CHAPTER 5

DISCUSSION

This chapter deals with the discussion of the findings on the study of the selected characteristics of male and female farmers of Antisar watershed of Gujarat.

5.1 Profile of the respondents:

The findings of this study reveal that majority of respondents both the male and female belong to the middle age group. The physical and psychological development of an individual is related to his or her age. It influences interests and needs of rural farmers. It plays a vital role in acquiring knowledge and know-how about soil and water conservation technologies and thereby it helps in developing favourable attitude towards SWC practices. Therefore, the middle age group might have better health and ability to do construction of soil and water conservation structures on their land for sustainable agricultural production.

It is usually found that the middle age group take up their parental occupation and as a result, farming is left in the hands of old people. Old farmers being physically slow and weak may not be able to carry out different hard agricultural operations in the fields. Old farmers should preferably play a supporting role by imparting counseling based on their experiences. Hence, the middle age and young age rural people, male as well as female farmers should be given priority in such soil

and water conservation programmes on watershed management. Young rural farmers should be contacted frequently to motivate them to participate in planning and execution of soil and water conservation works on their own land and on the land owned by their community. The young generation holds modern approach and enthusiasm to adopt new technologies, whereas the old generation farmers adhere to traditional practices.

The study reveals that the respondents in Antisar watershed area possess middle socio-economic status. It might be due to fact that majority of farmers have moderate infrastructure facilities to carry on agricultural operations on their field. The socio-economic status of rural farmers has direct bearing on the development of agriculture. It reflects upon the infrastructural facilities that the farmers have to carry out different agricultural operations. Rural farmers should always seek to develop their infrastructural facilities like farm implements, equipment, farm machinery, farm materials etc.

Majority of the farmers in Antisar watershed area possess moderate to high degree of farm power. It means that they very well know that the farm power is an essential input to carry out various operations. The farm power is a major input required for cultivation operations in agriculture. Agricultural machines like tractor, trailer, water pumpset etc. are essential equipments. Agricultural implements such as ploughs, cultivator, thresher, seed drill, chaff cutter etc. are also much useful in agricultural production operations. The farmers in Antisar watershed area make use of

different kinds of farm machinery and farm implements to carry out cultivation operations. These implements and machinery are also useful in the construction of the SWC technologies on their fields. This implies that the farmers should keep up high farm power, which may be useful even in the soil and water conservation works to ensure sustainable agricultural production.

In order to keep up high farm power, one needs good finance to invest. The farmers may not have adequate finance for the purpose. Hence, it is also essential that loan facilities are made available to farmers who need financial support to purchase farm machines and farm implements, as the case may be.

It is usually seen that agricultural land is divided into small pieces to distribute among the children who inherited it from their parents. The farmers in the Antisar watershed area are found to be cultivating small or medium sized land-pieces own by them on individual ground. They are not inclined to do farming on cooperative basis farming group of their fellow-farmers.

The soil and water conservation technologies are adopted in most cases on basis of contour lines of the land. The soil and water conservation can be planned in better way on watershed basis only. Large sized land holdings are conducive for adoption of the SWC practices. Hence, the farmers who have small farm holdings need to carry out agricultural cultivation on collective grounds on the basis of watershed area. It would, therefore, be better if children inheriting small land pieces unite with others of the kind and cultivate their land on

collective basis rather than to divide the land into small pieces.

It is again noticed that illiteracy prevails among the farmers of the Antisar watershed area. The level of education among them is very low. The probable reason for low education among them is poverty. Poor economic conditions and non-availability of schools and colleges in rural areas go hand in hand. The farmers might have preferred to send their children to fields to raise livelihood and support the family. Right from the childhood, children are thus deprived of education at schools. In such cases, colleges and higher education remain mere myth for them. There are schools upto primary levels in small villages. They do not have adequate facilities. Farmers can not afford to send their children to schools and colleges in cities. Hence, it is highly required that the condition of village schools should be improved and farmers should be motivated to send their children to schools for education.

The farmers in Antisar watershed area possess medium to small sized land holdings. Therefore, the income from the agricultural production is also small. The income of farmers might be low also due to lack of irrigation facilities for crop cultivation in the summer season. Most farmers in the area have rainfed farming only. The annual average rainfall in the Antisar watershed area is below 500 mm. The resulting cropping intensity in the area is also low. It is, therefore, highly desirable that the farmers should adopt the soil and water conservation structures for water recharging of land. It may increase the availability of water in wells in summer season.

Consequently, agricultural production may also be increased.

Money plays a vital role in the planning of multipurpose activities. Particularly, in adoption of soil and water conservation technologies, the initial cost of adoption is very high. Money also allows timely procurement of inputs or materials required for adoption of soil and water conservation technologies. The farmers should have easy access to local financial institutions from where they avail required amount on loans for adoption of new technologies.

The low level of education among the farmer in Antisar watershed area results into moderate social participation from male respondents and low social participation from female respondents. They are unable to understand the importance of village organizations such as village panchayat, cooperative societies, milk cooperative societies, village bank etc. Men toil through out the day on their lands. Women remain ever busy with household work and caring for the family. They also hesitate to talk with people due to restrictions imposed by the customs prevailing in Indian rural societies. Social participation among them is either very low or absent.

Social participation allows on extent to which an individual farmer can actively involve in the affairs of rural development institutions. If farmers and farm women have enough contacts with rural social organizations, they may be exposed to and motivated to cultivate interest in soil and water conservation programmes. They

should also be motivated for more and more social participation so that they may acquire more knowledge and awareness about different rural development programmes in the area. Social participation helps farmers and farm women to know about village organizations and to be aware of their role in rural development.

5.2 RISK PREFERENCE OF RURAL MALE AND FEMALE FARMERS TOWARDS ADOPTION OF SOIL AND WATER CONSERVATION TECHNOLOGIES

The findings of the study revealed that majority of farmers in Antisar watershed area have moderate to high risk preference regarding adoption of new soil and water conservation technologies for land recharging and sustainable agricultural production. This finding goes on the line of the findings presented by Trivedi (1984), Bhatt (1990) and Gamit (1993).

Trivedi (1984) conducted a research study on transfer of agricultural technologies among tribal farmers of Panchamahal district of Gujarat State. He reported that majority of the tribal respondents had medium (53.89 per cent) to high (25.00 per cent) risk preference. About 21.00 per cent had low risk preference.

Bhatt (1990) carried out a research study on transfer of hybrid maize technologies among the tribal farmers of Girwa block in Udaipur district of the Rajasthan state. He also reported that majority of the tribal respondents (71.66 per cent) were found to have medium risk preference followed by those (17.34 per cent)

who had low and those (11.00 per cent) who had high risk preferences.

Gamit (1993) conducted a research study on extent of adoption of recommended summer groundnut technology by the tribal farmers of the Panchamahals district of the Gujarat State. The study revealed that majority (71.67 per cent) of tribal respondents had medium risk bearing ability.

Majority of male and female farmers observe moderate to high level of risk preference. The possible reason is that they are oriented to face risk and uncertainty towards survival of soil and water conservation structures on their fields due to high intensity rainfall, long duration rainfall, drought and high cost involved in adoption of soil and water conservation technologies. The agricultural cultivation is the basic occupation of these farmers. Therefore, they might take risk of the adoption of new SWC technologies in the interest of increase in agricultural production. The farmers might have faith in the project implementing agency and extension personnel who would bring to them new SWC technologies. They might even be motivated to adopt the new SWC technologies in degraded fields for crop cultivation and increased production, even if they are costly (expensive) agricultural occupation as such usually involve many risk factors. Hence, the farmers develop a tendency of taking risks.

Agriculture is characterized by many uncontrollable variables such as rainfall, diseases and price fluctuations etc. Therefore, there is a risk in adoption

of new soil and water conservation measures that are costly. Hence, male and female farmers in villages must hold courage to take risk in adoption of new soil and water conservation measures. The unproductive and waste ravine lands can be converted into cultivable and productive lands if they adopt soil and water conservation measures. The farmers should not hesitate to adopt new although costly, soil and water conservation measures in ravine lands in the interest of increase in agricultural production. They should be motivated to replace their old traditional methods with new improved soil and water conservation methods. And farmers on their part should be enthusiastic to adopt SWC practices even if they yield benefits in the long term rather than yielding immediate returns.

5.3 Knowledge levels of male and female respondents regarding soil and water conservation technologies:

The present study shows that the majority of the respondents have moderate level of knowledge regarding soil and water conservation technologies. Similar findings were also reported by the researchers like Prabhu and Kadam (1990), Patel (1991) and Nandrana (1994).

Prabhu and Kadam (1990) state that majority of the adopters and non-adopters had medium level of knowledge on soil conservation practices. About one fifth of both the categories of farmers had low level of knowledge. Hardly thirty percent (30%) of non-adopters were found to be having high level of knowledge.

Patel (1991) conducted a study of farmers' knowledge about soil and water conservation measures. He found that a large majority of the respondents (73.33%) belonged to medium level of knowledge category. They were followed by some 16.67 per cent and 10.00 per cent of respondents who belonged to groups of high and low level of knowledge respectively.

Nandrana (1994) reported farmers' knowledge about water conservation practices. He found that majority of the respondents (60%) had medium level of knowledge. Whereas some 24.00 and 16.00 per cent of them had respectively low and high level of knowledge about improved water conservation practices.

The possible reasons for having moderate level of knowledge among farmers might be lack of awareness about soil and water conservation technologies and lack of training facilities in that regards in villages. The construction of SWC structures require technical knowledge.

The implications of the above findings are that the knowledge level of farmers in rural areas regarding soil and water conservation technologies is an important aspect that plays vital role in adoption of soil and water conservation programme. In order to increase the knowledge level of farmers in soil and water conservation programmes, the rural farmers must be aware of the recent knowledge regarding soil and water conservation technologies. It is also understood that if farmers have more knowledge about soil and water conservation technologies, they might contribute considerably to an

increased participation in soil and water conservation programme. The male and female farmers in villages must have enough contacts with and visits to different soil and water conservation institutions by which they may acquire more learning about conservation measures. The soil and water conservation institutes as well should organize soil and water conservation training programmes for rural farmers so that they may improve their skill regarding soil and water conservation technologies. The soil and water conservation training programmes must be suitable to specific conservation problems and situations of the farmers.

5.4 Attitude of farmers towards soil and water conservation programme:

It is revealed from the present study that majority of the male and female respondents had neutral attitude towards participation in the SWC programme.

The attitude of farmers towards soil and water conservation programmes also exerts influence on adoption of natural resource conservation measures. The farmers who have favourable attitude towards soil and water conservation programme can easily adopt soil and water conservation technologies. The other researchers were also reported findings on attitude towards soil and water conservation.

Reddy's study (1987) reveals that majority of the respondents exhibit more favourable attitude towards all the three components viz., (i) soil and water conservation (ii) improved dry farming technology and

(iii) non arable land development of WDP. Moreover, the study reveals that there is a significant difference between big and small farmers in their overall attitude towards watershed management practices. The big farmers from a more favourable attitude towards all the three components of watershed management than small farmers do.

Patel's study (1991) finds that majority of the respondent (75.71%) held favourable attitude to the SWC programme, whereas some 12.39 % of them held highly favourable attitude and some 11.90% of them held less favourable attitude towards the watershed development programme.

The probable reason of neutral attitude of farmers towards soil and water conservation programme on watershed basis might be lack of knowledge and awareness among them about soil and water conservation measures. Lack of education keeps them busy in the different agricultural operations in which knowledge is not the requirement. They participate very little in the soil and water conservation programme and planning meetings. They put forth very little of their suggestions regarding points of their own interest in the planning of SWC programme and that too with much hesitation. Farmers in villages usually believe that such type of rural development programmes are government programmes and the project implementing authority is totally responsible for the management of development activities. In this part, they have nothing to do. But it is a mere false notion in their part.

5.5 Adoption of soil and water conservation technologies:

It is revealed from the study that majority of the respondents had medium level adoption of soil & water conservation technologies, very few per cent had low and high level adoption. Other researchers like Padmiah (1992) and Bhutiya (1993) give out similar findings.

Padmiah et al. (1992) observes that majority of farmers in the watershed area (52.00%) fell into medium adoption level group. They were followed by high adoption level group (34.00%) and low adoption level group (14.00%). In case of farmers outside the watershed area, the majority of respondents (66.00%) belonged to a medium adoption level group. They were followed by those under a low adoption level group with 34.00 per cent.

Bhutiya (1993) observes that majority of adopter farmers (73.00%) were found to be in a medium adoption category. They were followed by a high level adoption category (30.00%). There was none in a category of low level adoption with respect to the watershed management programme. In case of non-adopter farmers, majority of the respondents (70.77%) were found to be in a medium level adoption category and some 28.33 per cent of them were in a low level adoption category, while hardly 1.67 per cent of the non-adopter farmers showed high level of adoption with respect to the Watershed management programme.

The reasons for this trend may be lack of soil and water conservation technologies, lack of its knowledge,

high cost involved in adoption of soil and water conservation technologies and non-suitability of the SWC technologies to the field conditions of rural areas. Adoption of soil and water conservation technologies also depends on economic condition and resource availability with the farmers. The situation and size of a field is also a vital consideration for adoption of soil and water conservation technologies, because small land holdings are unsuitable for adoption of the SWC structure.

The implications of the findings are that intensive educational and motivational efforts have to be undertaken by the implementing agency in order to enhance the adoption level of soil and water conservation practices on watershed basis. Input resources such as construction materials, implements and labour required for construction of soil and water conservation structures should also be made available to farmers. It is also important that both male and female farmers should realize the importance of soil and water conservation measures on watershed basis in the interest of increasing sustainable agricultural production. The soil and water conservation technologies should be developed according to the suitability of the area. Therefore, enhancement of educational facilities in rural areas and suitable low cost or no cost soil and water conservation technologies for rural farmers are most desirous factors that would work for easy transfer of soil and water conservation innovations in rural areas.

5.6 People's participation in soil and water conservation programme:

It is revealed that majority of male and female respondents exhibit moderate level of participation in planning, implementation and maintenance stages of soil and water conservation programme for sustainable agricultural production. Similar findings regarding people's participation in rural development programme are also reported in studies by researchers like Sen (1986), Singh (1988), Suresh (1990) and Kulkarni (1991).

Sen (1986) conducted a study on people's participation in community forestry - a case study in Maharashtra, in Aurangabad circle of Northern Maharashtra. There has been quite a number of plantation taken up during the last decade. The social forestry department initiated several plantations in this region. Some plantations have also been taken up under the USAID assisted project.

The study concludes that the strategy for planning and implementation of rural development programme needed review. It should be tailored to render it more effective in achieving the objectives of the programme, once it is accepted as community welfare programme. It is suggested that the approach should cover the dual perspective of providing short term as well as long term benefits to the rural community. In an effort to reach such goals, community education is of vital significance, which will motivate them to increasingly participate in the programme.

Singh's study conducted in 1988 concludes that the women are the backbone of the hill agriculture undertaken in the area of participation of rural farm women in agriculture in the hills of Uttar Pradesh. Men associated then with it only for the tasks like ploughing and marketing of agricultural produces. Women play a positive role in decision making. But men who are playing a dominate the process of decision making. This pattern of work and role distribution (division of labour) between males and females exert heavy impact directly and indirectly.

Suresh in his study (1990) reveals that the rates of participation of beneficiaries and institutional arrangements for participation are found to be very low in majority of organizations in Kerala. The beneficiaries are not taken into confidence at several stages of planning and implementation of programmes that are basically meant for them. The beneficiaries are also found to be resentful in actively involved in decision making bodies and planning processes. The institutional arrangements for participation and the participation scores are as such directly correlated. Hence, more vigorous and more sustainable efforts are needed to incorporate such arrangements in all the development organizations and their programmes.

Kulkarni (1991) conducted a study on participation of rural farm women in decision making in different agricultural operations. It reveals that the role played by rural women in decision making is apparent, but it is accepted indirectly in the form of suggestion. This is

due to dominance of men in the affairs of families by tradition, which is still prevalent.

The reason for moderate level of farmers' participation in soil and water conservation programme is lack of awareness among then about soil and water conservation rural development programmes. Lack of education among farmers and lack of knowledge in them render them ignorant about their rights and privileges, duties and responsibilities in the soil and water conservation programme on watershed basis.

The farmers may participate very little in the soil and water conservation programme, planning meetings and they suggest very little on points of their own interest in the planning of such SWC programme. The rural farmers perhaps think that such type of rural development programmes are government programmes and the project implementing authority has to carry out responsible of implementation of different development activities in the watershed area.

The moderate level of participation might probably be due to initial high cost involved in adoption of the soil and water conservation technologies and the non-suitability of the SWC technologies to the field conditions of the rural farmers. The topographic situation and the size of a field are valid factors responsible for adoption of soil and water conservation technologies, because small land holdings are not conducive to adoption of the SWC structures.

It is also found that local rural organizations like panchayats, cooperatives, mahila mandals, and youth clubs take little or no interest in the SWC programmes. Farmers also lack good leadership that would motivate them to participate in the watershed development programmes. Thus, lack of interest, involvement, motivation and guidance result significantly in farmers' absenteeism in participation of SWC programmes and its implementation.

The implications of the findings are that the participation should be conceived as a major component of the development programme from its very inception. There is a need to ensure that all caste groups are given adequate representation in soil and water conservation development programmes. The first and foremost objective of the programme should be to satisfy farmers' basic needs viz., fuel, fodder and food. Once this is taken care, they would come forward to involve them actively in the programme.

All possible efforts should be made to educate people on various aspects of the soil and water conservation programme and their significance to their interest, so that they would get a clear idea about the nature of various aspects of the programme. This would enable them to organize themselves into small functional groups.

People's involvement in the activity is influenced by the literacy rate among them. Therefore, provision of education, formal and informal, to all people is as essential as water and food. It is the first requisite to

be attended on. This would enhance the capacity of people to plan schemes and to initiate and follow-up them.

The existing rural organizations like panchayats, cooperatives, mahila mandals, and youth clubs should be activated and welfare programmes meant for the community should be routed through these organizations.

The farmers should be motivated to develop attitude that soil and water conservation development programmes are their own programmes and such programmes are meant for the farmers, to be managed by the farmers and to be owned by them. They should be educated that the project implementing authority is not totally responsible for such programmes. They have to share responsibility with the authority to generate and safeguard their interests.

Farmers who are involved in the soil and water conservation development programme should be made aware about their rights, privileges, duties and responsibilities, so that they can participate very well meaningfully. Leaders play an important role as facilitators in a process of change. There is a need to identify leaders who are informal, yet influential in the community and who have vital influence over local farmers. Such leaders should be selected and trained in all schemes of the development programme.

5.7 RELATIONSHIP BETWEEN THE OVERALL PARTICIPATION IN SWC PROGRAMME AND SELECTED INDEPENDENT VARIABLES

5.7.1 Relationship between the overall male's participation in Soil and Water Conservation programme and selected independent variables:

The findings of the present study revealed that by increase in the socio-economic status of farmers, land holding, farm power, family size, social participation, risk preference, knowledge regarding SWC practices, favourable attitude towards SWC programme and adoption of soil and water conservation technologies, increases the overall participation of male farmers in soil and water conservation programme.

It might be due to the fact that if rural male farmers enjoy high level of socio-economic status, they may afford to have more resources to their disposal. Financially sound position may encourage them for participation in planning, implementation and maintenance of SWC structures on their land. The improved socio economic status of farmers enables them to have improved infrastructure facilities on their lands to carry out construction of conservation structures. The farmers having higher socio economic status are capable of participating more and more in the SWC programmes by contributing resources. They are also able to contribute with more and more available physical facilities such as implements, equipment, material etc. when the implementation and maintenance of soil and water conservation programmes are undertaken.

As stated earlier, large size of land holding is the primary requirement for adoption of different SWC structures. The reason is the soil and water conservation technologies are adopted on the basis of contour lines in the watershed area. The soil and water conservation can be planned in better way on the watershed basis only. For such reason, big farmers may be able to participate more in the soil and water conservation programme.

Farm powers such as animal power, mechanical power, irrigation facilities and farm implements etc. help farmers in participation. They also carry out the construction work during adoption of different soil and water conservation structures in the watershed.

If the number of persons in a family of a rural male farmer is more he might get a chance to involve himself more in soil and water conservation works and in adoption and maintenance of different Soil and water conservation structures. Therefore, farmers should prefer joint farming system with other farmers in their watershed area and choose to adopt the soil and water conservation technologies collectively on watershed basis.

Social participation allows one frequent contacts with rural village institutions. More social participation helps male farmers in more participation in planning of soil and water conservation programme. Rural male farmers who have more contacts with rural village institution and extension agencies keep abreast of the latest innovations regarding soil and water conservation. They also receive help and guidance as and when they need

in adoption of different soil and water conservation structures.

Rural male farmers with high-risk preferences are oriented towards maximization of income from agriculture. They take risk in adoption of different new improved soil and water conservation structures on their land.

Rural male farmers who have better knowledge of soil and water conservation technologies are likely to utilize the knowledge for participation in planning, implementation and maintenance of soil and water conservation structures on their land. In turn, their work generates more income. The more knowledgeable male farmers are regarding SWC practices, the easier would be for them to participate in the SWC programme.

The male farmers with more favourable attitude towards soil and water conservation programme are likely to allow the project implementing authority to implement the soil and water conservation programme on their land as well as on the land owned by their community. They might have more meaningful contribution and participation in planning, implementation and maintenance of soil and water conservation programme in their village.

If rural male farmers show behaviour of high adoption regarding soil and water conservation technologies, they are likely to learn more and more to maintain the already-adopted SWC structures on their farm by more participation in planning, implementation and maintenance of soil and water conservation programme.

The findings in the present study also reveal that the age, education and income are found to be non-significantly correlated with overall participation of male farmers in soil and water conservation programme.

It is also a fact that old age male farmers in villages are weak in physical ability. They are unable to render active participation in soil and water conservation programmes. Although, these old farmers possess knowledge and experience of traditional SWC practices that they have adopted for long time, they are too rigid to change and adopt to new SWC technologies. Younger farmers on the other hand, participate more in the soil and water conservation. They impart higher and active contribution through more labour work than old farmers can do. The young age farmers have good physical strength to carry out hard toiling and tasks on a land during implementation and construction of soil and water conservation structures on their farm. Whereas, old farmers are very weak in physical strength and due to it they can not contribute labour work during construction of SWC structures.

Education level among majority of rural male farmers is found to be upto the primary level. Educated farmers are interested more in taking up jobs or businesses rather than to choose agriculture as their main occupation. Therefore, educated farmers should be motivated to adopt agriculture as their main occupation for livelihood.

Rich farmers have higher annual income. It is possible that they are not interested to take up

agricultural operations and contribute their own labour. They take it as sporting their prestige in the society and the village. Looking to their high socio economic status, they hire labourers from nearby villages to carry out their agricultural operations on their fields.

5.7.2 Relationship between the overall female's participation in Soil and Water Conservation programme and selected independent variables:

It is as well revealed from the study that increase in the socio-economic status, education, family size, social participation, risk preference, knowledge regarding SWC practices and favourable attitude towards SWC programme increases the overall participation of female farmers in soil and water conservation programme.

The fact that rural female farmers enjoy high socio-economic status will have then more resources at their disposal to participate in planning, implementation and maintenance of SWC programme.

If the female farmers in villages possess high level of education they can have more effective participation in planning, implementation and maintenance of SWC programme. In villages, educated women possess more knowledge about agriculture and are more capable of taking decisions about agricultural operations. Therefore, educated women in rural area may be able to contribute to more meaningful participation in soil and water conservation programme planning, implementation as well as in it's maintenance.

If women in villages have more members in their families, they may get better chance to involve themselves in participation in soil and water conservation programme in planning, implementation and in maintenance of different soil and water conservation structures. They might also extend more of helping hands in agricultural development works. This implies that the farmers should work on collective ground with cooperation to each other in agricultural operations.

The rural female farmers who have more personal contacts with rural village institution and extension agencies can explore ready contacts with latest innovations in soil and water conservation. They can come forward to participate more actively. They also receive help and guidance from competent persons or authority as and when they need in adoption of different soil and water conservation structures.

The rural female farmers were oriented towards higher risk preference with a view to maximizing their income from agriculture by adopting new soil and water conservation structures on their land.

It is again understood that if female farmers in villages have better knowledge level in respect to soil and water conservation technologies, they can utilize that knowledge for participation in planning, implementation and maintenance of soil and water conservation structures on their land and generate more income.

The female farmers with more favourable attitude towards soil and water conservation programme are likely to allow and cooperate project implementing authority in effective implementation of soil and water conservation programme on their land. They might also have more contribution through participation in planning, implementation and maintenance of soil and water conservation programme in their villages.

It is also revealed that with increase in the income of the female farmers, their overall participation decreased. It is worth noting that in case of rural female farmers the income is found negatively and significantly correlated with the female's overall participation in the soil and water conservation programme. It is because of it that the rich women avoid contributing through their own labour and any kind of participation in planning, implementation and maintenance in soil and water conservation programme. They treat it to affect adversely their prestige in the society and the village. Rich families in the rural areas even object to any involvement of female members in agricultural operations or any kind of work in their fields. They prefer to hire agricultural labourers to manage agricultural operations on their fields. It is also because of the social prestige, rich male farmers do not allow their women to take part in village level meetings. Social customs and prestige prevent them. This implies that rich female farmers in the rural areas should be motivated to contribute with their own labour and money in planning, implementation and maintenance of soil and water conservation programme.

The findings of the present study also revealed that in case of female farmers as their age increased their overall participation in the programme decreased. Whereas, any increase in land holding, farm power and adoption of SWC practices improves their overall participation of female farmers.

It is revealed that the age is negatively and non-significantly correlated with overall participation of female farmers in the Soil and Water conservation programme. It means by increasing the age of female farmers the participation decreases. There may be another reason also that old rural women are weak in physical ability and unable to perform and participate effectively in the soil and water conservation programmes. They even object to or prevent other young female women in their families to participate in planning of such programmes. Rural women can not enter into open discussion with the staff of the PIA. Traditional customs prevailing in rural areas prevent any kind of public participation on their part.

The large size of land holdings are conducive for adoption of different Soil and water conservation structures. But it does not happen because male farmers take all the decisions regarding different cultivation operations on the land and female farmers have just to follow the decision taken by male farmers in the family. The male dominate the decision power and the female are reduced to just passive followers in an Indian social set up. This very factor affects the female initiative and participation in the matter.

The farm powers viz. animal power, mechanical power, irrigation facilities, and farm implements etc. may help women in participation and adoption of different soil and water conservation structures. However, it would be difficult and not practical for them to operate directly and handle animals and farm machinery during agricultural operations.

The rural female farmers who are more willing to adopt soil and water conservation technologies are likely to learn more to maintain the structures once they are adopted on their fields. They may even participate more willingly in planning, implementation and maintenance of soil and water conservation programme. It may also be true once the reclamation of land is completed, the adoption of SWC practices may not be required further with the same soil and water conservation practices. Thus, the programme may not have the repeat value.

5.8 RELATIONSHIP BETWEEN THE PARTICIPATION IN PLANNING OF SWC PROGRAMME AND SELECTED INDEPENDENT VARIABLES

5.8.1 Relationship between the male's participation in planning of Soil and Water Conservation programme and selected independent variables:

An analysis of the findings reveal that as the socio economic status, land holding, farm power, social participation, risk preference, knowledge and attitude towards SWC programme increases, the participation of male farmers in planning of soil and water conservation programme too increases on considerable ground.

The socio economic status of farmers reflects on the resources in their possession. The farmers who have a higher socio economic status and possess more resources mobility in the local area are capable to cultivate more contacts with and extend higher participation to the project implementing agency. The socio economic status is thus, directly or indirectly correlated with the participation of farmers in the planning. Male farmers with the high socio economic status can participate in planning meetings with greater confidence and power and maintain their dominance in the village. They take greater interest in decision taking process as need arises in order to derive more benefits and advantages from the SWC programme.

Big size of land holding is also a vital factor to enable farmers to participate more significantly, because the soil and water conservation has the prerequisite to maintain a big size of land holding. It helps to check the soil erosion. Further, the soil and water conservation technologies are adopted on watershed contour lines basis and large size land holdings are conducive and more suitable for adoption of different SWC structures. Big farmers may have meaningful participation in soil and water conservation planning meetings if they agree to maintain big land holdings. They also show active interest in taking decisions and planning meetings to as much extent as they need to derive benefits from SWC programme. Therefore, big size of land holding enables rich farmers to participate more effectively in planning of soil and water conservation programme.

Farm power is also significantly correlated with participation in planning by male farmers. Farm power in the form of animal power, mechanical power, irrigation facilities, and farm implements help male farmers in construction of soil and water conservation structures on their land. Therefore, if farmers have more farm power, They can participate easily in planning and adoption of soil and water conservation structures on their land. Possession of more farm power and implements can help the rural male farmers to participate in planning meetings of soil and water conservation programme. They also enable them to take decisions for adoption of conservation structures on their farm land. Farmers who are interested in agricultural development usually keep and maintain more farm power to carry out different operations on their fields. With more farm power farmers may show more interest in planning of SWC programme so that they can learn more to use their farm power in the programme. Farmers having more farm power, thus, may exhibit more participation in planning. They can adopt SWC structures on their farm more effectively with the help of farm implements in their possession. They also participate to take decisions to adopt improved SWC structures on their fields.

Social participation paves the way for farmers' involvement in the affairs of rural institutions. Farmers develop more relationship and contacts with rural social organization. They are expected to involve actively with their contacts in planning of soil and water conservation programme. The possible reason could be that rural male farmers, who have more contacts with officials of rural village institutions and extension agencies can

contribute with more meaningful participation in planning of SWC programme.

Male farmers showing higher risk preference are usually oriented to maximization of income from agriculture. They are eager to adopt on their lands different new soil and water conservation structures that promise them good return of their investment. Therefore, the farmers with more risk taking ability assure higher contribution and more active participation in planning for the adoption of SWC structures on their land as well as on a land owned by the community.

Knowledge level of rural male farmers counts as vital factor. Farmers' interest and knowledge of soil and water conservation technologies is highly positively and significantly correlated with male's participation in planning of soil and water conservation programme. It is indeed understood rural male farmers with better knowledge level regarding soil and water conservation technologies are likely to utilize their knowledge in planning of soil and water conservation programme on their land. It would further help them to generate more income. Such farmers can exchange their ideas through interactions and discussions in planning meetings. They can as well motivate other fellow farmers to adopt the SWC programme.

Male farmers who hold more favourable attitude towards soil and water conservation programme are likely to allow project-implementing authority to affect planning and implementation of soil and water conservation programme on their land. They will also have

more meaningful contribution and participation in planning of soil and water conservation programme in their village.

It was also revealed from the findings that increase in age, family size, income and adoption increases in participation of male farmers in the soil and water conservation programme non-significantly. Whereas, any increase in the level of education reduces the participation in soil and water conservation programme non-significantly on the part of male farmers.

It is also a fact that rural male farmers in their old age suffer from poor health conditions. They are, therefore, unable to perform actively and participate effectively in planning of soil and water conservation programme. Old age farmers are usually rigid to any change. They prefer to adhere to old traditional practices. They usually resent to attend meetings of soil and water conservation planning and to adopt new technologies. They remain too idle or lethargic to attend to any important work of agriculture cultivation that involves hard labour. They take rest in their homes and involve very little even in the domestic work. When the need arises they may do work with very little will. Despite all these conditions, it is an undeniable fact that old farmers possess good traditional experience. Yet, low awareness among them about new soil and water conservation practices would render them little effective to help the programme.

Education among rural male farmers was found negatively and non-significantly correlated with the

their participation in planning of the SWC programme. It might be due to the fact that the majority of male farmers reach upto primary education level only. It is also true that the educated young male farmers are more interested in jobs and businesses rather than in agriculture. They attach remotest preference to cultivation as occupation. Therefore, educated rural population should be motivated and encouraged to adopt agriculture as their occupation. Educated young generation of rural farmers do not like to participate in planning and to take decisions for agriculture development programmes. They also lack practical experience in agriculture and do not have adequate ideas and skills to share with their fellow farmers in the SWC programme.

When the male family members in a rural family are more, they could be involve them in soil and water conservation works and in adoption of different soil and water conservation structures. However, the finding was revealed positive but non-significant.

Rich farmers with higher income might have already adopted the soil and water conservation structures on their farm. It is because of it that the rich farmers do not desire to take actual part in planning of soil and water conservation structures. It is also because their farm lands are developed they do not require again adoption of soil and water conservation structures. Income and male's participation in planning are factors known to be non-significantly correlated. Further, the finance required to meet the cost of adoption and construction of soil and water conservation structures in

a farmer's field is too high for him to afford. Those farmers whose income is higher can participate more in planning according to their needs, in adoption of SWC structures on their field. These farmers can afford high cost involved in adoption of SWC structures. Thus, rich farmers exhibit greater interest in planning meetings.

Rural male farmers were observed to have adoption behaviour regarding soil and water conservation technologies. It was found positively and non-significantly correlated with male's participation in planning of soil and water conservation programme. It is also a fact that the rural male farmers have more adoption of soil and water conservation technologies that are already set up on their land. They are also likely to participate little in planning stage of soil and water conservation programme, because the farmers do not need to adopt SWC practices for reclamation.

5.8.2 Relationship between the females' participation in planning of soil and water conservation programme and selected independent variables:

In relation to female farmers, it was noticed out that with increase in their socio economic status, social participation, knowledge and attitude towards the SWC programme, their participation in planning of the soil and water conservation programme increased considerably. Whereas, the female farmers' income was more tend to resent to participation in planning of soil and water conservation programme.

This indicates that female farmers in villages who enjoy high level of socio-economic status have more participation in planning of the SWC programme. Women in rural area particularly those who are socially and economically sound are likely to take part in planning of SWC programme. When female farmers own more resources viz. implements, machines, materials etc. they can participate more in planning and take decisions, they would ensure that the resources are used properly in adoption of SWC technologies.

The rural female farmers who are capable of exploring and maintaining more and more contacts with rural village institution and extension agencies, they can be in constant contact with latest innovations regarding soil and water conservation. They also receive good help and guidance from officers and experts, as and when needed, in matter related to adoption of different Soil and water conservation structures.

The level of knowledge among rural female farmers regarding soil and water conservation technologies was observed highly positively and significantly correlated with their participation in the planning of soil and water conservation programme. It was also found that if they have better knowledge level regarding soil and water conservation technologies, they are likely to utilize that knowledge for participation in planning of soil and water conservation structures on their land and consequently, generate more income.

If female farmers hold more favourable attitude towards soil and water conservation programme, they are

likely to allow and cooperate the project implementing authority in implementation of the soil and water conservation programme on their land. They can also have better contribution in the participation and planning of the soil and water conservation programme in their village.

Income of rural female farmers was found to be negatively and significantly correlated with their participation in the planning of the soil and water conservation programme. Because rich women with higher income do not like to attend and participate a meeting held for the soil and water conservation programme. They belong to rich families and do not like to work in a field. They care more to maintain their status in society. Again, rich male farmers do not allow their women to take part in village level meetings. Further, rich female farmers' land is already leveled and hence, it does not require any adoption of conservation structures.

It was also revealed that as the age of female farmers' increased, their participation decreased non-significantly. Whereas, any increase in their land holding, education, farm power, family size, risk preference and adoption mark an increase in participation of female farmers in the planning of the soil and water conservation programme and that is non-significant.

It was further revealed that age plays a negative and non-significant role correlating female farmers' participation in planning of the soil and water conservation programme. It is again a fact that old rural

women having weak physical abilities and are unable to perform participation in planning effectively for the soil and water conservation programmes. They even prevent other young women in their family to take part in the planning of such programmes. The old women in villages remain busy all the time with household works. They hardly find time to participate in the planning meetings of the SWC programmes. Old women are also attached to their family and remain busy to caring of the members. The rural women hesitate to take part in planning meeting, to come forward and take decisions. They are too submissive to social customs to act aggressively. They even objects to the young women who wish to take part in planing meetings of the SWC programme. The rigidity in a rural society does not allow it.

If female farmers own large sizes of land holding and are financially sound, they exhibit less participation in planning of different Soil and water conservation structures on their land. With big land holding they always remain busy in different operations on their land and hardly have find time to take part in planning meetings of the SWC programme.

Education among rural female farmers was found positively and non-significantly correlated with their participation in planning of the SWC programme. It is due to education that, female farmers hesitate to participate in such programme planning meetings. Educated women do not usually like to adopt agriculture as their occupation. They have a wish to be employed in government or private jobs. They do not have practical skill and knowledge about agricultural operations, because for most

time they remain busy in household works and in study. Hence, due to lack of agricultural knowledge they are unable to participate effectively in planning meetings.

The farm powers viz. animal power, mechanical power, irrigation facilities, farm implements etc. ensure for female farmers good participation and meaningful adoption of different soil and water conservation structures on their land. However, it would be difficult for them to handle drought animals and operate farm machinery. Rich women can keep more farm powers, yet they do not like to participate in planning meetings. Traditional customs that prevailing in their rural community stop them to do so.

Large number of members in a family is again a favourable factor to allow women in villages to involve themselves in participation of planning meetings for soil and water conservation. But it turns out to be non-significant. In big families, women are usually busy with nurturing and caring for the members. It is customary in our society that the females carry out this responsibility. It takes most of their time and hardly time left to participate in planning meetings.

Risk preference of rural female farmers was observed as a factor positively and non-significantly correlated with the female participation in planning of the soil and water conservation programme. It is because of it that rural female farmers with higher risk preference are oriented maximization of income raised from agriculture. They can do it by adopting different soil and water conservation structures on their land. But the fact is

that all the decisions are taken by male dominating rural society, male farmers take decisions in agricultural development activities on their farm.

It is remarkable to note that if rural female farmers have higher adoption behaviour regarding soil and water conservation technologies, they are likely to learn more to maintain conservation structures by participation in planning of the soil and water conservation programme. But when they have adoption of SWC structures already on their field, their participation in planning meetings is naturally reduced.

5.9 RELATIONSHIP BETWEEN THE PARTICIPATION IN IMPLEMENTATION OF SWC PROGRAMME AND SELECTED INDEPENDENT VARIABLES

5.9.1 Relationship between the males' participation in implementation of soil and water conservation programme and selected independent variables:

The study has revealed that with the increase in the socio economic status, farm power, risk preference, knowledge and attitude towards SWC programme, the participation of male farmers in implementation of the soil and water conservation programme was also increased significantly.

This indicates that rural male farmers with high level of socio-economic status can have greater participation at the implementation stage with contribution of money or materials. This supports the

soil and water conservation programme on watershed basis. A farmer with high socio economic status means to have more resources, implements, machinery and materials. As a result, they can contribute with implements, machines and materials during the implementation and construction of SWC structures on their land and on a land owned by the community.

Farm powers in the form of animal power, mechanical power, irrigation facilities and farm implements etc. enhance male farmers active participation and adoption of different soil and water conservation structures during the implementation stage.

Risk preference of rural male farmers was observed highly positively and significantly correlated with their participation in implementation of the soil and water conservation programme. Farmers with higher risk preference are usually oriented towards maximization of income from agriculture. They adopt different new soil and water conservation structures on their land even at high cost. They have risk taking ability and are capable to contribute labour and money to project implementing agency during the construction of new SWC structures on their field and the land owned by the community. This ensures increase of sustainable agriculture production even from degraded and sloppy lands.

Level of knowledge among rural male farmers regarding soil and water conservation technologies was also observed highly positively and significantly correlated with male's participation in implementation of the soil and water conservation programme. It is a fact

that if male farmers have improved knowledge level regarding soil and water conservation technologies they are capable of utilizing that knowledge for effective participation in implementation of soil and water conservation structures on their land. It would help generate more income.

If male farmers keep more favourable attitude towards soil and water conservation programme they may allow the project implementing authority to go ahead with implementation of soil and water conservation programme on their land. They might also impart substantial contribution to participation and in the form of labour and money to help implementation of soil and water conservation programme in their village.

It was also revealed that any increase in the age of male farmers decreased their participation in implementation non-significantly. Whereas any increase in the land holding, education, farm power, family size, income, social participation and adoption increases their participation in implementation of the soil and water conservation programme.

It was found that the age plays a negative and non-significant role as correlated with participation of male farmers in implementation of soil and water conservation programme. It was because of such fact that old rural male farmers have weak physical capabilities and are unable to perform tasks for effective participation. The old farmers are unable to contribute their own labour in implementation of soil and water conservation structures. Young farmers are physically strong enough to do hard

work during construction of SWC structures on their field. Old farmers are unable to do hard work. The only thing that they can do is to share their experiences with young family members and other farmers.

Large size of land holding is conducive to adoption of different SWC structures. But the adoption of SWC technologies also depends on the condition, the type of soil, and the slope of land.

Educated male farmers possess little experience of working in agricultural fields. It might be because educated young male farmers are more interested in government jobs and businesses rather than to go for agriculture cultivation as their main occupation. Educated farmers in spite of knowledge, lack in practical skills to carry out different agricultural functions. They are out of the habit of working hard in fields. Therefore, they are unable to contribute their own labour and skill during the construction of SWC structures on their fields and that of the community land.

With large families in villages, male farmers may get a chance to involve them in soil and water conservation works and in adoption of different soil and water conservation structures. It is also a fact that most decisions in implementation and adoption of SWC structures are taken by head of the family.

Farmers may need huge finance for adoption and construction of soil and water conservation structures in their fields. But they are unable to afford high initial cost in adoption of SWC structures.

Rural male farmers who have more contacts with officials of rural village institutions and extension agencies can contribute effectively participation in planning and during implementation of SWC programme. Farmers expressed desire that the expenses required for construction of SWC structures on their fields and community land should be contributed from the government money through the PIA.

Adoption behaviour of rural male farmers regarding soil and water conservation technologies was observed as factor positively and non-significantly correlated with male's participation in implementation of the soil and water conservation programme. It is also a fact that if rural male farmers have already adopted soil and water conservation technologies on their land, they are likely to participate very little in implementation or adoption of soil and water conservation structures on their land. Due to early adoption of SWC structures on farmers' field, the land might be already leveled and managed properly. Hence, the land does not need any more construction or adoption of SWC structures.

5.9.2 Relationship between the female's participation in implementation of soil and water conservation programme and selected independent variables:

The study revealed that any increase in the socio economic status, education, family size, social participation, risk preference, knowledge and attitude towards SWC programme affects increased participation of

female farmers in implementation of soil and water conservation programme. Whereas, any increase in the age and income of female farmers' affects decrease in their participation in implementation of soil and water conservation programme.

Socio-economic status of rural female farmers operates as factor highly positively and significantly correlated with their participation in implementation of the soil and water conservation programme. It indicates that rural female farmers with high level of socio-economic status participate more by contributing equipment, materials, machinery and money in implementation of SWC programme and also through actual adoption of practices.

Education among rural female farmers was found to be highly positively and significantly correlated with their participation in implementation of the SWC programme. The reasons might be that educated female farmers in rural areas are capable of supporting and help their spouses in their decisions related to farming. They can also help in making their families financially sound with additional income from their side. Educated women help male farmers also in budgeting and planning of agricultural resources. They, thus, support their spouses to affect increase in agricultural production by adopting SWC measures.

The size of a family works as a probable reason for positive and significant correlation of female farmers' participation in implementation of the soil and water conservation programme. The more is the number of persons in a family, the higher would be rural women's

involvement and participation in implementation of the soil and water conservation programme. Large sized families have yet one more advantage in the form of more helping hands in agricultural operations. This allows female farmers to spare themselves for soil and water conservation works and hand over household tasks to other family members. They may also put to use the labour work contributed by their family members in implementation of SWC structures on their agricultural fields.

Female farmers in villages who have more contacts with rural village institutions and extension agencies can keep abreast of the latest innovations regarding soil and water conservation. They can also utilize that knowledge in implementation of the SWC programme. They can also offer help and guidance to other farmers, as and when needed, to affect proper implementation of different soil and water conservation structures on their land and that of community. They may also allow easy participation of labour and money.

Risk preference of rural female farmers was observed as highly positively and significantly correlated with female's participation in implementation of the soil and water conservation programme. It is a noteworthy fact that the higher risk preferred rural female farmers are oriented towards maximization of income from agriculture and they do it by adopting different soil and water conservation structures on their land.

If female farmers in villages have better knowledge level regarding soil and water conservation technologies, they can utilize that knowledge during implementation

phase of the SWC programme. The highly knowledgeable women can contribute with more guidance and suggestions during implementation of soil and water conservation structures on their land as well as on that of the community land. It ensures sustainable agricultural production and generates more income.

Attitude of rural female farmers towards soil and water conservation programme was also observed highly positively and significantly correlated with their participation in implementation of soil and water conservation programme. It might be due to more favourable attitude of female farmers towards soil and water conservation programme, which is likely to allow project implementing authority to implement soil and water conservation programme on their land. They might also contribute more significantly by motivating other fellow farmers to adopt soil and water conservation structures on their land.

It was again revealed that factors like age and income were negatively and significantly correlated with female farmers' participation in implementation of the Soil and Water conservation programme. The fact remains that old rural female farmers are physically weak and have lower capacity for hard tasks. This unable them to contribute with hard labour work efficiently in their agricultural fields during implementation phase of the soil and water conservation programme with adoption of conservation structures. Old women in villages remain busy in rearing their children in the day time. Hence, all the decisions regarding contribution of labour and

money in adoption of new SWC technologies remain with males in the family.

Similarly, the rich female farmers are not really interested to undertake agricultural works. They attach to it the point of view of their prestige in the society. They hire labourers on their farms and get the work done. These works include land leveling, bunding, summer ploughing, mulching, weeding, harvesting etc. Rich female farmers hire even poor labourers from outside to carry out their household works such as cutting of fodder, supply of fodder to animals, cutting of fuel wood for kitchen and threshing of cereals and pulses for home etc. It is generally noticed that rich female farmers in rural area are much bothered about their status and prestige in the society.

The study also revealed that any increased in the land holding, farm power affects adoption the participation of female farmers in implementation of soil and water conservation programme. It as such increases non-significantly.

The fact that the large sizes of land holdings usually have undulating topography and are also slopy. Hence, they are conducive and suitable for adoption of different Soil and water conservation structures on their land.

The farm powers such as animal power, mechanical power, irrigation facilities and farm implements etc. help women's participation and adoption of different Soil and water conservation structures, yet it was observed

non-significant. The reasons might be that female farmers generally do not have any practice or skill to operate various farm powers and machinery such as various kind of ploughs, tube-well operation, use of bullock cart, tractor driving etc.

Adoption behaviour of rural female farmers towards soil and water conservation technologies was found to be positively and non-significantly correlated with female's participation in implementation of the soil and water conservation programme. The fact remains that rural female farmers with already more adoption of soil and water conservation practices are likely to have little intention for participation in implementation by over-adoption of soil and water conservation technologies.

5.10 RELATIONSHIP BETWEEN THE PARTICIPATION IN MAINTENANCE OF SWC PROGRAMME AND SELECTED INDEPENDENT VARIABLES

5.10.1 Relationship between the male's participation in maintenance of soil and water conservation programme and selected independent variables:

The study revealed that any increase in the socio economic status, land holding, farm power, family size, risk preference, knowledge, attitude and adoption of SWC practices helps to increase the participation of male farmers in maintenance of soil and water conservation programme.

The male farmers with more agricultural resources such as implements, materials, animal power, machinery

etc. are capable of maintaining and repairing SWC structures constructed on their farm land. The farmers with more resources can easily contribute their resources to maintenance and repair of damaged SWC structures on the land owned by the community in a watershed area. The SWC structures can be damaged or breached due to heavy rain. In such situation, if a farmer has adequate farm implements and machinery he could arrange for the repair of the structures immediately and prevent any severe loss.

The male farmers with large size of land holdings are interested in maintaining the different SWC structures constructed on their land. It is because of the regular maintenance and repair of conservation structures, the fertility of the land is maintained, as well as the soil degradation and erosion are checked on considerable ground. It is, therefore, very important to maintain big size of land holdings to ensure sustainable agricultural production. Otherwise soil erosion may convert a cultivable land into an eroded land.

Farm power owned by rural male farmers was observed positively and significantly correlated with males' participation in maintenance of the soil and water conservation programme. Farm powers such as animal power, mechanical power, irrigation facilities and farm implements etc. help male farmers to carry out maintenance and repair work of damaged or breached different soil and water conservation structures on their field.

Large families in the form of the joint family system help the rural male farmers to have more helping hands in maintenance and repair of damaged soil and water conservation structures on their fields. Soil and water conservation structures are usually affected by various kinds of soil erosion through out the year. Therefore, maintenance and repair of conservation structures is essential to derive proper benefits from the structures.

Male farmers in villages who keep higher risk preference are oriented towards maximization of income from agriculture. They repair the soil and water conservation structures on their land the moment they are damaged or breached. They do not neglect it, because it affects their benefits of increasing agricultural production with due conservation of soil and water. Hence, the risk taking ability helps farmers to maintain SWC structures to ensure sustainable agricultural production.

If male farmers in villages have better knowledge of soil and water conservation technologies, they know when and how to repair and maintain soil and water conservation structures on their land. Their awareness helps them increase sustainable agricultural production by maintaining fertility of soil and by conservation of natural nutrients due to siltation. Male farmers with good skills can easily carry out the repair of the SWC structures on their own when required.

Again, if male farmers hold more favourable attitude towards the soil and water conservation programme they hold strong feeling that the soil and water conservation

programme has to be developed by the farmers, for the farmers and of the farmers. Hence, favourable attitude of farmers might help for good contribution of labour and money in the repair and maintenance of soil and water conservation structures on their land as well as on pasture land in the watershed of the community.

Rural male farmers, who have more adoption of the soil and water conservation technologies, are likely to maintain and repair soil and water conservation structures on their land to ensure sustainable agricultural production. Once the SWC structures are adopted on the field, it becomes necessary to repair and maintain them whenever they are damaged and breached. Such care would ensure long term benefits from them.

It was also revealed that with the increase in the age, income and social participation have direct bearing on the participation of male farmers in maintenance of soil and water conservation programme. But it increases non-significantly. Whereas, with increase in education, the participation of male farmers in maintenance of soil and water conservation programme decreases non-significantly.

Old male farmers are weak in physical capacity. They are unable to contribute labour in maintenance of the SWC structures on their land as well as on the land owned by the community. Old farmers may also have feelings that they have done enough work in their young age and so now it is their turn to take rest in the old age. They think that young of their family should work in the field. They also want that the young members should learn about

various SWC and agricultural practices, their maintenance and doing actual work with them in fields. Old age farmers have poor health and so they are unable to do hard work in field and carry out repair and maintenance of damaged SWC structures on their land.

Education among rural male farmers was found negatively and non-significantly correlated with their participation in maintenance of SWC programme. It is obvious that educated male farmers have less experience of working in fields as they devote most of their time to study. It is also true that the educated young male farmers are more interested in jobs and businesses rather than to take up cultivation as occupation. It might be because most of the educated farmers accept jobs or businesses as their occupation. Because of it that again they do not gain much experience about agriculture and cultivation as well as soil and water conservation practices. With lack of experience on fields, educated farmers are unable to contribute with not enough participation in repair and maintenance of the SWC structures on their farm and that of the community.

Rich farmers can easily afford the cost required for repair and maintenance of the SWC structures. But most of them keep their land in good condition and levelled, hence there is very low cost to be incurred on repair and maintenance of the SWC structures on their farm. The rich farmers also prefer to get the repair and maintenance work done by hired labourers. They avoid doing any labour work themselves on their fields, as it would affect their prestige in their village and the society.

The rural male farmers who maintain more contacts with officials of rural village institutions and extension agencies are also likely to contribute more effectively in participation in maintenance of SWC programme. If these farmers adopt SWC structures on their lands for soil and water conservation, in that case the farmers manage their structures. It is necessary for them to get economic benefits from the structures even without more social participation.

5.10.2 Relationship between the female's participation in maintenance of soil and water conservation programme and selected independent variables:

The present study revealed a fact that any increased in the socio economic status, land holding, education, family size, risk preference, knowledge, attitude and adoption of SWC practices would help to allow increased participation of female farmers in maintenance of soil and water conservation programme.

The rural female farmers with high level of socio-economic status can manage more equipments, materials, machinery, money etc. which might be used properly in maintenance and repair of SWC structures to ensure sustainable agricultural production.

The large size of land holdings have undulating topography. Thus, they are conducive and more suitable for adoption of different Soil and water conservation structures on their land. Once the SWC structures are adopted by female farmers it becomes necessary after that

to maintain the conservation structures for control of soil erosion and sustainable production.

Educated female farmers in rural areas might help their spouses in proper decision making, and in making their families financially sound with increase in their income. Educated women motivate and advise their spouses to undertake timely repair and maintenance of adopted SWC structures. They possess more knowledge about maintenance of SWC structures.

It was found that the level of women's participation in maintenance increases with increase in the size of their families. The probable reason for above finding might be that with more persons in a family, rural women might get a chance to involve themselves with contribution of labour work and guidance in repair of damaged soil and water conservation structures. The large families enjoy advantage of having more helping hands to share the work of repair and maintenance of soil and water conservation structures adopted at their farm and that of the community. They can spare themselves for maintenance of soil and water conservation works after entrusting household activities to other members in their families.

Risk preference of rural female farmers was observed as factor positively and significantly correlated with their participation in maintenance of soil and water conservation programme. It is because of this that the higher risk preferred rural female farmers are oriented towards maximization of income from agriculture. They ensure timely repair and maintenance of various adopted

soil and water conservation structures on their land. The female farmers are again ready to take risk in maintenance of structures for in the interest of increasing their income.

Female farmers in villages with higher knowledge level regarding soil and water conservation technologies are capable of utilizing their knowledge during repair of damaged soil and water conservation structures on their land as well as on the land owned by the community. It ensures sustainable agricultural production for long time. Knowledgeable female farmers can also help their spouses in taking decisions during repair and maintenance of the SWC structures.

If female farmers have more favourable attitude towards the soil and water conservation programme they might develop good contacts with the staff of project implementing agency. It helps them to learn about repair and maintenance of soil and water conservation structures on their land. They might even contribute more meaningfully in maintenance of the SWC structures on their farm as well as on that of the community land.

The rural female farmers who have adopted soil and water conservation technologies on their land might necessarily look to maintain and repair the soil and water conservation structures on their land to ensure sustainable agricultural production. It is also true that without proper care and maintenance of adopted conservation structures, their utility gets reduced and lost and money spent in their adoption will be a mere waste. Therefore, it is essential that the adopted

structures should be maintained properly for their sustainable output for long period.

It was also revealed that with the increase in age and income, participation of female farmers in maintenance of soil and water conservation programme decreased non-significantly. Whereas, with increase in farm power and social participation, the participation of female farmers in maintenance of soil and water conservation programme increased non-significantly.

It was again revealed that the age is negatively and significantly correlated with participation in maintenance by female farmers in soil and water conservation programme. Old female farmers are physically weak and unable to contribute hard labour efficiently on their agricultural fields. They are unable to carry out so effectively the repair and maintenance of soil and water conservation structures. They usually remain busy in rearing their children in the day time.

Farm power owned by rural female farmers was observed positively and non-significantly correlated with female's participation in maintenance of soil and water conservation programme. The possible reasons might be that female farmers generally do not have adequate skill or knowledge to operate various farm power machinery such as various kind of ploughs, use of bullock cart, tractor driving etc.

Rich female farmers do not like to work themselves for the repair of soil and water conservation structures on their land. They see it affecting their prestige in

the society. Usually they get the labour work done by hired labourers on their farms. It is also true that rich male farmers do not allow their ladies to involve themselves in labour work on agricultural fields.

Social participation of rural female farmers is observed positively and non-significantly correlated with their participation in maintenance of the soil and water conservation programme. The reason is that when male farmers wanted to carry out any repair of damaged soil and water conservation structures in rural area or learn about it, they contact officials of project implementing agency and extension agencies easily, rather than female farmers. If rural female farmers have more contacts with rural village institutions and extension agencies they remain in contact with latest innovations regarding soil and water conservation. But due to gender problem they can explore fewer contacts than the male farmers do.

5.11 RELATIONSHIP BETWEEN THE DEPENDENT VARIABLES OF PEOPLE'S PARTICIPATION IN SWC PROGRAMME AND THE INDEPENDENT VARIABLE GENDER.

The present study revealed that the variable gender was negatively and non-significantly correlated with people's overall participation and in implementation stage of the soil and water conservation programme. Whereas, gender was found positively and also non-significantly correlated with people's participation in planning and maintenance stages of the soil and water conservation programme.

It was revealed that the independent variable gender does not have significant correlation with different dependent variables of people's participation in SWC programme. It is due to the fact that both the male and female respondents are participating in cultivation works on their fields. Therefore, no difference is noticed between the participation of male respondents and female respondents in the light of an overall extent of people's participation and in different stages of the Antisar watershed development programme such as planning, implementation and maintenance. Thus, the female respondents contributed equally as the male respondents, and vise-versa, when their participation in the soil and water conservation programme is counted. Hence, both the male and female farmers can be involved in the soil and water conservation programme on watershed basis on equal ground.

5.12 CONSTRAINTS FACED BY RESPONDENTS

It was revealed from the study that majority of the male respondents faced some constraints during Antisar watershed development programme. They included lack of finance, high cost involved in adoption of technology, shortage of labour in watershed area, lack of knowledge about watershed management practices, inadequate transport facilities and lack of cooperation of people.

Similarly, majority of the female respondents also faced the constraints during Antisar watershed development programme, such as lack of finance, shortage of labour in watershed, high cost involved in adoption of technology, lack of knowledge about watershed management

practices, lack of cooperation of people and inadequate transport facilities.

Such problems include that farmers of Antisar watershed face shortage of money for adoption of costly SWC structures. Since, the majority of rural male and female farmers have land holdings and majority of farmers having cultivation of their main occupation. Therefore, there was non-availability of landless labourers for agriculture occupation. It is also due to that the rich farmers do not like to work in their fields because of their prestige point in the society. There was also non-availability of institution in nearby area to guide the farmers about soil and water conservation technologies. The Antisar watershed is in rural area and there is also lack of transport facilities.

The implication for the above findings is that:

- Loan facilities should be provided in rural area to meet the initial cost involved in adoption of the SWC structures.
- Farmers should be motivated to do labour work on their on farm.
- Low cost or no cost technologies should be developed.
- Skilled trainings for target group farmers should be organized to improve the awareness among the farmers regarding SWC technologies.
- Farmers should be motivated to cooperate with each other during the adoption of SWC technologies.

5.13 CRITERIA FOR PARTICIPATORY APPROACH FOR SUSTAINABLE AGRICULTURAL PRODUCTION IN WATERSHED MANAGEMENT

The following criteria for appropriate participatory approach are suggested on the basis of the findings and discussion of the study:

1. Middle age and young age rural male and female farmers should be given priority in such soil and water conservation development programmes on watershed basis.

2. Efforts should be made to increase the social participation of rural female farmers. They should be encouraged to be members of village level organizations or take up any position in the panchayat. Such assignments will motivate them for more frequent contacts to local organization and participation in meetings.

3. Approach of collective farming on watershed basis may be adopted for sustainable agricultural production.

4. Farmers should be motivated to maintain adequate farm power viz. implements, machines etc. they are helpful in the soil and water conservation works.

5. Efforts should be made so that the farmers may develop in their character risk taking ability. It may help them to adopt new soil and water conservation technologies and derive maximum benefits from them with increase in agriculture production, fertility of land and increase in income on long term basis.

6. Skill oriented training programme should be organised by experts at village level for both male and female farmers, during watershed development programme. Such programmes will improve their knowledge regarding improved soil and water conservation technologies.

7. Bottom-up approach should be adopted in soil and water conservation programme on watershed basis. It means that the soil and water conservation programme should be developed by the rural farmers, for the farmers and of the farmers.

8. Need based programme: The basic needs of the rural farmers' viz., fuel, fodder and food should be taken care of through the planning of the SWC programme. It encourages among local farmers for more favourable attitude towards the SWC programmes.

9. Low cost soil and water conservation technologies, that may suit most to marginal and small land holdings should be disseminated to farmers for easy adoption.

10. Planning meetings of watershed development committee members, Users groups and Self-help groups should be organized on regular basis to plan the watershed development activities systematically.

11. Local village leader should be identified. They have good influence over local farmers. A leader should properly appraise the soil and water conservation programme to the people of his village and organize watershed development programmes through committees

for action. He would form a team of young and skilled farmers and lead them into action.

12. People of villages should be motivated for participation in the SWC programme. They may be encouraged to contribute their own labour, money, implements and materials in construction of soil and water conservation structures during implementation stage of the programme.

13. Farmers have tendency to be dependent more on the government or project implementing agency. Therefore, they should be taught to become self-reliant. They may receive guidance and technical assistance from government and project implementing agencies. But development of watershed programme has to be through their participation in labour and monetary contribution.

14. Attempts should be made through an agency like watershed development society so that the male and female farmers become aware and alert about their rights, privileges, duties and responsibilities in matters of repair and maintain of the soil and water conservation practices adopted on watershed basis. Such attempts ensure proper care of SWC structures even after the project is accomplished by PIA.

15. The farmers should be motivated for proper maintenance and repair of SWC structures by contributing their own labour and money. It would go in the interest of sustainable agricultural production.

RECOMMENDATIONS FOR FURTHER RESEARCH STUDIES

It is expected that the findings and discussions emerging from the present study would pave the way for further studies in the area. The probable area to conduct further research may be suggested on the following lines:

1. The present study was conducted only in the Antisar watershed of Kapadvanj Taluka in Kheda district of Gujarat State. To strengthen the findings of this study, similar study may be replicated in other watersheds in the state of Gujarat.
2. Some more variables, other than those included in this study, might be affecting people's participation in soil and water conservation programmes. Hence, such variables may be identified and incorporated in studies to be conducted in future.
3. Research studies may be carried out to experiment various kinds of participatory approaches in soil and water conservation programme on watershed basis.
4. Comparative research may be taken to study the participation of male and female farmers in soil and water conservation programme through watershed management.
5. Similar studies may be conducted in the context of other watersheds in Gujarat and India.
6. A detailed investigation may be conducted on people's participation in planning of soil and water conservation programme on watershed development programme.

7. A detailed investigation may be conducted on people's participation in implementation of soil and water conservation programme on watershed development programme.
8. A detailed investigation may be conducted on people's participation in maintenance of soil and water conservation programme on watershed basis.
9. An investigation may also be carried out on evaluation of people's participation in soil and water conservation during watershed development programme.
10. An investigation may also be conducted on women's participation in soil and water conservation programmes. Collective efforts of the male and the female sections is the need of the time. It would ensure sustainable agricultural development through watershed management.