CHAPTER II

REVIEW OF LITERATURE
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The word ‘constraints’ refers to the factors obstructing the farmers obtaining full potential of a cultivar. There are number of studies which have analysed these factors from various angles but hardly any attempt has been made to analyse these problems at farmers level. Hence, an attempt has been made to review the findings of similar studies. The relevant review of literature has been presented here under.

FACTORS LIMITING AREA AND PRODUCTIVITY OF SUNFLOWER

Chaudhary and Mahajan (1978) reported that optimum seeding dates for two sunflower cultivars viz. 68414 and Latur selection during kharif winter and summer seasons were first week of July, second week of Oct. and first week of February respectively giving maximum seed yields of 10.96, 8.96 and 4.48 quintals per hectare in respective seasons. Both the cultivars gave equal performance in all the seasons.

Garg, J.S. and Bhan, S (1978) reported that the present status of sunflower in India is analysed and suggestions are given for increasing its production. India’s oilseed production accounted for only 8.7 percent of the world output. In 1974-75 the production of sunflower constituted one-eighth of the total oilseed production in the country.

Mohammad and Rama Rao (1981) reported that different spacing in sunflower showed no effect on the oil percentage and seed oil per hectare. The oil percentage increased upto 40 Kgs N. per hectare and then decline with further increase in the level of nitrogen but oil yield increased every encerement of added N. The optimum economic dose from the quadratic equations obtained from the ported data of rabi 1978-79 and 1979-80 worked out to be 109.69 kg N. per hectare. The additional profit per rupee investment on nitrogen of the level of fertilization was Rs 2.58.
Narsimha Rao and Reddy (1982) studied that treatment considered to three plant populations (55,555,74074 and 11,111, plants per hectare) and six times of application of 90 Kg N, and 60 Kg P2O5 per hectare in varying proportions as basal and top dressing at 30 days. The treatments were arranged in a split plot design with population as main plots and time of N and P2O5 application as sub plots with four replications. The experimental field was sandy loam with PH 7.8, 0.57 organic carbon, 27 Kg per hectare, available P2O5 and 455 Kgs per hectare available K2O. Sunflower variety Ec 64414 was sown on July 6, 1980 and was harvested on Oct, 3 1980. All plots sowned an uniform dose of 30 Kg K2O per hectare at the time of sowing.

Nikam, Patil and Deokar (1984) reported that studies on intercropping sunflower (Helianthus annus L.) with Ground nut (Arachis hypogaea L.) under rainfed condition was conducted during 1979 to 1981 at the agril Research station, Jalgaon. Intercropping whereas the total oilseeds production as well as total oil production. However, highest monetary return was obtained from sole crop of groundnut which was at par with two skip rows +5 rows of groundnut, (1:5), One skip sow +3 rows of groundnut (1:3) and paired sows +2 rows of groundnut (1:2). The planting pattern of sunflower affected the fields of sunflower considerably. The mean LER values decreased due to planting patterns whereas it was maximum due to intercrop of groundnut (1:14) than sole crop of sunflower (0.76).

Patel (1977) reported that the wide fluctuations in total output and productivity of oilseeds had resulted in a shortage of output of oils and fats for the requirements of the growing population. The per capita consumption of fats and oils in the country is estimated at only 10 grams per day as against requirement of about 30 grams per day. It is suggested that there is ample scope for increasing the area under groundnut sesamum and sunflower through intercropping and cultivation in the new command areas and in the tribal as also non traditional oilseed growing areas.
Patel and Singh (1980) reported that a two year field experiment was conducted on the clay loam soil of Agronomy farm, Rajasthan college of Agriculture University of Udaipur, Udaipur. During summer seasons of 1976 and 1977 to study the independent and combined effects of four schedule of irrigation viz 50 mm irrigation of 0.5, 0.7, 0.9 and 0.11 sates of stover mulch viz 0 and 20 tonnes per hectare and two rates of cycocel viz 0 and 0.03 percent.

Scheduling irrigation assessed on 1W/PAN -E ratio of 0.7 for entire season gave maximum seed field of sunflower. Stover mulching in sunflower during summer season increased the crop yield with greater water use efficiency. The retarding effect of cycocel on morphological parameters ultimately minimized the leading incidence and helped in boosting up the seed yield of sunflower.

Pizarro and Cattaneo (1980) said that sunflower was introduced in Argentina in the mid 19th century, and since 1910 it has been the main source of edible oil. However, there has been considerable fluctuation in sown area and yields particularly since, 1950's. Since there is a growing world demand for oilseeds effects should be made to improve sunflower productivity and varieties in Argentina to make full use of existing production advantages in this country.

Rangaswami, Purushothaman, Sivaram, Appadurai, Peter and Raman (1983) reported that a dwarf variety of sunflower (70 cm) maturing in 65 days has been developed from occension "Cernianka -66" of Russian origin. In various farm trials in the cultivars field it recorded mean yields 923 and 804 Kgs per hectare under irrigated and rainfed condition respectively. An average yield of 1126 Kgs per hectare was realised in large scale demonstration plots. The mean per day production of this variety is 177 Kg per hectare under irrigated and 138 Kg per hectare under rainfed conditions.

Report of State Bank of India (1979). The demand of edible oils in the economy in physical terms has been increasing at the
rate of 2.5 percent per annum. However, growth in domestic produc-
tion of edible oils is inadequate of crop with the increased at a
rate of 3.5 percent per annum. However, during the decade March (1971;
production of five major oilseeds (groundnut, sesame, sunflower,
rapeseed and mustered linseed). Showed an annual increase of 3.16
of during 1971-78. However the rate of growth of oilseeds produc-
tion was only 0.42 percent. It is noted that the production of
oilseeds increased from 8.8 million tonnes during 1971-72 to 9.2
million tonnes during 1978-79, it has showed sharp fluctuation
during the period.

KNOWLEDGE GAP ON SUNFLOWER CULTIVATION AND SOCIO
ECONOMIC FACTORS ASSOCIATED WITH IT.

Binswanger and Rayan (1979), reported that extension has a
great temptation to respond primarily to the need of the big farm-
ers by advocating high management technology not useful to small
producers.

Dubey and Singh (1977), reported that farmers ploughed
their fields more no. of times than recommended dose of nitrogen,
phosphorous and potash, applied more no. of irrigation with no
benefit and average yield obtained was less to the extent of 21-
25 q/hectare. NO plant protection measure were adopted by treating
the seed or applying insecticides. Sowing by broadcasting (a
prominent method) was practiced by all the farmers. The constraints
responsible for gap identified were (i) lack of knowledge in appli-
cation of irrigation, treatment of seed, use of pesticides and
weeds use of balance fertilizers, testing the soil and use of
improved method of sowing (ii) poor source of information taking no
linkage with IABP of HAU Interests. (iii) Input supply like seeds
fertilizer ect. was found inadequate by all the farmers, credit
problem existed in village and marketing of the produces was not
found up to the mark, farmers had to sale their produce at low
rate than the rate fixed by the government.
Jaiswal and Das (1980) reported that improved technology are not oriented to field condition and information developed by the research institution are mostly publication oriented rather than application oriented. They further observed that most modern farm technology has been designed for farmers with big holdings and adequate irrigation and other farms resources. They identified perceived economy profitability relative advantage in respect yield time, labour etc. as major acceptance motives for agricultural technology the reason for rejection were found to be lack of information, lack of easy timely and inadequate availability of inputs, lack of facilities of marketing of output, financial limitation, labour scarcity, lack of assured irrigation, risk and uncertainty involved in the use of innovations.

Jodha (1976) and Padheria (1973) reported that most important factors responsible for resistance of improve farm practices are irregular rain fall lack of irrigation facilities, lack of finance, high cost of inputs, lack of knowledge about important farm practices, lack of technological help and guidance, lack of timely supply of inputs, insufficient quantity and non availability of timely labour.

Pandey (1975) reported that low small farmers differ in their knowledge from state to state from technology to technology this knowledge gap therefore becomes a major constant and has to be bridged first for removing the production gap.

Rogers (1976) reported that agriculture research station often develop their recommendations about innovation with only a vague perception of those farmers for when the recommendations are intended resulting that most of the innovations diffused are irrelevant to the perceived needs of the majority of the guidance. They further agreed that most innovations are uncritically received by development workers as good for the farmers and thus diffusion system is triggered to convince the farmers to adopt it.

Somsundaram (1976) reported differential perception of
farmers on package of practices of IR 20 variety of paddy on suit-
ability, risk, cost, complexity and input availability as deter-
minants of checked technological transfer.

Swindale (1979) in order to make the complex technology
appropriate to field condition feared the danger of being the
technology malesfed that it represents on advance of all. He
pointed out that no single institution can deal with all socio
economic and ecological niches and, to make changes, requires both
skill in transferring technology and understanding of low technolo-
gies are diffused.

FARMERS PERFORMANCE FOR VARIETIES OF SUNFLOWER

Chaudhary and Anand (1985) reported that correlation
analysis of data on seed yield per plant and 13 yield related and
quality characters from 30 association grown in three seasons,
revealed that seed yield, was positively and significantly asso-
ciated with seeding fresh and dry weights, no. of farms plant,
height at flowering and maturity and stem and head diameters in all
three seasons. Path coefficient analysis revealed that days of
flowering and plant height at flowering and the strongest direct
effect on field, and that various other characters influenced
field indirectly. It is concluded that days to flowering, head
diameter, together with seedling height and plant height at flower-
ing should be given the greater weight in formulating selection
indices for yield in sunflower.

Jaya Kumar, Prem Shekhar Kumpuchetty and Subramanian
(1988) showed that field experiments were conducted during kharif
1984 and 1985 at Tamilnadu Agriculture University farm with sun-
flower Var CO2 to study the quality of sunflower as influenced by
different weed management practices (The pre emergence an applica-
tion of fluchoralin @ 0.75 Kgs per hectare followed by one late
weeding at DAS enhanced the quality of sunflower and increased the
protein and oil production by 130 Kg and 335 Kg per hectare respec-
tively over uniweeded control. Fluchoralin at 1.25 Kg per hectare
or the farmer practices of two manual weeding at 20 & 40 days were
the next application alternate in enhancing the yield and quality of sunflower.

Rao, Uma Devi and Rao (1991) reported that the research results indicates that under proper managerial conditions the yield can be increased to 100-150 percent. The most important factor for increasing production in sunflower is improved seed, proper seed bed, timely sowing adequate fertilizer management and effective plant protection measures.

Singh and Singh (1985) reported that after harvesting of Rabi crop, sowing the crop of sunflower in zaid season. The crop is maximised for Rs 4263.20 per hectare net returns get up of this crop.

ADOPTION OF PRACTICES AND DETERMINING FACTORS

Adhikari and Sen (1978), reported that socio economic status was found to be significantly related at 0.1 level with the respondents extension contact communication, extent of utilization of communication sources management orientation and their crop yield index.

Bose (1962) reported that those having a scientific outlook adopted significantly large number of recommended practices.

Chattopadhyay (1976) reported a non significant relationship between age and participation of farmers in high yielding varieties programme.

Chitamber (1961) saw the economic factors positively associated with the level of adoption of agricultural innovations.

Chaubey (1972) found that farmers caste rank and adoption of modern wheat technology were significantly related.

Dubey (1961) reported that by and large, farm size of farmers participating in H.Y.V.P. was larger than that of farmers not participating in the programme.

Hutchinson (1979) studied that trickledown theory which holds that age technology transferred to large land holders was not worked in many situations.
Havens (1962) reveals that there is significant relationship between the time of adoption and social status of the farmers.

Hoffer and Stagland (1958) reported that unfavourable attitude towards a practice was shown because the farmers thought that practice would not be successful with the soil they had.

Jha and Shekhawat (1972) reported a non significant relationship between age and participation of farmers in high yielding varieties programme.


Murthi and Singh (1974) reported that farmers socio-economic status, farming norms, education, farms size, degree of communalization of farmers, and perception of economic system value orientation and progress of change were found to correlate with better communication behavior with regard to modern wheat technology.

Patel (1977) suggested that there was ample scope for increasing the area under groundnut sesame and sunflower through intercropping and cultivation in the new command area and in the traditional nontraditional oil seed growing areas.

Ram (1975) found that only 14 percent farmers were conscious to use the improved seed.

Reddy (1962) observed that old farmers adopted the recommended practices more than others.

Singh (1974) reported that in order to accelerate diffusion and adoption of innovations the farmers must have the knowledge skill, willingness and situation ability.

Singh (1977) found a non significant correlation between caste of the farmers and their adoption behavior.

Temple (1959) stated that the farmers having official post
in a farm organization or a co-operative were progressive keeping other factors constant.

Tiwari (1964) found that membership of rural institutions and organizations is positively correlated to the adoption of improved varieties.

THE AREA UNDER CROP SUBSTITUTION FOR SUNFLOWER
TECHNOLOGICAL CONSTANT

Kumar, Arvind (1979) reported that non availability of quality seeds of improved varieties, non adoption of improved package of practices and cultivation of these crops on marginal and submarginal land under poor package of plant protection practices were the major causes responsible for poor level of production in the region. They also observed that rate of increase in total production could be attributed to expansion in area.

Chauhan (1970) stated that large size of holdings and higher economic status affected the adoption positively while farmers holding small size land and lower economic group farmers were either non adopters.


Patel and Patel (1988) found it convincing to say that the sunflower was a profitable crop in draught conditions. They also observed looking to the comparison of cost and income, it is very convincing to say that the sunflower is a profitable crop in draught condition.

Sindgi (1990), stated that two mechanical weeding and two intercultivation with hoe were effective pre emergence application of 1.5 to 2.0 kg ai per hectare of Tok @ 25 or 0.75 to 1.0 Kg ai per hectare of prominently controlled the weeds effectively. However Alachlor (LASO) @ 1.5 Kg per hectare was more economical.

Singh et al (1990), suggested many factors that hindered the adoption of sunflower cultivation in summer season.

Warsi Pathak and Govil (1991), strategies of production
SOCIO-ECONOMIC CHARACTERISTICS

Education:

Dubey (1958), stated that the rural communities play a very high value on education and for this reason projects for building schools for children got appreciable village support. Yadav (1964), Gupta (1968), Ready and Kelvin (1968) and Desai and Desai (1971) found that education is significantly correlated with the H.Y.V.P. and practices.

However Gupta (1968), Parthasarathi (1975), and Pal (1975) reported a non significant relation between education and adoption of High Yielding Varieties Programme. Mishra and Sinha (1981) reported a highly significant relationship between education of simple farmers with their knowledge about wheat technology. The regression coefficient of education was, however, found to be non significant in cases of the three categories of big, medium and small farmers.

Zaidi (1960), reported that the reasons for non adoption were, lacks of proper training, education, guidance of the people and diffusion of new techniques. He found that the recommended practices did not satisfy the farmers and, thus, are reflected in low level of adoption.

FARM SIZE:

Dubey (1961), Saxena (1961), Reddy (1962), Gupta (1968), Ready and Kelvin (1968), Rao (1968), Vyas et al (1969) and studies conducted by Directorate of Statistics and Economics (1967) reported that by and large, than farm size of farmers not participating in H.Y.V.P. was larger that of farmers not participating in the programme. Gupta et al (1968) were of the opinion that there is a positive relation between land size and the acceptance of improved agricultural practices by the farmers.

Tiwari (1964) stated that the size of holding of the
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improved arJr· icu 1 tural practices. Rao et al (1959) found that the
large land holders adopted less practices. Ready and Ready (1972)
found that farm size was positively associated with the level of
adoption. Subramanyam and Lakshna (1972) observed that the size of
farm and farm income were positively correlated with the adoption
level.

The Indian Institute of management (1967) did not find
any significant association between size of holding of participant
and non participant farmers.

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

Sethy (1979) pointed out the size of holding except in
case of dose of fertilizers was positively but non significantly
associated with technological gap in adoption of fertilizers.

FAMILY SIZE:

Shyam (1965) and Gupta (1968) observed that the size of
family is positively associated with the adoption of improved farm
practices.

SOCIAL STATUS :-

Manivannon (1980) pointed out that social participation
had non significant relation with the extent of adoption.

Mishra and Sinha (1981) found that except in cases of
modern farmers, social participation was significantly related to
farmers knowledge about farm technology.

SOURCES OF INFORMATION :-

Sinha et.al. (1984) reported that use of impersonal sourc-
es of farm information was more with untrained farmers.

CONTACT WITH EXTENSION WORKERS :-

Wilkening (1952), Bose (1961), Sawhney (1961) and Dhaliwal
and Sohal (1965) found that low adoption of improved agricultural
practices was due to less contacts with the extension workers.
ATTITUDE:

Chatopadhyay (1967) found that adoption behavior is negatively related with the conservatism. He also concluded that value orientation variable contribute jointly towards 59 percent of the productivity of the multi practice adoption behavior.

KNOWLEDGE:

Bose (1962) reported that those who were scientific in outlook adopted significantly larger number of recommended practices.

Singh (1974) reported that in order to accelerate the role of diffusion/adoption of innovation, the farmers must have knowledge skill, willingness and situational ability.

Ram (1975) found that only 14 percent farmers were conscious to the use of improved seed.

RISK ORIENTATION:

Hoffer & stagland (1958) reported that unfavourable attitude towards a practice was shown because the farmers thought the practices would not be successful with the kind of soil they had.

Sharma (1978) found highest percentage of respondents having medium risk bearing capacity followed by low and high risk bearing capacity, means minimum respondents were able to bear high risk bearing capacity in agricultural business.

ECONOMIC CHARACTERISTICS OF THE INNOVATIONS:

Bose (1962) reported that those having a scientific outlook adopted significantly large number of recommended practices.

Bose et al (1962) found in their study that the extent of adoption of plant protection chemicals and fertilizers was more (67.97 percent & 53.75 percent) as compared to adoption of seed and implements (20.07 percent & 1.76 percent) respectively.

COMMUNICATION SOURCES:

Hussain (1964), reported that demonstration is the most effective source of information of improved seeds, fertilizers, implements and plant protection measures.
Chaddha (1967), reveals that non application of all required inputs or failure to adhere to all the required agricultural practices did not give the desired yield or economic returns, a facts which may contribute to farmers resistance to take up the cultivation of high yielding varieties involving comparatively higher investment on fertilizers, pesticides etc. Demonstration comprehensive publicity helps to remove the resistance.

But for any demonstration or extension programme to become more purposeful it is very essential that the required minimum inputs are assured and made available to the farmers at the correct time and right place.

CHANGE IN THE AREA AND PRODUCTION :-

Dayakrishna (1965), observed that prevailing high prices of vegetable oils can be reduced only by raising the production of oil seed in the country. Vagaries of rainfall were largely responsible for the low yields of oil seeds which are mostly grown in unirrigated areas.

Dayakrishna (1965), concluded that prices of oil seeds and their products have been moving erratically from year to year due to large fluctuations in the production of oil seeds and steadily rising internal consumption.

Tripathi (1973), found that cost of practices effects the rate of adoption of the innovation. The farmers were found accepting only profit generating practices.

Goswami (1979), reported that lack of finance and proper guidance were common constraints in raising the productivity of oilseeds in the area programme and observation for increasing sunflower production.

LACK OF PERSONNEL AND RESOURCES FOR RESEARCH :-

Singh (1982) described that the lack of adequate staff also adversely affected oil seed research. Many posts, particularly the senior ones, at the research centers and Directorate Of Oil Seeds Research have been vacant for six years.
PROGRAMMES AND OBSERVATIONS:

FAO (1977) reported that agricultural credit is one of the factors restricting agricultural production as a whole and oil seeds in specific.

INPUT AVAILABILITY:

Sawhney (1961) and Ready (1962) outlined the difficulty and non availability of improved seeds as an important factor in its low adoption by farmers.

CREDIT AND INSTITUTION:

Sharma (1978) reported that service co-operatives were also organized for the supply of necessary inputs like credit, fertilizers, seeds, insecticides etc. particularly to the weaker sections. Later co-operatives entered the field with bigger packages providing for credit follow up services, technical assistance, supply of materials, marketing facilities etc.

ACTIONS NEEDED FOR REMOVAL OF THE CAUSES/CONSTRAINTS

Yadav (1964) reported that many scientists today, hardly bother with regard to the utilization of the knowledge gained.

Putt (1943) studies the association of seed yield with economic characters in sunflower and observed positive correlation between yield and the characters, days from sowing to maturity, height, head diameter.

Russel (1953) made a study of interrelationship of characters in sunflower. He reported that there was a strong positive correlation between oil content and kernel of the seed.

Palowski (1964) reported to the genotype of the seed in sunflower. He further reported that pollen percent has no effect on the oil content of seed which is determined by genotype of the maternal parent on which the seed develops.

D. Jakov (1969) found a strong and positive correlation between heredity variabilities of seed and oil yield in sunflower heredity variabilities of seed and oil yield in sunflower. Correlation studies showed that plant individual with in the variety were
98 percent for between yield and kernel yield; and 90 percent between kernel oil content and oil yields. It is concluded that selection for kernel yield result in selection a high kernel oil content.

**PACKAGE APPROACH:**

Pandey (1975) suggests that production can be increased if high yielding varieties of seed, timely and adequate use of fertilizers, plant protection measures, irrigation and management practices are ensured.

Saini (1984) suggested that simply by replacing the seed of traditional varieties with the improved ones, the yield of mustard increased by 14 to 26 percent.

**AVAILABILITY OF SEED AND SEED RATE:**

Malhotra (1984) described the problem in accelerating the production of certified seeds within the country are not so much technological as financial, administrative and organizational. The total production of quality seed of oil seed crops by two major agencies like NSC and SFCI has been negligible and unsteady, both these organizations could produce only about 17800 quintals during the period of 1975-76 to 1978-79.

One of the major reasons for it was that the present degree of emphasis on oil seed has been phenomenon of the recent past availability of breeder and foundation seed.

**PLANT PROTECTION:**

Singh (1982) reported that the availability of plant protection may give an additional one quintal/ha. yield of oil seed crop.

**IRRIGATION:**

Saini (1984) reported that one irrigation applied at flowering stage increased the yield by 26 percent compared with only 9 percent at pod formation stage over no irrigation. Two irrigations (one flowering and one at pod formation) were found at var. with only one irrigation at flowering stage.
CHOICE OF VARIETIES:

Singh and Chaudhury (1978) reported that the selection of varieties for a particular condition is most important factor for increasing the yield of crop.

WEED CONTROL:

Rangiah (1973) reported that the chemical control gave lowest net profit per acre. There was little differences between the net profit for manual or mechanical control and either method can be recommended.

CROPPING PATTERN:

Rao (1962) reported that with increased irrigation facilities and improved agricultural productivity the cropping pattern is expected to be more in favour of crops of high cash value.