2. REVIEW OF LITERATURE

In this chapter, relevant literature related with the problem is discussed. Any scientific investigation requires essentially a comprehensive review of literature concerning its subject matter. It is necessary for an investigator to be well acquainted with the work done in the past (in India and abroad) to delineate the important problem areas, however isolating such reviews to, a single chapter of the thesis may have amounted assigning it ritualistic rather than a functional role. Therefore, the use of relevant references has also been made in other parts of the thesis apart from being discussed here. For the convenience of presentation, all the literatures have been reviewed in light with the diversification and are presented under the following sub-heads:-

1. Knowledge of sugarcane cultivation.

2. Adoption of sugarcane cultivation.

3. Gap in knowledge and adoption of sugarcane cultivation.

4. Relationship (Correlation) between knowledge and adoption.

5. Constraints in adoption of sugarcane cultivation.
2.1 KNOWLEDGE OF SUGARCANE CULTIVATION

Verma, 1989) suggested that training and demonstration system showed a significant improvement in their knowledge and acceptance of advances in plant and ratoon cane cultivation.

Lakshminarayan, et al (2000) suggested that the farmer’s knowledge needs to be increased by providing ample opportunities to participate in training programme and extension activities.

Girijesh and Chandrasekhar (2001) found that the farmers who were composting and mulching sugarcane trash have the knowledge on nutritive value of trash and its beneficial effect on soil fertility and crop productivity.

Poswal et al (2005) conducted survey among sugarcane farmers (n=220) in Muzaffarnagar district, western Uttar Pradesh, India, to determine farmers' knowledge level about recommended practices in sugarcane cultivation and the extent of adoption of improved sugarcane technology and found that respondents were having overall average knowledge level 53.70 percent,

Rajula, et al (2005) conducted a study on moisture stress management practices: adoption pattern and constraints involved, and revealed that registered growers, much like the unregistered ones, have little knowledge about the recommended practices.
Maraddi, et al (2007) observed that more than half of the respondents (53.33%) belonged to medium knowledge level category, while 32.77 per cent had low knowledge about selected sugarcane practices.

**2.2 ADOPTION OF SUGARCANE CULTIVATION**

Directorate of Evaluation, U.P. (1966-67) has reported that only 3 percent in the State has adopted above 90 percent recommended practices of the crop raising. It was further pointed out that about 40 per cent farmers has adopted 50-70 per cent of the total package of practices and 20 percent of them had adopted below 50 per cent of the package of practices.

Khatik (1997) reported that the farmers of adopted villages adopted the technologies like improved varieties, fertilizers and pesticides more than the non-adopted villages.

Hanumarangaiah, et al (1998) indicated that adoption of improved cultivation practices, extension agent contact, and farm mechanization had the greatest direct impact on productivity of sugarcane.

Malik, (2000) told that farmers applied more than the recommended quantity of nitrogen fertilizers in all the categories. On average, sugarcane growers applied 83.00 percent of recommended P in the free area and 78.00 percent in the reserve area. Only 13.00 percent of the recommended rate of K was applied in overall mean levels. Protective irrigation was adopted at a
low level. The adoption of plant protection was 82.00 percent in the free area and 73.00 percent in the reserve area.

Manjunatha, et al (2001) revealed that 5 most important factors contributing to sustainable sugarcane farming as perceived by the farmers were: application of farm manure/compost, application of bio-fertilizers, adoption of hot water treatment of sets to prevent disease, proper water management practices, and non-dependency on chemical pesticides.

Ranish et al (2001) reported that 68.42 percent small farmers have medium level of adoption followed by 31.58 percent in low level. In the medium farmers category, 71.42 percent had medium level of adoption followed by 14.29 percent each from high and low level of adoption, respectively. In large category of farmers, 54.24 percent medium level of adoption followed by 32.20 percent having high level and 13.56 percent had low.

Poswal, et al (2006) found that only 46.45 percent of the farmers adopted the improved package of practices in sugarcane cultivation, which is the main cause of the low yield and quality of sugarcane in the district.

Chandraker, et al (2007) conducted a study to determine the extent of adoption of sugarcane growers (n=150) of the improved sugarcane production technology in Amarpatan Block of Satna District, Madhya...
Pradesh, India. They reported that 42.67 percent growers completely adopted the technology.

### 2.3 GAP IN KNOWLEDGE AND ADOPTION OF SUGARCANE CULTIVATION

Mishra (1981) studied that knowledge gap of sugarcane production technology and indicated that the practices related to the techno-economic and psychological factors have a wide technological gap ranging from 60.45 to 79.80 and from 7- 58.78 percent, respectively.

Mishra (1982) observed 48 percent information gap in sugarcane production technology. The highest gap was reported in case of plant protection (76 percent). It was followed by improved varieties (69 percent), ratoon management (69 percent), requirements of fertilizers and manures (59 percent), and time of fertilizers application (49 percent), sowing operation (25 percent), harvesting (25 percent), irrigation (7 percent) and intercultural operations (5 percent).

Singh (1982) reported that on an average the knowledge gap with all categories of farmers in higher (11.82%) in Gorakhpur as a compared to Bulandshahr district on the basis of production wise analysis. It was further observed that the gaps in land preparation, seed treatment and sowing operation, fertilizer application, irrigation, weed control, diseases and pest control are 0.98, 34.74, 2.89, 2.11, 7.57 and 25.68 percent, respectively. He
further concluded that irrespective of the production and categories of the farmers on an average, the gap is comparatively wider in Gorakhpur region. However, as the size of land holding decreases the size of the knowledge gap becomes larger in Gorakhpur as compared to bulandshahr district.

**Verma (1989)** analysed the differential information gap on ratoon management technology. The overall gap in ratoon management was 62 percent, the highest gap was recorded in gap filling (92 percent) followed by plant protection measures (80 percent) fertilizer management (67 percent). The least gap was observed in timely harvesting of ratoon crop (36 percent).

**Verma (1992)** observed that existing level of knowledge, skill and adoption of each categories of farmers were recorded statistically low as compared to the recommendations made by the research stations. The study further revealed that there were 42 and 66 percent gaps in technical know-how and adoption pattern of sugarcane cultivation, respectively. The gap in knowledge and adoption among small, medium and large farmers were at par but these were comparatively lower than the marginal farmers. The level of adoption was higher by those farmers who possessed more technical know-how in various practices of sugarcane cultivation.

**Gupta and Sood (1993)** reported in their study that contact farmers had an overall technological gap of 40.20 percent whereas, the fellow farmers had a technological gap of 47.55 percent. They further reported that 37 contact farmers (30.83 percent) were in low gap group, 65 in medium
(54.17 percent) and 18 were in high gap group (15.0 percent). Thus, majority of the adopters were in medium gap group.

Patel, et al (2001) collected Data were obtained from 150 sugarcane farmers in Sehore district, Madhya Pradesh, India, to determine the gap in farmers' adoption of sugarcane production technology. They concluded that majority of the farmers had a medium-level adoption gap. There was a significant difference in technological gap between farmers with small and large holdings.

2.4 RELATIONSHIP (CORRELATION) BETWEEN KNOWLEDGE AND ADOPTION

Kashikar (1967) reported that the agricultural technologies are needed to disseminate due to rapid innovation made at the research station. For this, the persons having formal education, land holding, socio-economic statuses were significantly associated with the awareness of innovations.

Bharadwaj (1970) observed that the gain in knowledge was positively associated with the age, education, size of holding and farming experience of farmers.

Longewar (1971) observed that farmers' personal characters and psychological attributes except their age influenced the knowledge level. Study further revealed that the farmers of all the knowledge level categories
were relatively less informed about plant protection measures and manure and fertilizer application techniques.

Kher and Halyal (1991) reported that there was a significant difference between the characteristics such as: age, knowledge index, innovation proneness and extension participation index of contact and non-contact sugarcane growers. Contact and non-contact sugarcane growers possessed a medium level of knowledge and adoption of sugarcane production technology. There was a positive and significant association between contact sugarcane growers' level of knowledge about sugarcane production technology and their characteristics such as education, social participation, innovation proneness, extension participation and localite-cosmopolite value orientation.

Reddy and Reddy (1997) revealed that the variables of farm size, extension participation activity, extension contact, socio-political participation and socioeconomic status were found to have the largest direct effect on gain in knowledge on sugarcane. The variables of extension contact, extension participation activity, economic orientation, education, management orientation and scientific orientation had a strong indirect effect.

Manjunatha et al (1999) conducted a study in Mandya district of Karnataka to identify selected factors responsible for low and high adoption levels of sustainable sugarcane farming practices. They found that knowledge of sustainable sugarcane farming technologies, farm size, and
attitude towards sustainable farming were the most important three variables contributing to differences in sustainable practice adoption levels among growers.

Yuzawa (1999) showed that there were significant relationships between land productivity and household, farm variables (tenurial status, source and frequency of information, and farm size), and household farm income. Labour productivity had significant relationship with village, farm size, and land productivity. Those which had significant relationship with household farm income were tenurial status, off-farm income, use of credit, household decision making pattern, farm size, accessibility of drainage, and land and labour productivity. Variables such as accessibility of drainage, extension services, land and labour productivity showed significant relationship with farmers cohesiveness.

Lakshminarayan, et al (2001) found that 12 variables (age, education, socioeconomic status, knowledge, attitude, economic motivation, achievement orientation, experience, farming commitment, mass media use, farm scientist contact, and extension participation) were having significant to highly significant relationship with the adoption level of sustainable sugarcane farming practices. Further, it was observed that all the 17 variables included in the study contributed nearly 89% to the adoption of sustainable sugarcane farming experience.
Singh et al (2002) reported that three variables viz. age of farmer, occupation and attitude did not have significant influence on knowledge. Education, land size, farm power use, material possession, annual income, socio-economic status, mass media exposure have been found significant effect in the knowledge level of farmers.

Patel et al (2003) reported that all the selected undependable variables viz., age, education, farm size, socio-economic status, social participation, innovativeness, cosmopolitanes, information seeking, scientific orientation knowledge were significantly and positively associated with the adoption behavior. It also revealed that the independent variable like knowledge had maximum positive direct effect (0.7803), while other variables had lesser effect.

Singh, et al (2004) revealed that the level of adoption is significantly associated with cane growers' characteristics like age, educational attainment, size of landholding and socioeconomic status.

2.5 CONSTRAINTS IN ADOPTION OF SUGARCANE CULTIVATION

Verma, (1989) reported that number and intensity of the constraints responsible for the technological gap differ from practice to practice of sugarcane cultivation. Most commonly and frequently reported were lack of knowledge, lack of technical help, lack of irrigation facilities, high cost of
inputs unconvincing merit, scarcity of labour, complicacy of the practice, non-availability of inputs and unsuitable policy of cane supply by the Government.

**Intodia et al (1995)** observed that small and marginal farmers perceived high constraints in adoption of plant protection measures by improved seeds and seed treatments. Lesser constraints were reported by them in the adoption of inoculation of seed with rhizobium culture and post-harvest technology.

**Krishnamurthy, et al (1997)** revealed that the major constraints identified for the non-adoption or partial adoption of recommended practices were lack of knowledge on number of sets, fertilizer dose and chemical weed control.

**Kushwaha et al (1998)** found that the problem of insect-pests and diseases control has been indicated as the most severe constraints and it stands first on the rank order scale in the opinion of contact farmers. Lack of availability of disease resistant varieties ranked second, improper seed supply, selection of poor land, sowing of poor quality seed, lack of fertilizer application, unawareness about use of rhizobium culture, improper method of sowing, inappropriate time of sowing were other constraints in descending order, respectively.
Malik and Malik (1998) showed that farmers used more N and less P and K fertilizers than the recommended quantity, thus causing imbalance nutrition which adversely affects sugarcane productivity and quality. The main reasons were lack of knowledge and the high price of P and K fertilizers in comparison to N. Demonstration and training programmes and an increase in the subsidy on P and K fertilizers are recommended.

Mikhalev (1999) reported that water poses a particular problem on both costs and availability grounds. Currently water charges are based on the area under irrigation, With government Subsidies amounting to 79 per cent of the actual cost, however, the opinion that charges should be based on the volume of water used, not the area under irrigation is gaining ground. Intensive industrialization, leading to considerable contamination of, groundwater, and loss of irrigation water are contributory factors to the existing situation.

Chand et al. (2002) reported that high cost of inputs, scarcity of money, lack of irrigation facilities, lack of technical know-how were the major constraints in adoption of mustard technology.

Poswal. et al (2005) determined the following constraints in adopting the improved technology of sugarcane (1) lack of knowledge, (2) lack of technical guidance, (3) unconvincing merit, (4) high cost of inputs, (5) lack of money; (6) complicated practices, (7) higher labour requirements, (8) unavailable materials, (9) low rainfall rate, (10) susceptibility of sugarcane to...
diseases, (11) drought, (12) dishonesty in weighing the materials, (13) low production of sugarcane; and (14) late payments.

Poswal. et al (2005) conducted a study among 220 sugarcane farmers in Muzaffarnagar district, Uttar Pradesh, India and revealed that lack of technical guidance and lack of knowledge are the major constraints to the adoption of improved sugarcane technology.

Singh and Singh (2007) revealed following major constraints in the adoption of IPM in sugarcane cultivation i.e. lack of knowledge of determining ETL of insect pest, lack of knowledge about identifying the harmful and beneficial insects, lack of knowledge about recommended dose of pesticides, insecticides, fertilizers, etc., lack of timely and appropriate transfer of technology by extension organizations, lack of dedicated and regular extension personnel, Lack of supply of farm literature on sugarcane cultivation, high cost of pesticides/bio-pesticides and bio-agents, lack of finance for purchase of pesticides, implements, etc., non-availability of resistant varieties and adulteration and substandard quality of pesticides, insecticides, etc.

Same authors further revealed that the overall percentage regarding the constraints pertaining to technology was 71.60 percent, constraints pertaining to technology was 75.00 percent, constraints pertaining to service, supply and marketing was 72.00 percent and constraints pertaining to transfer of technology was 64.00 percent.
Vaster, et al (2007) revealed that over 60.00 percent of the respondents expressed lack of technical know-how, non-availability of inputs and high cost of inputs as reasons for non-adoption or partial adoption of recommended sugarcane cultivation practices.