This chapter provides a detailed account of the researches done in the past on the problem under study and the related aspects to provide at a glance the earlier 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 foregoing pages in the four sections, as under:

1. Recommendations on scientific cultivation of the crop.
2. Technological gap (knowledge and adoption gap).
3. Variables associated with technological gap.
4. Adoption constraints.

Section I. Recommendations on Scientific Cultivation of the Crop.

Kumar (1966) recommended 3-4 sprayings of 2 litre malathion (50%) and 2.5 litre/h of endosulfan (35%) to control pyrilla and top borer at an interval of 10 days during the months of August and September.

Sachan (1984) recommended use of 50 kg eldrin (5%) or B.H.C. (5%) in soil at the time of soil preparation to control termites. He further suggested the spraying of 1.5 litre thiodan 35 E.C. or nivacron 45 E.C. mixed with 1000 litre
water to control shoot borer and guraspur borer. He also recommended a spray of one C.C. metasystox 25 B.C./litre of water or one C.C. dimacron 100 B.C./3 litre of water on the crop to control pyrilla.

Saini (1986) recommended COs 687, COs 64, early varieties and COs 302, COs 767, CO 62399, CO 1158 and CO 1148 medium - late improved varieties of sugarcane for Harcourt region. He also suggested 3-4 hoeings and weedicars during first 120 days of sowing by snade and cultivator at monthly intervals. Further he reported sprays of 2 kg tricline immediate after sowing, 1 kg 2, 4-6 after 60 days of sowing or 0.5 kg gammexrine after 90 days of sowing. In addition he suggested that raulahha cane should be harvested in February and March. The rate of sucrose decreases after this time.

Saini and Singh (1981) suggested the use of disease free healthy seed of improved varieties to prevent the diseases of sugarcane. The authors also advised dipping the sets in 0.2% solution of arctan or defacion before sowing.

Saini and Singh (1985) proved that a dose of 150 kg N/ha produced the maximum number of millable canes (90 thousand/ha) and cane yield (54.5 t/ha).
Saini, Singh, Negi & Kumar (1982) observed 84.7 percent higher cane yield by sencor spray and manual hoeing for weeds control.

Singh and Saini (1983) recommended one ploughing by mould board plough, 3-4 harrowing or 5-6 ploughing by deshi plough in preparation of soil sugarcane crop. The authors further suggested 35 to 40 thousand sets of 60-70 quintals cane seed/h at 30 cm depth between 75-90 cm distance of two rows. They also reported 6-8 irrigations as optimum for sugarcane. A dose of 120 kg N₂, 40 kg K₂O and 60 kg P₂O₅/h was recommended by both the authors.

Singh, Saini and Kumar (1983) reported yield levels of 114.4 t/h from autumn planted pure cane, 101.9 t/h from inter cropped with wheat and 90.3 t/h from late spring cane at the G.B. Pant University or Agriculture and Technology.

Suyal and Saini (1987) assessed a reduction of 59 percent in cane yield in unchecked weeds field at the G.B. Pant University Research Farm, Pantnagar.

Verma, Singh and Singh (1985) recommended seed treatment of sugarcane set with 10-12 drops coltar mixed water for 24 hours, wet the setts in water for 4-6 hours and dip the setts 0.5% agallol (500 gm/h) or 0.25% aratan (250 gm/h) mixed with water of 100 litre/h for 2 minutes.
Section II. Technological gap (Knowledge and adoption gap)

Directorate of Evaluation Uttar Pradesh (1967) in its report on High Yielding Varieties Programme for Rabi 1966-67, pointed out that only 40 percent of the respondents adopted 50 to 70 percent by the total package of practices. 20 percent of adopted less than 50 percent package and only 3 percent of respondents adopted above 20 percent of the recommended package of practices.

D. Mellow (1979) opined 'among the agro based industries, sugar industry in general and sugar co-operatives in particular hold the pride of place as an instrument of rural reconstruction and development.

Hautz (1976) observed after a long period of slow economic development Queensland has become one of the Australia's most prosperous states. The opening of new export markets for sugar was followed by a rapid expansion of sugar industries leading to important changes in rural areas of sugar growing regions. The changes have been accelerated with the increasing use of modern technology.

Hindustan Times (1985) Federation of Indian Chambers of Commerce and Industry remarked- a stimulate to Economic Growth "A price policy providing incentives to farmers and also to attract investment in agricultural sector will help in developing and adopting new technologies."
Jain (1977) stated the establishments of sugar factory has a healthy impact in rural areas by promoting new industries maintaining the industrial temt of a place or by making for reaching improvements in agriculture irrigation etc.

Mishra (1982) reported the overall technological gap in sugarcane cultivation 48.01 percent. It was calculated 75.80 percent in cane protection, 69.08 percent in choice of varieties, 68.80 percent in ratoon management, 59.4 percent in requirement of manures and fertilizers, 49.21 percent in manure application, 25.06 percent in sowing, 21.00 percent in harvesting and 7 percent in irrigation management.

Nair (1969) reported that the adoption of paddy technology was for below the recommended levels, only 12 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 farmer's applied full recommendations.

Singh (1985) determined overall technological gap in all the technological gap components was highest in case of plant protection measures (63.66 percent) followed by fertilizer application (63 percent) lowest gap was found
In case of harvest and post harvest operations (42.75 percent) overall average gap in rice technology was found to be 56.75 percent.

Singh and Kathur (1982) reported 24 and 12 percent (sowing time) technological gaps in case of small and medium farmers in bajra cultivation. Further it was also followed 36 and 4 percent in depth of sowing, 56 and 4 percent in method of sowing, 70.60 and 50.40 percent in weed control and 72 and 54 percent in plant protection measures by small and medium respondents.

Supa, Waghobara and Patarkar (1985) observed that actual seed rate was used by few farmers, seed treatment by half sample farmers, spacing recommendations by three-fourth, manure and fertilizer by one third and plant protection by minor group of cotton growers.

Ziaul Karim and Mehboob (1974) while analysing adoption of fertilizers in Bangladesh reported that 50 percent of the growers adopted phosphate only 5 percent of them adopted potash.
Section III. Independent Variables Associated with Technological Gap.

Daviskar (1976) regarding extension services stated "Cane production has increased where co-operative factories employ extension workers to advise the growers better production techniques and to help them acquire such inputs as fertilizers."

Rosa and Dasgupta (1962), Millin (1968), Singh (1971) found caste to be an important factor affecting adoption behaviour of the farmers.

Chattopadhyay (1976) did not find significant relationship between age, family size and family type and participation of farmers in High Yielding Variety Programme.

Desai and Desai (1969) in their study of high yielding varieties programme in Kaira district of Gujrat found that 72 percent of the participants had formal education, among non-participants only 55 percent had formal education. They also reported that the extent of tenancy was higher among the non-participants.

Directorate of Economics and Statistics (1968) pointed out that proportion of members of co-operative societies among the participating farmers was larger than that among the non-participants.
Gupta (1966) 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 40 kg per acre. Only 30.95 kg per acre was applied by the participating farmers. He further reported that education was positively and significantly related to adoption of High Yielding Varieties tended to be with higher education.

Hoffer and Stagland (1958) reported that unfavourable attitude towards a practice was shown because the farmers though that the practice would not be successful with the type of their crop protection environment. Farmers having high social aptitude, high opinion about the innovation and possessing risk bearing capacity would certainly have positive attitude towards the adoption.

Jaiswal (1965), Shankarian (1965), Sinha (1966), Majumdar and Majumdar (1967), Rao (1968), Singh (1968), Nair (1969), Singh (1969) and Singh (1979) reported a positive significant correlation between knowledge of the farmers about agricultural innovations and their adoption.

Kaul and Balasubramanian (1982) did not see significant association of age, education, annual income and membership in co-operative society with adoption of agricultural technology.
Kherde, Misra and Malik (1986) placed 60 percent respondent about dairy farming practices under medium knowledge group, 17.12 percent under high knowledge and 22.38 percent under low knowledge group.

Huthain, Perumal and Somasundram (1976) concluded that:

(i) age did not influence the participants in the adoption of recommended farm practices;

(ii) adoption of correct dose of nitrogen was not significantly influenced by literacy level and

(iii) the participants of the different farm sizes adopted the recommended practices irrespective of their size of holdings.

Mutherjee (1970), Chowbey (1972), Somasundram (1976) did not find significant relationship between age, family size and family type and participation of farmers in High Yielding Variety Programme.

Nair (1969), in his study of High Yielding Varieties Programme in Kerala State, has reported positive relationship between education and adoption of High Yielding Varieties. He further reported that use of mass media, interpersonal cosmopolitan sources of information, interpersonal local knowledge sources of information and extension
contact as positively and significantly co-related with the adoption.

Ogunfidiitime (1981) observed that education, economic status, farm size, leadership role and social interaction and extension credibility contributed to adoption of the new improved maize variety.

Prasad and Singh (1981) concluded that the small farmers have higher credit needs for crop production as well as for farm as a whole when all economic activities are taken in account.

Reddy (1981) felt that to have an adequate impact on agriculture production, the provision of credit should be accompanied and coordinated with extension services and supervision.

Reddy and Kivlin (1968) reported that adoption of high yielding varieties was not influenced by the tenure status of the farmers. They also did not find a significant association adoption of high yielding varieties and credit use.

Rogers (1951) found positive association between farmers knowledge and the extent of adoption of the same.
Rogers and Shoemaker (1971) indicated a strong association between opinion leadership and innovationness based on diffusion studies.

Ryan and Gross (1950), Gross and Taves (1952), Marsh and Coleman (1955), Van den Ban (1957), reported that there was a positive relationship between youthfullness and early adoption of improved agricultural practices.

Salunke and Thorat (1975) reported significant relationship between family type variable and adoption of technology.

Sinha (1977) reported that educational status, social participation, socio-economic status, risk orientation, knowledge, attitude were found positively and significantly related with the adoption of agricultural innovations by the small, medium and big farmers. Credit orientation was positively and significantly related with the adoption of agricultural innovations only among small farmers. No significant relationship was observed in the case of medium and big farmers. Age and tenure status did not exhibit any relationship with the adoption of agricultural innovations in any category of farmers under study. Positive and significant relationship of source credibility and extension contact with the adoption of agricultural innovations was found in almost all the categories of farmers under study.
Singh (1971) found that extension contacts of the farmers were highly correlated to agricultural progressiveness. Big farmers had higher extension contact than the small farmers. On the other hand small farmers had significant higher tenure status than the medium and big farmers.

Singh (1974) reported that the credit, fertilizer, pesticide and seed technical advice was consumed by 10 percent elites of the farming community.

Singh (1978) reported that by and large the first conversion of scientific knowledge into information took place at the level of research institutions where the people have a high level of understanding but have a very little knowledge of rural environment. Such information is further converted for second time in the form of pamphlets, booklets, news-letters and transferred through the extension agencies to the lower functionaries, such as V.L. Ws. at third conversion, understanding of social and personality system is substantial but that of technical knowledge is very poor. Thus at this level we find a combination of technical knowledge and understanding of the socio-economic conditions of the farming communities.

Singh (1985) inferred that the "credit delayed is credit denied." Timely credit is important for the farmer,
since all the operations are seasonal oriented and if
the credit not provided in time, this affects his agri-
cultural operations and yield and consequently his
capacity to repay.

Singh and Singh (1961) established significant
contribution of economic motivation, risk motivation,
knowledge, attitude and source credibility to the pre-
diction of adoption behaviours of farming couples.

Somasunandan and Singh (1978) have shown that the
level of education, economic status, age and farm size
correlated with adoption of a new farm practice.

Supa (1959), Singh (1969), Singh (1971) and
Singh (1974) have indicated that risk orientation was
positively related to adoption behaviour of the farmers.

Sushma, Kanch and Shashikan (1961) cleared that
in more developed areas, the variables such as farm size,
income, socio-economic status and use of information
sources and positive and significant relationship with
adoption.

Milkening (1952), Gupta (1966) indicated that
age was negatively correlated with adoption. However,
Choubey (1972), Chattopadhyay (1976) and Balsubramaniam (1980) did not report significant relationship between age and adoption behaviour of farmers. They also revealed that education of the farm operators was positively associated with adoption of improved techniques.

Section IV. Adoption Constraints

Gandhi (1986) in his study prospects for a National Level Farmers’ Movement provided a brief introduction to peasant agitations in different states of the country and said economic exploitation, especially the governmental policies for denial of remunerative prices for agricultural produce were the root cause of poverty in India.

Gurmani (1986) stated that the lack of coherence between sugarcane prices payable and sugar prices realised by the factories was one of the major causes for the fluctuations in sugarcane production apart from natural factors affecting sugarcane crop.

Kunnal, Itnal and Krishnaswami (1984) found the highest barrier of high cost (58.06%) for non-adoption of plant protection measures which was followed by lack of knowledge (41.93%), difficulty in application of pesticides (19.32%) and lack of technical guidance (6.44%) in sorghum crop.
Mishra (1982) reported most commonly and frequently causes—lack of knowledge of the individual practice, lack of technical help, high cost, non-availability of material, need more labour, unconvincing merit of the practices and complication of the practice which were responsible for high technological gap in sugarcane cultivation.

Nair (1969) reported that most important reason for non-adoption of seed treatment was non-availability of chemicals, high cost of fertilizers and untimely supply were the important reasons for non-adoption. Lack of finance, assured irrigation, high incidence of insect-pests, low price of produce also limit the adoption.

Singh and Mathur (1984) found that small (68%) and medium (62%) categories of farmers were prohibited due to high cost of nitrogenous fertilizers whereas about 60 percent marginal as well as small felt due to poor knowledge.

Sinha, and Sinha (1980) found that the most important reasons for non-adoption of high yielding variety of maize were lack of money (91.5 %), non-availability of fungicide (81.2 %), lack of proper guidance (72.8%).
Tripathi (1977) observed that the main constraints were ignorance about the quantity, time and method of fertilizer application, input supply, institutional finance and transfer of information.

Vijayamuni and Pandit (1982) found lack of knowledge and lack of technical guidance main constraints in transfer of technology.