CHAPTER 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

The growing emphasis on users in irrigation research necessitates identification of an accurate picture of who uses water and for what purposes to develop appropriate policies, to improve system performance and to bring about desired development impacts, especially those enhancing agricultural production. Also, the widespread trend to transfer irrigation management responsibility from the state to communities or local user groups has by and large ignored the implications of intra-community power differences for the effective and equity of water management.

According to the authors Agarwal (1981), Cloud (1984), Jones (1981) and Zwartveen (1994) the scant literatures that are available demonstrates that gender is a recurrent source of differences or gender is an important factor determining differences in the uses and intensity of the application of irrigation water. As such, gender may be an important variable as well in explaining levels of performance and irrigation impacts and offering insights into the improvements currently being sought in efficiency and management of irrigation water.

An attempt is being made here to demonstrate the contributions that gender analysis can make to improve our understanding of irrigation water management. In this context, it is proposed to examine the following issues – gender role in irrigated agriculture, irrigation and irrigation water management. Because of
little gender related research that has been done so far, a brief review of literature that
are currently available on these issues is grouped under five major headings and
discussed in this chapter. They are: (i) Gender division of labour; (ii) Gendered
specific water uses and the output of irrigation; (iii) Gender role in irrigation water
management; and (iv) Water users association and gender participation.

2.2 GENDER ROLE

The term gender, according to Dabir, Neela (2000), refers to economic,
social and cultural attributes and opportunities associated with being male and female,
whereas Cathy (1995) refers gender to the social area in which men and women are
differentially raised and valued.

Historically, throughout the world, rural women have played and continue
to play an important role in farming systems. Their roles and those of rural men’s are
conditioned by several interrelated socio-economic, political and environmental
factors and are known as “gender roles”. However, gender roles as defined by Tiina
Huvio (1998) are dynamic and can change over time depending on changes in other
factors noted above.

Gender roles are the socially, not biologically, ascribed roles of women
and men, which can vary between different societies and cultures, classes, ages and
throughout different periods in history. The FAO (1997) report have identified that
gender specific roles and responsibilities are often conditioned by household structure,
access to resources, and the specific impacts of the global economy and other locally
relevant factors such as ecological conditions

Irrigation being one of the production enhancing inputs, right to water is
related to the role in agriculture. As water right is related to the roles in agriculture, a
good starting point to understand irrigation water management is to assess different
roles played by women and men farmers in irrigated agriculture (gender analysis).
Gender analysis is an essential element of socio-economic analysis. It refers to variety of methods used to understand the relationship between men and women, their access to resources, the activities men and women play and the constraints they face relative to each other.

From the above discussion, it could be concluded that though various definitions have been put forth on the notion of gender, and all of them concurred that it is a sociological concept (result of socialization) to be differentiated from the notion of sex, which has more to do with biological consideration (acquired at birth). It is clear that “gender” is not the same as sex or women, it is about the relationship between men and women, and therefore concerns men as much as it does women. The focus of this study is on the productive and community roles of women.

2.3 GENDER DIVISION OF LABOUR IN IRRIGATED AGRICULTURE

In many agrarian societies, there is a more or less fixed division of labour according to gender, meaning that certain agricultural tasks are typically done by men, while others are typically done by women. Some tasks may be gender neutral (which are done by both men and women) while some may even be considered children’s work. However, the customs of what are considered as male and female works do not always correspond with actual practice. Especially in situations where men take up non-farm employment, women’s responsibilities in agriculture are expanded (the feminization of agriculture), to include many tasks that were initially undertaken by men.

There is ample evidence as identified by Quisumbing (1996) to show that women are as efficient producers as men, provided that they obtain equitable access to productive resources and human capital and have a say over output. The fact that
productivity of women in irrigated agriculture is equal to that of men is confirmed in studies carried out in Burkina Faso by Zwarteveen (1997) and Deuss (1994).

Women have made equal and significant contributions in agriculture, which are roughly estimated to be around 50%. They contribute as cultivators and are engaged in a number of farm operations independently or jointly. The participation of women varies from carrying out actual farm operations in the field to supervision, management and decision-making process. In many places, the time spent by women towards agriculture is more than that of men.

Based on the above discussion, the gender role in irrigated agriculture can be grouped under two major categories: (i) Gender participation in decision making role and (ii) Gender participation in productive role. These gender role performances are described and discussed below.

2.3.1 Decision making role in agricultural activities

Decision making is an inseparable part of human life. In a farming family, women are making decisions in a majority of agricultural operations, especially in adopting cropping pattern and in irrigation scheduling. Whether women are farm decision makers or just family labourers in a particular rural society is an underlying or prior gender issue.

There are success stories of farm women maximizing the water use efficiency by their active involvement/participation and decision making activities. For example, Sisodia (1986) in her study on role of farm women in agriculture in Chambal command area of Madhya Pradesh State in India observes that more than 30% of the farm house wives are consulted regarding a choice of crops to be grown, seed variety, fertilizer application, number of irrigations and marketing (quantity and place). The female participation to implement new ideas in agriculture is much more
in case of scheduled castes, scheduled tribes and other backward communities and declines with higher classes in the social hierarchy

A study on the intra-household organisation of production in male farming systems in Indian states of Andhra Pradesh and Gujarat by van Koppen (2002) reveals that with regard to decision making, men take most decisions in majority of households, including those regarding resources such as land and credit. Irrigation is a decision and activity of the same gendered nature as other technology related decisions and activities. A decision, in which slightly more women participate, is in the use of produce that is kept at home and related to crop choice. This probably reflects women’s roles as housewives and their involvement in estimating future family consumption needs, from which they themselves benefit indirectly. However, their say over the produce do not extend to the decision of marketing produce or to decisions over the use of the money earned. Slightly higher proportion of women who decide about labour exchange probably does so because of their preponderant roles in labour provision.

As identified by Bullock (1994) the extent to which women are involved in decision making varies greatly between and within regions and sub regions in Asia, where the gender division of labour may be less well delineated between crops and women play more of a co-farmer role, they may still exercise varying degree of influence over farm management and decision making. For example in parts of Nepal, where farmers use high-yielding crop varieties, Ahmed (1987) found that women made 81% of the decisions pertaining to seed selection and 60% of those concerning the use of improved seeds. They also made 40% of decisions (versus 32.5% by men alone) about fertilizer use.

It is a widely held belief that in rural agrarian economy, women merely contribute their labour but have little role to play in the decision making process of the farm centered activities Kargbo (1983) point out that wives and other women in farm
household may be consulted but husbands and heads of the household take the final decision.

A study by Harmeet Saini and van Koppen (2000) on the decision making role in irrigated agriculture among Bhil communities in Gujarat, India, reveals that men's role in decision making is stronger than that of women. Men alone decides around 60% of the decisions over the activities like selection of crop, application of pesticides and fertilizers, leasing land, taking credit, and hiring and buying of implements. More often, men consult women for the change of labour, which reflects that women are more responsible to carry out labour intensive tasks. However, the decision on the use of the harvest either for self-consumption or for sale is in most cases a joint decision. Among the 60 households studied, men alone deciding is only in 22% of households whereas in 23% of the households women alone decide about harvesting.

Majority of women cultivators of Salipperi, a tail end village of Kavery delta, Thiruvarur district, Tamil Nadu, India, as identified by Sophia (1994) never take decisions regarding on-farm activities such as field preparation, irrigating field and transporting produce etc. Sometimes, considerable numbers of women farmers have a say on the activities in which they participate. For example, in transplanting and weeding, women take up absolute participation and decisions. Majority among the women respondents (88.5%) independently decide and carry out storage of produce and other post harvesting activities.

A study by Pattnaik (1988) on decision making role of women in farming activities reveals that participation of farm women in decision making varies with the size of landholding. It was also identified that, among the marginal farmwomen, 20% and 24.4% are found in the full and partial participant category respectively and 55.6% of them do not participate in the decision making process. Among the small holding farm women, 32% are fully participating, 28% of them participate partially in the
decision making process and 34% not at all participating. Among the large farmers category, 17% participate fully followed by 34% partially participating and 49% not all participating in the decision making process. Of the total sample studied (180 farm women), only 50% of the respondents are seen to take part in the decision making process either fully or partially and the rest 50% are not at all participating. It was also identified that non-participation is due to several factors. Around 25% of the sample respondents feel that due to illiteracy they fail to take effective part in decision making. The study also represents a type of male dominated society where many of the traditional social restrictions have gone against the interest of farm women. One such example is that they were not allowed to stand before elderly male members in order to give their suggestions, even if given, their suggestions were never taken into consideration

Women’s role in farm management and other areas of decision making process varied partly in relation to their status in the household and the farm enterprise. Their role and decision making level is highest when they are heads of the household. Women’s involvement in decision making include decisions regarding the benefits obtained from irrigated agriculture - the amount of the crop to be sold, the amount to be allocated for home consumption, the ways in which the money should be spent etc. Pattnaik (1988) identified in her study that 14% of the women reported that on decisions related to agricultural benefits their husbands never consulted them. Nearly 26% of the women mentioned that in some cases their husbands consulted them. More than half, 60% of the women, in this group reported that they shared decision making with their husbands. It was also found that there is a positive relationship between women’s participation in agricultural activities and their involvement in decision making. Women who participated in more number of agricultural activities tend to have greater influence on decision making.

A study conducted by Chandratal (1983) shows that through out Asia, women play an important role in paddy seed selection. They are often responsible for
selecting plants to provide seed and for storing, testing and germinating seed. Frequently, women are involved in farm management decisions about inputs and hiring of labour.

Another study by Li-Chen-Quan (1983) reveals that in Nepal and China, women make up an overwhelming majority of decisions pertaining to the use of their own improved seed selection process. But in India, their role is not important in decision making regarding adoption of new seeds, fertilizers, implements and pesticides, as they do not have adequate knowledge of the improved farm practices.

Swaminathan (1996) pointed out that 81% of female respondents took decisions safely regarding seed selection followed by male 10% and both 8%. Illiteracy was the greater hurdle in the improvement of status for women among several other problems.

Sawar (1973) identified that family size, income and farm size seem to restrict to encourage the wife’s participation in farm decisions. Other than these factors, marital status and age of the farmers also have influence on decision making as evidenced from the studies conducted by Arya (1964) and others. In contrary an analysis of participation of rural women in decision making in Madhya Pradesh state in India by Sharma and Singh (1970) shows that age, education, caste, type of family and urban contact do not affect the extent of participation in decision-making while social participation and size of land holding significantly affect the extent of participation. Other studies by Craven (1963), Bhamrah (1966) and Satnam Kaur (1987) confirm that participation in decision making is greater where there exists a low level of agricultural technology, low income, small farm size and nuclear type of family.
2.3.2 Participation in agricultural activities

A study on the intra-household organisation of production in male farming systems in Andhra Pradesh and Gujarat reveals that the activities carried by men, both by men and women and by women household members appear to be quite similar in both the States. In majority of the irrigated farms, women’s activities are confined to unskilled, labour intensive tasks like weeding, threshing and harvesting and in Andhra Pradesh, transplanting paddy. In these farms, men take up core-tasks like ploughing, application of fertilizers and pesticides, which are essential for the overall activities, and require investments, technological skills and outside contacts. Men are also involved in marketing, an activity strongly related to control over the benefits van Koopen (2002).

Women in rural Pakistan play multiple roles in agriculture in a collaborative effort, with household as an unit of production and consumption. One of the major findings of the research by Basnet (1992) is that women are active participants in the irrigated agriculture. Gender roles are differentiated based on the type of crops grown and stages of their growth. Women’s participation is confined mainly to the manual and unskilled labour, whereas in contrary men’s responsibilities are more technical and less labour intensive. Socio-economic status of the family is the most important determinant of women’s participation in agricultural activities. Land owning and tenure are the best indicators. Women of large holding households are less interested to participate in the on-farm activities. To some extent, caste system also influences the degree of women’s participation in agriculture.

In surveys carried out by Truong Thi Ngoo Chi et al (1994) in two irrigated rice-farming systems in Southern Vietnam, it was found that irrigation had increased the on-farm work load. Women began to participate in tasks such as land preparation, duties that were traditionally the realm of men. Weeding demanded a lot of women’s time as well as irrigation responsibilities. Women also applied fertilizers...
and pesticides, which in some parts of Asia are considered to be traditionally male responsibilities. Women were also predominantly responsible for seed storage. They had very little information on the use of agricultural chemicals due to lack of their involvement in training activities.

As shown an example by Nyantong (1985), Riveros (1994), in many areas from the West Africa, activities related to planting, weeding, harvesting and processing of the crop are the domain of women. And wherever rice is cultivated on small plots of land for household subsistence need, the role of women is critical. In Gambia and Liberia, in mangrove swamp rice cultivation women participate in most of the activities and usually undertake post-harvest processing of the crop.

In many parts of India, weeding is typically women’s responsibility, whereas harvesting and post harvesting activities are shared between men and women. According to Vedavalli (1997) and Sharma et al (1997) in some areas, for example Malayali people who are settled in Tamil Nadu, men and women share most of the tasks and there does not seem to be any taboo forbidding women to take up any specific activities. Only the storage and preservation of seed material for future use (in the following season) is noted as essential and exclusively women’s responsibility. Men are responsible for sowing the seed. The reason for this seems to be that it is usually done in the morning when women are busy with other farm/household activities. Hence, it would appear that the gender division of labour of the Malayali households might be because of the conflicting demand on women’s time.

According to the study by Pundarikanthan et al (2000) done in three irrigation systems in Tamil Nadu, India, the role of women in agriculture varies based on the crops grown, location of land and the presence of irrigation institutions. For example, it was found in the middle and head reaches of Cumbum Valley, women could play only limited role in agriculture due to indigenous system of Thanneermaniam (Water Guide). However, women in tail reach played supervisory
role in irrigating their fields and actively participated in agriculture. In the Sathanur command, irrespective of the land location, women had active involvement in irrigation as majority of them were subsistence farmers and there was no proper water allocation procedure. Women’s role in Marudhanadhi system was also limited due to perennial crops.

Study of gender analysis among the Bhil communities in Gujarat, India, by Harmeet Saini and van Koppen (2000) reveals that in agricultural operations, men carry out the technological and highly production-enhancing tasks like ploughing (82% is exclusively performed by men) and fertilizer application (exclusively by men in 62% of the cases). Men also did the marketing in 62% of the cases. Marketing indicates a strong say over the benefits as it influences the income gained. Women on the other hand tend to be involved in the labor intensive and unskilled tasks like weeding, harvesting and thrashing either alone or jointly with men. Irrigation is the only interesting activity in which only one third of the cases are exclusively performed by men. In 13% of the cases, women exclusively performed the activity. In another 53% it was performed jointly by both men and women.

Another study in the above area by Ahmed (1999) revealed that gender based distribution of agricultural tasks and responsibilities are seemed to be rigid among Bhils. The number of hours that men and women spend in agriculture varied according to the size of landholding, the crops grown and whether or not they are able to hire labour. Generally in the Patel households who are upper caste, women play smaller role in agriculture than in the Bhils households whose families depend more on their own labour resources. In addition, higher male migration amongst the Bhil community has meant that women have a significant role in agriculture and are involved in agricultural decision-makings.

Studies conducted by Sundararajan (1972) and Rexlin (1984) reveal that women do supervise the work of labourers such as harvesting, transplanting and they
have a check on labour, pests and weeds and watering the field. A higher percentage of farm women belonging to big farm families compared to those of small farm families have been found to involve themselves in the process of various farm activities. But women’s role in farm management declines when the extension of new technology is directed to men.

Van Der Molen (2000) in her study on sustained gender inequality in irrigation management in the North-Central Province, Sri Lanka, identified gender-based division of labour in farming. It was found that women are actively involved in irrigated agriculture (especially paddy cultivation) and in cultivation of their homesteads. On their own fields (including their husband’s or their parent’s land), they are involved in all activities except ploughing and threshing, spraying, fencing, building watching huts and watching the field at nights. Construction of their small field bunds, cleaning canals, irrigating their fields, checking the water levels in the field are thus not restricted to men’s domain of activities.

In Mestizo culture, according Bastidas (1999) to division of labour based on gender does not represent what people actually do, but the norm in the area is what people is ought to be doing. About 90% of men and 70% of women, who were interviewed during the survey about the general division of labour in the area, differentiated the tasks on the basis of the physical strength required to carry out them. Male tasks were considered as those requiring more physical strength while typical female tasks require less physical strength. She also found that men do most of the fieldwork, while women help in activities like planning, weeding, harvesting, selection of seed, threshing and storing the product. Sometimes, women cook in the field for family members and paid workers. This is usually done at times of planting and harvesting.

In Bangladesh, according to Jordan and Zwartveen (1997), men traditionally carry out field-based stages of rice production. Now a days, there is a
tendency towards the growing involvement of women in field-based activities, because of male migration and male involvement in off-farm activities. In the past, no one accepted that women could have more responsibility. But in the changed socio-economic environment, people accept that women could take over men’s responsibilities. Field activities are now defined in such a way that they can be seen as part of the overall household duties.

2.4 GENDERED SPECIFIC WATER USES AND OUTPUT OF IRRIGATION SYSTEM

Because of intra-household gender-based division of labour and responsibilities, women and men do not always and automatically have the same interest and needs with respect to irrigated crop production and by consequence they are also differentially interested in irrigation services. Usually, if at all users’ needs are taken into account those are most often the male water users’ needs. Women are often not considered, but there is enough evidence to substantiate the belief that they have specific needs with respect to irrigation. According to Zwarteveen (1995) these needs do not necessarily conflict with those of men. They may be complementary or shared.

Using water for irrigation is not confined to men alone. Women do use water both for productive as well as domestic purposes in different capacities. In Nepal, as identified by Zwarteveen and Neupane (1996), irrigating field is a joint responsibility of both husband and wife. Men are more heavily involved in field work in the early stages of paddy production, during land preparation and ploughing and this is also the time when they take more responsibility for irrigation. During later stages of crop growth, women predominantly irrigate. Monitoring crop growth and deciding when irrigation needed are very much linked to the predominantly female responsibility of weeding.
In Sri Lanka, irrigating paddy fields is traditionally thought of as a male task. There are, nevertheless, quite a number of women that can be found in the paddy fields, opening and closing the bunds and monitoring the flow of water. Women’s roles are more important when it comes to irrigating other field crop, such as chili and onion. However, contrary to the common belief, Zwarteveen (1994) had identified that there are even some women who are actively involved in water management at the level of the field channel. Bhattacharya and Jhansi Rani (1995) have identified that the number of women using water for irrigation in their capacity as heads of farms is reported to be steadily increasing in most South Asian countries.

What matters is the fact that the gender of a water user will make a difference in terms of how water and other resources are used. For example, female farmers often have less access to credit, information and other support services. The rationale of irrigated farming may also change with gender of the farm manager. This was observed in Niger, by Schaap et al (1994), where widows who had inherited irrigated land from their husbands (8% of the total number of pattaholders) depended much more on the proceeds of the irrigated land for their survival than male irrigators. Unlike widows, male farmers of irrigated plots have access to rainfed land in addition to the irrigated plots.

Who use water for what purpose is often determined by gender. In addition to using irrigation water in their capacities as main farmers or co-farmers, women may also use irrigation water for other activities. Apart from using various sources of water for domestic purpose it had been found that almost in all the irrigation systems women use water from the irrigation canals for washing, bathing themselves and children, cleaning and irrigation water is also used for watering cattle, a task which is often performed by women.
In a Base Line Survey (2000) conducted in 8 irrigation commands of Tamil Nadu, the inference drawn from the tank studies is that tank water is being used for other than irrigation purposes as well as, though not for drinking and cooking. Usage of tank water for domestic use i.e. for bathing, washing clothes, cattle maintenance and homestead farming is a common phenomenon in these systems and deserve special attention in planning and allocation of irrigation water.

Zwarteveen and Neupane (1996), in the Chhattis Mauja Irrigation System of Nepal for instance found many women washing their clothes and cleaning pots in nearby irrigation channels and also using this water for feeding and watering livestock and cleaning livestock sheds. In two out of three villages studied among the Bhil community in Gujarat, India, Ahmed (1999) found that in addition to irrigation, water from the Kundis is used for watering cattle and washing utensils. The interviewed women consider this to be an added advantage of lift-irrigation scheme of Sadguru’s. In the West Gandak irrigation scheme, Prabina Bajracharya (2000) found that water of the irrigation canals is also used for bathing, washing, drinking and bathing of livestock and fishing. The poor farmers depend on canal water for their well being than well off farmers, because they do not have access to alternative water sources.

The adequacy of water deliveries may vary according to gender division in crops grown, because men are often responsible for different crops than women. Very often, men mainly control the irrigated crop and women contribute labour. Often, women also grow crops of their own which may be used for consumption or may be sold. In the example from Burkina Faso and Niger, specific plots were allocated for women. Since crops grown by women are not considered to be the main crops, or because it is not even realised that they are grown, their water requirements are seldom taken into account when devising water delivery schedules. As identified by Zwarteveen (1994) men and women often have different tasks, and these can be affected by the adequacy of irrigation delivery. Water can reduce labour, as for example; irrigation water can be used to soften soil for land preparation (Svenden and
Small, 1990). Men often do land preparation, as preseason application of water reduced the amount of male labour needed.

In paddy cultivation in Asia, women may be expected to do the bulk of weeding. Unless they work as paid labourers, women are thus likely to be in favour of increasing the ponding depth, which reduces weed growth. In Nepal, women reported that the increased availability of irrigation water had considerably reduced the time needed for weeding (Backer, 1992). While discussing the adequacy of water deliveries in Nepal Zwartveen and Neupane (1996) reveal that men expressed most concern about enough water being available to allow a timely start of paddy season. Women shared this concern, but unlike men they also stressed the importance of water being available during the season, because a lesser ponding depth in the paddy fields directly increases the time they need to spend on weeding.

Equity refers to the spatial distribution of water across the system. However, according to Bruins and Heijmans (1993) female farmers who grow the same crop as men, and who are thus in principle entitled to receive an equal amount of water, often find it difficult to claim and receive the amount of water they are entitled to during scarcity periods. Women are often in a much weaker position to obtain water than men that could be justified by existing gender ideologies. This gender discrimination in water allocation will often not be very direct and open. In Nepal for example, female heads of households felt that they received less water than men. Because they were not supposed to participate in agricultural planning meetings, water allocation plans were made in their absence.

Equity may also be valued differently because of differences in the nature and importance of social relations to men and women. According to Kabeer (1992) extra household relations and networks may carry a specific significance, especially for poorer women, on two grounds. They tend to be more disadvantaged in relation to other more tangible forms of resources. Further more, these relationships may offer
women a measure of autonomy from male authority within the household and can help furnish them with power of persuasion in their dealings with men. This may be the reason that women sometimes place a higher value on equitable water distribution than men.

The way men and women appreciate the timeliness of water deliveries of an irrigation system relates to the distribution of water across the season relative to some utility-based standard. Differences may arise because of a division along gender lines between crops and between labour peaks. During the final stage of crop growth observed that water distribution ceased when the crops controlled by men were almost ready to be harvested. The vegetables grown by women still needed water. As a result women experienced severe losses.

In the Chhattis Mauja irrigation system in Nepal, for instance, Zwartveen and Neupane (1996) had found that female farmers are even keener than male farmers are. To be sure about the precise time of the first water delivery of the paddy season, since they (unlike most male farmers) have to hire male labourers for land preparation.

The convenience of water delivery timing may be different for men and women. Female irrigators may have preferred different daily irrigation timings because they have to plan their various productive and domestic works alongside each other. Some of these activities have to be carried out at a more or less fixed time of the day, like for instance preparation of meals. In Blaauw (1992) identified that there was a marked difference in the time women and men were willing and able to start irrigating their fields. Women preferred to start later because of the domestic duties, which they had to perform early in the morning.

Irrigation at night may be particularly difficult for women because of social norms that prevent them from going out at night. According to Basnet (1992) in Pakistan, the few women who were directly involved in irrigation send a male relative.
However, if there were no other possibility, they would try to be accompanied by a family member or a friend.

In Nepal, when irrigation turns occur at night according to Zwartveeen and Neupane (1996) both men and women prefer to go together or with a neighbour or relative out of fear for snakes. Women in Sreramsagar project Andhra Pradesh, India, as identified by Rao et al (1991) did night irrigation according to their term and normally three women were in the field at night. Sophia (1994) in her study on role of women in irrigation management identified that though majority of the women cultivators of Salipperi village, Tamil Nadu, India, prefers day time irrigation, there are few respondents who favour night irrigation mainly to avoid conflict in sharing the limited water supply.

2.5 GENDER ROLE IN IRRIGATION MANAGEMENT

Traditionally, it is believed that men’s role is more predominant in irrigation activities. And this is ascribed to the social prescriptions laid down by patriarchy, which defines what task a woman “can do” and “can not do”. In irrigation, particularly in large irrigation systems, the processes of procuring water and guarding it have become male activities justified by the fact that physical strength is required to deal with conflicts those might arise during water scarcity. Timings of irrigation (where night irrigation is practised) and interactions with other neighboring farmers in sharing the water and also with the irrigation officials are the other constraints normally identified for women not having a role in irrigation water management.

However, there are field observations, which suggest that some women do participate in the irrigation activities. A research report by the Project Management Unit (Bhave, 1991) in Tamil Nadu, Karnataka and Andhra Pradesh, India, reveals that women’s knowledge about the number of irrigations required for each crop, the intervals at which irrigation is required, depth of water necessary in the field,
techniques of draining excess water, type of field preparations necessary for the most effective use of available water were on par with male counterparts. Studies on women’s role in tank irrigated agriculture in India, reveals that approximately half the women interviewed noted that female members of the household were involved in decisions regarding when to irrigate. Reference is made from the study on “Gender issues- Water issues” by Zwarteveen (1995) to suggest that few women in countries of Peru, Pakistan, Indonesia and Philippines are directly engaged in irrigation.

In all the tail end regions of Sathanur, Cumbum Valley and Marudhanadhi irrigation commands in Tamil Nadu, India, Pundarikanthan et al (2000) observed that women are actively involved as co-irrigators along with their spouses. In the households, where men are invalid or have taken up off-farm jobs, women play the role of main irrigators. In the absence of male members for brief periods, women worked as substitute irrigators. Women’s participation in irrigation is directly linked with small land holdings and subsistence farming.

Irrigation is generally not considered as the main task for women in Nepal. But a study on mainstreaming irrigation management transfer in the West Gandak irrigation system shows that a considerable number of women, both in male and female headed households, are involved in irrigation. Besides being the main irrigator in homesteads, women are involved in canal irrigation as well. From the sample of 99 respondents, it was found that 40% of all women in male-headed households are irrigating their fields, out of which 7% are main irrigators and 33% are partial irrigators. For women in female-headed households the figure is slightly higher: 63% women are involved in irrigation of which 32% and 31% are main and partial irrigators respectively; Rao et al (1993); IRDAS (1993); Zwarteveen (1994); and Prabina Bajracharya (2000).
In Himachal Pradesh, India, according to Sreelatha and Bindu (2000), Water Users’ Associations are responsible for irrigation scheduling and water distribution. At least 50% of the members are women. In some associations, the percentage is much higher. Women not only do take an active part in clearing channels and diverting water but also in all decision makings regarding water sharing and distribution, the crops to be grown and water requirements of different crops etc. Such an active involvement of women in irrigation throughout the entire state could possibly be attributed to the strong history of Mahila Mandals in the state. Women in this state have traditionally had a substantial role in economic activities and have taken on responsibilities of areas that are usually male preserve.

Analysis of 33 female groups in Nyanza Province, Kenya, revealed features of the female groups that succeed the best in controlling the irrigation enterprise are those supported by NGOs. The NGOs adopted an individual approach of women’s empowerment and explicitly channeled its financial, technical and organizational support to the women. A case study by Kimani and De vries (1991), in one such group, reveals that at group level the women do not depend on men any more, except for labour. The women’s group hires a paid pump driver for daily pump operation, water delivery, maintenance and minor repairs, and also to guard at night. For effective irrigation management, women do not need to be in the field at night themselves. This contradicts the argument often heard that cultural constraints to be in the fields at night are the major reason why women do not and cannot take up irrigation.

While expressing their experiences on role of women in irrigation management in Sreeramsagar project of Andhra Pradesh, India, Rao et al (1991) first described the role taken up by women to work along with their men folk mainly in the distribution of irrigation water. The distributory under minor supplying water to Hyderpet, the last village is considered to be one of the major distributaries under Sreeramsagar canal system. The area under this minor of is 45 acres with 38 farmers.
Irrigation water normally does not reach the lower outlets. To get water, women of the farming families took an initiative to devise their own methods and worked along with their men folk. Women came forward and took up the responsibility of applying water to the field and relieved the entire men folk to attend to activities of removing blocks and obstructions along the length of the minor and close or reduce the drawls into some of the outlets. Farmers under the outlet were divided into five groups and agreed to take water by rotation one day in a week. As mentioned in the previous section women also did night irrigation according to their term and normally 3 women were in the field at night.

Women also perform the role of procuring and guarding while men play the supportive role of irrigating the field. One of the villages in Sreeramsagar canal system in Andhra Pradesh, India, gets its water supply through a minor of a distributory. This minor has 16 outlets, of which three (11, 12 and 13) get very limited quantity of water supply with very great difficulty. Farm women of these three outlets took initiatives to procure water. Irrespective of the extent of holding or social status, one woman from each farming household joined together as a group with mutual agreement, carried spades and worked along the minor removing the obstructions and guarding the flow. Men on the other hand stayed in the field irrigating to different holdings of the minor. Men were happy doing this job and women were proud in handling the normal man oriented job. Nobody was bold enough to obstruct women; Rao et al (1991).

Leadership qualities of women have also been identified by Rao et al (1991). Israjapally is the tail end village of a minor in Sreeramsagar canal system, Andhra Pradesh, India. This minor has also 16 outlets. Srimathi Sugunamma, a small farmer with about 3 acres of land holding under 14th outlet, does all the agricultural activities independently. There was an unresolved quarrel among farmers in sharing water in the 14th outlet. Seeing this, Sugunamma designed and provided an earthen divider in the minor that helped the downstream farmers in sharing water without any
conflict. Soon, this was appreciated by the upper reach farmers and requested her to design such dividers in their outlets. Thus, her attitude disproved the normal thinking that men alone are capable of providing leadership and guidance (in irrigation) and women are passive participants in irrigated agriculture. Women are capable of going up to the extreme of finding solutions to the day to day problems and establish confidence among their fellow farmers. They are also capable of resolving conflicts among farmers.

In a village of Madurai district, Tamil Nadu, India, it was identified by Jayashekar et al (1992) that women play a primary and dominant role in all aspects of paddy cultivation, including crop and water management. The all women cultivators association had been formed in the village in 1978 with about 50 active farmers. The members are actively involved in tank irrigation, water distribution, operation and maintenance, regular monitoring and improvement of the system. As a group, they make and enforce regulations and are involved in conflict resolution and decision making through negotiation and discussion respectively. It was also identified that the success of the association is generally thought to be related to its small size that provide for face to face interactions and effective interpersonal relationships and voluntary creation of the group, and its clear purpose that provides visible benefits to its members. In addition, the technical support and mediation provided by staff at the Tamil Nadu Agricultural University (TNAU) have also been important.

Irrigation among Bhils of Panchmahals, Gujarat, India, according to Ahmed (1999) is commonly done by both men and women together, and often by women alone when men have gone on short-term migration. Women have to stay in the field during nights to guard and monitor water flow since irrigation is mostly done during nights due to unreliable power supply during the day. Meanwhile, men go along the channels to see that they are not blocked, digging or clearing the channels if necessary and ensuring that the water is flowing according to the schedule. Female
headed households (widows) receive water in day time, as night irrigation is difficult for women on their own without any resource to male labour.

2.6 WATER USERS ASSOCIATION AND GENDER PARTICIPATION

Moser (1989) identified participation in community managing work as part of the “Triple Role” of women (along with their reproductive and productive roles), and noted that this has formed the basis for many welfare approaches to women that treat women’s organizations as an extension of their domestic roles.

Uphoff (1986), in his analysis of the 50 case studies, found few most specific references to women’s participation. He also states that review of literature revealed very little documentation on participation by women in irrigation management. For example, in San Pedro de Atacama, Chile, women constitute about one-third of the landowners, given high male out-migration, yet their role in the irrigation organisation is minor. For women in general, their role is restricted to participation at meetings. In the Mwea scheme in Kenya, there are informal women’s work groups active in irrigated cultivation, but women are excluded from public meetings (barazas) with officials. The Rahad project in Sudan has taken the unusual step of reserving six seats in each village council for women, but these councils are relatively underpowered. While one might expect women’s roles to be negligible in an Islamic country, one of the few documented activities for women in irrigation is in the Nayband irrigation system in Iran, where women fix the time of the rotation of water deliveries.

It was identified in the study on “Gender issues- Water issues” by Zwartveen (1994) that in the process of turning over operation and maintenance responsibilities from the irrigation agency to farmers, female irrigators unexpectedly turned out to be very interested and willing to participate in Water Users Association (WUAs). Their husbands supported this. It was felt that women would better perform
some task and that irrigation decision-making is something, which concerns both male and female members of households. The same as identified in FOT report (1997) at Sathanur command was that women were enthusiastic to participate in WUAs and men were also encouraging them. The same was the case with the tail end region of Cumbum Valley. But women of Marudhanadhi have inhibition to participate in WUA.

Although women's participation in water user association is low and culture plays strong in terms of decision making power they have, women who had higher than average education occupied positions of leadership in the organisation. Also, women tried to solve their irrigation related problems through informal ways where they had more decision making power.

Ramasamy and Bhuvaneshwari (2000) in their research on women leaders in micro watershed management found that out of 15 Drought Prone Area Programme (DPAP) micro watersheds taken for development works in Coimbatore district by the Water Technology Centre (WTC) three watershed association presidents are women. The three watershed viz. Kurumapalayam, Rasipalayam and Sokkanur led by women leaders are quite on par with their male counterparts in the remaining 12 watersheds. The involvement of rural women in watershed training programmes like mushroom cultivation, fruit squash making, sanitation structures and backyard poultry maintenance had been exemplary.

Participatory Irrigation Management (PIM) has been made as the central theme of the irrigation reforms with all the concerted sections in Andhra Pradesh. About 10,292 Water Users Associations (WUAs) have been created by enacting a legislation called the “Andhra Pradesh Farmers Management of Irrigation Systems Act 1997”. From the analysis of the composition of the WUAs formed, Vijaya Shyamala et al (2000) found that 98 presidents and 830 managing committee members, normally known as Territorial Constituency (TC) members, turned out to be women. This intervention threw open new challenges into the earlier conceptions that women can
have no role in irrigation management because they are not the direct stake holders of the irrigation system.

Vijaya Shyamala et al (2000) have taken up a study of 4 women presidents out of 98, 18 TC members out of 830 and a cross section of men and women farmers in the command areas with an objective to understand the actual performance of these women office-bearers and exploring the opportunities for increasing the women’s participation in the WUAs and the PIM programme. The findings of the study explain that the women have occupied the present positions at the behest of their male members, who obviously were motivated by their self-interest of acquiring the de facto powers. When the women were probed as to why they are not carrying out the activities themselves, majority of them have said, “we are not used to going out and they (husbands) only take care of things”. Some of the men, particularly of some castes, also have said, “Our women do not go out”. Thus, the traditional patriarchal social system, which has prescribed certain norms of behavior for women, seems to be the major influencing factor for the inactive role played by women presidents and TC members.

Evidences from water users’ organizations from Sri Lanka, Nepal, Pakistan and India show that women participation in WUAs is much lower than that of men. In all these countries, there is a low participation in WUAs despite high involvement of women in irrigated agriculture and agricultural decision making. The few documented cases of a higher female involvement in WUAs either stem from women only organizations managing ground water pumps (van Koppen and Mahmud (1995), Jordan and Zwarteeven (1997)) or are from areas where men were not interested or absent Jayashekar et al (1992) and Dalwai (1997). This is partly because membership is often confined to one member of each irrigation household, either the official landholder or the head of the household. Both criteria apply to male for more often than to women. The only women who can potentially participate in water users groups are either widows or single mothers with no adult male living in the household.
The most easily recognized gender based constraint for participation according to Ruth Meinzen-Dick and Zwarteveen (1998) stems from membership rules that directly or indirectly exclude women. Prevailing stereotypical ideas about the gender division of labour and about appropriate male and female behaviour functions as informal membership criteria. Social norms prescribing women to confine their activities to a small geographical area (homestead, village, or nearby fields) may also effectively exclude women from becoming members of water users’ association. IRDAS (1993). Kome (1997) identified in Sri Lanka, the fact that the first set of activities to be undertaken by the new organisations concerned rehabilitation construction work further decreased the chance for women to become involved, since construction works are considered typically male activities.

In spite of not formally being members or participating in meetings, women may play other roles in the organisation or in carrying out collective action as back stage actors, which have decisive influence on strategies and scenarios. There exist a few documented examples of such non-formal ways of female participation. In the Bhanjayang Tar KO Kulo system in the hills in Nepal, women intervened in a conflict between head and tail-enders about canal maintenance. In the Sreeramsagar irrigation project in Andhra Pradesh, India, women in one village organized among themselves to remove obstructions in canal and guard the water flow. The monitoring and enforcement reduced water theft and elicited the following comment from an old farmer. “We have seen that nobody is bold enough to obstruct women and it has made things easy for us”. A female farmer in another village in the same irrigation project played a leading role in settling water related conflicts. In yet another village, women took the initiative to help their husbands to irrigate by allowing them to guard the canal and procure the water while the women apply the water to the field Pradhan (1989) and Rao et al (1991).

Though 45% of the women respondents are members of Valappar Salipperi water users association in Kavery Delta, Tamil Nadu, India, Sophia (1994)
had found that their direct participation in association activities is very meager due to socio-cultural constraints. Besides, women’s role in decision making and conflict resolution is uncommon. Nonetheless, women express their views and suggestions informally through their husbands and office bearers of the association. According to Athukorale and Zwarteeveen (1994) in Sri Lanka, wives of men office bearers often assist their husbands with administrative tasks and secretarial duties and.

The neerpachis or common irrigators in South Indian tanks are traditionally male employees of the WUA. In several cases, Ruth Meinzen-Dick and Zwarteeveen (1998) identified women have been seen carrying out the water distribution tasks not as neerpachis themselves, but carrying out the work for their husbands.

The cultures of Water Users’ Association and their ways of doing business remain a barrier to women. Women tend to find it harder to have their voices heard than men. In many contexts, it is regarded as inappropriate for women to speak out or take the lead in public. Women farmers themselves may feel different about participating in mixed meetings. Women in Nepal were reluctant to attend water users’ meetings because they were sure that nobody would listen to them Cleaver and Elson (1995) and Bruins and Heijmans (1993).

Though women farmers may have informal ways and mechanisms to satisfy their water needs, exclusion of women from users’ association still risks endangering the equity and efficiency of association. In the Bauraha irrigation system in Nepal for instance, Bruins and Heijmans (1993) identified that women were often not aware of their water turns, because rotation schedules were devised in their absence, at meetings of Water Users’ Association of which they are not formal members. Water often flowed through the canals without being used or women farmers only started irrigating after having been warned by neighboring male farmers.
In order to solve these problems, men farmers took the initiative of also inviting women farmers to the meetings.

The absence of women in associations may make it difficult for the association to enforce its rules on women, which as in the Chhattis Mauja irrigation system in Nepal may lead to problems with the mobilization of labour for maintenance. In Tanzania, the involvement of women in decision making position in WUAs has resulted in fewer operational problems and better financial recovery of operation and maintenance expenses compared to WUAs where solely men are involved.

Van de Pol (1992) identifies that it may also be that participation in meetings is simply not judged to be efficient and rewarding. In Peru, women stated that it was of little use going to meetings, since the most important decisions were not taken in those meetings but during informal get-togethers of men.

Just as membership criteria have formal and informal dimensions for men and women so also the costs and benefits influence their decisions to participate in the activities of local organisation. Because of their high domestic and productive workloads, the opportunity cost time to attend meetings and do other work for the organisation is different for women than for men. In this regard Ruth Meinzen-Dick and Zwarteveen (1998) state that it is not as easy for women to transfer some of their responsibilities to their husbands as it is for men to leave some of their tasks to their wives. Timing and location of meetings may improve a higher cost on women than on men. In the Ambewela irrigation system in the hills Sri Lanka, Kome (1997) identified that meetings are held at night to suit men preference. For women, it is highly unsuitable to go out after dark.

Ruth Meinzen-Dick and Zwarteveen (1998) and Kome (1997) had also identified in another system in Sri Lanka, that women do not like to go to the meetings
of the WUAs because they are held at the bar, and usually end up with everybody drinking liquor. And, while most Sri Lankan men go to the meetings by bicycle, very few women own or ride bicycle implying that it would take them much longer time to go to the meetings. Similarly, formal training held away from the village or community and requiring an overnight stay impose a higher cost (in terms of child care arrangements or family resistance) on women than on men.

The abilities and capacities needed for participating in organisations, and especially for office bearer positions, may not be as easily identified with women than men for a number of reasons. In Nepal, “Women referred to their illiteracy as a reason for not attending meetings; they were afraid that they would not be able to understand what was being said and thought they would have little to contribute”. Both men and women farmers in Nepal also mentioned women’s lack of negotiating skills and mobility as two inhibiting factors for meaningful participation. On the benefit side, the prestige of participation in public forums, and especially of leadership positions in the organisations, may be valued more highly by men than women; Zwarteveen and Neupane (1996); Moser (1989); and Agarwal (1997b).

In Chhattis Mauja system, Nepal, which is a system traditionally managed by farmers, women said that they never attended meetings of the water users’ organisation because the meetings offered no opportunities for them to raise their concerns and needs. Many of these women perceive “stealing” water to be an easier solution than offered by more formal channels; Zwarteveen and Neupane (1996)

According to Ostrom (1992) the lack of a large number of users in the management of irrigation would, at least according to the theories of participatory management, imply performance weakness in the organisation, because of weakness in communication, representation, democracy, and accountability, which may lead to free riding, rent seeking, and corruption. In one of the few studies to address this from a gender perspective, Zwarteveen and Neupane (1996) found that the all male
organisation for the Chhattis Mauja system in Nepal faced difficulties in enforcing its rules on women. Female heads of farms in the head reach of the system always took more water than their entitlements, while contributing less labour than they should. In other parts of the system, village irrigation leaders also mentioned water stealing by women as a problem that was difficult to solve because women were not members of the organisation and could thus not be punished. Fear of being harassed by men and cultural restrictions on women’s mobility further impede their ability to contribute labour.

2.7 SUMMARY

A careful critical study of relevant literature has been made to assess the feasibility of the present study. The literature review on irrigation management issues with reference to gender reveals that there are huge variations among men and women’s role and participation right from local to global level. A multitude of factors influencing their differential role in irrigated agriculture, water uses, role in irrigation water management and gender participation in Water Users’ Associations have also been identified. However, it should be noted that, though many studies have been made on gender in irrigation management, there are no specific studies available on quantification of information on women and men farm decision makers and on the factors that prevent women from participation in irrigation management, especially in water users association. This may be perhaps a serious limitation on the tenant of literature.

In the above context, the present study is proposed to first classify the scheme into male, dual and female farming system by identifying the gender of farm decision maker using GPU tool and secondly will identify the actual barriers women face and the factors that prevent women from participation in Water Users’ Association.