed that actual seed rate used by few farmers, seed treatment by half sample farmers, recommended spacing by three-fourth, manure and fertilizer by one-third and plant protection by minor group of cotton growers.

Tyagi and Tyagi (1988) studied that education and credit orientation were the most important determinant of technological gap.

Verma and Yadava (1995) revealed that there is a wide technological skill gap is various practices of sugarcane cultivation among the farmers and lack of skill proficiency in adoption of technology.

Abdul Mazi, Tantray and Khasir Mohd. (1996) reported that wider technological gaps dose exist in the farmers about the production recommendations for Sarson cultivation.

Singh, Tripathi and Singh (1998) findings clearly indicated that extent of the technological gaps in
adoption of recommended wheat production practices can be minimized by increasing education, investment, irrigation, potentiality, cropping intensity, knowledge of technology and awareness of credit facilities at the existing level of system of Jaunsar-Bhawar area.

Tyagi (1999) reported that 61.38 percent gap in choice of improved varieties practices. Although, large farmers showed only (36.75) percent gap followed by medium farmers (55.05) percent and small farmers (70.84) percent in adoption have improved varieties.

Kumar (2001) found that maximum technological gap in sugarcane production technology was found in case of seed rate & treatment (74.00) percent followed in succession by method of sowing (64.04) percent, irrigation (63.00) percent, fertilizer application (60.90) percent, high yielding varieties (53.50) percent, plant protection (53.80) percent, weed control (51.00) percent and time of sowing (34.50) percent.

Section-4: Constraints in adoption

Constraints assumes a significant role in the adoption of farm technology because of the fact that they are inhibitors and they either slow down or block the process of acceptance of innovations. It is a well-established fact that for better results in any extension approach, the elimination or minimization of constraints, if any, becomes imperative. Therefore, the constraints/problems in the flow of farm technology and its acceptance by the users need in-depth probing, which this study envisages. This situation, therefore, calls for presentation/reproduction of constraints reported in past studies related to constraints in adoption with a view to explore similarity/variation between the constraints of the past researchers and this investigation. By doing so, an additional dimension shall be added to the existing inventory of constraints indicated by past researches. The past researches screened by the investigator in this context have been furnished as under:

Srivastava and Pathak (1979) observed that pest diseases, lack of short duration and drought resistant varieties extension programme and proper management practices, were some of the major problems responsible for the low yields of rapeseed mustard in Uttar Pradesh.

Sinha and Sinha (1980) found that the most important reason for non adoption of high yielding varieties of maize were lack of money (91.5%), non availability of fungicide (81.2%), lack of proper guidance (72.8%).
Bhaskaran and Praveena (1982) reported that regarding the package of practices of castor, majority of the farmers stated lack of knowledge about the practices, high costs involved in adopting them and lack of guidance the main reasons for non-adoption.

Singh and Sharma (1990) found that some of the major constrains were lack of finance for purchase of inputs (84%) is lack knowledge (81.7%). High costs of H.Y.V seed (75.09%) shortage of irrigation facilities (61.0%). The other constraints included non-availability of inputs on time (58.76%) followed by incidence of pest and disease (48.0%).

Giase and Kamble (1991) expressed that 87.65 percent farmers did not adopt any plant protection for Bajra crop the study further revealed that among the factor affecting crop productivity at the most was the non-adoption of plant protection measures.

Jagdale and Nimbalkar (1993) reported that the major constraints towards adoption of recommended technology to high cost fertilizer and no knowledge towards fertilizer use and lack of knowledge of plant protection measures was major constraints for all the three categories of farmers since most of the farmers do not use plant protection measures.

Intodia, Bareth and Upadyaya (1995) revealed that small and marginal urd growing farmers perceived more technological constraints in adoption of soil treatment and protection measures.