

Community Participation and Sustainable Livelihoods: A Study on Watershed Management in Odisha

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By

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Dedicated to my Mother

CERTIFICATE

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This is to certify that the thesis entitled “**Community Participation and Sustainable Livelihoods: A Study on Watershed Management in Odisha**” being submitted by Ms. Suman Devi, Roll No. 509HS305, to the National Institute of Technology, Rourkela, India, for the award of the degree of **Doctor of Philosophy** is a record of confide research carried out by her under my supervision. The Candidate has fulfilled all the prescribed requirements. The thesis is based on candidate’s own work, has not been submitted elsewhere for the award of any degree to the best of my knowledge and belief. In my opinion, the thesis is of the standard required for the award of Doctor of Philosophy in Sociology.

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Abstract

Agriculture is an important source of livelihood for millions of population in rural areas of India. In this country, nearly 60 percent of the population depends on agriculture. According to the Population Census (2011), approximately 18.20 crore of the population are engaged in agriculture as cultivators and agricultural workers. In India, out of the total land, approximately 195 million hectares are used for cultivation from which around 63 percent is rain fed. Globally, India's position is first in rainfed agriculture in terms of both extent and value of production and is responsible for 65 to 70 per cent of the staple food in the country. Rainfed agriculture provides about 55 percent of rice, 91 percent coarse grains, 90 per cent pulses, 85 per cent oilseeds and 65 percent cotton. The Government of India has taken up macro- and micro-irrigation projects to improve the agricultural productivity in rainfed agriculture areas. But the over-pumping of water for irrigational purposes and other uses has resulted in decreasing of the groundwater level. Even the green revolution that has improved agricultural productivity in India had little impact on rainfed agriculture.

In rainfed regions, agricultural productivity is low, natural resources are degraded and the people increasingly are poor. In the wake of depleting water, soil and other natural resources, the idea of watershed project comes as a relief to rainfed agriculture. Agricultural scientists and planners aimed to promote rainfed agriculture through Watershed Development Programme (WSDP). Among many proposed solutions for the improvement of rainfed areas, development through watershed projects has emerged as the best strategy. Watershed is an area from which all water drains to a common point. It is an attractive unit for technical development to manage water and soil for production and conservation of natural resources.

To explore the potentiality of the rainfed agriculture, WSDP is implemented with the involvement of the local community. Up to now massive investments have been made in this regard but real evidences of success and failures of the community participation are still lacking. Under this background, the present study has been carried out in two micro-watersheds located in Balangir district of western Odisha. Broadly, the objectives of the study are to figure out the level of community participation, factors affecting the participation, conflict resolution and impact of

watershed on livelihoods. The sociological and anthropological techniques are used to fulfil the objectives of the present study. The key findings of the study show that community participation varies at different levels of watershed implementation. The empirical results of the study show that in both the watersheds, most of the people who attended the watershed meetings or involved in the watershed activities are educated, rich and farmers doing the crops in *Rabi* season. The participation of illiterates, old persons, women groups and poor farmers are very rare. The participation of landless, marginal and women are quite less because of lack of awareness and non-closeness with the PIA. But, the scenario has changed in the planning and implementation phase. The marginal, landless, and women groups those who mostly work as labourers are encouraged to participate as their labour contribution was needed to form the watershed structures.

In post-implementation phase of watershed project the transformation took place. Those who have the ability (in terms of labour, money and materials) to maintain the watershed physical structure, participated more, irrespective of their caste and land holding size. The post-implementation scenario in NGO implemented watershed shows that while around 50 percent beneficiaries participated in watershed management, it is not uniform in case of all the communities and land holding groups. The landless (30%) and marginal communities (35%) who really need water for their livelihoods take less interest to participate. The women participation is very minimal that is 20 percent. In case of GO implemented watershed it is 20 percent, 25 percent and 10 percent respectively for landless, marginal and women beneficiaries.

It is observed that in the NGO implemented watershed, the management of watershed assets and community participation are quite better in comparison to the GO implemented watershed. This is because of the creation of proper awareness; smooth functioning of the Watershed Committee (WC), Self-Help Groups (SHGs), Watershed Association (WA) and other grass root level institutions. The levels of participation in either of the NGO and GO implemented watershed areas are not satisfactory, because of some socio-cultural, economic, institutional and physical, technical factors. However, the NGO implemented watershed performed comparatively well. In this regard, several variables are identified for determining the reasons for non-participation. The factor and regression analysis reveals that economic factor plays a significant role in the community participation. The main reason attributed for this is

that the economic activities are directly linked to the livelihood, poverty, employment, short term and long term benefit. The second highest factor that has influenced the participation is socio-cultural followed by the institutional and physical-technical factors. As mentioned earlier, the participation is highly infused in the social system, which can be a probable reason for the relevance of the social-cultural factor. The institutional factors have a very mild impact as well as physical and technical factors also have a minor impact on overall participation.

It is observed that in both GO and NGO watersheds, Brahmins and upper caste people had power and social prestige that gave them an upper hand in the use of watershed resources. The traditional type of authority helped in maintaining harmony in the village before the introduction of the watershed and there were very less chances of conflict. After the implementation of the watershed, the role and functions of traditional authority has changed. The unequal distribution of watershed resource caused conflict between the watershed beneficiaries. However, the idea behind the watershed guideline is that 'let the beneficiaries resolve their disputes by themselves' which are yet to be realised. It is found in the study areas that the watershed project has improved all the capital assets, but it was not felt vividly by the farmers of all castes and communities.

As a result, along with the sustainability, the problem of inequality remained a problem. The marginal farmers did not get many benefits due to the inability to invest, lack of participation in watershed activities, lack of awareness, inadequate training, lack of knowledge of market fair price. The NGO implemented watershed has a moderate impact on the entire livelihood capital assets while the low quality of water harvesting structures constructed in GO implemented watershed, affected the sustainability of all the capitals assets. Though, the watershed project has a good impact on rural livelihood; the sustainability of this has become a pressing question.

Key words: Rainfed Agriculture, Watershed Project, Natural Resources, Community Participation, Livelihood, Conflict, Factors,

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ACRONYMS

ACA	Additional Central Assistance
APD	Assistant Project Director
BPL	Below Poverty Line
CBNRM	Community-Based Natural Resource Management
CBT	Capacity Building Team
CPR	Common Property Resource/Common Pool Resource
DDP	Desert Development Programme
DFID	Department for International Development
DoLR	Department of Land Resources
DPAP	Drought Prone Area Programme
DRD	Department of Rural Development
DRDA	District Rural Development Agency
EAS	Employment Assurance Scheme
FAO	Food and Agricultural Organization
FYP	Five Year Plan
GC	General Category
GO	Government Organisation
GoI	Government of India
GoO	Government of Odisha
GP	Gram Panchayat
GS	Gram Sabha
GSDP	Gross State Domestic Product
IDCWDP	Indo-Danish Comprehensive Watershed Development Project
IWSDP	Integrated Wasteland Development Programme
IWSM	Integrated Watershed Management
KBK	Kalahandi, Balangir and Koraput (KBK)
LBCD	Loose Boulder Contour Development
LST	Livelihoods Support Team (LST).
MF	Marginal Farmer/Medium Farmer
MM	Millimetre
MoA	Ministry of Agriculture

MoE	Ministry of Environment
MoRD	Ministry of Rural Development
MWS	Micro Watersheds (MWS)
NABARD	National Bank for Agriculture and Rural Development
NASDORA	National Authority for Sustainable Development of Rainfed Areas
NFSA	National Food Security Act
NGO	None Governmental Organization
NMSA	National Mission for Sustainable Agriculture
NRAA	National Rainfed Area Authority
NRM	Natural Resource Management
NTFPs	Non-Timber Forest Products
NWDP	National Watershed Development Project
NWFPs	Non-Wood Forest Produce (NWFPs).
NWSDPRA	National Watershed Development Programme for Rainfed Areas
OBC	Other backward community
OTDP	Orissa Tribal Development Project
OWDM	Orissa Watershed Development Mission
PDW	Project Director of Watersheds (PDW)
PIA	Planning Implementing Agency
PMC	Project Management Committee (PMC)
RKVY	Rashtriya Krishi Vikas Yojana
RSA	Registered Societies Ac
RVP	River Valley Projects
RWHSs	Rain Water Harvesting Structures
SC	Scheduled Caste
SGSY	Swarna Gram Samridhi Yojna
SHGs	Self Help Grou
SLNA	State Level Nodal Agency
SM	Small Farmer
SMF	Semi-Medium Farmer
ST	Scheduled Tribe
TGA	Total geographical area (TGA)
UGs	User Groups
UNDP	United Nations Development Program

VWC	Village Watershed Committee
WA	Watershed Association
WC	Watershed Committee
WDF	Watershed Development Fund
WDT	Watershed Development Team
WHSs	Water harvesting structures
WORLP	Western Orissa Rural Livelihoods Programme
WSDP	Watershed Development Programme
WSMC	Watershed Management Committee
WSMP	Watershed Management Programme
WUAs	Water Users Association
ZP	Zila Panchayat

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CHAPTER-I

Background, Objectives and Methodology of the Study

1.1. Introduction

Agriculture is an important source of livelihood for millions of population in rural areas of India. Nearly 60 percent of the population in India depends on agriculture. According to the Population Census (2011), 18.20 crore of the population are engaged in this sector as cultivators and agricultural workers (Jain & Singh, 2014). The unfolding history of Indian agriculture reveals that in spite of its importance, the growth was not similar throughout the ages. The agricultural growth was very slow in the colonial period due to commercialization of land, forest, water and other natural resources. Moreover, the socio-economic security of the rural poor depending on the natural resources was also ignored. In fact, the real growth of Indian agriculture started after independence, as the Government of India placed a high priority on agricultural productivity along with environmental protection. From the first five-year plan to till date, massive investment accompanied by landmark policies and programmes has been implemented. The Programmes like, Drought Prone Area Programme (DPAP, 1971), Desert Development Programme (DDP, 1975), National Watershed Development Project for Rainfed Areas (NWDPA, 1986-87), Rashtriya Krishi Vikas Yojana (2007-08), National Mission for Sustainable Agriculture (2008), Integrated Wasteland Development Programme (IWSDP, 1989) and The National Food Security Act (2013) are some of the examples.

Agricultural development programmes have been initiated with the objective of ensuring food security at both the national and household levels. Development strategies are in operation since the mid-1960s and even since independence, agricultural development policies in India focussed on reducing hunger, food insecurity, malnourishment and poverty at a rapid rate (Acharya, 2009). After the green revolution, agricultural sector attracted the attention of the political leaders, they realised that, ignoring the potentiality of the agriculture for the economic development might result in the balance of payments crisis (BOP) and may affect the livelihoods of the farmers and the economy as a whole. In India, out of the total land,

195 million hectares are used for cultivation in which approximately 63 percent is rainfed (roughly 125 million hectares) and 37 percent (70 million hectares) is irrigated. The concept of dry land agriculture refers to a condition of growing crops entirely under rainfed situation. Globally, India's position is first in rainfed agriculture in terms of both extent and value of produce. It is responsible for 65 to 70 percent of the staple food in the country and in addition to that, it supports 40 percent to the national food basket. Rainfed agriculture provides about 55 percent of rice, 91 percent coarse grains, 90 percent pulses, 85 percent oilseeds and 65 percent cotton. The precipitations received by these areas vary annually between 400 millimetre (mm) to 1000 mm and in certain areas the total annual rainfall does not exceed more than 500 mm (Latha, et al., 2012). The Government of India has taken up macro- and micro-irrigation projects to improve agricultural productivity in rainfed and dryland agriculture. But the over-pumping of water for irrigation and other uses has resulted in decreasing of the groundwater level. Even the green revolution that has improved agricultural productivity in India had little impact on rainfed agriculture.

In rainfed regions, agricultural productivity is low, natural resources are degraded and the people increasingly are poor. In the wake of depleting water, soil and other natural resources, the idea of watershed project comes as a relief to rainfed agriculture. Agricultural scientists and planners aimed to promote rainfed agriculture through watershed development programmes (Kerr, et al., 2007). Among many proposed solutions for the improvement of rainfed areas, development through watershed projects has emerged as the best strategy in India. Many donors and development agencies, such as Central Government, State Governments, the World Bank and NGOs, have promoted Watershed Development Programme (WSDP). Watershed is an area from which all water drains to a common point.

Watershed is an attractive unit for technical development to manage water and soil for production and conservation of natural resources (Kerr, 2002). Subsequently, the concept of Integrated Watershed Management (IWSM) has emerged to make watershed programmes more viable. IWSDP is a process of management where development and best possible utilisation of the available natural resources in a watershed area are taken up on a sustained basis. The studies conducted by different government, NGOs and researchers have assessed the impact of watershed programmes on the livelihoods and in most of the cases, they have found positive

results. The watershed project has a significant effect on the agricultural and non-agricultural incomes, employment, forestry, cropping pattern, and production and productivity of different crops. It addresses the issues of generating natural resources and enhancing of rural livelihoods, especially in rainfed areas (Shah, et al., 2009). In Watershed Management Programme (WSMP), communities adopt the most suitable land planning and agricultural practices that improve soil moisture, reduce soil erosion, and improve agricultural productivity through crop diversification. It has real impact on water harvesting structures, soil erosion reduction, increase in surface and ground water level, change in land use pattern, debt reduction, cropping benefits and yield growth, crop intensity, and capacity building organization (Singh et al., 2010, Farrington et al., 1999, Shanker, 1999, Bhattacharya, 2008).

Most of the watersheds have helped in the diversification of livelihoods. The activities such as leaf plate making, mushroom cultivation and forestry initiated through self-help groups (SHGs) provide opportunities to women and landless to enhance their livelihoods. The importance of watershed in improving the livelihood and restoration of natural resources has been clearly brought out by Rao (1999) in his study, it was found that watershed has improved agricultural productivity, water resources, horticulture, animal husbandry and forestry. Describing the impact of Kali-Khola watershed project in western Nepal, Bhandari and Grant (2007) said that the watershed has remarkable impact on soil fertility, pests and diseases management, risk and uncertainties, use of agrochemicals and access to social services. The study of Sukhomarji, Ren Marga, Ralegaon Siddhi watersheds have shown ample shreds of evidence of multiple benefits of this programme (Singh & Mishra, 1999).

Watershed not only improves the livelihood and natural resources but it also helps in sustainable and equitable management of common property resources and rural development along with Non-Timber Forest Products (NTFP), fodder and fuel wood (Dishingkar, 2004, Singhal, 1999). It was observed that as watershed project enhances the livelihood, it has a direct impact on the migration rate. The field study carried out by Shiyani et.al. (2002) in South Saurashtra region of Gujarat, found that the watershed development plays a significant role in increasing cropping intensity, productivity of various crops, profitability and employment generation. The watershed project helps in improving agricultural productivity and sustaining livelihood along with reducing migration, creation of jobs and restoration of ecology,

etc. Watershed has attracted the policy makers, as an active device for poverty alleviation. It plays a significant role in the context of promoting rural economies (Chandrudu, 2010). The watershed project also helps in improving income and natural base of the disadvantaged regions of the country (Ninal et al., 2000). Hence, in India concerned agencies have implemented watershed in a massive manner.

1.2. Watershed Development Programmes (WSDP) in India

The era of watershed management started in 1880 with Famine Commission. It picked up momentum in 1928 with Royal Commission of Agriculture. These Commissions did the groundwork for research in watersheds (Shaheen et al., 2007). After independence, some landmark steps have been taken by the Government of India (GOI) in the year 1954. Soil and water conservation training centres were established at eight locations in India for research and demonstration. In this regard, construction of about 42 micro-watersheds was carried out in 1956. In these watershed projects, more emphasis was given to biophysical issues, especially hydrology. Further, findings of this limited experience became the basis for launching River Valley Projects (RVP) for conserving various catchments in 1961–62. In the first Five Year Plan (FYP, 1951-56), soil and water conservation programmes were initiated, and they have been intensified over the successive plan periods. Till 1979-80, an area of 23.40 million hectares was treated by various soil conservation measures and 21.7 million hectares were treated at the end of fourth five-year plan period (1977-78).

During the first and second plan periods (1951-61), soil conservation works chiefly constituted of contour bunding. Under the third five-year plan (1961-66), a centrally sponsored scheme of soil conservation in catchments of 13 major river valley projects was undertaken. This was extended to another eight catchments during the fourth five-year plan (1969-74) and today this scheme is covering 21 catchments. From the fifth five-year plan onwards (1974-78), soil and water conservation programmes are being taken up through the watershed approach. During the sixth five-year plan (1980-85), it was realized that increasing irrigation potential through major irrigation projects has limited scope and involves a significant amount of the investment and also have environmental side effects. Development of agriculture through the management of water resources has emerged as the top resource management policy in India during this time.

It was emphasized that watershed development projects could work as a strategy for 1) water harvesting; 2) conservation and control of soil erosion; 3) increasing groundwater level, soil moisture, vegetation or biomass (fuel and fodder); and 4) for diversification of livelihoods, minimizing migration; and for enhancing social capital, beside increasing production. The areas for watershed programmes were selected based on two criteria, firstly the areas with rainfall of 750 to 1125 millimetre (mm) and local situation. Secondly, the areas where the population consists of a majority of SCs and STs were given preference. Again seventh five-year plan (1984-85 to 1989-90) has set its primary objectives as food, work and productivity and put emphasis on enhancement of rice production in the eastern part of the country.

Seventh five year plan initiated national oilseeds development project and also national WSDP for rainfed agriculture for the economic development of small and marginal farmers and to improve social forestry. In the same plan period, high priority was also given to the implementation of watershed-based programmes and, further, it was expected to solve the problems of high poverty, unemployment and depletion of natural resources. In the year 1986-87, the centrally funded scheme for National Watershed Development Programme for Rainfed Areas (NWSDPRA) was also launched. It was carried out in 16 states with an objective of increasing agricultural productivity by introducing land and moisture management practices, better cropping systems, adequate availability of fodder production and encouraging farm forestry.

An area of more than 5 lakh hectares in 647 watersheds in 99 districts in the country was covered during these planning periods. Subsequently, in the eighth plan period (1992-1997) some new measurements were introduced. In 1992-1997, an area of 4.23 million hectares with about 2,554 watersheds covering 350 districts in the country was treated and developed with an expenditure of Rs. 9,679 million. And later on in the ninth plan (1998-2002), the outlay was raised to Rs. 10,200 million to treat 2.30 million hectare. The Integrated Wastelands Development Programme (IWDP) which seeks to develop non-forest wastelands through the holistic approach of watersheds is under implementation since 1989–90. Besides this, an area of 0.23 million hectares was planted in the ninth plan period, which comes under the integrated afforestation and eco-development projects (Joshi et al., 2004a). With the objective of integrating all watershed programmes in 100 important districts, a Watershed Development Fund (WDF) was also created in 1990–91 with the National Bank for Agriculture and Rural

Development (NABARD). A total of Rs. 2,000 million, which included Rs.1, 000 million from NABARD and a matching fund contributed by the Ministry of Agriculture was made available. The primary objective of setting up of WDF was to help state governments to enhance their watershed development programmes, over and above the support they received from WDF was through budgetary resources. DPAP and DDP adopted the watershed approach in the year 1987; the Integrated Wasteland Development Programme (IWDP) has also taken the watershed approach to developing the wastelands. In ninth five-year plan, it was proposed that all the three programmes, IWDP, DPAP and DDP need to be integrated within the Ministry of Rural Development. In the tenth five year plan (2002-2007), it was decided that livelihoods perspective is to be incorporated at the planning stage itself rather than after the physical works have been completed. The livestock management has also been given priority.

Before the starting of the eleventh plan (2007-2012), the Government has constituted the National Rainfed Area Authority (NRAA, 2006) to focus on the problems and potentials of rainfed agricultural areas often considered as neglected areas. To sustain people's participation, it is necessary to have effective management and insertion of a farming systems component. The NRAA would be providing guidelines and technical assistance for the programmes. The eleventh plan targeted the growth rate in agriculture to 4% per annum, as against the present level of 2%. A number of measures, such as good prices for farmers for their crops, change from productivity of individual crops to farm income, security by diversifying agriculture, allocation of public investment in irrigation, watershed development have been suggested in this regard.

The twelve five year plan (2012-2017) made certain specific observations like the non-applicability of general watershed programme to all types of lands and areas because of their differentiation in ecology, socioeconomic conditions, and level of resources depletion. Right from the first five-year plan, government has made the massive investment in WSDP to promote land and water-related development activities and simultaneous improvement of livelihoods of the poor depends either on natural resources or agriculture. WSDP has been under implementation in India for about 45 years and so far only 27.5 million hectare out of the problem area of 107 million hectare was treated by the end of the ninth five-year plan.

Under the direction of the Parliament, the Planning Commission of India prepared a twenty years' Perspective Plan. The approach suggested in that Perspective Plan should be taken into consideration. It was suggested that Ministry of Rural Development (MoRD), Ministry of Agriculture (MoA) and Ministry of Environment (MoE) together should prepare a perspective plan to develop the degraded areas in the given period and the tenth five year plan should be a part of the perspective plan of each of these ministries. A perspective plan intended to treat/reclaim/cover 88.5 million hectare of rainfed degraded lands in next four-five year plan and the cost would be shared by the Centre, the states, and the beneficiaries. In the past, several studies have been conducted to assess the impact of the watershed on the socio-economic and ecological outcomes in the lives of the people. These studies have mixed findings on the impact and performance of watersheds in achieving the goals (Joshi et al., 2004_b). However, the results of watershed project investments and efforts have not generated the expected results. The watershed development programme in India has faced many challenges. It is combined with serious problems of management that prevent the optimum use of its recourses. As a result, the investment becomes unjustified when the cost-benefit analysis is done. Another problem is the unequal distribution of benefits, gender and sustainability of watershed harvesting structures (WHSs).

Some impact assessment studies carried out by different organizations pointed out the equity issues, and variation in benefits shared by upstream farmers and downstream farmers (Devi, 2013). There is no realistic indication of the equal distribution of advantages. Another factor to be considered is whether they have been successful in the eradication of poverty of most vulnerable sections. The study of Pangare (1998) shows that women groups support the watershed programmes, individually or through groups. But the activities undertaken for women in the watershed do not empower them to be equal partners with men. While describing the importance of watershed to improve the livelihoods, many watershed development projects around the world have performed poorly because they failed to take into account the needs, constraints, and practices of local people. In the watershed project, there is no universally applicable institutional and policy arrangement to deal with the problem of individual and collective action, coordination and market failures. The study of Mireku et al. (2015) revealed that watershed management institutions are not applicable to take into

account the initiatives of the local users in monitoring and evaluation process because they are not approached properly. Most of the watershed projects in India failed because of their bureaucratic setup. They suffered from the problems, such as unmotivated project officers, specific target oriented, low quality of technical work. Meanwhile, different theoretical approaches have been evolved to manage the watershed and other common property resources.

1.3. Theoretical approaches in Common Property Resources (CPRs) and Natural Resources Management (NRM)

All the disciplines have devised different approaches to understand the nature of environmental management and the role of community in its management process. The problem of management of Common Property Resources (CPRs) has become an interdisciplinary task. The social scientists, technocrats, environmentalists have used their own perspective to study the relation between society and environment. Sociologists understand the meaning of CPR from social actions and interactions, similarly, anthropologists perceive it from symbolic values, and political scientist focuses on institutional arrangements, economist study the utility and value of CPR and environmentalists are interested in its maintenance and depletion.

Over time, several perspectives and approaches have emerged on order to manage Common Property Resources (CPR) and Natural Resources in a lucid manner. According to Bromley (1989) and Bromley and Cernea (1989), there are four types of possible interventions in CPR management, they are, state property, private property, common property and open access regimes. These approaches were intended to find solutions to the problem of CPR degradation, and sustainability and management of collective organizations. In this regard, a paradigm shift occurred from 'the resources perspective' to 'people's perspective'. The people's perspective highlights the importance of poverty that occurs as a result of environmental degradation, and it establishes the links between livelihood and community participation.

To understand the present mode of community resource management processes, it is important to examine the historical processes of resource use practices that are changing over time. This knowledge will help us in understanding the relationship between the past and present mode of resource management. Further, it will also assist us in formulating a better model for future. In this context, Gadgil & Guha

(1990) described four historical means of resource use. It consists of gathering, nomadic pastoralism, settled cultivation and industrial mode of resource use. In the gathering modes, entire society exclusively depends on nature. Economic institutions were very simple and were based on the resources available within a small area. The primary activity and needs of the society were limited to food gathering, using simple technologies and human muscle power. They used to gather fuel wood (source of energy), naturally available plants, animals and stones; they did not accumulate extra assets. The community also used to hunt collectively and used to share the resources among themselves. Resources were distributed among individuals depending on the size of the family. The social capital and we feeling was quite high within the community. In the pastoral mode, the notion of private property came into existence. However, the pastures remained commonly used, and the societies were egalitarian.

The requirements of a nomadic pastoral mode resulted in gradual increasing in grazing and expansion of arid region at their margins, throughout their history. Subsequently, they have also contributed to the ecological degradation through the organisation of trade and diffusion of technology over large distances. In addition to this, their disseminating belief in man's mastery over nature further led to the degradation. In the course of time, human beings started searching for a settled life. For this, they settled on the bank of rivers with settled agriculture. Gradually, with the development of human civilizations, they organized themselves into villages.

The human civilization came into existence with great traditions and cultures. The village chief used to deal with all the matters of a village in consultation with all the villagers. There were village councils, whose primary function was to develop the village. The villagers were cultivating the lands attached to their habitats by utilizing river water. They were also preserving the available water resources by practicing some indigenous methods. The power to take any decisions on village affairs was concentrated in a few hands. It was derived on the basis of technological advancement and land ownership. The powerless or small and marginal farmers in the villages have surrendered their control over cultivated land to the dominant groups and became subjected to them. They also lost control over non-cultivated land. With the advancement of technical know-how, industrial societies have spread their resource bases. As a result, many resources were overexploited and depleted. To stop the degradation, State in some cases, allowed the involvement of private agencies, for

example, in the forest protection and management. The participation of government and private bodies in resource management discouraged community involvement. It led to growing individualism and as a result, village-based community forest and pasture management systems were victimised. Hardin (1968) is of the view that everyone exploits the limited resources to their optimum level and, therefore, results in a slow depletion of the natural resource. It is a normal human tendency to avoid the social costs of resource uses, as it is thought that others might appropriate the benefits of the resources before him/her (Wade, 1987). Hardin favoured the idea of third party involvement, as a solution for the avoidance of depletion of natural resources.

Kimber (1981, p.100-101) criticized the views of Hardin, and he argued that it may be possible that Hardin's logic will be functional in the situation where the resources are insignificant. Vandana Shiva (1986) argues that Hardin took the competition as a central theme in his work that inspires the individuals to use resources. But competition has not always been the characteristic of human societies. Mostly the social set up of rural societies in the third world countries are based on cooperation. Under these circumstances, Hardin's 'Tragedy of commons theory' is not applicable. Many researchers working in the area of Natural Resource Management (NRM) or CPR have challenged the universal applicability of Hardin's theory.

One group of common property theorists argued that Hardin failed to differentiate between the common property and open access resources. And he was not clear about the collective property and no property regimes (Wantrup, Bishop, 1975). They argued that common property regimes are capable of regulating the rules on individuals to gain and access the benefits of resources (Ostrom, 1990; Wade, 1988). According to them, the situation of the tragedy of the commons arises due to the institutional incapability to regulate the accessibility of the resources and failure to make internal decisions for collective management. In light of above argument, the tragedy of commons can only be applied to the open access resources, in which there are no assigned property rights existing to the Commons (Runge, 1986). However, the thesis (Tragedy of commons) has been applied to some of the resource management problem in the arena of fisheries, forestry and watershed management (Feeny et al., 1990). The exponents of property rights school are of the opinion that the problem of CPR degradation can be resolved by facilitating the full private rights over the commons (Demsetz, 1967) Property rights impose necessary conditions for the

management of CPRs; hence it controls the degradation and property rights are transferred freely. It is also argued that even the common property rights sets the parameters for the controlling and managing the resources, but groups are not able to manage the resources in a socially preferred manner due to the defused authority. However, with an absolute authority individuals are expected to act in a socially preferred way while deriving the benefits. Hence, individuals, rather than community, may use and allocate the resources more efficiently, and it enhances the societal returns.

But the privatisation of natural resources may not always give the desired results. It was argued by Bromley & Cernea (1989) that the privatisation of CPR ensures the right to a limited group while excluding the rights of the majority of the others. Criticizing the privatization, Wade (1988) was of the opinion that imposing the regulation externally, is not a necessary condition for the use and management of commons. He argued that the privatisation of resources or government control over the commons breakdown the local management institutions, whereas shared property rights can strengthen collective action among the user groups. Olson (1971) supported the view that neither privatization nor centralization or nationalization of the CPR solves the problem of degradation completely. She also admitted that in some cases the privatization and centralization have facilitated the efficient use of CPR. She stated that some small groups can organize themselves for the collective action to manage the CPRs.

Olson is optimistic about the small groups, and they can organize themselves with collective goods without depending on any other external force, positive incentives, except the collective good itself. This happens because in a small group the members attain the personal benefits. The achieved benefit from the collective action is more than the total costs that they have to make to produce the collective action. In addition to this, each member knows that acting collectively is more beneficial than individually. Another theoretical approach to analyse collective action used by the researchers and policy makers is the 'Prisoner's Dilemma of Game Theory' (Rasmussen & Meinzen Dick, 1995). This theory attempted to answer the question, whether or not people will choose cooperation and organise themselves to cooperate with each other voluntarily. Prisoner's dilemma analysis is applied to common property management, where there are many individual either to cooperate or defect

for personal interest. The pieces of evidence show that the rational choice of each will instigate him / her to take a free ride at the cost of others, finally leading to what Hardin told as 'tragedy of the common'. The structure and payoff of prisoner's dilemma game are often criticized as highly artificial, as it may not always represent the real life situation faced by individuals in most natural resource management situations.

The reasoning of prisoner's dilemma is that each player is individually better off, and she or he takes defection strategy unmindfully of what the other players do, may not apply in continuous and recurrent situations, and where players interact with each other for an indefinite number of times. If the players know that the game will be repeatedly played, there is a possibility that the chances of cooperation will emerge. Once the association begins, it will be reciprocated, as each player plays seeing the play of the previous player, i.e., whether the former player had performed according to a strategy. Here the argument is that each player accumulates experience of the behaviour of his opponent since he meets him personally at each round of the game and can recall his past move (Baland & Platteau, 1996). And, most importantly, the players get time to observe rationally the behaviour of others and adopt a choice of conditional cooperation, that cooperates first and only defect if others do so.

While highlighting certain ways to overcome the problems posed by prisoner's dilemma model, Runge (1986) argued that the dominant strategy of defection does not exist, and the individuals' decisions to cooperate or not to cooperate are not independent of one another, but it is the outcome of individual assessment of mutual expectations and interests. Under these circumstances, the degree of communication between players takes a crucial role in determining the possibility of cooperation and organization (Cited in Gorada, 2003:61). Ostrom (1990) opines that the pioneers of both privatization and nationalization or centralization ideas are not perfect in their approach. She argues that they assume that all CPR problems have structural similarities with the prisoners' dilemma game situations. In the above case, the external force is essential for imposing suggested policies. Further, she also supported the existing argument partially; these assumptions may be applicable for the subset of CPR problem situations, but may not necessary for all the set of such problems. She states that, ideally there is no perfect approach or management system dealing with the CPR problems. In this regard the best management system, if needed, is based on

situation-specific factors. In the light of above theoretical perspective, Krishna Kumar (2002) emphasizes on decentralization. This is because, the local institutions are better informed about the individual agents and the ecological and biographical characteristics of the concerned region. He also supported the idea that sustainable growth can be achieved by utilizing the natural resources at the optimum level. The participation of beneficiaries in CPR like watershed programme, Singh (1994) in his study of Mittermari watershed of Karnataka state, observed that the government or the process of centralization of CPR should only provide the technical and financial support to facilitate the environment in which the CPR users or farmers organizations can participate to control and manage their resources effectively. Watershed can be managed properly by the village community with well-defined intuitional rules. It is a better alternative to the private and state property regimes.

The village level authority is also capable of designing the institutions for self-governance. It was observed that the formal institutional arrangement is needed to involve the community. The NGO-led planning implementing agency (PIA) performs better than the Government Organization (GO) led PIA in applying the bottom-up participatory approaches. However, the study of Kerr (2003) in states of Maharashtra and Andhra Pradesh showed that the NGO and NGO/ government collaborative watershed participatory projects have performed better than the other top-down technocratic projects. The GO watersheds are different from NGO watersheds mainly in terms of their scale of operations and staffing structures. The government watershed programmes are implemented with huge budgets and scattered in the number of villages, but the NGO watersheds work in few villages with more dedication.

The government staffs are mainly professionals from engineering and agricultural science while the majority of the NGO staffs are nontechnical and trained in community mobilization. The supporters of community participation in watershed programmes are of the view that a watershed can be managed best under the common property regime with well-defined institutional arrangements. On the other hand, in state property or private property regimes, though the communities access resources, they are not the primary decision makers. In a common property regime the communities are the ultimate decision makers, and they have a right to exclude other non-members from resource use. International development agencies like the World

Bank, the United Nations Development Program (UNDP) and the Food and Agricultural Organization (FAO) proposed decentralization as the primary approach to fight improper distribution of resources and shortcomings of a state-directed resource distribution. In India, the government has brought changes in policies related to watershed management, to evolve better resource management regime.

The contemporary policies and programmes have given emphasis on community participation and the involvement of a community in resource management. The rural and tribal communities have a symbiotic relationship with the natural environment. They use their traditional knowledge to earn their livelihoods. Their culture and livelihood are linked to their environment. The case studies of Ralegaon Sidhi and Adgaon in Maharashtra, some watershed projects in tribal areas of Panchmahal in Gujarat, Mittemari in Karnataka and Jhabua in Madhya Pradesh showed that community participation was essential to the success of watershed project. It is introduced in watershed programmes because of the strong relationship among higher levels of participation, performance of communities availing resources, investments on watershed works and management of the resources.

Watershed projects are more efficient and effective when users are given a role in managing their watershed resources (Johnson, 2002). Participation of people is needed because they know their community members and can define the watershed resources use and management problems, the causes of problem and solution to those problems by using the available economic and human resources. Korfmacher (2001) argues that people's participation in watershed management has greater potential for watershed management. It can be done by giving them a better understanding, bringing awareness about the strengths and limits of watershed models and by creating a sense of ownership. A similar observation was made by Kulkarni (2011) who said that in watershed management programme, people's participation, awareness and action are very essential for improving the economy of farmers. Besides this, the participation will help in attaining livelihood and environmental security on a sustainable basis. Emphasising on the role of community Sharma et al. (2011) cited an example of the work of an organization Tarun Bhagat Singh in Alwar district of Rajasthan. They noted that for effective, efficient and sustainable watershed project, community involvement should be present at all stages of watershed implementation. Participatory approaches evolved in watershed projects with greater

emphasis to operationalize the bottom up approaches. Most of the studies have given emphasis on the community involvement (Farrington, 1999).

1.4. Community participation

Indian watershed projects started in the 1970s and 1980s and when the technocratic approach failed to recognize the need to address some of the challenges faced by the watershed projects. Subsequently, in 1980s-1990s, projects included participatory approach (community participation) that focused more on social organisation (Kerr, 2007). Community can represent a narrow group of individuals who have captured the participatory process to have their interests promoted as those of the community (Dulani, 1997). According to Banki, participation is “a dynamic group process in which all members of a group contribute, share or are influenced by the exchange of ideas and activities toward problem-solving or decision-making” (cited in Singh, 1995:9). People’s participation in the context of rural development refers to their share in the benefits of development programme and their efforts in assessing such programme (Cohen & Uphoff, 1980).

The FAO defines it as ‘the process by which the rural poor can organize themselves and, through their organization, are able to identify their own needs, share in the design, implementation and evaluation of the participatory action’ (Cited in Chambers et. al., 1989: 218). Other researchers define participation as an active process in which beneficiary influences the direction and implementation of a development programme with an objective to improve their income, personal growth and other things. The objective of this participation is to create an environment in which member can actively contribute and influence the development process with an aim to share the development benefits equally. Participation connotes different meanings for different people. “Participation is not merely the application of a ‘method’. Rather it is a part of a process of dialogue, action, analysis, conflict resolution and change” (Pimbert, Gujja, Shah, 1996). The people’s participation can be conceived as a human process, in which the people for whom the development programme is meant have an access to decisions that are going to affect their livelihoods. It is needed because it is essential to manage existing and new structures created by the project, or else the costs and benefits of watershed may be unequally distributed among the people (Silva et al., 2003). From all these discussions, it was observed that along with the technical inputs,

the human inputs are of immense significance to make the programme (Deshpande & Reddy, 1991). Further research carried out by the researchers (Kumari, 1997, Purandare, 1989, Jaiswal et al. 1985) has also emphasized community participation is necessary for the success outcome of the watershed.

1.4.1. Levels of participation

With the development of participatory approaches, the idea of participation has become the part of every rural development programs. Pretty (1994) and Pimbert and Pretty (1995) defines its typology in the following ways. There could be seven types of people's participation in any developmental projects as explained in table number 1.1. To elaborate the role of community in managing the natural resources, the review of literature is made from people's participation in pre-colonial to independent period. Though various land and water management practices were present in the traditional society, the notion of watershed management was not conceptualized previously. In post-independence, the term watershed was used to combine various land and water management practices. Hence the review of literature revolves around traditional water and land management practices in India from per-colonial to independent periods.

Table 1.1: Typology of participation

Typology	Components of each type
Passive Participation	People participate passively when they are told about the consequences. Sometimes they participate because they are forced.
Participation in Information Giving	People participate by answering the questions posed by researchers and project managers. They do not influence the process of research.
Participation by Consultation	People participate in a consultation process initiated by external agents.
Participation for Material Incentives	People participate for some material incentives. They do not participate in the experimentation process.
Functional Participation	People participate through groups to meet predefined objectives set by the external agencies. Further these groups may become self-dependent.
Interactive Participation	People participate by cooperating in the study. It helps in making action plans and creation of new local groups. These groups control the local decisions.
Self-Mobilization	People participate by taking decision independently to change the systems. However, self-initiated mobilization does not guarantee distribution of wealth and power equally.

1.4.2. Community participation and Natural Resources Management during pre-colonial/ mughal periods

The relationship between man and environment is symbiotic in nature. In India, traditionally village community used to manage natural resources such as village pastures, water bodies, common lands, forest and other resources collectively. Natural resources were one of the primary sources of rural livelihoods; forest, land and water were placed on high priority. Forests provided many valuable raw materials to the communities for their livelihood and land, water resources are directly linked to the agricultural productivity. So the community and chief headmen of the village were much concerned about managing these resources, especially the water resources. The history of water management techniques can be traced from the Indus Valley Civilization (around 300 BC). The Arthashastra of Kautliya mentioned that, a rain gauge was used in India at that time, and these were the first rain gauges of the world (Agarwal & Narain, 1997a). Apart from it, archaeological evidence revealed that Chalkolithic and Megalithic people were the earliest to build reservoirs in prehistoric India, especially in South India (Biswas, 1970).

In the Vedic period, mass participation and decentralization prevailed in the decision making of village affairs. *Gram Sabha* and *Gram Samiti* were two popular institutions through which community used to participate in village development works and had direct control over village's natural resources. The village was self-sufficient, it produced its resources, had its functional mechanisms. There was lesser intervention of the state in the village activities. This system was also continued in the ancient period under the Mauryas, Guptas and Harsabarddhan ruling time. During Vedic period, people in India used to irrigate their crops with dug wells and in the times of Chalukya dynasty (942-1304 AD) many types of water reservoirs were constructed.

People around the country had different water management practices for different agro-climatic zones. For example, the channels known as *kuhls* or *gulbs* were made to draw water from hill streams. And in the North-Eastern India, bamboo pipes familiar as zabo system of cultivation of Nagaland involving a combination of forestry, agriculture and animal care with soil erosion control was used. Kunds (underground tanks) with an artificially constructed catchment area of Thar Desert were built to conserve water. Tanks locally known as Surangams in Karnataka, horizontal tunnel-like wells of Kerala and Karnataka, Eris or tanks of Tamil Nadu, water- harvesting

structures by fragmented bamboos of the tribes of Nicobar were some of the traditional practices employed to conserve the water and other natural resources (Agarwal and Narain, 1997b). Many ancient dynasties that ruled India have initiated different mechanisms for water management. During the rule of Chandragupta Maurya, district officers were appointed to ensure fair distribution of water. The subsequent dynasties like Shakas, Cholas, Pallavas, Bhoj and Pandyas also gave importance to the issues of water management and irrigation.

The Pallavas constructed several wells, tanks, and the canals. But these water bodies were also controlled by the government. In the medieval period, during the Delhi Sultanate, more irrigation facilities was provided to the farmers to get a proper amount of land revenue because it was directly linked with the agricultural productivity. Mughals had also built big as well as small canals. The remarkable features of these systems were that some of the canals in the Multan region were dug and maintained by local people of that region. But in the early medieval period, many changes occurred in village socio-political scenario. Mughals introduced Zagirdari system, in which there were middlemen to collect revenue between the peasantry and the state. Zagirdari system has brought radical changes in exercising of power at the local level, and it weakened the authority and economy of *panchayat* system and village community. Subsequently, with the advent of colonial rule in India the condition of *panchayat raj* system and the role of villagers in political affairs further deteriorated.

1.4.3. Colonial advent in India; threatened the community's control over NRM & CPRs

The advent of the British disturbed the self-governance at the grass root level. The aim of the British government was centralization of administration. A very insignificant role was given to the village panchayats. It adversely affected their control over natural resources. A Large part of natural resources such as land, water, village pastures and forest owned by the villagers became a matter of the state affairs during colonial rule. And the traditional NRM systems by village community collapsed (Gadgil, 1993, Prasad & Mishra, 2007). This has brought drastic changes in the livelihoods of the local community, especially for rural people because forest and agriculture were the primary sources of their livelihoods. It also had an adverse impact on the sustainability of CPRs, which was protected by well- designed

mechanism by enforcing rules at the local level. The colonial period witnessed the transformation of policy on natural resources. All these changes have also weakened the traditional Rain Water Harvesting Structures (RWHS). Colonial rulers were well aware of the fact that expansion of their empire needed control over the economy. The power to rule a nation can only be derived from capturing its economic and political institutions. They started monitoring and exploiting the natural resources for commercial purposes. Along with the proprietary rights of the state over natural resources to extract revenue from land, forests, and water, regulation of community, use of natural resources was also undertaken by the state.

The Easement Act (1882) recommended absolute water rights of the state over rivers, lakes and water bodies. Though, the colonial government has incorporated some elements of cooperation between traditional and private water resources, it had an adverse impact on community rights on water resources (Baumann et al., 2003). The colonial policies were alienated the community from the ownership and management of natural resources. State intervention, Privatization, industrialization, breakdown of traditional community control over resources, high population growth seem to be the causes of natural resources degradation from the colonial era to independent India and other parts of the world. Therefore, all the nations, globally, have become more aware of the deterioration of these resources. In post-independent period in India again a revisit was made to involve the community. It was tried to make modifications in different policies.

1.5. Community participation and Watershed Development programme (WSDP): A policy review

The Watershed Guidelines (1994) proved to be a landmark in the evolution of the participatory approaches in the WSDP in India. In this, it was suggested that the main purpose of the programme should be to promote the welfare of the poor and their ownership over the natural resources; therefore WSDP should become peoples' programme. The basic objective of public participation in the project was to convert the watershed development project from a government programme to people's programme (GOI, 2001). For the first time, these guidelines called for the institutionalisation of mechanisms for the active involvement of the user communities from the very beginning of the programme.

This guideline was formulated in response to the failure of many implemented watersheds in our country without the participation of the community. Participation was seen as essential for the sustainability of watershed and other projects like DDP, DPAP, and IWDP. These guidelines were relevant especially in the areas where traditional community institutions failed. The DDP, APAP, IWDP programmes had been operational for the past six decades, and they have both successful stories as well as weak outcomes. Many gaps and overlaps in programme implementation needed to be addressed. For example, extending fund support through exploring avenues of institutional credit was considered essential.

Therefore, suitable provisions were made in the revised Watershed Guidelines (2001). And it was hoped that programme execution in the new scheme would be sustainable and would create greater ownership by the user community against the backdrop of an environment-friendly framework (Kanda, 2001). Hence, the Guidelines (2001) have been formulated to assure, programme specific and careful project approach, more flexibility in its implementation, the well-defined role of the state, district and village level institutions. Further, twin track approach to the application of the projects, a combination of GO/NGO as PIA, a greater role of women, effective role of *Panchayat Raj Institutions (PRIs)*, bringing SHGs on centre-stage and participation of communities, more specifically people belonging to the SC/ST was also envisaged (MoRD, 2001). According to the institutional arrangements of these guidelines, WSDP will be carried out through Zilla Parishads or District Rural Development Agencies (DRDA). Zilla Parishad (ZP) and Planning Implementing Agencies (PIAs) are expected to play a significant role in the implementation of watershed. And at village level, Gram Panchayats (GPs) role is significant. Subsequently, the Hariyali Guidelines (2003) came into force, to involve village communities in the implementation of watershed projects.

It was recommended that the preparation, execution and supervision of the watershed development activities should be entrusted directly to the Grama Panchayats (GPs). It would work under the overall supervision and guidance of Project Implementation Agencies (PIAs). Following Hariyali guidelines, Parthasarathy Committee (2006) on watershed management laid down the recommendations for future watershed projects (called the Neeranchal guidelines, 2007). The major recommendations of the committee were the recognition of the role of Village Watershed Committee (VWC)

and acceptance of *Gram Sabha* in place of Watershed Association as per the Hariyal guidelines. The VWC is expected to meet as a committee of GP. It also has recommended for the replacement of present management structure of the programme with an all-India authority, National Authority for Sustainable Development of Rainfed Areas (NASDORA). After Hariyal guideline the common watershed guidelines (2008) came; it states that district planning committee will support the watershed perspective and annual plans.

Key features of this guideline are, focus on natural resource management based on livelihoods especially in rural areas, cluster approach, capacity building programme, and scientific planning; for example, using the remote sensing inputs in the planning of the programme. In its institutional set up to involve people, more power was vested in the Gram Sabha. It was required to guide the watershed committee (WC) to implement the watershed project with technical support from the WDT. In the latest watershed guidelines (2012), State Level Nodal Agency (SLNA) handles the selection of the PIA for the implementation of watershed projects in different parts of districts. PIA would provide necessary technical training to GP, WC, UGs, SHGs and other institutions.

WDT would be set up by the PIA; further, WDT would give guidance to the WC in making of the watershed action plan. *Gram Sabha* would constitute the WC as per the norms of the guidelines, and *Gram Panchayat* would supervise, support and advice WC from time to time. The institutions which facilitates people participation in WSDP are SHGs, UGs, and labour groups and these are building blocks of WC. They function as a necessary institutional platform for natural resource conservation, livelihoods improvement and ensuring equity and sustainability in outcomes. In this regard, WDT should ensure that these institutions should not be dominated by the powerful classes or upper castes of the village. The common features of all watershed guidelines evolved in India during different time periods have the common characteristics of emphasising on participatory approaches. But the participatory approaches are proven to be difficult to implement.

1.6. Problems of community participation

In spite of an increasing emphasis on participatory watershed management, some studies illustrated the problems involved in community participation. The problem areas that influence participation include:

- ❖ Ignorance of traditional natural resources management systems and institutional arrangements by the government and NGO, planning implementing agency.
- ❖ Socio-economic status of the beneficiaries and the gender
- ❖ Inequality of distribution of benefits among marginal and big farmers
- ❖ Conflict among the resource users and PIA.
- ❖ Sustainability of participatory institutions and watershed physical structures

Before independence, the policy and law on natural resources took place during the colonial time also discouraged the local property rights on land and water. After participatory independence, approaches have been introduced by the government in the arena of watershed and other natural resources management. It can be viewed as a top-down approach to a bottom-up approach. Like the construction of large dams for irrigation to improve the agricultural productivity discouraged the practices of managing the traditional village tanks by the local community (Shankari, 1991). The transfer of control over resources, from the State to local organizations does not guarantee participation and empowerment of all stakeholders.

This is applicable in highly differentiated and stratified societies (based on socio-economic status) like India. The study conducted by Swain & Swain (2003) on socioeconomic assessment of water users in Hirabati irrigation project, Odisha, observed that in egalitarian production relations, community divisiveness, caste resentment and class difference observed among water user's associations are the main constraints in implementing the formation of water user's associations. Similar type of findings were observed by Singh & Mishra (1999), the watershed projects have failed to harness the benefits of the technology adopted by the farmers due to their poverty, low literacy, poor marketing facilities, absence of proper storage facilities, lack of accessibility of infrastructure facilities, socio-political conflicts. The ignorance of traditional management system is one of the drawbacks of current watershed management policy. The institutions that are not based on local culture and

needs of the local communities cannot evoke their participation. While studying on Water Users Association (WUAs), Mishra (2008) claimed that the culture of ignorance, drinking alcohol, feeling marginal, the dominance of higher caste farmers have discouraged the participation of marginal farmers. The similar observations were made by Rao (1999) in his study on irrigation in Medak District of Andhra Pradesh. The decline of the traditional authority system in villages during British period resulted in poor maintenance of the tanks over a period. Another problem found was related to the institutional arrangement for its implementation. It was observed by few of studies that participation is affected by the type of watershed planning implementing agency.

The projects under the NGOs have a better community involvement levels in comparison with the Government projects. In the Government projects, the staffs are ill-equipped and lack the necessary skills to ensure meaningful participation (Kolavalli et al., 2002). Both the GO and NGO implementing agencies adopted a participatory approach in rural development initiatives. Experience suggests that participation as a model and as a methodology is quite difficult, and its success depends on many interrelated factors. Again there is no consensus on best practices, proper degree and suitable definition of different participatory approaches.

There is no clarity of meaning of participation. It is considered as a fuzzy concept having several meanings over a period. At times, it could just be a nominal membership in a group and at the other end it could imply having an effective voice in the decision-making process (Agarwal, 2001). Besides this, the concept of community is hardly defined or carefully examined by those who are working on natural resource use and management (Agrawal & Gibson, 1999). Along with careful examination, many policy makers are unable to capture the reality of community participation and fail to acknowledge the inherent hierarchies, power differentials and socio-economic inequalities (Puri, 2004). Along with the socio-economic condition, the link of watershed with the livelihood also decides the level of participation. The chances of cooperation are more by economically and socially well-off households than poor households. And people who are aware of government's decentralization policies are also more likely to participate in user groups. Even if community is involved in the watershed programmes, it is hard to check the level of participation as it depends mainly on three factors: spatial, temporal and property rights. Huge money is being

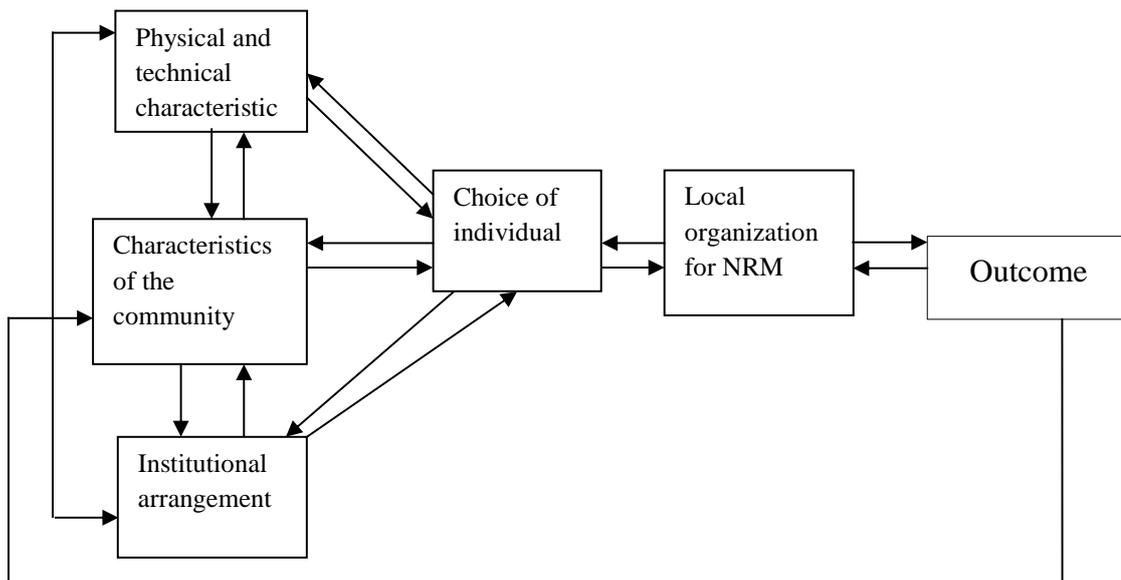
invested for community mobilization to operationalize the participation and stop the degradation, but still, how to involve the community in watershed planning remains controversial. While community-based natural resource management (CBNRM) now attracts widespread international attention, its practical implementation frequently falls short of expectations (Leache et al., 1999). Blaikie (2006) commented in his study that theoretically justified benefits support CBNRM projects. So far the real and practical evidence are not visible.

Encouraging people's participation is the key to the sustainable watershed development program. But there is no proper arrangement for handing over of structures and maintenance of physical assets after a project is completed. The formulation of groups with defined roles in pre-project and post-project is lacking. Once the money is spent, it is expected that improvement will be automatically achieved; however, it is not true. The regrettable fact today is that most projects have failed to generate sustainability because of the failure of government agencies to involve the people. Other important, prevalent problems are women's participation and conflict among sharing of different watershed resources.

The studies of Dick & Zwarteveen (1997) in South Asia and Chatarjee (2003) in Madhya Pradesh India, highlighted the drawbacks in participatory water management and stated that, though policy statements follow the 'participatory', 'user based' Terms and involve all the stakeholders but no organized thought and attention has so far been given to women's participation. Although the goal of gender equality provides strong grounds for enhancing women's participation in institutions of natural resource management, there is little knowledge about the impact of their presence on outcomes (Agarwal, 2010). The contradictions or conflict arises in natural resources because few of the user groups get the benefit from soil conservation activities and enclosure of commons, while other groups such as women and pastoralists face problem in getting their livelihood. In the context of watershed resources, there are conflicting interest and priorities among the upland, middle land and lowland communities (Paudel, 2002). So the technical aspect of the watershed program is no doubt important, it is also important to avoid conflicts among local communities. Rasmussen and Dick (1995, cited in Mishra, 2007) noted that the establishment of relationship among different variables like physical and technical characteristics of the system, characteristics of the community, institutional arrangements that affect

local organization could sustain the local organization in resource management (Figure 1.1). The factors affecting the participation have different physical, social and public aspects attached to it. The climate, availability of water and the existing infrastructure forms the physical or the technical aspects. The village-based farming communities, the crops were grown, the access to domestic and international markets, the ethnicity and the extent to which there are long-standing conflicts in the area form the social or economic aspects. The key socio-economic factors which affect the participation in the watershed are a low level of awareness and literacy rate, poverty, no faith in government programmes, village politics and subsidy problems (Brahmi & Thakur, 2012). Participation is also affected by the public or agency aspects encompassed by the type of regulatory body, the extent of involvement of various agencies, the upstream water system management and the degree to which agency personnel are publicly accountable, their efficiency and professionalism.

Figure 1.1: Relationship among factors affecting local organization (Mishra, 2007)



Besides this, the size of user group, social homogeneity, number of family members working in agriculture and number of ownership of wells have positive factors which influence the participation and distance to access the rainwater harvesting structures is the negative factor which affects the participation. The natural resource treatment activities of watershed also found to be relevant which encourage the farmer's involvement, these includes, plantation and maintenance, construction of soil

conservation structures and training in agroforestry-type works, methods of agriculture (Daru & Tips, 1985). Kacho & Asfaw (2014) in their study found that the community participation in watershed management depends on involvement in decision-making, local leader's knowledge and commitment to involving community, equity of benefit sharing and government support.

1.7. Statement of the problem

From the review of available literature it is clear that most of the social scientists, technocrats, NGOs and government organizations are concerned about the rapid degradation and depletion of natural resources in general and watershed resource in particular and their negative impact on marginal communities. However, they do not address the question of sustainability in the long run. Though a few studies (Sengupta, 1991, Puri, 2004, Kumar & Palanisami, 2009) on watershed management have identified the factors which influenced the sustainability of water management, however, no such attention has been paid on how arrangements for co-ordination and concerted action amongst beneficiaries might be established and sustained.

It is observed that though most of the studies have given emphasis on participatory watershed management, some of the studies show dismal performance of community participation. Even the remarkable measures taken by the Central and the State governments in India in establishing formal policies and in implementing various programmes by involving all the villagers in watershed management at different levels, still they have not attained the desired results. The initiatives taken by the government in this regard have yielded varied responses. Though some of the scholars have mentioned various reasons for no and less participation of community members, none of their studies is comprehensive. The suggestions offered have not yielded the desired results may be due to their non-implementation or for some other reasons. As a result, the agricultural production in dry land areas is still at a low level. Some important questions that are not answered satisfactory needs to be looked after, such as, What are the possibilities for which the watershed which was built to sustain the livelihoods of marginal communities in dry land areas have not succeeded in producing the desired result? Are the traditional institutions are in conflict with formal institutions? In contrast to the prevailing view that ethnicity is an impediment to development, can it be used to harness the development that can benefit people? If the

participation is the way of solution, can we really build the participation irrespective of gender and ethnicity among rural communities in watershed management? What are the reasons for which a community who used to participate in resource management spontaneously in traditional days have not shown much interest to participate in the present day's watershed programmes?

Does the role of PIA matters in motivating the people to participate? Can this participatory watershed management, which is formulated by the government, bring the sustainable development among the villagers? If not, what might be the appropriate design and strategy for a programmatic intervention to develop this opportunity? Taking into consideration their culture, territory, customary laws, indigenous knowledge, traditional institutions, access to market and information, utilisation pattern of water, the role of gender, ethnicity, clan, the WORLP schemes introduced by Government of Orissa in collaboration with DFID and watershed guideline 2001 into account, the proposed study made an analysis on community participation in watershed management in dry land areas of Odisha, India.

Various studies have highlight couple of factors and processes that result in the variations in the functioning of Watershed Associations and the participation of villagers. What are the factors and processes that result in the variations? While there is standardized common policy format and implementation strategy, are there certain factors inherent in a local socio-cultural and institutional set up that effects variation in the result? How do beneficiaries in GO implemented watershed areas participate vis-à-vis in NGO implemented watershed and what are the intervening variables that could explain the disparity, if any? The present study addressed these issues in an interdisciplinary framework, taking the social science perspective, in general, sociological and anthropological perspective, in particular.

1.8. Theoretical framework

To achieve the desired results WSDP should not only be looked from the technical perspective but also from a social viewpoint. It should be viewed as a social reconstruction. The theoretical perspective adopted in the study assumes that for sustainable natural resource management and livelihoods there should be harmony among technical, financial, historical aspects of the community, socio-cultural and institutional aspects of their conservation practices. Any Watershed Management

Committee (WSMC) which does not have this compatibility will not have the active participation of its members. Different perspectives and theoretical approaches (Hardin 1968; Bromley 1992; Ostrom 1990; Runge 1986; Wade, 1988; Vandana Shiva, 1986, Olson 1971; Rasmussen and Meinzen Dick, 1995, Uphoff 1986,) in the field of community participation in CPR discussed earlier in this chapter are used to test the field situation.

In the context of community involvement in watershed development programmes, watershed guidelines perspective is used. Subsequently, the processes and occurrence of conflicts during the implementation of the watershed projects are analysed by using the functionalist, conflict and structural-functionalist theories of sociology. While debating on conflict and conflict resolution process the structural-functional conflict theory of Talcott Parsons has used. The approach of Pangare (1998) is used in discussing the role of gender participation. Keeping in view the positive impact of watersheds on the livelihood of communities, the phenomena can best be understood by taking into account the social, human, physical, financial and natural capitals.

Therefore, the DFID's theoretical livelihood framework is used for the purpose. Further, the political capital as discussed by Baumann and Sinha (2001) was also incorporated in analysing its impact on livelihood. The theoretical model given by Mishra, (2007, pp.37) analysed the relationship between the sustainable water and livelihoods management. He rightly pointed out that there should be coordination between technical, financial, historical aspects of community water management and socio-cultural and institutional aspects of water management. If any Water User Association (WUA) will not have this compatibility will not achieve participation of its members. This model is used in present studied watershed programmes to analyse the relationship between the sustainable watershed and livelihoods management (Figure 1.2).

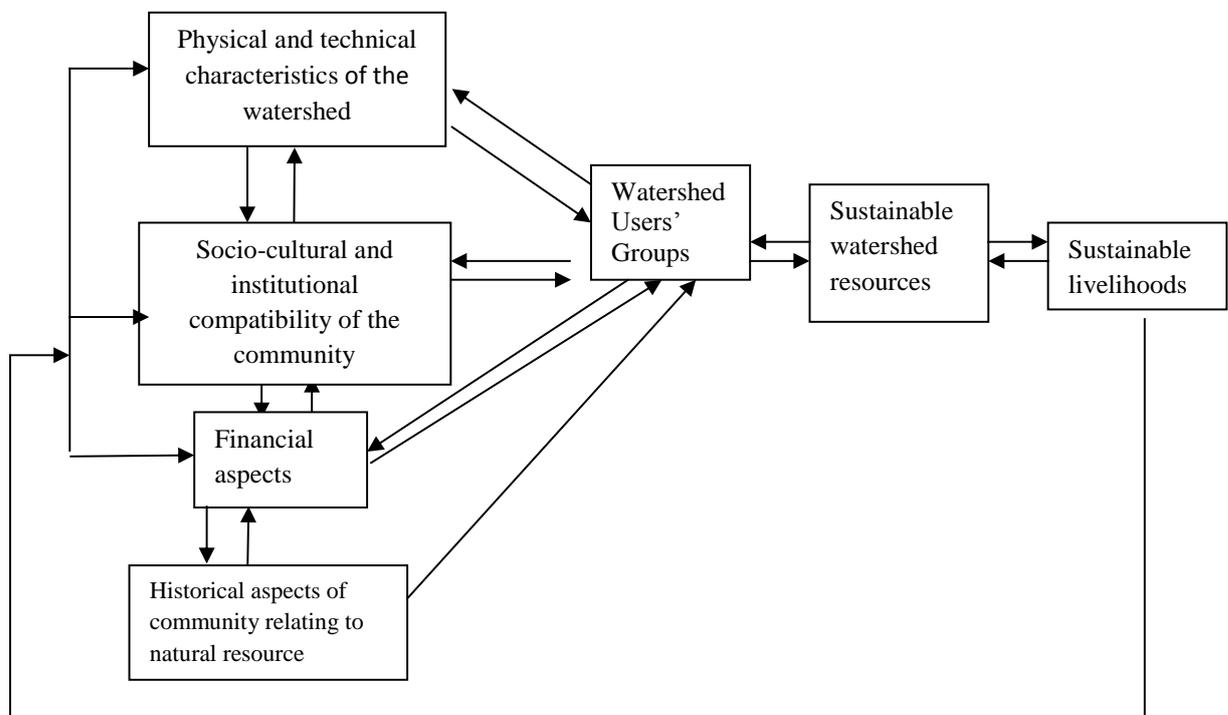
1.9. Objectives of the study

The prime objective of present study is to explore the relationship between the level of collective action and watershed management. In the process of research, an attempt is made to illustrate the factors and conflicts that hinder the participation. In the course of analysis the impact of the watershed on livelihood is discussed, which is an

important factor to mobilize the community for the participation. The particular objectives of the research are as follows:

- ❖ To understand the level of community participation in the watershed development programme.
- ❖ To examine socio - cultural, economic, institutional and physical- technical factors those influence the community involvement.
- ❖ To review the impact of watershed development programme on local livelihoods.
- ❖ To make an assessment of the conflicts and conflict resolution mechanisms in watershed management.

Figure1.2: Theoretical model of sustainable watershed and livelihoods management



1.10 Methodology

1.10.1. Universe of the study

The present study was carried out in Western Odisha and the study area was confined to Agalpur and Loisingha blocks of Balangir district. Based on certain criteria (discussed in detail in sampling procedure, section) two micro watersheds implemented under Western Odisha Rural livelihood Programme (WORLP) one implemented by Government and another implemented by NGO were selected for final study.

1.10.2. Rationale behind selection of the study area

As compared to other parts of Odisha, western Odisha has been selected as the universe of study because it is known for its poverty, lack of infrastructure, drought, crop failure, joblessness and distress migration. Kalahandi, Nuapada and Balangir, which falls under western Odisha and also in KBK region (Kalahandi, Balangir and Koraput) of Odisha, have received 40 percent less rainfall than the average. More than 60 percent of the households in these three districts are Below Poverty Line (BPL). Various Government programmes and schemes like Drought Prone Area Programme (DPAP), Long Term Action Plan (LTAP), Integrated Watershed Management Project (IWDP), and Western Odisha Rural Livelihood Project (WORLP) are working actively in this region for reducing poverty, migration and enhancing livelihood of the people.

The history of water management in Odisha reveals that western Odisha was quite famous for its traditional system of community-based water management. However, the loss of these system, the present day has pushed this region into more vulnerable stage (Panda, 2010). Though there are different schemes working in this region for the implementation of micro-watershed projects, the WORLP scheme has been taken purposively for the present study. In comparison to other projects the WORLP scheme is majorly hyped by the Government of Odisha and this project especially is working for sustaining livelihoods in dryland areas of western Odisha.

It is a Government of Odisha initiative managed by the Orissa Watershed Development Mission and is a joint venture of the Government of Odisha and DFID - the Department for International Development, United Kingdom (UK). In this context, it was thought that a sociological study is highly required to see to what extent the major hyped scheme is giving justice to the people living in rainfed regions. WORLP project is functioning in Balangir, Kalahandi, Nuapada and Baragarh districts of western Odisha. Out of the four vulnerable districts of western Odisha, Balangir district was selected for final study. In comparison to the other three districts, this scheme was first introduced in Balangir district and highest numbers of watersheds are being implemented in this district under this scheme. Details are discussed in chapter two while discussing the study area. This district is suffering from the problem of drought. Mass migration, starvation deaths, dependence and

deprivation have been increasing continuously. Chronic poverty prevails in the region despite better averages of landholding size and planning of government. Balangir is also suffering from the problem of land alienation, encroachment on common property resources, dependency on private moneylenders and gender issues.

The majority of the population derive their livelihoods from natural resources. In this regard, the role of watershed is of much importance. Balangir district has the highest variability of rainfall among all the districts of Odisha, particularly among the three districts, Kalahandi, Nuapada and Bargarh. It is one of the most important determinants and a cause of the drought. Approximately, 96% of the cultivable land in this region is rainfed (Swain and Swain, 2009). Apart from this, Balangir has highest cultivable waste land and out of its fourteen blocks thirteen blocks do not get proper irrigation (Odisha, Agricultural Statistics, 2006-07). Among all the four districts, Balangir has the least net irrigation area (19.02%), on the other hand, in Kalahandi it is 38.12%, in Nuapada 26.62% and Bargarh, 43.88% (Department of Water Resources, Odisha, 2013). The data given by Odisha agricultural statistics (2007) shows that among all the four WORLP functioning districts, comparatively in Balangir more population depends on the rainfed area for their livelihood. 79.77% of the rainfed land was brought under cultivation, while in Kalahandi it is only 61.11%, in Nuapada, 75.13% and Bargarh 55.30%. Table 1.2 shows the extension of the rainfed area in different districts of Odisha. The data indicates that above 70% of the land comes from rainfed agriculture in Balangir.

Table 1.2: Extension of rain fed area in all the Districts of Odisha

Extent of rainfed area	Name of districts
15-30%	Bhadrak, Cuttack, Jajpur, Kendrapara, Ganjam, Puri
30-40%	Sonepur, Jagatsingpur
40-50%	Balasore, Malkanagiri, Boudh, Khurdha
50-60%	Dhenkanal, Gajapati, Nayagarh, Bargarh
60-70%	Angul, Kalahandi, Koraput, Keonjhar, Nabarangpur, Sambalpur, Deogarh, Rayagada
Above 70%	Balangir, Nuapada, Kandhamal, Jharsuguda, Sundargarh, Mayurbhanj

Source: (Orissa Watershed Development Mission, 2012).

1.10.3. Sampling procedure

The selection of the respondents was done through four stages. In the first phase, the districts where micro-watersheds are being implemented under Western Odisha Rural

Livelihood Project (WORLP) were identified. Out of the four districts in western Odisha (Kalahandi, Nuapada, Bargarh and Balangir) where WORLP project is implemented, one district, that is Balangir, was selected on the basis of criteria discussed earlier. In the second stage, two micro-watersheds were chosen based on criteria like 1) The government implements one and the second one by NGO, 2) Both the watersheds handed over to the community during the same period, 3) Watersheds formulated under same watershed guidelines, 4) More or less demographic and social setup and the agro-climatic zone are similar.

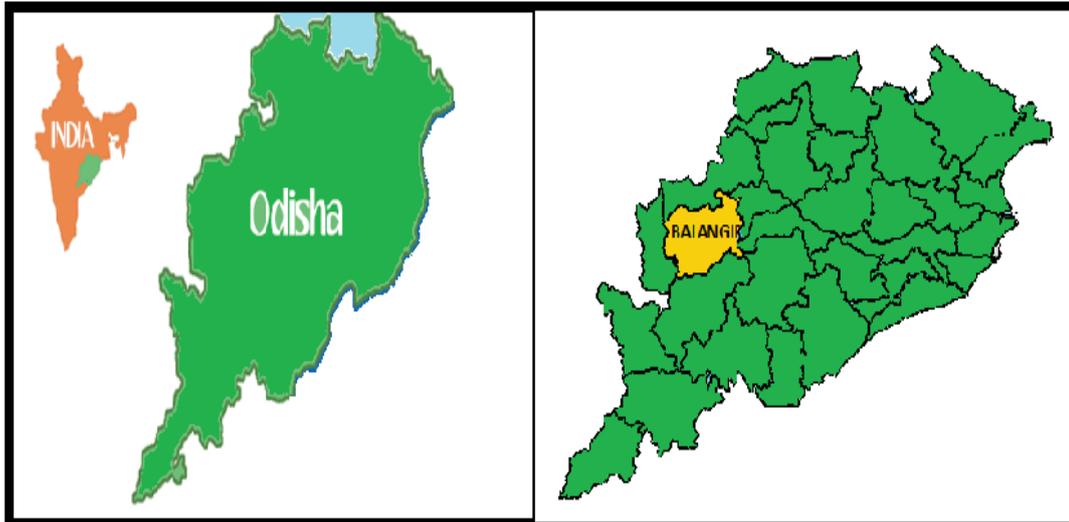
Based on the above criteria two micro-watersheds namely Jharabandhali and Alekha Mahima were selected. While the Jharabandhali micro-watershed falls in Agalpur block implemented by an NGO, the Alekha Mahima micro-watershed falls in Loisingha block implemented by Government. As per the guideline of WORLP only one Project Implementing Agency (PIA) can implement the project in one block. It means where NGO act as a PIA, Government (GO) cannot work as PIA in that block. Out of 14 blocks, NGO played as a PIA in 10 blocks whereas GO operationalised as PIA in 4 blocks. To fulfil the criteria of maintaining same demographic and social set up two adjacent blocks namely Loisingha and Agalpur were selected where NGO is acts as PIA in one block and GO is acting as PIA in another block. In the final stage, after finalizing the micro-watersheds, beneficiary selection process was started. As this study is focussed from an Anthropological perspective, therefor, the universe as a whole was taken into account. In this connection all the beneficiaries in both the micro watershed has taken into consideration. On this basis all the 167 households from Jharabandhali micro-watershed (NGO implemented) and 236 families from Alekha Mahima micro-watershed (GO implemented) were selected.

1.10.4. Research design

The present research has applied the ex-post facto research design. In this type of research design, the study takes place after the event has occurred, the researcher does not control the variables during the event. From the perspective of social science research, the ex post facto research design aims at establishing the possible relationship among the variables by observing the present condition and looking back for some possible contributory factors (Kerlinger & Rint,1986). In the current

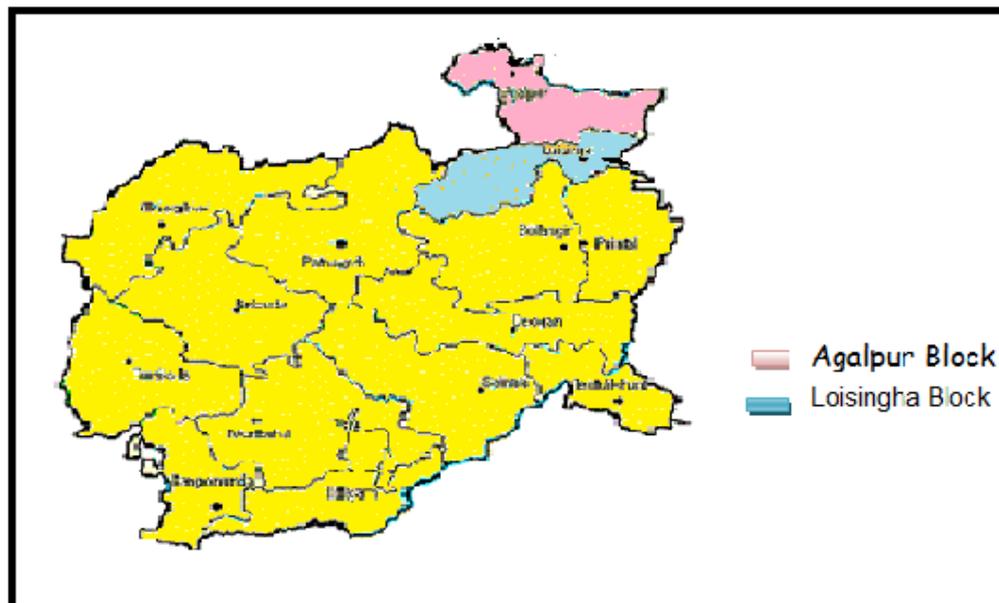
research, this design is found to be appropriate as the watershed programme is completed.

Map1.1: Location of Balangir district



Source: Mapsofindia.com

Map.1.2: Location of study blocks



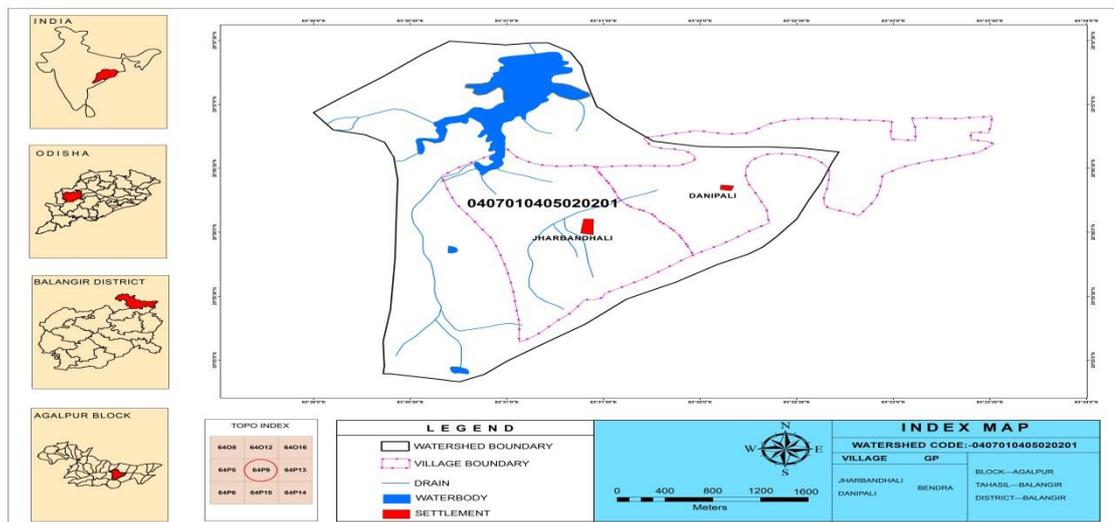
Source: Mapsofindia.com

1.10.5. Sources of data

The present study is qualitative micro-level study. It aims at understanding the process of watershed implementation and management in the selected villages of both the studied watersheds. The data were collected from both the primary and secondary sources to fulfil the objectives of the study. The primary data collection consists of

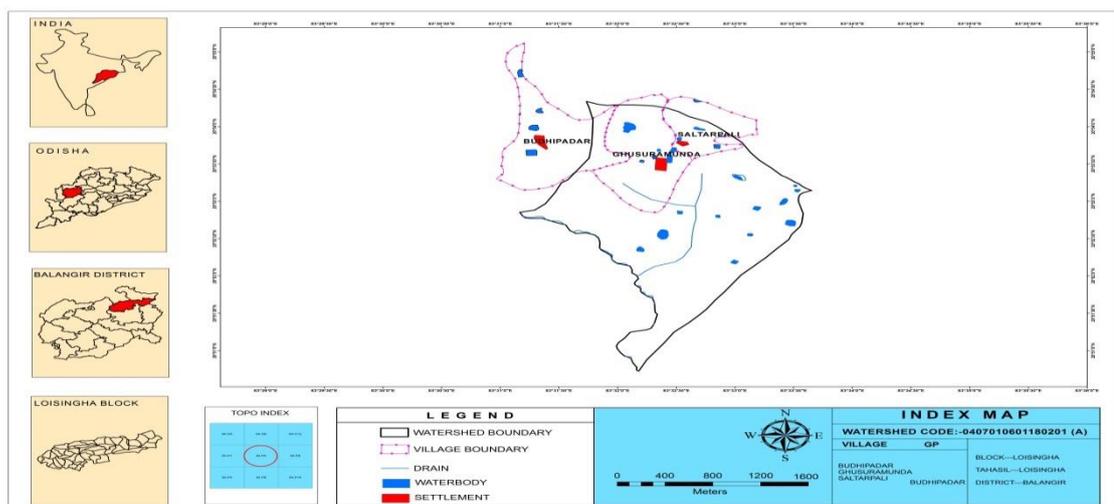
both quantitative and qualitative techniques. With regard to qualitative data collection, the observation method (both participant and non-participant), case study, key informant interview schedule, structured, unstructured and semi-structured interviews, Participatory Rural Appraisal (PRA) techniques, focused group discussions, social and resource mapping were used. The household survey was made using household schedules to collect the quantitative data. Apart from this the audio-video accessories were also used. For the secondary data collection the sources like government reports, available literature and archives were used. The ethical issues were also taken into consideration

Map.1.3: Index Map of Jharbandhali micro watershed



Source: field study

Map.1.4: Index Map of Alekha Mahima micro watershed



Source: field study

1.10.6. Extensive fieldwork at studied area and establishing rapport with the villagers

After reaching the Agalpur block (Jharbandhali watershed), the first door researcher knocked over was the office of an NGO Sabuja Biplav, working in the village since 1995. This NGO has been working on the use of traditional agricultural fertilisers, nursing plants and herbs and other welfare and developmental activities in the village. This NGO is the Planning Implementing Agency (PIA) of the watershed in Agalpur block. An NGO employee, who was also a resident, took the researcher to the village and introduced her to the villagers. Luckily the villagers were kind, caring, considerate and co-operative. Usually in rural Indian tradition, people are more concerned and caring towards strangers and all the more for women. It was a kind of a relief to the researcher, as the villagers offered her water wherever she went. The researcher was informed that the area is Naxal infested; hence researcher preferred travelling in the company of the other villagers at all times and wound up the fieldwork before sunset.

But, sometimes returning from neighbouring villages late in the evening was a difficult task. As a result, the researcher could not spend time in the field till late evening. As a lady researcher, initially it was little difficult to get a safe accommodation in nearby field areas. However, the problem was solved little later. Though in the beginning it was difficult to extract information from the villagers, it was resolved with the passage of time. After knowing that researcher was collecting information only for educational purpose, slowly, everyone accepted the researcher and started sharing information. The caste based rigidity was quite visible in the watershed areas. During the interaction with a few higher caste households, the researcher observed that ritual of sprinkling water around, soon after the researcher left the premises.

The Brahmin families did not give water in their daily used utensils. However, in the later course, the same Brahmin communities accepted the researcher, once they were aware of the caste of the researcher. Some of the families were trying to inspire their daughters by giving the example of the researcher's ability to manage difficulties and solve problems for her study and research. Travelling to the nearby market to get some basic things was a very difficult task. The state-run and also the private buses were overcrowded not only with the people but also animals and fowls. It was equally

difficult to work in the second research field, Loisingha block. It is approximately 25 kilometres away from the Balangir district headquarters. On the way to the *Gram Panchayat (GP)* office, on the first day the researcher came across a dilapidated bridge that was further broken due to heavy rains.

There was a drizzle on that day, and some of the passengers with heavy luggage started walking towards the village, which was seven kilometres away. The researcher had no other option but to walk with them. After walking for three kilometres, a villager gave her a lift on a bike. The researcher went to the GP office in pursuit of some information about the PIA of the completed watershed in Loisingha block. The official present there informed that the PIA was corrupt; in fact they did not share any information with GP or with any other department also. Subsequently, the researcher visited the District Rural Development Office (DRDA), Balangir to get the details of completed watersheds in the Loisingha block. The contact number of the Assistant Soil Conservation Officer, PIA of the block, was provided to her. Researcher talked to the officer over the phone. The officer was of the impression that the researcher was inquiring on the budgeting of the implemented watershed. After long persuasion, the researcher was able to convince the officer that she was collecting information only for the sake of research.

Subsequently, the researcher was given the contact number of the watershed secretary of the studied watershed with a condition that negative aspect of the Alekha Mahima micro-watershed should not be presented. The existing factional politics among the villagers and their displeasure with watershed and PIA officials created a hurdle for the researcher. Visiting *Anganwadi* centre, occasionally having evening tea with the women, and elderly of the village helped the researcher to get more information about the village. Further, the researcher was able to develop rapport with them by actively involving herself in participating in festivals and in birth and marriage rituals, learning embroidering with young girls, teaching in primary schools for a brief time and discussions of watershed activities and agricultural practices with male members of the village.

1.11. Primary Data Collection

1.11.1 Observation

Both the participant and non-participant observation methods were used to collect the data. As part of participant observation, the researcher stayed in both the watershed villages. The different sources of livelihoods, water for irrigation, assets and physical structures created during implementation of the WSDP were observed. Along with this, the cropping pattern, the traditional and modern methods of water conservation and land utilization, crop production, soil conservation, use of organic and inorganic fertilizers, pesticides, and other forms of traditional and modern forms of agricultural practices were carefully observed. With the help of beneficiaries the entire watershed treated area was visited and condition of water and soil managing activities was studied. Further, the problems of managing the watershed structures in the post-project period were also carefully understood. The role of caste, class, ethnicity and women in planning, managing and implementing watershed projects were also observed and explained while discussing with the beneficiaries and PIA. And it was noted during fieldwork that, the watershed meetings were not taking place during the post-project period.

1.11.2. Interview

Structured, unstructured and semi-structured interviews were conducted with the User Groups (UGs), PIA, government officials, Self Help Groups (SHGs) and NGOs. Agricultural officials and DRDA officials were interviewed regarding their perceptions towards the implementation of watershed and about the functioning of User Groups (UGs), Watershed Association (WA), and Watershed Committee (WC). The watershed beneficiaries were interviewed to understand their perceptions about the PIA. The UG members were interviewed regarding the availability of water in the farm pond and percolation ponds and their role in planning, managing, and implementation of the watershed programme in their village. In the interviews, particular emphasis was given to agricultural labourers, landless people, and women. Broadly, the interviews were conducted in such a manner that they were able to cover the socio-economic condition of the households, sources of livelihoods before and after watershed, cost of cultivation and sources of water for different purposes before and after watershed, awareness about watershed, and community participation in

various phases of the watershed. Various cultural practices and indigenous knowledge related to natural resource management, particularly land and water resources, the manner of conflict resolution, cropping pattern, the capacity building training programmes, and various constraints in watershed management were discussed with the beneficiaries. Apart from beneficiaries of watershed and officials dealing with watershed, some exclusive interviews were also held with agricultural labourers and other migrant workers. Separate and joint focused group interviews were conducted for the PIA and beneficiaries. Distinct and mixed interviews were also conducted both for men and women.

1.11.3. Case study

Case study method was used to understand, the role of community or villagers, who were traditionally in the process of natural resource management and the traditional mechanism of water management in this area. Through this method both the inter- and intra-ethnic relations and the process of conflict resolutions and role of PIA to resolve it were understood. Case study method was also used for gathering information regarding various factors affecting the success and failure of collective action in the participatory watershed development programme.

1.11.4. Schedule

The household schedule was designed to capture the details of the socio-cultural and economic information to the beneficiaries, in particular, and the study areas, in general. These include demographic details, educational status, occupational and income aspects of the recipients. It also helped in the collection of data regarding sources of irrigation, domestic use and landholding, irrigated and non-irrigated fields in acres, sharecropping, a multiplicity of cropping, agricultural production before and after the watershed project.

1.12. Secondary data collection

During the pilot study, researcher visited Odisha Watershed Development Mission, District Rural Development Agency (DRDA), Balangir, block development offices of the surveyed blocks, collector office, National Information Center and other agencies who are involved in watershed implementation process in Balangir district. It helped to finalize the watershed areas to carry out an extensive study. Apart from interaction with the officials the data were collected from published and unpublished reports.

Secondary information was gathered from books, articles, journals, census reports, and government documents. Quantitative information concerning landholding, demographic aspects, cropping pattern and irrigation system was collected from *panchayat* office and district statistical handbook. The government records, like state agricultural policy, land reform report, and economic survey and the watershed completion report given by the concerned PIAs gave an overall idea of user groups and irrigation development in the studied areas. To understand a series of rites and rituals that are traditionally prescribed, the present study referred few books in the vernacular (Oriya) literature.

1.13. Methods of Data Analysis

1.13.1. Quantitative data analysis

Quantitative data analysis includes cross tabulation, percentage, descriptive statistics, regression analysis and factor analysis is undertaken by using the Statistical Package for Social Sciences (SPSS version, 20.0). The data was organised, classified and presented in the form of tables and percentages. Additionally, a questionnaire survey was undertaken. After having a detailed discussion with the concerned PIAs and watershed beneficiaries, the questionnaire was developed and finalised. Apart from this, the Likert scale has also been used to analyse some categories of data. Likert scale is mostly used in psychological and sociological research, questionnaire and surveys. It uses the rating format in the data analysis (Pykh and Pykh, 2013). In present study, the 5-point Likert scale has been used to analyse the rejoinder of the watershed beneficiaries from both the studied areas. In scaling system, different numbers (1, 2, 3, 4, and 5) are used to convey the responses of the beneficiaries.

1.13. 2. Qualitative data analysis

The qualitative data analysis is done by comparing the indicators and parameters set by the watershed guideline and typology of participation given by the Pretty, (1994, 1996) and Pimbert and Pretty (1995) with the findings of real field conditions. The filed notes, case studies, diagrams, observation, interview, documentation, conceptualization and information gathered from the beneficiaries and watershed officials helped to check the level of community participation in the watershed programme.

1.14. Implication of the study

Watershed is a technical term and in this regard there are many studies made on WSDP by economists, geographers and hydrologists, and watershed committees constituted by the Government. These studies highlighted the economic and technical aspects and neglected the important socio-cultural dimensions. Presently there is a need to look at the problem, more comprehensively and in a holistic way, from the social anthropological perspective. The outcome of the study will help in understanding the socio-economic aspects and environmental dynamics of the watershed management process in rural India. It will assist in institutionalizing the participation and highlight the adaptive and coping mechanisms and survival tactics of the people with the environment. Understanding the livelihood strategies and people's dependence on natural resources is crucial in building alternative sustainable livelihood strategies. The study on structure and function of watershed development programme along with the socio-cultural, economic and ecological constraints will facilitate in identifying appropriate strategies and policies for sustainable watershed management and sustaining livelihoods. Our study will help in finding the gap between the policy of participatory watershed management and its implementation.

1.15. Chapterization

This thesis is organized into seven chapters. The first chapter introduces the subject, concepts, theoretical perspectives, literature review, objectives, methodology and statement of the problem. The second chapter provides details about the profile of both the studied watershed beneficiaries. In the third chapter, the empirical findings of both the NGO and GO implemented watersheds with the theoretical concepts and background has been discussed. It also focussed on the institutional arrangements and their functioning to involve the community at different watershed implementation phases. The fourth chapter gives the description of the factors affecting the participation. The fifth chapter presents the problem of conflicts related to watershed resource sharing and conflict resolving methods. It attempts to analyse the traditional and modern conflict causes and resolution methods. The sixth chapter deals with the impact of the watershed on the livelihood of beneficiaries. It tries to assess the changes that watershed project brought in terms of improvement in social, human, natural, physical, financial and political capitals. And the last chapter (seventh) provides the summary and conclusion. This chapter also provides the suggestions that

will help to institutionalize the community participation to make the watershed programme sustainable.

CHAPTER-II

Socio-Economic Profile of the Watershed User Groups

2.1. Introduction

Odisha is an agrarian State. Its economy and culture is based on agriculture. Around 70 percent population of the State are still depending on agriculture. About 65 percent of the workforce depends on agriculture for livelihood. In spite of its contribution, the share of this sector in the Gross State Domestic Product (GSDP) has been declining over the years. While agriculture contributed around 17.5 percent to Gross State Domestic Product in 2012-13, it has gone down to 15.6 percent in the year 2013-14. Despite the decreasing share, the agricultural sector continues to be vital for the State (Odisha Economic Survey, 2013-14). *Kharif* is the main cropping season, and Paddy is the principal crop that constitutes more than 90 percent of the total production of the food grains. Rainwater is the primary source of irrigation for *Kharif* crops. And during the *Rabi* season, cultivation depends on mainly irrigated tracts, land with residual moisture in the soil, and on the occurrence of rainfall towards the end of September. The other major crops grown in the state are maize, ragi, pulses (*arhar, mung, biri*), oilseeds, groundnuts, mustard, niger, sugarcane, vegetables and spices.

The State has about 64.09 lakh hectares of cultivable lands out of the total geographical area of 155.711 lakh hectares, accounting for 41.16 percent (State Agricultural Policy, 2013). However, approximately 49.90 lakh hectares can be irrigated by implementing major, medium and minor irrigation projects. In this regard, significant improvement is noticed during last six decades; the irrigation potential created from 1.83 lakh hectares in 1951 to 33.12 lakh hectares in 2014. Presently, 33 projects are providing irrigation to 539.99 thousand hectares of land (Department of water resources, Odisha, 2013-14). The irrigation projects are not able to bring all the land under irrigation. Hence, agricultural productivity and irrigation is entirely dependent on rainfall. The normal rainfall is 1451.2mm, usually occurring from 15th June to September (Department of forest and environment, 2014). According to the climate type characteristics, the State is divided into ten agro-climatic zones. Though the agricultural sector provides a broad scope to improve the socio-economic condition of the State, the inadequate and erratic irrigation facilities are major

constraints for improving its productivity. In this regard, in the year 2009-10, Government of Odisha launched two irrigation schemes, i.e. (i) construction of check dams and (ii) sustainable harvesting of groundwater by setting up of bore wells. The State is also prone to frequent natural calamities like cyclones, droughts, and flash floods. Despite the abundant natural resources in the State, Odisha is considered as an underdeveloped State due to the factors described above.

2.2. Water and land conservation practices in Odisha during pre-colonial period

During the rule of Gonds (9CE) in Odisha, agricultural productivity was high and good arrangements were made for land and water conservation. They constructed the Rani Talao Reservoir. Further, Gonds dynasty propagated the Lakhbata system, which meant common rights and management of land and water resources (Panda, 2010a). After the invasion of many rulers, various sources of water for irrigation, drinking, and domestic uses were facilitated. The land and water-related improvements were made on both private and community lands of the villages. Villagers voluntarily participated in its management. The ancient rulers constructed embankments to store rainwater, and this water was used during the summer.

Western Odisha, has a long history of the sustainable management of natural resources by the rulers as well as by local communities. Historically, in different parts of Odisha, villages or communities used to devise their mechanism for conservation of natural resources and cultivation of different crops in different seasons. For example, during this pre-colonial period, the most drought-prone districts of Odisha (Kalahandi, Balangir and Koraput (KBK)) solved the problem of droughts successfully with a network of about 20,000 traditional water tanks built with community participation.

They used to store water in these tanks, and it was used during the dry months. Therefore, irregularity or uncertainty of rainfall might have caused some scarcity of water but never caused drought (Panda, 2010b). The community built tanks, not only to fulfil the demand of water but were also useful for soil moisture and agricultural productivity. Villagers were also well aware of some seeds that require less water for irrigation. They used these seeds during drought period. Another initiative of villagers was the use of organic fertilisers, which did not harm the fertility of the soil in the long run and were not expensive. They made it by mixing cow dung with other

substances. Some of the examples of traditional indigenous land and water resources management practices are the *Katta* (farm pond), *Bandha* (a bank of mud is made to stop the flow of water into the agricultural fields), *Munda* (percolation pond), *Pokhari* (pond) and check dams, these were managed by the local communities. These structures helped in reducing the chances of soil erosion, consequently made the agricultural fields fertile. It also met villager's water needs.

2.3. Colonial period

Before the colonial rulers, the *Gountia* (village chief) system prevailed in Odisha. This made the construction of tanks, *Katta* and *Munda* mandatory for the community. Odisha is one of the drought-affected states in the country, and few districts of western Odisha are more prone to droughts. The drought-affected districts are Kalahandi, Nuapada, Balangir, Sonepur, Koraput, Malkangiri, Rayagada, and Nabarangpur. On the contrary, in the traditional societies, when the practice of water-harvesting structures by the community was prevalent, the above districts were less affected by drought and flood. But the traditional practices started decaying during the colonial rule. Instead of developing local practices for conservation of water and land resources, the colonial officers focused more on the construction of large dams and canals. Abolition of traditional practices and political instability during the 1750s caused severe damages in community managed natural resources and their livelihood. Traditionally, working as the headman and with additional powers as the revenue collecting authority, the *Gauntiya* had a significant role in the village administration, management, and development.

The other elders in the village functioning as 'Council of Elders' formed an important decision-making body at the village level. They involved collectively in matters concerning the use of management of various natural resources such as forests, water, and water bodies. Some of the examples of these institutions are forest protection committee, water management committee and pond management/ fisheries committee. In the Balangir district of Odisha, it was found that apart from the *Gauntiya*, other people who played a dominant role in decision-making were *Jhankar*, *Nariha*, *Chowkidar* and ward members. The *Gauntiya*, later on came to be known as the *Zamindars* or landlords, captured most of the fertile lands. As a result, a large

number of peasants became landless. Thus, the sustainable management of resources and livelihood of the community was affected in the villages of western Odisha.

2.4. Post -Independence period

In the post-independent period, though the emphasis was placed on decentralization of power to carry out developmental activities, the traditional practices of the community to manage natural resources was ignored. The water storage mechanism by the local community was not sufficiently encouraged. The problem of overuse or misuse of these resources started. Further, some of the changes brought by the government had threatened the livelihoods of the majority of poor and marginal farmers. Most of the land and water bodies owned by the community got transferred to the jurisdiction of the State government's corporate or non-tribal population.

The transformation resulted in the loss of local community's control over the use and management of natural resources. The intervention of the external agency (government or corporate) discourages the local community to participate in the management of natural resources. Further, they did not cooperate with the external agency in managing the water or other resources. As a result some of the districts suffered a number of droughts during 1974, 1979, 1982 (drought and flood), 1987, 1992, 1996, 1998, 2000, 2002, 2004, 2005, 2009 (partial drought), 2010 (partial drought, unseasonal rain). After independence (1947) Government of Odisha enacted many lands and water conservation policies like, the Orissa River Pollution and Prevention Act, 1953 and Acquisition of Land and Flood Control and Prevention of Erosion Act, 1955. The State government has formulated many policies regarding, development and management of water resources for irrigation, flood control, drainage line treatment and implementation of major, medium and minor irrigation projects (Hirakud project, Salandi and Delta irrigation projects, Sasan Canal, Baragarh Canal, Upper Kolab project).

The first water policy by the State Government came into existence in the year 1994 by following the National Water Policy 1987. Later on, the National Water Policy of 1987 was reformulated in the year 2002. Subsequently, water policy of 1994 was also reframed and reformulated as 'Odisha State Water Policy – 2007'. One of the remarkable features of the Orissa State Water Policy- 1994 was the incorporation of water user group's roles and responsibility to take care of operation and maintenance

of irrigation systems. Another initiation for farmer's participation in irrigation was the introduction of *Pani Panchayat Act, 2002* and *Pani Panchayat Rules, 2003*. But in spite of formulating many policies and reforms, the depletion of natural resources continued due to faulty implementation procedures and conservation practices.

The per-capita water availability started reducing gradually. In 2001 the average per-capita water availability (both surface and ground) was around 3359 cubic meters (m^3) per year. It was projected that it will reduce to 2218 m^3 by 2051. In this regard if the per-capita water availability will be less than 1700 m^3 and below 1000 m^3 , the condition is considered as water stress condition. The current situation of the per-capita availability of water resources is not in its worst condition, but it is expected that the Rushikulya basin and basins like Budhabalanga and Bahuda will face severe water shortage by 2051. Apart from water resources, improving production of rainfed agriculture is also essential because it produces significant crops like oilseeds, coarse cereals, pulses. In Odisha 67.8 percent net sown area is rainfed agriculture, therefore, along with other area development programmes, Odisha has implemented watershed development programme (WSDP).

Watershed project is one of the most significant area development programmes. Watershed focuses on conservation of soil moisture and put lands to their best use, it adopts recommended practices to enhance crop yields in rainfed or dry land areas. Government of Odisha has set up a separate mission named Orissa Watershed Development Mission (OWDM) for better coordination in the development, execution and management of watershed programmes. In Odisha Watershed programme was first introduced during the second five-year plan (1955- 61) and developed during the fifth five-year plan. In the eight five-year plan (1992-1997), some of the major projects such as, Integrated Watershed Development (IWDP) Project, National Watershed Development Project for Rainfed Areas (NWDPR) and Indo-Danish Comprehensive Watershed Development Project (IDCWDP) were implemented. The objectives of these programmes were to

- ❖ Prevent land degradation,
- ❖ Promote and balance the ecosystem,
- ❖ Enhance the capacity to retain moisture
- ❖ Increase the fertility and productivity of the soil.

Watershed projects were also implemented under other schemes like Employment Assurance Scheme (EAS), Drought Prone Area Programmes (DPAP). The data collected from the Odisha Watershed Development Mission (OWDM) reveals that by the year 2012 around 4836 micro-watersheds covering 27, 99,367 hectare (ha) of the land were implemented in Odisha under different schemes like DPAP, IWDP, Additional Central Assistance (ACA), Special Plan for KBK, Western Orissa Rural Livelihoods Project (WORLP), National Watershed Development Programme for Rainfed Areas (NWDPR), River Valley Projects (RVP), The Orissa Tribal Empowerment and Livelihoods Programme (OTELP) and Employment Assurance Scheme (EAS). According to the data given by the OWDM (Table 2.1), DPAP is being implemented in Kalahandi, Nuapada, Balangir, Sonapur, Bargarh, Boudh, Kandhamal and Dhenkanal districts. There are 5200 MWSs allocated in these blocks, out of which, 1319 are presently under implementation. The total treatable area of 1319 Micro Watersheds is 6, 67,800 hectares, out of which 2, 14,034 hectares has been treated till now. Integrated Westland Development Programme (IWDP) is being implemented in 23 districts except in Puri, Jagatsingpur, Kendrapara, Bhadrak, Boudh, Kandhamal and Nuapada districts.

Total MWSs identified under IWDP is 1046 with a treatable area of 5, 44,000 hectares, out of which, 2, 01,471 hectares has been treated. GOI has provided additional central assistance (ACA) for eight districts of Kalahandi, Balangir, Koraput (KBK) for the implementation of 314 watersheds in order to combat the problem of drought and to conserve soil, consequently to improve agricultural productivity. Foreign organizations also sponsor some of the watershed projects in Odisha, for example, Western Odisha Rural Livelihoods Programme (WORLP) scheme is funded by Department for International Development (DFID). Under this 290 micro-watershed projects have been executed in Balangir, Nuapada, Kalahandi and Bargarh districts in two phases. Under NWDPR scheme, 885 micro-watersheds are being sanctioned. Out of which 664 have been completed, and 212 are on-going in 30 districts of Odisha.

Table 2.1: Number of micro-watersheds under implementation in districts of Odisha

Scheme	Districts	Number of MWS	Area in hectare
DPAP	8	1319	667800
IWDP	23	1046	544330
ACA	8	314	167616
Spl KBK Plan	8	150	75000
WORLP	4	290	147670
NWDpra	30	885	754713
RKVY	7	100	50000
OTELP	4	136	63678
EAS	13	596	328562
Total		4836	2799369

(Source: Odisha Watershed Development Mission (OWDM), 2010a)

These are under implementation since 1990-91. Another important watershed, River Valley Projects (RVP) is being implemented in the catchments of inter- state reservoirs like Hirakud, Machakund- Sileru, Rengali-Mandira and Upper Kolab. Currently, it was decided to continue the treatment to saturate 29 on-going watersheds and start treatment of seven new watersheds over an area of 9720 ha. Apart from this, other watershed programmes like EAS are also being implemented. The table mentioned below (No. 2.2) shows the current scenario of Micro Watersheds (MWS) in different districts of Odisha.

Table 2.2: Current scenario of MWS in different districts of Odisha

Districts	No. of blocks	No. of MWS identified	Total Area (in hectares)	MWS implemented so far	Area already treated (in hectares)
Angul	8	874	637500	61	40316
Balasore	12	547	380600	45	31031
Bargarh	12	637	583700	223	113692
Bhadrak	7	198	250500	6	4896
Balangir	14	824	657500	641	345303
Boudh	3	340	309800	65	34081
Cuttack	14	482	393200	51	32629
Deograh	3	385	294000	34	20113
Dhenkanal	8	732	445200	149	86952
Gajapati	7	596	432500	111	58182
Ganjam	22	1316	820600	93	43249
Jagatsinghpur	8	213	166800	5	4088
Jajpur	10	317	289900	45	38208
Jharsuguda	5	247	208100	72	21409
Kalahandi	13	1049	792000	610	321151
Kandhamal	12	935	802100	422	226039
Keonjhar	13	1220	264400	105	63415
Kendrapara	9	146	830300	19	10064
Khurda	10	383	281300	50	38105
Koraput	14	955	880700	340	226747

Malkanagiri	7	662	579100	216	146679
Mayurbhanj	26	1694	1041800	175	113121
Nabarangpur	10	594	529100	259	181251
Nayagarh	8	581	389000	102	54170
Nuapada	5	464	385200	316	161067
Puri	11	311	347900	17	13364
Rayagada	11	838	707300	272	163429
Sambalpur	9	838	665700	46	29826
Sonepur	6	245	233700	147	96609
Sundargarh	17	1402	971200	139	80181
Total		20079	15570700	4836	2799367

(Source: Odisha Watershed Development Mission, 2010b).

All these projects primarily focused on water harvesting structures (WHS), soil conservation and improvement of livelihood of communities, but did not bring any remarkable changes in the environment and living conditions of the poor people. Consequently, participatory approaches have been introduced in watershed projects. The first initiative in this regard can be found in the Orissa Tribal Development Project (OTDP) and Indo-German Watershed Development (IGWD) projects. In Odisha, participatory watershed development programmes have emerged since the introduction of revised watershed guidelines of 2001 and *Janasahabhagita* by the Government of India (GoI). Further, WORLP scheme broadened the element of the participatory approach. The present study of watershed is located in Balangir district of Western Odisha. Before describing the socio-economic profile of the watershed and User Group (UG) members in the study area, it is pertinent to discuss about the Balangir district.

2.5. Brief description of the Balangir district

The climate of Balangir district is very hot. Balangir falls between 82° 41' to 83° 43' east longitudes and between 20° 9' to 21° 5' north latitude. The climate is hot and humid. It has six tehsils, 14 blocks and three sub-divisions including 1792 villages. According to the 2011 census, the total population of Balangir is 1,648,997. Out of which male population is 8, 30,097 and female population is 8,18, 900. It constitutes of 3.93 percent to the total population of Odisha. The sex ratio of this district is 987 female per 1000 males. The average literacy rate is also bright i.e. 64.72 percent. While male literacy rate is 75 percent, the female is 53.50 percent (District Statistical Hand Book, Balangir, 2009_a).

Long back Balangir was under Sonapur province. Historically, the Patna state and Sonapur were under the rule of Marathas of Nagpur since 1755, but it was captured by the East India Company during the second Maratha war early in 1804. These states were ruled by Raja of Nagpur in 1806. After the third Maratha war, these states were entirely occupied by the British (colonial). Again, Patna and Sonapur were administered by their chief from 1877 onwards. In 1905, these states were given to Bengal.

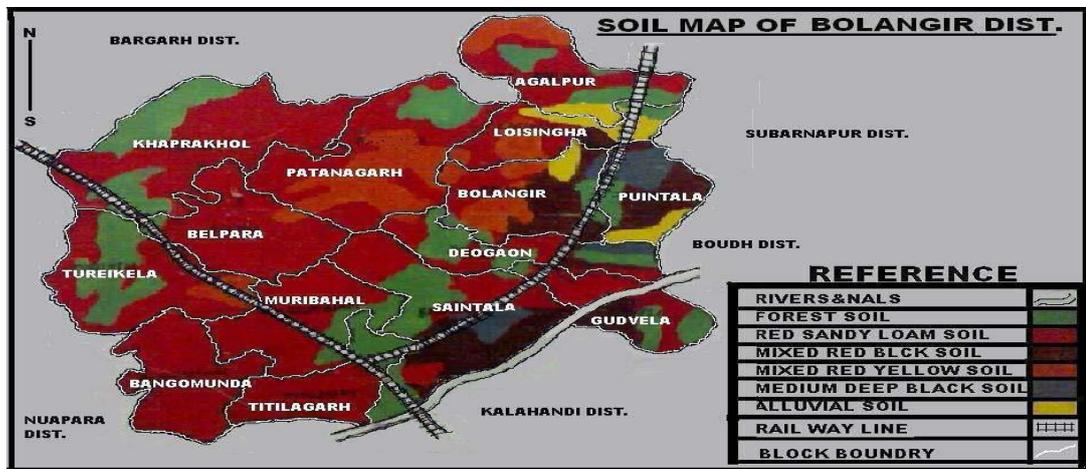
On first January 1948, after the merger of feudatory states of Odisha, the ex-state of Kalahandi, Patna and Sonapur were joined, and a new district was formed, named as Balangir-Patna. Afterwards, on 1st November 1949, the Patna was separated and formed Balangir district. Further, the Balangir district can be divided into two regions, rolling plains and hilly areas of western and southern part of the district. The plain areas again fall into two parts, irrigation plains and hilly areas. The plains get irrigation from Hirakud canal system and other medium irrigation projects. Hilly areas have rolling lands with isolated hill ranges with an approximate height of about 3,500 metres. The main river of the district is Mahanadi and its tributaries, Tel and Suktel. It is surrounded by Bargarh on the north side and on the south by Kalahandi district. Similarly Kandhamal, Boudh, Debagarh and Sonapur are situated in the east and Nuapada district on the west.

2.5.1. Natural resources

A large portion of Balangir district is covered with forests of diverse flora and fauna. There are varieties of soil and lot of mineral deposits. Many rivers flow through the district. In this region mono-cropping is a common practice, rice is the principal crop; other crops are millets, maize, pulses, oilseeds, ground nuts, ragi, and wheat. Other significant natural resources like forest, land and rivers have high social and economic value, for example; the tribes worship some of the sacred trees, and they are heavily dependent on it for their livelihood. The principal forest products are *kendu* leaves, timber, and firewood; along with other forest products such as bamboo, hill brooms, *mahua* flowers, *sal* seeds. The principal soil types found in the district are red, mixed red, black and alluvial soils (Figure 2.1). The soil found in the basins of Tel and Ong are alluvial and very fertile. On the eastern side, the soil is ranging from light sandy

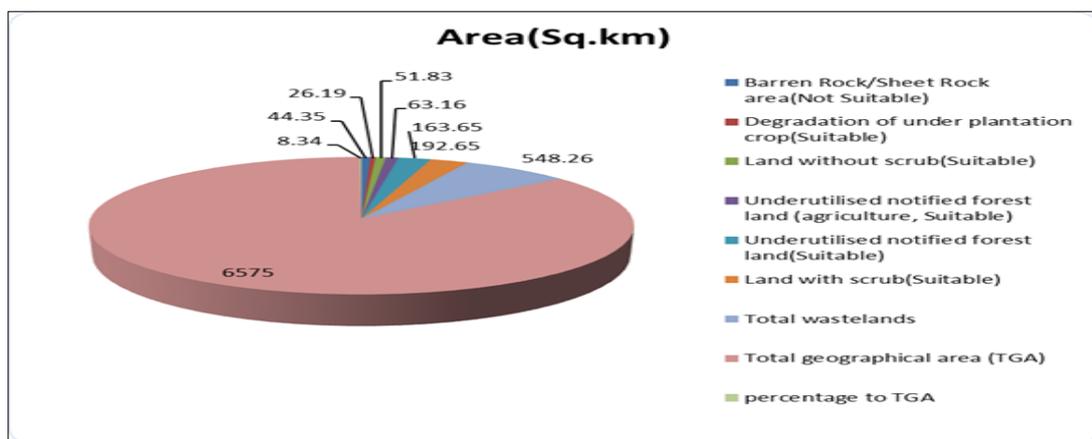
type to sandy loam. But the soil of the southern and western part of the district is lateritic in character and productivity is low.

Figure: 2.1.Types of soil



Source: Department of Agriculture, Balangir, 2014

Figure: 2.2: Types of Land



Source: Odisha Space Applications Centre (ORSAC), 2012).

Data comprising of land resources of the district in Figure 2.2 shows that the total geographical area (TGA) is 6575 square kilometre. Around 8.34 percent of the total land of the district is treated as wasteland. These lands have different wasteland class utility value and area of expansion. While around 44.35 percent of wasteland is regarded as unsuitable for cultivation, the remaining wasteland can be utilized if proper rehabilitation measures are being taken. If it can be cleaned properly and soil conservation development work can be carried out, around 192.65 kilometres square (Km²) of land can be used for the agricultural or horticultural activities. Similarly, forest lands under the categories of notified forest can be treated under government initiatives (Potential linked credit plan, Balangir, 2013). The main rivers flowing in

the district are Tel, Suktel, Rahul, Udei and Ong. The river Suktel originates from the hill ranges of the Western part, flows across Patnagarh, Balangir and Loisingha blocks and linked with the Tel in Subaranpur district. Similarly, the Ong river passes through the Agalpur block in the district. Except for the Tel, that flows along the eastern boundary of the district, all other rivers flows either in the direction of the northern or north-eastern part of the district.

The district is also rich in manganese, graphite and bauxite. It was estimated along with five million tons of bauxite, approximately six lakh tonnes of manganese are deposited in the Gandhmardan hill ranges of this district. Graphite and manganese have been commercially exploited for the export. The eastern ghat comprises of rocks such as khondalite granite, calc granulite. Table 2.3 gives the details of land resources and land holding patterns of the district. The data collected show that majority of the households (49 percent) in the district are having land less than one hectares. While 31.02 percent households have land between one hectare to two hectares, 14.63 percent are holding two hectare to four hectare and 4. 67 percent have four hectare to ten hectare. The households having land above ten hectare are very less that is 0.68 percent.

Table 2.3: Land holding pattern in the Balangir

Size of the holding	No. of holdings	Area in hectare	percent to the total
Less than 1 ha.	100140	52194	49 percent
Between 1 ha.-2 ha.	63389	86751	31.02 percent
Between 2 ha. - 4 ha.	29909	81216	14.63 percent
Between 4 ha. – 10 ha.	9555	56794	4.67 percent
Above 10 ha	1376	19940	0.68 percent
Total	204369	296895	100 percent

(Source: Potential linked credit plan (PLCP); Balangir,2013)

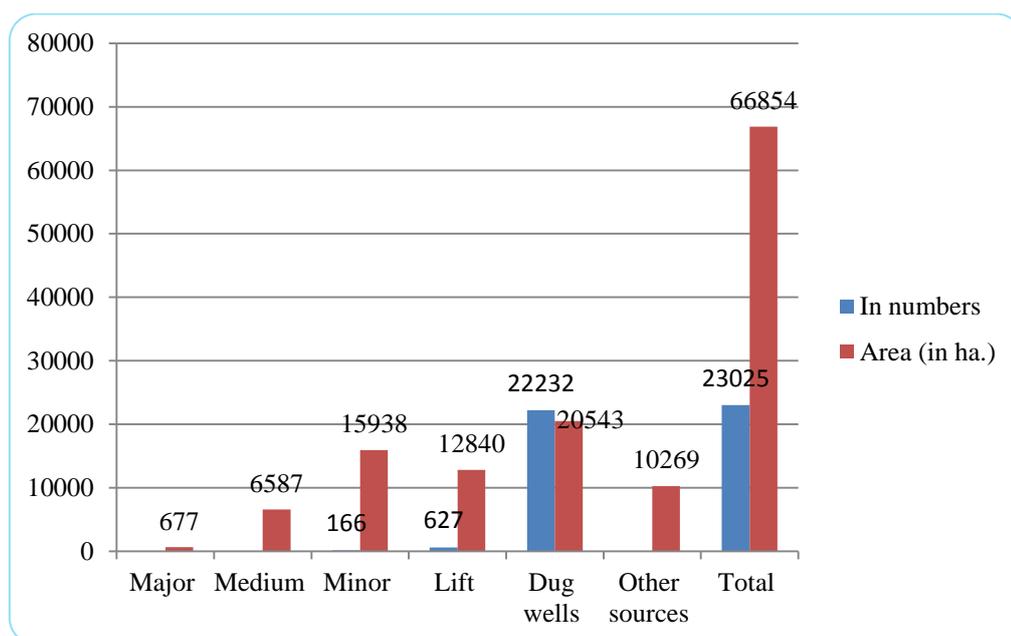
2.5.2. Rainfall and irrigation facilities

The average rainfall in this district is 1442.6 mm per year. Environmentally this region is fragile, and rainfall is quite erratic. By the end of 2009 total irrigation potential created in the district during Kharif and *Rabi* season are 64104 and 15965 hectares respectively (District Statistical Handbook, 2009b). Though, many irrigation projects are undertaken in this district, it has covered only 23.17 percent of the net sown area (District Statistical Handbook, 2009c). There are major and medium, lift, dug wells and other irrigation sources are present in the district and

area irrigated by them are, 677 hectare (ha); 6587 ha; 15938 ha; 12840 ha; 20543 ha; and 10269 ha, respectively (Figure: 2.3). To create more irrigation potential, increased agricultural productivity, enhance livelihood opportunities and utilisation of the wasteland and judicious use of other natural resources, watershed project has been implemented in the district. District Watershed Mission, Balangir, supports the watershed projects operating in different blocks. Table 4.2 shows that, total number of 433 micro-watershed projects are under various stages of implementation, such as WORLP (140), DPAP (244), IWDP (45), ACA (28), EAS (91). For the implementation of watershed project 17 Government & 6, Non-Government Project Implementing Agencies (PIAs) are engaged.

The core objectives of entire watershed projects are institutionalising community participation and sustaining livelihood opportunities for the theme. Some of the projects have an additional fund provision (for example; WORLP), called ‘Watershed Plus Component’ to the tune of Rs 3500/ per hectare. It was made for the improvement of the quality of life of vulnerable sections. Further, it was extended to 124 ongoing DPAP and IWDP watershed projects in the district during 2007-08. The watershed program is in operation in Odisha from the second five-year plan, but broader objectives of watershed started with the implementation of Western Orissa Rural Livelihoods Project (WORLP).

Figure: 2.3: Irrigated area (in hectares) by different sources



Source: District Portal, Balangir, 2012.

Table 2.4: Status of micro watershed projects in Balangir district

Sl. No.	Name of Scheme	MWS Projects Covered	MWS Projects Operational	Treatment Area (Ha)	Funds Utilized During 2007-08 (in crores)
1.	WORLP	140 nos.	140 nos.	70000	11.32
2.	DPAP	244 nos.	220 nos.	110000	2.08
3.	IWDP	45 nos.	45 nos.	25758	0.26
4.	ACA	28 nos.	28 nos.	14000	1.31
5.	EAS	91 nos.	Nil	Nil	Nil
	Total	548 nos.	433 nos.	219758	14.97

(Source: Odisha Watershed Development Mission, 2012)

The present study was carried out covering two micro-watersheds namely Jharbandhali and Alekha Mahima in Balangir district. The Jharbandhali micro-watershed is implemented by an NGO as Planning Implementing Agency (PIA) while the GO PIA implements Alekha Mahima micro-watershed.

2.6. Study areas

The present study dealt with two micro watersheds in Balangir district of Odisha, while one is being implemented by the NGO named Sabuja Biplav, the other is implemented by the Assistant Soil Conservation Officer of Balangir, government of Odisha. The studied, NGO implemented watershed named Jharbandhali micro-watershed has taken the criteria such as poverty, proportion of upland, degradation of forest and other CPR like gochar (grazing land), land alienation by SC & ST, as the basis for its intervention. It is situated in Agalpur block. Their primary source of income is cultivation, daily wage labour, *khali dona* making (disposable plates), and *kendu* leaf collection. They earn about Rs. 30 to 40 per day. They suffer most from the drought or heavy rainy seasons, as they do not go for cultivation, and they do not get regular wage labour work. So it is too difficult to sustain their livelihood throughout the year. This watershed consists of two revenue villages namely Jharbandhli & Danipali (Plate 2.1).

Table 2.5: Salient features of the NGO implemented watershed area

Name of the watershed	Jharbandhli micro watershed
Project period	2004-2010
Watershed Code	3-05-02-02-01
Name of the District	Balangir
Name of the Block	Agalpur
Name of the Panchayat	Bendra
Name of the Villages	Jharbandhli & Danipali
Name of the Constituency	Balangir
Project implementation Agency	Sabuja Biplav
Total Geographical area of the Project	606.62 Hectare (Ha)
Total treatable area of the project	528 Ha
District Nodal Agency	Project Director, Watershed Mission, Balangir
WDT leader	S.K. Das
Up Land	67.56 Ha
Medium Land	55.98 Ha
Low Land	69.49 Ha
Cultivable Waste Land	55.76 Ha
Grazing Land/ <i>Gochar</i>	56.46 Ha
<i>Patra</i>	57.29 Ha
<i>Patit/ Bastijogya</i>	22.44 Ha
Total Budget of the Project	Rs.29,55,012

Source: Field Study

Another studied watershed named Alekha Mahima micro-watershed is Government implemented watershed. This watershed consists of three revenue villages namely Budhipadar, Ghusrumunda and Salterpali (Plate 2.2). It is located in Budhipadar Grampanchayat of Loisingha block. Erratic rainfall, scarcity of irrigation, severity of soil degradation, proportion of upland, degraded village forests, low incidence of double cropping pattern, migration and drought has kept on priority by PIA during selection of this area for watershed programme. There were no adequate water bodies in the village. Its economy mainly depends on agriculture. The villagers are living in this watershed areas used to cultivate paddy as a major crop in *Kharif* season followed by Pulses. Along with cultivation, livestock was an additional source of income for few of the households.

Table 2.6: Salient features of the GO implemented watershed project

Name of the watershed	Alekha mahima micro watershed
Project period	2004-2010
Watershed Code	1-01180201 (A)
Name of the District	Balangir
Name of the Block	Loisingha
Name of the Panchayat	<i>Budhipadar</i>
Name of the Villages	Budhipadar, Ghusrumunda and Salterpali
Name of the Constituency	Balangir
Project implementation Agency	Assistant Soil Conservation Officer, Balangir
Total Geographical area of the Project	643.46 Ha
Total treatable area of the project	632.00 Ha
District Nodal Agency	Project Director, Watershed Mission, Balangir
WDT leader	S. Mohanty
Up Land	232.42 Ha
Medium Land	88.70 Ha
Low Land	188.98 Ha
Cultivable Waste Land	89.32 Ha
Pasture Land	34.56 Ha
Village Forest	12.81 Ha
Total Budget of the Project	Not available

Source: Field Study

2.7. Traditional system of water management in the study areas

Water is most important for the subsistence of life on earth. It has a greater impact on economic, agricultural, and industrial growth of the country. It is evident from the fact that the human civilizations came into existence due to the river water. Water is used, shared, preserved as per cultural norms of the people everywhere. Traditionally, people used to conserve water for their diverse use, both individually and communally, by following age-old system of management. In present study it was found that the villagers were heavily dependent on nature for agricultural production, which was the main source of their income. To improve the agricultural productivity, they used their ecological knowledge, which helped them in predicting the future state of rain.

The pattern of seasonal changes was captured by the local people by watching the movement of the sun, waxing and waning of the moon, the positioning of the stars. The Monsoons i.e. the northeast and the southwest and the periodic rains constituted the determining factors for deciding the course of agricultural activity and eventually the livelihood of the villagers. This also explains the spiritual beliefs of the farmers

who went to visit the priest to inquire about the position of *megha* (King of Cloud) in the coming agricultural season. The priest, using his astrological knowledge would appropriately forecast the position of *megha* and advise the farmers accordingly. This stands testimonial to the fact that the farmers who lived and enjoyed the agrarian life were fascinated by the myths, legends, rituals, customs and beliefs. It helped them in planning and executing the agricultural practice of farming based on the time of rain. In both the watersheds, some of the traditional practices and rituals are performed by the villagers; these practices include *Katas/Mundas/Bandhas* and *Indra Puja*.

2.7.1. *Katas/Mundas/Bandhas*

In earlier days the practices of using the water of *katas*, *mundas* and *bandhas* for the irrigation was very much prevalent in both the watershed areas. It was informed by the *Gond* community that, they were mainly dependent on these sources of irrigation for their agricultural activities. The village headman (*Gauntiya*) guides all the villagers for the judicious use of the water stored in the *katas*, *mundas* and *bandhas*. And all the villagers obediently followed the orders and suggestions of the village chief. Throughout the years the rain water is stored in the *katas*, *mundas* and *bandhas*, and all the villagers used to take the water at the time of drought or if there is less rain. The management of these water bodies was done by the villagers collectively. The construction of *katas*, *mundas* and *bandhas* are carried out on both the community and individual land. However, the number of these water bodies was build more on village or community land than on individual land. A *kata* is basically a strong earthen embankment, curved at either end, built across a drainage line to hold up an irregularly shaped sheet of water. The undulations of the country usually determine its shape as that of a long isosceles triangle, of which the dam forms the base. It commands a valley, the bottom of which is the *bahal* land and the sides are the mal terrace. As a rule, there is a cut high up on the slope near one end of the embankment from where water is led either by a small channel or from field to field along terraces, going lower down to the fields. In many years of normal rainfall, the water from the rains was not irrigated because of the already available moisture from percolation and, in that case, the surplus flow was passed into a *nallah* (small canal)

2.7.2. Indra puja

It was informed by the watershed beneficiaries that they perform *Indra Puja* (*worship of Lord Indra – the god of rains as per Hindu mythology*) in case there is no or less rain; they perform this ritual yearly once, most probably, at the time of monsoon. Traditionally, they have been practicing this ritual for receiving rain at the time of drought. It is observed that at the time of difficulties, when there was drought, the villagers used to collectively organize a worship to appease lord *Indra* for rainfall. The *puja* used to be held near the village deity by the *Pujari* (Brahmin priest). It was belief that if the *Pujari* completes the ritual in a good way, then rainfall will certainly occur during the worship. If it does not rain at that time; it may come after one or two days. If within a week rain does not occur, than the villagers and request *Pujari* to perform the worship again. Apart from the *Indra Puja*, in both the NGO and GO implemented watershed, the villagers worship their *Kul Devi* (ancestral goddess) to avoid the difficulties and drought.

2.7.3. Traditional way of soil conservation and run off reduction

In both the watersheds, the villagers used to preserve the water flowing in small streams and stored for irrigation through creation of small *nallah* (drain). These *nallah* are simple diversion channels that converge stream flow, partly or wholly, to fields whose elevation is lower than that of the point at which the stream is diverted. The bamboo and banana plants were used to make these *nallahs*. Generally, in hilly terrain the villagers used to plant small trees in the end of the land, which helped in checking of the speed flow of water. The small trees worked as a barrier to stop the flowing of water and allow it slowly to enter into the ground. It also helps in increasing the ground water level, which indirectly prevents the crops from facing water scarcity.

2.8. Location and demographic details of the watershed beneficiaries

As per the watershed guideline, the households residing in a watershed area and directly or indirectly depending on that watershed are treated as a member of the watershed association. It includes both the land holding and landless households. However, only land holding families are considered as a member of User Groups formed in that particular watershed. A watershed association includes all the beneficiaries of that particular watershed like a member of User Groups, a member of SHGs, members of the

watershed committee and landless households. A particular person who is a member of a watershed association may have membership in different groups such as UGs, SHGs. There are total 15 User Groups (UGs) consists of 121 members are formed underwater harvesting structures (WHS) during the implementation of the watershed project in the NGO implemented watershed (Table 2.7). It is located around two kilometres (Kms) away from Bendra *Gram Panchayat* (GP), 10 kilometres from block headquarter (Agalpur) and 27 kilometres from district headquarter. As almost all the land is registered in the name of a male member of a family, the women are being deprived of being the part of user groups.

The majority of the households in this watershed are SC and OBC (72 percent). Around 23.14 percent population belonged to the ST category. The general community that constitute 4.95 percent in the user group is living in Jharbandhali village. No general category households live in the Danipali village. This watershed received, Rupees (Rs.) 41, 000/- as Watershed Development Fund (WDF) which was used for the maintenance of watershed created assets in the post-implementation period. The SC and ST communities living in these watershed areas are not in a position to contribute much to the Watershed Development Fund because of their weak economic condition. OBCs are little well off, so their contribution is higher than SC, ST households. Most of the general category families are rich and hence their contribution is high.

All UGs are situated close to the treated watershed area. Though all the villagers residing in the watershed area are treated as User Groups of watershed resources, in sharing of benefits of WHS only landholders get the membership. Landless people use the forest resources, tube well for drinking water and grazing land for their livestock. They are given microfinance of five thousand to do some pity business. It was found that six General Category (GC) farmers have membership in a water harvesting structures. When the physical area of water harvesting structures (WHS) is large, the numbers of farmers in UGs are more; it can be 10-20. If it is small, the strength usually varies between five and ten members. Mostly farmers belonging to the same caste category get the membership in the same user group (Table. 2.7). It is because they have land in the same locality and being from the same caste there are lesser chances of caste conflicts.

Another studied watershed named, Alekha Mahima micro-watershed that was implemented by the Government agency has 28 UGs. This watershed is situated at a distance of five kilometres from Loisingha block headquarters and 25 kilometres from district headquarter Balangir. Table 2.8 gives the description of GO implemented watershed. Apart from the farm pond (*Chahala*) and percolation pond (*Munda*) some well repairing has been done on private lands. In the work of compost pit and open wells on community lands, all the villagers have memberships. The majority of UGs members belong to the OBC groups (76.85 percent). Six general category farmers have memberships in some UGs and most of the general caste households either have their open well or tube well for the irrigation. There were no SC landholding households having UGs memberships in the watershed. Around 17.59 percent households belong to the ST community in this watershed (Table 2.8).

**Table 2.7: Memberships of landholders in water harvesting structures user groups
(NGO implemented watershed)**

Sl. No.	Name of UG	Village	Member		Caste				Total	WDF Contributed (Rs.)
			M	F	SC	ST	OBC	GC		
1	Dwari Munda	Jharbandhali	6		6				6	3500
2	Rangiapadar Munda	Jharbandhali	5				5		5	4000
3	BinuaDunguri Munda	Jharbandhali	8		5	3		0	8	3000
4	Bija Munda	Jharbandhali	10		7	3			10	4000
5	Rangia Munda	Danipali	6			2	4		6	4500
6	Balipata Munda	Danipali	8			5	3		8	3500
7	Semelbahali Munda	Danipali	10		2	3	5		10	Defunct
8	GudgudiMunda	Danipali	5		5				5	2000
9	Bhanga Munda	Danipali	10		3	2	5		10	Defunct
10	Pathuria Check Dam	Jharbandhali	9		7		2		9	3500
11	Well &Chahala	Jharbandhali	20		2	5	7	6	20	12000
12	Ainla Munda	Jharbandhali	11		5		6		11	1000
13	Tal Munda	Danipali	5				5		5	Defunct
14	Dwari Munda	Danipali	6			3	3		6	Defunct
15	Bija Munda	Danipali	2			2			2	Defunct
Total			121	00	42	28	45	6	121	41000

Source: Completion report submitted by the Sabuja Viplab (PIA) to the project director, watershed, DRDA, Balangir, 2010.

Table 2.8: Membership of landholders in water harvesting structures user groups (GO implemented watershed)

Sl. No.	Name of UG	Village	Member		Caste				Total	WDF Contributed (Rs.)
			M	F	SC	ST	OBC	GC		
1	Budhipadar-1	Budhipadar	4				4		4	3970
2	Budhipadar-2	Budhipadar	5			2	3		5	5700
3	Budhipadar-3	Budhipadar	5				5		5	6087
4	Budhipadar-4	Budhipadar	4				4		4	3178
5	Budhipadar-5	Budhipadar	5			4	1		5	3900
6	Budhipadar-6	Budhipadar	3				3		3	2500
7	Bachhor Munda	Budhipadar	6				6		6	5800
8	Budhipadar-8	Budhipadar	3				3		3	6870
9	Budhipadar-9	Budhipadar	3				3		3	1600
10	Budhipadar-10	Budhipadar	4				4		4	7500
11	Budhipadar-11	Budhipadar	4					4	4	12000
12	Budhipadar-12	Budhipadar	5				5		5	5000
13	Budhipadar-13	Budhipadar	7				7		7	11000
14	Budhipadar-14	Budhipadar	3			1		2	3	7000
15	Ghusrumunda-1	Ghusrumunda	3				3		3	6222
16	Ghusrumunda-2	Ghusrumunda	5				5		5	12895
17	Ghusrumunda-3	Ghusrumunda	3				3		3	-
18	Ghusrumunda-4	Ghusrumunda	4				4		4	6885
19	Ghusrumunda-5	Ghusrumunda	5				5		5	1950
20	Ghusrumunda-6	Ghusrumunda	6			3	3		6	4000
21	Ghusrumunda-7	Ghusrumunda	3				3		3	546
22	Ghusrumunda-8	Ghusrumunda	4				4		4	10580
23	Ghusrumunda-9	Ghusrumunda	1				1		1	11335
24	Ghusrumunda-10	Ghusrumunda	1				1		1	5793
25	Ghusrumunda-11	Ghusrumunda	1				1		1	7100
26	Ghusrumunda-12	Ghusrumunda	2				2		2	9593
27	Salterpali-1	Salterpali	5			5			5	1500
28	Salterpali-2	Salterpali	4			4			4	900
Total		28	108			19	83	6	108	161404

Source: Source: Completion report submitted by the assistant soil conservation officer (PIA) to the project director, watershed, DRDA, Balangir, 2010.

2.8.1. Demographic profile of the watershed beneficiaries

The table drawn below (Table 2.9) shows the demographic profile of the beneficiaries of studied NGO and GO implemented watersheds. It represents the numerical strength of various social groups belonging to different castes and communities. It was found that both the NGO and GO implemented the OBC communities numerically dominate watersheds. It is found that around 41 percent beneficiaries belong to the OBC communities. After OBC, the SC communities represent a numerically higher position in both the GO and NGO implemented watersheds. While in the case of GO implemented watershed they reported 24.57 percent, in case of NGO, implemented watershed it is 34.13 percent. After SC communities, the ST communities represent numerically higher position. While in NGO made watershed they represent 23.95 percent in GO 19.91 percent. Very few households belong to the general category and it is only nine percent. The representation of different caste groups is not equal.

Women are not very much aware of their memberships in all watershed assets created on community lands. They know only about their membership in the Self Help Groups (SHGs) and among all watershed resources, they use only tube well for drinking water. In case of landowner households, women did not come forward to give information as they were not aware of irrigation. They only help their male counterparts during plantation, harvesting and cleaning the fields. Out of the total beneficiaries, 11 percent respondents are women (Table: 2.12). It shows the gender gap in the involvement of men and women in watershed activities. The general category and OBC category women have a little better awareness of their membership. While 13.17 percent women have membership in NGO implemented watershed, it is 18.22 percent in the case of GO implemented watersheds.

Table 2.9: Community of the watershed beneficiaries

Caste	PIA (Planning Implementing Agency)		Total beneficiaries	Percent in totality
	NGO	GO		
SC	57 (34.13)	58 (24.57)	115	28
ST	40 (23.95)	47 (19.91)	87	22
OBC	64 (38.32)	102 (43.22)	166	41
GC	6 (3.5)	29 (12.28)	35	9
Total	167 (100)	236 (100)	403	100

Source: Field Study, Note: Figures in the parenthesis are percentage

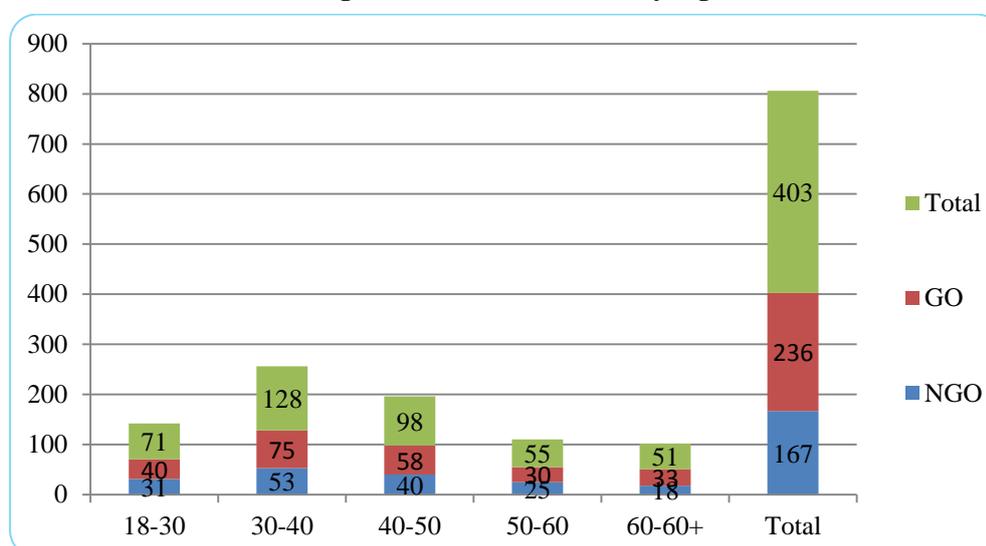
Table: 2.10: Watershed beneficiaries by their communities and gender

PIA	Community of the Respondent								
	SC		ST		OBC		GC		Total
	M	F	M	F	M	F	M	F	
NGO	51	6	36	4	54	10	4	2	167
GO	55	3	42	5	96	6	21	8	236
Total	107	8	78	9	150	16	25	10	403

Source: Field Study

The data collected from the field reveals that around 74 percent of the beneficiaries are below 50 years. However, the involvement of young persons (below 30) in watershed activities is quite less, 17.61 percent (Figure: 2.4).

Figure: 2.4: Beneficiaries by Age



Source: Field Study

2.8.2 Housing pattern

The majority of households either belong to the SCs, STs or OBCs. Very few beneficiaries belong to the general caste. The villages of the two watersheds are located near the forest and hilly areas. *Gaikhayi* canal is located near the NGO implemented watershed. The housing pattern of SCs communities of both NGO and GO implemented watersheds are more or less same. They paint it with black coal and red soils and decorate their veranda with cow dung. Their houses have tiny windows. The majority of SC and ST households have only two rooms. In one room, they keep agricultural equipment and seeds. And the other room is used for cooking and in Varanda they sleep.

The data depicts in Table 2.14 shows that the housing pattern of watershed beneficiaries. While more than 50 percent beneficiaries are living in *kutch*a & hut houses (64.64 percent in NGO and 50.42 percent in GO areas), 20 percent are residing in *pucca* houses (20.95 percent in NGO and 19.91 percent in GO areas). The rest are in semi-*pucca* houses. If we see the community wise housing pattern, it reflects that the SC communities are more vulnerable. More than 65 percent of them are living in *kutch*a and hut houses (73.68 percent in NGO and 65.52 percent in GO areas). Even majority of the ST and OBC respondents areas are living in *kutch*a & hut houses.

While around 65 percent STs and 65.62 percent OBC communities in NGO implemented watershed areas are living in *kutch*a and hut houses, around 53.19 percent STs and 44.11 percent OBC respondents are living in same in GO implemented watershed. The scenario is little different in the case of general caste households. The general caste households who are in better economic position are living in *pucca* and semi-*pucca* houses. While about 83.34 percent general caste beneficiaries in NGO implemented watershed areas living in *pucca* houses around 62.07 percent of them in GO implemented, watershed areas are living in *pucca* and semi- *pucca* houses. It is observed that the same caste groups are residing in the same locality called *padas* (street), which are based on the notion of purity and pollution. These are called by the name of the caste or community predominant over there, for example, *Gonda Pada*, *Gouda Pada*, and *Saura Pada*.

2.8.3. Ethnic composition of the study areas

The data collected from the field reveals that broadly the ethnic composition of the study area is divided into four categories like Scheduled Caste (SC), Scheduled Tribe (ST), Other Backward Community (OBC) and General Caste (GC). And further they are divided into many sub-caste and sub-tribal groups (Table 2.12). The sub-communities of SC's belong to the *Gonda* and *Keuta* communities. Similarly, there are three tribal communities such as *Saura*, *Kandha* and *Sahara* found in the study areas. The sub-caste of OBC communities is *Gouda*, *Doma*, *Teli*, *Kandra*, *Pandra*, *Bhuliya* and *Kulta*. The communities like *Brahmin*, *Karda* and *Rajput*, are found as sub-castes of general castes.

Table 2.11: Beneficiaries according to their communities and house type

PIA	Community of the Respondent	House owned				Total
		<i>Pucca</i>	<i>Semi-pucca</i>	<i>Kutchha</i>	Hut	
NGO	SC	7 (12.28)	8 (14.4)	38 (66.66)	4 (7.2)	57
	ST	8 (20)	6 (15)	20 (50)	6 (15)	40
	OBC	15 (23.44)	7 (10.94)	35 (54.68)	7 (10.94)	64
	OC	5 (83.34)	0	1 (16.66)	0	6
Total		35	21	94	17	167
GO	SC	8 (13.80)	12 (20.68)	30 (51.72)	8 (13.80)	58
	ST	9 (19.14)	13 (27.65)	20 (42.55)	5 (10.64)	47
	OBC	22 (21.57)	35 (34.32)	42 (41.17)	3 (2.94)	102
	OC	8 (27.58)	10 (34.40)	9 (31.03)	2 (6.90)	29
Total		47	70	101	18	236

Source: Field Study

Note: Figures in the parenthesis are percentage

Table 2.12: Beneficiaries according to their sub-communities

Caste	Sub-Communities	PIA			
		NGO	GO	Total	In percent
SC	Gonda	52	50	102	25
	Keuta	5	8	13	3
ST	Saura	20	47	67	17
	Kondha	5	0	5	1
	Sahara	15	0	15	4
OBC	Gouda	25	12	37	9
	Dumal	20	50	70	18
	Teli	5	30	35	9
	Kandra	4	0	4	1
	Pandra	10	0	10	2
	Kulta	0	10	10	2
GC	Brahmin	1	10	11	3
	Karda		15	15	4
	Rajput	5	4	9	2
Total		167	236	403	100

Source: Field Study

Note: Figures in the parenthesis are percentage

The table (2.12) drawn above shows that *Gonda* as a scheduled caste community numerically dominated in both the NGO and GO implemented watershed areas. Approximately they constitute 25 percent to the total population. *Gonda* people are very simple and humble in nature. The majority of them own plain lands that are not suitable for the cultivation, it comes under wasteland. Some of the households are indebted and had given their land to the landlords. However, in the villages of NGO implemented watershed some of the households got back their mortgage land. In the

NGO implemented watershed areas the *Gonda* communities are addressed with the title *Nag, Mahanand, Sagar, Nand, Kumbhar, Barik* and *Tandi* while in GO implemented watershed their title is *Mahanand, Suna, and Chhatriya*. The *Keuta* communities fall under SC communities and are numerically very less (three percent). Their surname is *Katula* and *Muduli*. They are economically and politically deprived communities. They depend on daily wages for their survival.

The *Saura, Kondha,* and *Sahara* are some of tribal (ST groups) communities found in NGO implemented watershed areas. *Sauras* is one of the ancient tribes of India. It has its presence in the *Ramayan* and the *Mahabharat*, the great epics of India. The hunter *Jara*, who wounded Lord *Krishna* with an arrow, belongs to this tribal community. In NGO implemented watershed some of the tribes have claimed that they belong to the *Jara* lineage. *Jara* communities are 20 in numbers in NGO implemented watershed and in GO implemented watershed they are 47. All together, they constitute 17 percent to the total sample size. Their surname is *Bhoi*, They also depend on agriculture for their livelihood, some of the households practice horticulture and some practice livestock rearing (Table 2.15). The *Kondha* tribes are numerically the largest group among the 62 tribal groups of Odisha. In NGO implemented watershed only (3 percent) beneficiaries come under this tribal group.

Their titles are, *Majhi* and *Malik*. They mainly depend on cultivation and livestock practices for their livelihoods. Another tribal group that is found in the studied area is *Sahara*, and they are confined to NGO implemented watershed only, they constitute around 8.98 percent. Their surname is also *Bhoi*. They are poor, and most of them are marginal farmers. Agriculture and daily wage labour are their primary occupation. OBC communities constitute a significant portion in both the GO and NGO implemented watershed areas. While in NGO implemented area they constitute 38.32 percent in GO implemented watershed area 43.22 percent (Table 2.15). In NGO implemented watershed, the OBC communities are known with surnames *Bogarti, Ghebhela, Nayak, Rout, Podha* and in GO implemented watershed *Bisi* and *Teji*. The communities like *Gouda, Dumal, Teli, Kandra, Pandra* and *Kulta* comes under OBC category.

The representation of *Dumal* communities is higher (18 percent). Historically, *Dumal* communities are an agricultural, social group mostly found in the Odisha and some

other Eastern states of India. Other ethnic communities found, are *Brahmin*, *Karda*, and *Rajput*, they are three percent, four percent and two percent respectively. Although these communities represented small groups in the study area, they play a significant role in decision making process of watershed project. Some of these families are rich and well educated. Only one *Brahmin* family is involved in priesthood work, whereas others are involved in cultivation and service sector. *Rajputs* and *Karda* are also working in the agricultural field, and some of them do the small business in Balangir town. *Brahmins* have surnames like *Panda*, *Mishra*, *Ratha*, *Hota*, *Nanda* and *Rajputs* have the family name of *Majhi*, *Thakur*, and *Karda* surname is *Mohanty*. The general caste people maintain social distance with SCs and STs Communities. The caste discrimination is still prevailing, but gradually changes are taking place.

2.9. Social organization

Many sociologists use the term social system to refer to the society rather than social organization. According to Ogburn and Nimkoff 'organization is an articulation of different parts that perform various functions¹'. The social organisation in any rural set up rests on different organisational systems such as community, caste, family and kinship. Community and caste appear to be the most significant features of the village social structure. It is more prevalent in social institution called marriage. Even after development activities have taken place in the rural life, the changes in social structure are very minimal. Changes have occurred in traditional occupation of different caste groups but very few changes have occurred in religious and ritual practices. *Brahmin* does not perform *puja* (rituals) in a SC or ST households. All the caste groups have their own *Pandits* (priest) or *Jhankar* from their own caste for religious activities. During social occasions *Brahmins* do not eat food with lower caste people. After the upper castes finish eating, the other communities eat. And inter-caste marriages are strictly prohibited.

¹ For the further information, see the webpage at <http://www.sociologyguide.com/organization-and-individual/definition.php>.

2.9.1. Marriage

It is found that all castes or communities are endogamous, and they practise clan exogamy, and the descent is traced through males. The type of marriage in the study areas is monogamy. Villagers have a firm belief in arranged marriages. At the first stage of the wedding, they match the horoscope of groom and bride that is called as *jatak milana*. If it is alright then the process of marriage takes place with the visit of parents and the elderly person of the groom to the bride's house. After the first visit, if they like a girl then they send their son to see her. If both the parties agree, then they decide a date for engagement that is traditionally called the *Pindhani*. On this *Pindhani* day, father of the groom visits the bride's home along with his relatives, and he presents a ring to the bride along with the cloth. The bride's father provides them alcohol and non-vegetarian food. On the same day, they decide the date of marriage. During the wedding, the *Brahmin* priest used to perform ritual activities for GC and OBC households but now SC and ST communities have their priest called '*Karna Guru*'.

On the day of marriage the groom, along with his relatives and friends, go to the bride's home. The marriage ceremony takes place there. The bride's father again offers a feast there. Then the bride and groom come to groom's home. Dowry system is very much prevalent; it is called '*Goutuk*'. The system of paying a bride price was traditionally prevalent among the *Rajputs* communities in NGO implemented watershed while it is not seen as the other caste or communities. The ideal age for marriage for men belonging to all castes and communities is around 25 and for women it is around 20. Usually from the age of ten a girl learns the household work and gets married after she attains the puberty. A man gets married when he can work for the maintenance of his respective family. The patrilocal residence is very common, but in post marriage period couple prefers neolocal residence. Traditional forms of marriages are: (a) marriage by negotiation and (b) marriage by elopement.

2.9.1.1 Marriage by negotiation

In this type of marriage, the parents of the boy and girl negotiate with each other, and if they like each other's family background and the boy or girl, they fix the marriage. This is one of the most common forms of marriage found in both the NGO and GO

implemented watersheds. But in some cases it happens that though the parents negotiate the marriage, sometimes the mate is selected by the girls and boys themselves. For example in NGO implemented village, a tribal boy has chosen a girl from his neighbouring house and later on their parents negotiated and fixed the marriage.

2.9.1.2. Marriage by elopement

The term marriage by elopement refers to a type of marriage in which the couples elope because of objection from their parents or because of non-acceptance by society. In NGO implemented watershed it was found that some of the couples had gone for this type of marriage because of differences in their castes. In GO implemented watershed also some cases of marriage by elopement was observed.

2.9.1.3. Divorce

It is observed that marriages are not easily breakable; divorce is not very much prevalent. If there is no compatibility between the couples, they start staying separately without legally divorcing each other. In both the watersheds it was observed that divorce (*Chhadapatra*) takes place from man's side for many reasons such as a) if the man is a drunkard and beats his wife brutally, b) if the man is unable to serve his family. In case of the woman, the reasons for divorce are: a) if the woman is unable to give birth to children, c) if the woman has an illicit relation with another person. In GO implemented watershed the ST Communities believe that the chronic illness of the man can be cured if he divorces his wife. The Table 2.16 shows that in NGO implemented watershed around 72 percent of the beneficiaries are married. Among them, 41.32 percent belong to the OBC communities, 33 percent SC, 23.14 percent ST and 2.4 percent are GC. Similarly in GO implemented watershed majority (71 percent) of respondents are married. Among them, 48.19 percent are OBC followed by SC 24.9 percent, ST 18.07 percent and GC 9.63 percent. On the other hand, two percent beneficiaries are widower and all of them belong to SC and ST communities. In both the watershed areas none of the beneficiaries was found to be separated.

Table 2.13: Beneficiaries according to their communities and marital status

PIA	Community of the Respondent	Marital Status of the Respondent			
		Married	Unmarried	Widow/Widower	Separated
NGO	SC	40	12	5	
	ST	28	10	2	
	OBC	50	12	2	
	GC	3	3		
Total		121 (72)	36 (22)	10 (6)	
GO	SC	40	14	4	
	ST	30	15	2	
	OBC	80	22		
	GC	16	13		
Total		166 (71)	64 (27)	6 (2)	

Source: Field Study
Figures in the parenthesis are percentage

2.9.2. Family pattern

Family is the fundamental unit of the society. All the households in the study areas are patriarchal in nature. Most of the joint families become nuclear after the marriage of their sons. The main reason is the lack of compatibility between the daughters in law and the boy's parents. The other reason is unequal earning by different sons in the family. The ones, who earn more, do not want to share it with the other siblings and prefer nuclear families for better life. But they help each other during the economic crisis. While in NGO made watershed areas 21 percent beneficiaries staying in the joint family, in GO made areas it is 31 percent. However, the GC communities are staying mostly in joint families. While it is 100 percent in NGO created watershed areas, it is 38 percent in GO watershed areas. As economically they are affluent and having large land holdings they prefer to stay together. To retain their dominant power in the society, they want land should be undivided. The data collected from the field shows that the joint family is decreasing its base very fast. While in NGO implemented watershed areas 24.56 percent SC beneficiaries are staying in the joint family, it is 20 percent in the case of ST and 15.62 percent in the case of OBC.

In GO implemented watershed areas 31.03 percent SC beneficiaries are staying in joint families. It is 23.40 percent in the case of ST and 31.37 percent in the case of OBC. Very few beneficiaries are living in extended families. While it is three percent

in the case of NGO area, it is two percent in GO areas (Table: 2.14). During interaction with the beneficiaries it was observed that most of the SC and ST beneficiaries' members who are staying in joint families revealed that because of their poverty ridden condition they prefer to stay jointly. A typical rural social set up was observed in both the NGO and GO implemented watershed villages, where male member of the family, mainly performs all the social and economic duties. The responsibility of the female members is confined to all the household work and child rearing. On the other hand, the role of women differs from community to community. It was found that female groups of GC and OBC caste or communities rarely go to the forest to collect fuels. However, the female of OBC communities help the male counterpart during the cultivation. The women in SC or ST communities not only work in household and take care of children but they also work in the agricultural field and are engaged in collecting the minor forest produce.

Table 2.14: Beneficiaries according to their communities and family type

PIA	Community of the respondent	Type of Family of the beneficiaries		
		Nuclear	Joint	Extended
NGO	SC	43	14	
	ST	30	8	2
	OBC	50	10	4
	GC		6	
Total		124 (76)	37 (21)	6 (3)
GO	SC	40	18	
	ST	36	11	
	OBC	65	32	5
	GC	18	11	
Total		159 (67)	72 (31)	5 (2)

Source: Field Study

Figures in the parenthesis are percentage

2.9.3. Kinship

The term kinship in social anthropology refers to the web of social relationships. The patterns of social relationships are made either by blood or by marriage. The villagers use kin terms to address relatives and use fictive kin terms for the villagers. Earlier in the kinship was very strong among the villagers but it was observed that in both the watersheds, now gradual changes are occurring in the kinship system. Joking as well

as avoidance relationship was seen among the beneficiaries. The joking relationship is observed between a man's wife and his younger brother. Avoidance relationship is observed among certain relations. It is more rigorous between a woman and her husband's elder brother and with man's maternal uncle. Mainly OBC and GC communities follow this type of avoidance relationship very strictly. Among SCs and STs no strict avoidance relationship prevails. A wife does not utter the name of husband among all the communities.

2.9.4. Education system

In the NGO implemented watershed area, there is only one primary and one upper primary school is situated. For high school, villagers go to the *Rampura panchayat*, nearly two kilometres away from the Jharbandhali and Danipali village. The intermediate and degree colleges are located at Loisinga, which is ten kilometres far from their village. There are also four *Anganwadi* centres located in Danipali village. In the GO implemented watershed area, there is one primary school in each of the villages is situated. Though there are upper primary schools in two villages, they are not upgraded. Therefore, children used to go to the neighbouring village, *Bendra* (7-10 km) for high school. For intermediate and graduation they go to *Loisingha* chok, 10 kilometres far from their village. Due to lack of parental support and poor economic conditions of families, most of the students drop out after primary education.

Among those who go for high school education, very few pass in the matriculation exam and go for higher studies. There are very few graduate members are found among the respondents in both the NGO and GO implemented watershed areas. On enquiry, it is noticed that many of them failed in inter exam. The other factors affecting the educational system are a lack of infrastructure, distance, low quality of teaching. Gender discrimination is prominent in education. It is a general conception among the villagers in the studied areas that if boy is educated he will serve the family, but if the girl is educated she will leave the family once she gets married and hence cannot help her parents.

The NGO and GO implemented watershed areas are backward in terms of educational qualifications of the watershed beneficiaries. The table 2.18 shows that around 47 percent population in the NGO implemented watershed area are literate. Among

them, 22 percent received education till primary school, nine percent have gone to minor schooling and high school, and only seven percent were educated till the college level. A large number of respondents are illiterate (53 percent). The situation is quite similar in the case of GO implemented watershed. Here also, only 49 percent of the villagers are literate. From them, 21 percent attended primary school education, 11 percent minor schooling, followed by high school (eight percent) and college level (nine percent) education. Mainly the medium of instruction at school level, even at the college level is Oriya though at college level student can choose either Oriya or English medium. If analyse the overall educational situation, it reflects that SC and ST communities are a more deprived section here. Most of them are not having the primary education. Because of poverty they preferred to live as illiterate. While in NGO implemented areas around 63.15 percent SC households are illiterate, it is 53.44 percent in the case of GO implemented areas. Similarly in the case of ST communities while it is 52.5 percent in NGO implemented areas, it is 57.44 percent in the case of GO made watershed areas.

Table 2.15: Educational status of beneficiaries

PIA	Community of the respondent	Educational status				Total Literate	Illiterate
		Primary	Minor	High school	+2& above		
NGO	SC	9	5	5	2	21	36
	ST	10	3	3	3	19	21
	OBC	15	7	6	5	33	31
	GC	3		1	2	6	
Total		37 (22)	15 (9)	15 (9)	12 (7)	79 (47)	88 (53)
GO	SC	10	9	5	3	27	31
	ST	12	3		5	20	27
	OBC	20	10	9	7	46	56
	GC	8	5	4	6	23	6
Total		50 (21)	27 (11)	18 (8)	21 (9)	116 (49)	120 (51)

Source: Field Study

Figures in the parenthesis are percentage

2.9.5. Language and communication

In a society, communication takes place through language, verbal or non-verbal. Language is highly influenced by the socio-cultural set up of the society. A common language shared by the entire social group promotes social solidarity. It is one of the

reasons for higher social solidarity among rural people than their urban counterparts, as in rural areas majority of the people share a common language. It is found that most of the watershed beneficiaries share a common language, irrespective of their caste and community. The tribes staying in the study area do not speak their traditional language, but they either speak *Sambalpuri* or Oriya. *Sambalpuri* and Oriya are spoken by all the villagers living in NGO and GO implemented watershed areas. In GO implemented watershed it is referred to as '*Gauli Sambalpuri*' which means, *Sambalpuri* language spoken by villagers. However, the youth who go to the schools or colleges, have some knowledge of English and Hindi. In both the NGO and GO implemented watersheds no telephone facilities are available. Though both the watersheds have electricity but mainly wealthy families use it, remaining poor beneficiaries cannot access it. Around 16 percent households in the NGO implemented watershed areas are having televisions, seven percent radio, 10.5 percent beneficiaries own motorbikes and 21 percent mobile phones. Similarly, in the GO implemented watershed area, 13 percent households possess televisions, seven percent radio and 17 percent have motorbikes.

2.9.6. Political organization

A formal political *Panchayat* system and a village *Sarpanch* is found in both the watershed areas. *Sarpanch* acts as a head of the *panchayat* and the other members of the *Panchayat* are called ward members. After the election, the ward members of the *Panchayat* nominate a member among themselves called as *Nayab Sarpanch*. It was found that before the advent of any formal political party in the village, there was more oneness among the villagers. They used to help each other at the times of requirement. But the new political system to some extent made the villagers more ethnocentric. The *Sarpanch* of both the NGO and GO implemented watersheds are belonging to BJD (Biju Janata Dal). Although the SC and OBCs are the numerically dominant community in the NGO implemented watershed but the present *Sarpanch* belongs to open category caste due to his economic and social status. However in GO implemented watershed, the *Sarpanch* belongs to the OBC community. If some conflicts occur, the *Sarpanch* along with the some elder members of the village call for a meeting to settle it down. The function of traditional village committee is not observed. But during village festivals and other rituals the older and experienced people participate in the decision-making process.

2.9.7. Economic organization

The watershed beneficiaries are associated with many economic activities for their survival, such as non-timber forest products, cultivation, horticulture and animal husbandry. The economy is not based on the strict division of labour. At the time of cultivation, all the men and women work together. Women do not do a tough job, and they help in sowing and watering. Due to the intervention of forest department the villagers are deprived of collecting most of the forest products. The depletion of forests for the last twenty years forced the villagers to walk a long distance to collect the firewood for household use and *mahua* (*madhuca longifolia*) to make liquor. In NGO implemented watershed areas the villagers used to go to the forest to collect big *saal* leaves to make disposable plates. The primary source of livelihood for the villagers is agriculture. More than 91 percent of the people depend on agriculture. So any developmental activities related to land and water play a significant role in their lives. Table 2.16 shows the category of watershed beneficiaries by their community and ownership of land holdings. Land resources are prime component of socio-economic life of the villagers. It was found that there is a high link between ownership of land and poverty level of the beneficiaries.

The situation of farmers is not very much good at NGO implemented watershed because most (37 percent) of them are marginal farmers. Among all the farmers 29 percent are small farmers, seven percent are semi medium and one percent are medium farmers. And 26 percent are landless. Most of the marginal and medium farmers belong to SC and OBC communities. Ironically though agriculture is the principal occupation, none of the farmers is a large farmer.

In GO implemented watershed too, beneficiaries are mainly marginal farmers and they constitute 41 percent of the total study population. 23 percent of the farmers possess the land between 2.5-5 acres. Very few farmers (11 percent) own land between 5-10 acres come under semi-medium farmers. Around four percent farmers are medium farmers. Remaining 21 percent respondents are landless. The Government of Odisha has classified all the farmer groups into five categories based on their ownership of land holdings. Marginal farmer are those who possess land less

than one hectare, small farmers 1-2 hectare of land, semi-medium, 2-4 hectare, medium 4-10 hectare and large farmers who have land more than 10 hectare.

Table 2.16: Watershed beneficiaries by community and category of farmers

PIA	Community of the respondent	Size of the land holding in acre					
		Marginal	Small	Semi-medium	Medium	Large	Landless
NGO	SC	28	12	2	0		15
	ST	15	10	3	0		12
	OBC	19	22	4	2		17
	GC	0	4	2			
Total		62 (37)	48 (29)	11(7)	2 (1)		44 (26)
GO	SC	27	5	2			24
	ST	19	14	2			12
	OBC	40	30	15	6		11
	GC	12	5	6	4		2
Total		98 (41)	54 (23)	25 (11)	10 (4)		49 (21)

Source: Field Study

Note: Figures in the parenthesis are Percentage

2.9.8. Religion and folklore

Religion has a remarkable impact on the social, economic and political life of the villagers. They firmly believe that right from birth to death their lives are controlled by the existence of supernatural powers. They perform religious activities by going to temples and performing rituals and recite the names of Gods or spirits. At the time of any natural calamities, such as drought or epidemics they appease Gods or Goddess through proper rites and sacrifices of animals. The Hindu religion dominates both watershed areas. And despite having caste and community differences, all the households celebrate the village fairs and festivals together. The temple of Goddess *Metakani Devi* (Plate, 2.3) is found in the entrance of NGO implemented watershed villages. It is believed that if you wish something to her, it will be fulfilled.

Villagers sacrifice goat or buffalo in her *puja*. Mostly SC and ST communities go for animal sacrifices during the celebration of *Suliya* festival. This festival is celebrated for the welfare of their caste and communities. The *Gouda* (sub-caste of OBC) community of GO implemented watershed mainly worships the *Patkhanda Devi* Goddess for their well-being (Plate, 2.4). Apart from this all the villagers worship Lord *Siva*, Lord *Jagannath*, Lord *Ganesh*, Goddess *Laxmi* and *Durga*. The culture of

consumption of alcohol and sacrificing animals are quite prevalent among the SC, ST and OBC communities. But in case of general category it is not observed much. Here beneficiaries observe some of the essential festivals, these are; *Powojutiya* (mothers do for their son's long life), *Bhaijutiya* (sisters do for their brothers), *Nuakhai* (for Goddess Laxmi), *Ganesh Puja* (worship Lord Ganesha), *Durga Puja* (for Goddess Durga). Similar kind of rituals and festival are also observed in GO implemented watershed villages.

2.9.9. Life cycle rituals

Right from the birth to death rituals are an integral part of the social life of the villagers. The culture is still preserved because of some unique rituals of the castes or communities. Among all, the rituals performed during the birth, marriage and death are highly significant for them. Villages after seven days of the birth of a baby an old lady of the household cuts the umbilical cord with a new blade and keeps it under the earth. The christening of the child takes place after twenty-one days. On the day of ceremony father of the child collects a rooster to offer it to the ancestral spirits and household deities. To celebrate this occasion, no distinction is made between male and female child. A big feast is organised on this auspicious day. During this time, all the villagers and relatives are invited. Irrespective of their caste and community, everyone comes and bless the child.

Similarly like birth, even at the time of the death of an individual, some rituals are performed by the villages. When a man dies, his elder son or brother, take the dead body on six bamboo strips with a covering cloth by own community people and relatives to the cremation ground called as *Samshan* or Ghats. The elder son of the dead person first puts fire on the pyre, which is called as *Mukhagni*. A widow in the family or of the village removes the bangles from the hands of the dead man's wife. In SC and ST communities, girls can go to the cremation ground. But in case of OBCs and GCs communities, girls are not permitted to go. It is believed that the boys observe the death of a person for ten days and girls for seven days. After three days a married daughter of a dead man come to her house with *Shital Gada*, it consists of sweets and fruits, which is distributed among the villagers and the relatives. This practice is prevalent among all the caste and communities. The amount of *Shital Gada* shows the status of daughter-in-laws in the house. On the tenth day, they purify

themselves through the ritual, called as *Sudhikriya* by sprinkling water. The practice of death ceremony is more or similar in all castes or communities.

2.10. Livestock

Livestock is one of the most important sources of income or livelihood of landless and marginal farmers. Though most of landless and poor farmers supplement their livelihood through livestock, they are discouraged from practicing it as the livestock dies uncertainty, and no veterinarian service is available. In NGO implemented watershed most of the livestock (40.54 percent) is kept by the ST community (Table, 2.17). They depend on it for the alternative source of livelihood. Mostly bullocks are kept by the ST and OBC communities. The poor watershed beneficiaries hire the bullock from them at the time of cultivation. The elite people or big farmers of the village use tractors for ploughing irrespective of their caste or community. The poor beneficiaries sell their livestock at the time of economic requirement such as marriages and medical expenses during droughts. In GO implemented watershed most of the livestock is kept by the OBC community, followed by the ST and SC communities. The rich persons in all caste and communities have kept cows mainly for milk for their household use, but the poor people sell it in the market.

Table 2.17: No. of livestock kept by beneficiaries

PIA	Community of the respondent	Livestock status							Total
		Bullock	Cow	Buffalo	Goats	Sheep	Poultry	Duck	
NGO	SC	5	8		16	8	2		39
	ST	15	11	3	27	10	7	2	75
	OBC	12	17	2	20	10	3		64
	GC	4	3						6
Total		36	39	5	63	28	12	2	185
GO	SC	6	3	1	6		0		16
	ST	28	5		10	4	2		49
	OBC	32	13	6	19		7		77
	GC		5		2				2
Total		66	24	7	37	4	9		144

Source: Field Study

CHAPTER –III

Institutional Arrangement and Community Participation in Watershed Development Programme

3.1. Introduction

During the past few decades, significant policy changes have taken place in the area of natural resource management, shifting the focus from government agencies to user groups. User groups or community is treated as a social capital which can be used to increase the output of any development programme. Social capital can be referred to the collection of networks, which sociologists call as a social group in which one tries to be socialized or aims to be socialized (Stiglitz, 1999). It was found that social capital can have a positive impact on the socio-economic outputs including growth, equity and poverty alleviation. In the context of Watershed Development Programme (WSDP), policy makers have become more concerned about the role of interpersonal social networks and dynamics of social capital which can influence the participatory process in WSDP. Due to the relevance of social capital, the watershed guidelines made a provision to utilise the full potential of this capital. And for this purpose, guidelines established a framework for constituting and functioning of social groups or communities. These social groups are groups of individuals, who have been once excluded from the developmental process, and they are likely to emerge as the beneficiaries of the participation.

In a WSDP, the involvement of communities refers to a meaningful responsibility and participation in resource management. Here the communities monitor resource utilization, and the mutual consensus is formed among them for resource use. They involve themselves in a watershed project by making some investments (in terms of material, money and labour) on watershed physical structures. These structures include farm pond, percolation pond, field bunding, and lands levelling. The community also participates voluntarily in planting trees or shrubs, cleaning the existing water bodies, cleaning roads and schools in the villages. Participation also

leads to their contribution in decision- making and when communities themselves prepare the management plan it creates a sense of ownership of resources among them. Further, they successfully identify and solve practical problems related to the management and use of the watershed resources. In addition to that, the post-project period ensures the long-term support for better management and planning. It is hoped that with the participation of social groups or user groups, a process of revisiting of natural resource management can be done. Once the whole village is brought together under different social groupings, it becomes relatively easier to conserve natural resources in that locality.

Ideally, the user groups must cover all the sections of the villagers (especially the landless, women and other weaker sections). The different studies illustrated that the success of a WSDP depends upon the best utilization of natural, technical and social capitals. Therefore, the social, environmental, institutional and technological factors operating within and outside the watershed area have a considerable impact on the implementation and success of the WSDP. After the implementation of the first generation of watershed projects throughout the country, the policy makers and social scientists were more focussed on the working of the institutions. These institutions were created to facilitate community or user group participation in a watershed project. Institutional changes were brought with a focus on community participation in watershed guidelines.

The institutions are understood as a standardized pattern of behaviour among individuals or groups in society. Institution refers complexes of norms, rules and behaviour that serve a collective purpose (Janvry, et al. 1993: 556). Institutions prepare an informal ground for sharing information, coordinating activities and making decisions (Serageldin & Grootaert, 2000). According to the Oxford dictionary of sociology (2005) “an institution can be seen as a sort of super custom, a set of mores, folkways and patterns of behaviour that deals with major social interests” (pp-311).

Institutions can broadly be divided into formal and informal institutions. In informal institutions, rules are deliberately devised by human beings; they are socially recognised and meet the expectations of everyone in society concerning the de facto legal relations that define the choice sets of individuals with respect to choice sets of

others. The informal institutions are the conventions and codes of behaviour, i.e. a structured set of expectations about behaviour and actual behaviour. The informal institution is determined by shared and dominant performances for the ultimate outcome as opposed to the means by which that result is achieved (Bromely, 1989). In watershed programme along with the formal institutions emphasis was also put on the local institutions. It is hoped that by implementing the local institutional processes in the watershed guidelines, a new environment can be created in which a win-win situation can be achieved for all the stakeholders. In addition to this, it is believed that the local institutions that evolved for the management of natural resources are based on the principle of natural experiment rather than based on scientific analysis.

3.2. Institutional arrangement

Institutionalization of community participation in watershed development programme requires the establishment of various formal and informal institutions at different levels of planning, implementing and monitoring phases. In this regard, Ministry of Rural Development, Government of India (MoRD) in its watershed guidelines (2001) has set up many administrative, financial and institutional arrangements. Government of Odisha was also adopted various institutional approaches for making the watershed programme a community-based programme. The Western Orissa Rural Livelihoods Programme (WORLP) followed the watershed development guidelines (revised 2001) given by the Ministry of Rural Development (MoRD), Department of Land Resources (DoLR), Government of India (GoI) in order to implement the watershed component or natural resource management aspects. Livelihood component is an additional element of WORLP to enhance the livelihood opportunities of the poor residing in watershed project villages. Figure 3.1 shows the institutional arrangement of WORLP. The WSDP is undertaken by designed roles and responsibilities of involved departments at state, district and block or watershed village level.

In the hierarchy of institutional arrangements, at the state level Odisha Watershed Development Mission (OWDM) got the top priority. It works as a state level nodal agency. And it handles planning, implementing and monitoring of the project at the state level. Agricultural production commissioner heads a project management committee (PMC) of the OWDM, who reviews and guides the programme,

managers, assistant managers and expert supervisory consultants. To strengthen the institutional structure in all four districts (Balangir, Bargarh, Nuapada and Kalahandi) of WORLP projects, a separate office of Project Director of Watersheds (PDW) was created. PDW coordinates the implementation of the watershed project and is supported by a Capacity Building Team (CBT) and an Assistant Project Director (APD) at the district level. The CBT consists of 4-5 subject matter specialists from the field of agriculture, management. On the other hand, at the block level, Planning Implementing Agency (PIA) implements the respective watershed projects. It is supported by the Watershed Development Team (WDT) and Livelihoods Support Team (LST).

The WDT is an essential organ of the PIA; it has a minimum of four members. Their area of specialization could be agriculture, institution building programmes, water management and community mobilization. The WDT works with the watershed experts at state and district level. The salaries of WDT come from the administrative expense of the PIA. The Livelihoods support team consists of three members, having specialization in rural livelihoods, microenterprise development and a social scientist. At the village or watershed level, various groups like User Groups (UGs), Self Help Groups (SHGs), Watershed Committee (WC) are created to implement watershed projects. The Watershed Association (WA) is registered society under Registered Societies Act (RSA), 1860. At the village level, watershed president, secretary and some volunteers are selected to execute watershed works. Taking the watershed guidelines into account the present chapter attempts to describe the structure and functions of institutional arrangements made at grass root level to create and facilitate community participation.

The level of community participation is checked in the preparatory, planning, implementation and monitoring phase. The approaches adopted by both the GO and NGO planning implementing agencies to ensure the people's participation have also discussed. The theoretical approach of Uphoff (1986) has used to examine the level of participation in different watershed implementation phases. Uphoff raised questions in his participatory framework that, it is important to find out, who participate? How do they participate? Why do they participate? Merely considering that whether there is participation or not? What type of participation? In spite of the provision for people's participation in the domain of local government, the

authorized provision for participation is found to be unequal to the actual meaning and expectations of actors (Khan & Govender, 2010). The institutions working at the grassroots level for rural development also face the problems (Ravi & Sunder, 2006).

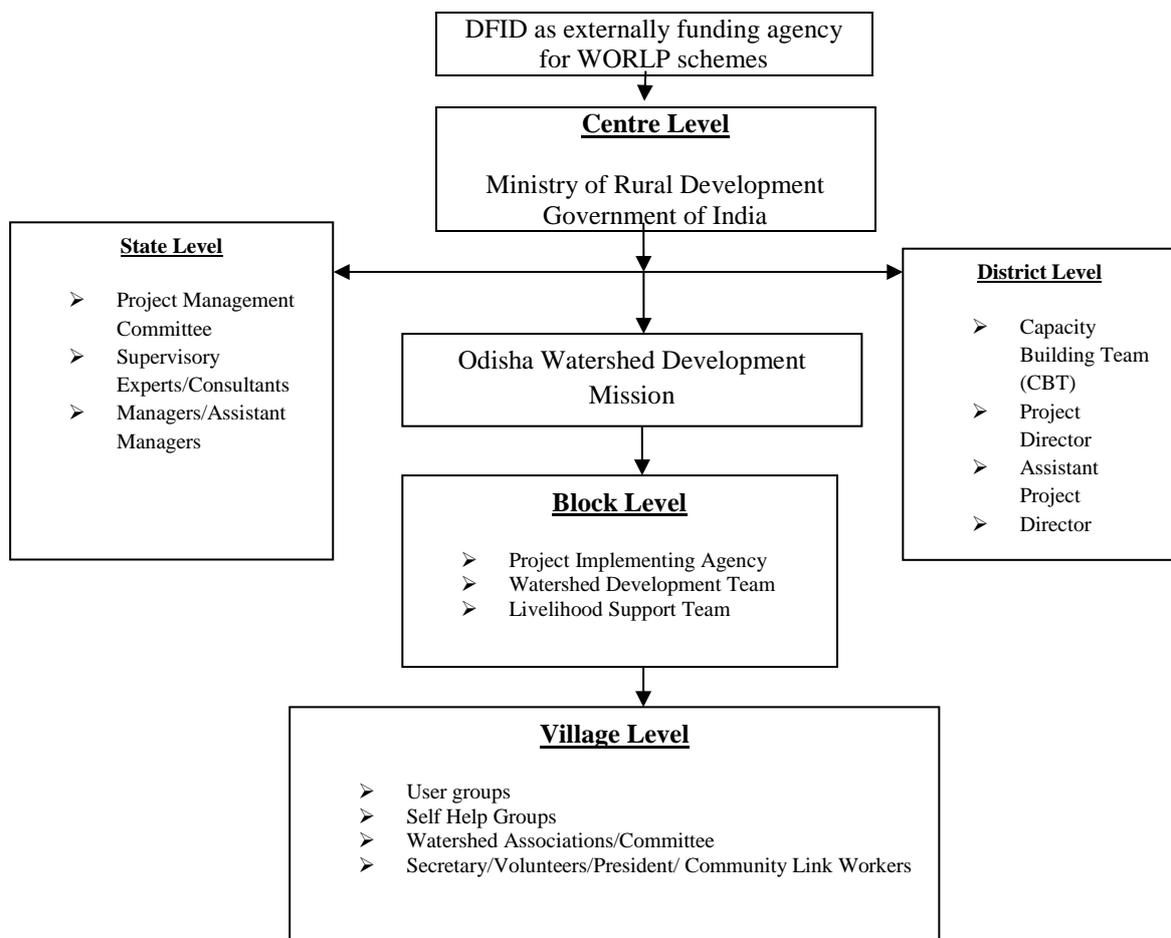
3.3. Preparatory phase

The preparatory phase in WSDP is a blueprint of activities to be carried out in the whole programme. A systematic and serious approach towards the preparatory activities, by the participatory facilitators, increases the chances of success of the project. The analysis of data shows that, in the GO implemented watershed, the watershed activities in preparatory phase was very slow in comparison to the NGO implemented watershed. From the very beginning, the officials of GO implemented watershed focused mainly on the preparation of action plan. The WDT did not conduct a detailed benchmark survey, and PRA exercise to gather the detailed information. In the case of the NGO implemented watershed, the primary focus was on community mobilization and more number of visits to the watershed villages than in the GO implemented watershed. Both the PIAs used thematic maps to locate the land and water resources during the preparatory phase. Concerning the community mobilisation as a part of the preliminary phase, the officials of the NGO watershed initiated mobilization from the poorest sections of the society irrespective of their casts and community. And on the other hand, the WDT members of the GO implemented watershed approached few key persons of the village.

The meetings are used as a significant tool in both of the watersheds to motivate the people. The variation in the methods and impact of community mobilisation in both watersheds can be attributed to the commitment and approach of the WDT members and the training given to them by the watershed management committee at district and state level. During the interaction with the WDT members, it was found that the WDT members of the NGO were more active in attending the workshops and training programmes than their counterparts in the GO implemented watershed. It was also observed that, initially both PIAs of GO and NGO implemented watersheds did not take into account the gender and equity issues. However, subsequently, the NGO PIA involved the existing SHGs member and landless, actively. The activities of

preparatory phase were analysed to find out the levels of community participation and efforts of PIAs to involve the community.

Figure: 3. 1. Institutional arrangement in watershed development programme under WORLP schemes



Source: Field study

3.3.1. Criteria for selection of watershed and demarcation of watershed boundary

The guideline suggests that the watershed treatment area can be of 500 hectare. However, the guidelines ensured that some amount of flexibility is possible concerning the area selection. A minor variation from the 500 hectare limit in the actual survey was also accepted for project implementation. The treatment area selected by the NGO watershed was 528 hectare. The watershed boundary was decided based on the drainage system and with the help of top sheet of watershed area. The drainage pattern helped the PIA and WDT to prioritise the development of a

particular area. In this regard in the GO implemented watershed, it was found the watershed area demarcation was not done properly by the WDT due to their lack of knowledge. The watershed area is 632.00 hectare. Ideally, a smaller area of the micro-watershed or an area of approximately 500 hectare is assumed to be easy to manage and make implementation more efficient.

The guidelines also stress the fact that preference should be given to a watershed that has non-forest wasteland predominantly. But in the GO only 82.32 hectares and NGO only 55.76 hectare of land falls under wasteland. It was observed that as per the expectations of guidelines both the watersheds failed in bringing the more community land under treatment area while selecting the watershed villages. As suggested by the guidelines, the selection of the watershed area for the treatment should be done based on the high concentration of SCs and STs Population. However, ethnically OBC communities are dominating. In comparison to GO implemented watershed, the NGO implemented watershed gave more preference to develop the land of very poor, followed the general drainage pattern while selecting the treatment area.

3.3.2. Creating awareness about the main objectives of watershed project

In the preparatory phase, the WDT creates the awareness about the projects objectives. In the NGO implemented watershed, initially the villagers were not very much aware of the goals of the watershed projects. But the PIA organised few street plays, public announcements and meetings to create awareness among the people. The WDT members used to have open meetings at the centre of the village. WDT members used to explain, the problem of water scarcity, need for a watershed project and the importance of community participation and processes involved. However, no extra effort was made for building awareness among women and landless. In the GO implemented watershed, WDT officials did not pay much attention to creating awareness about the watershed project concepts and expected roles and responsibilities from the beneficiaries. The majority of the villagers were not aware of the objectives and approaches of the watershed project. No camp, workshop or public meeting was organized by the WDT for awareness building. Even though meetings took place, the information did not spread to all in the three villages falling under watershed area. Sometimes the meetings of watershed officials held at village *Sarpanch* house.

3.3.3. Establishing rapport with community

The experience of the NGO as a PIA helped in dealing with the village community, organizing public meetings, workshops and initiating need-based approaches. Their frequent visits to the village and contact with resource-poor families helped them in winning the trust of the villagers and in understanding the social and power structures. They started helping the people by guiding them to access the government schemes and in the livelihood activities like mushroom farming and petty business. In the GO implemented watershed, the WDT did not put in much effort to establish rapport with the villagers. Their occasional visits were only limited to the key informants such as the *Sarpanch* and his/her family members, semi-medium farmers and some other people who were employed in the block office. The officials of government dealing with the watershed failed to understand the social structure of the village because of their fewer visits. The analysis of data shows that in the NGO implemented watershed, the rapport between PIA/WDT and villagers is stronger than the GO implemented watershed. The reason being, the NGO as a PIA followed the instructions of the management department at district and state level more seriously than the GO implemented watershed.

3.3.4. Participatory Rural Appraisal (PRA)

Before finalising the watershed development plan, a multidisciplinary team known as the Watershed Development Team (WDT) carries out an extensive survey of the watershed area and conducts a PRA. The PRA exercise helps the project staff to learn about the rural setup. The objective of PRA is to enable the villagers to participate and take action in planning, execution and maintenance of watershed programmes meant for the improvement of their lives. Involvement of villagers by WDT in PRA exercises shows the democratic philosophy of the watershed programme, in which, the main decision-making body is the community. As per the information given by the watershed beneficiaries of the NGO implemented watershed, WDT first interacted with rich and elite or with the villagers whom they already knew. A mass meeting in the village was organised but due to lack of information many of the villagers did not attend it (Table; 3.1).

Interaction of WDT with the landless and marginal farmers and women groups was very limited. Several farmers were not aware of the objective of the visit of WDT to

their villages. Few took it as an official visit for some village development work. To check the level of community participation in the initial phase of the watershed, important information was obtained from the beneficiaries. Table 3.1 shows the awareness level of the villagers in both the GO and NGO implemented watershed areas during the first visit of WDT and PRA activities. In the NGO implemented, it was observed that around 52.09 percent beneficiaries were not aware of the WDT visit. And most of them are marginal (39 percent) and landless (32 percent) households. Irrespective of casts, all the semi medium and medium farmers are aware of the WDT visit. It shows that the poor and marginal communities are not well informed about the visit, and the higher authorities ignored them.

Table 3.1: Respondents non-awareness regarding the visit of WDT in GO and NGO implemented watersheds

Community of the respondent	Size of land holding of the respondent										Total	
	Marginal		Small		Semi-medium		Medium		Landless			
	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO
SC	10	20	8	2					8	18	26	40
ST	12	15	5	9					7	9	24	33
OBC	12	32	10	19		5		2	13	9	35	67
GC	0	7	2	2		2					2	11
Total	34	74	25	30		7		2	28	38	87	151

Source: *Field study*

In the case of the GO implemented watershed, it is pertinent to note that total (236) households, 63.98 percent (151 households) of people are not aware of the WDT visit. Just like NGO implemented watershed areas the WDT interaction was higher with the semi medium and medium farmers. The beneficiaries, who are not aware of the WDT visit, are mostly confined to the marginal farmers (49 percent), small (19.86 percent) and landless (25.16 percent) communities. The interaction with the beneficiaries reveals that as during planning phase their personal or community needs are not asked, therefore they are not aware of the WDT works in the initial stage. The majority of the marginal and landless people complained that the WDT interacted mostly with the semi-medium or medium farmers.

The WDT members are under the impression that the rich and big farmers have better knowledge of the land, agricultural productivity, and water bodies. They also interacted with families who own private tube wells and bore wells, to acquire

information on the ground water levels. Giving more stress on land and water-related development planning demotivated the marginal, landless people and women groups in interaction with WDT. Further, there was no pre-information given to them on any of the PRA activities or other surveys. Comparatively the awareness level is higher in NGO implemented watershed than the GO implemented watershed. In NGO implemented watershed most of the villagers were informed about the visit of WDT while in GO the information was not spread properly.

3.3.5. Entry point activities

According to the watershed guidelines (2001) to build positive attitudes among the watershed communities, some entry point activities should be carried out. These activities include, renovation of village schools, *panchayat* buildings, repairing of existing tube wells, cleaning of bathing ghat (river bank) or pokhri (pond), village sanitation improvement works and investing in the development of the existing water harvesting structures (WHSs). All these works can be carried out by using the grants available for the watershed community organization. With some entry point activities, the WDT establishes rapport with the village community. The activities include, awareness on environmental degradation and impact of gender ratio gap, baseline survey for the preparation of Detailed Project Report (DPR) and hydro-geological study of the watershed area to find out groundwater potential zones. The DPR is made with the consultation of the Watershed Committee (WC), WDT uses different maps to locate land and water resources in the watershed area for finalizing DPR.

The DPR also depicts the location of proposed work for each year, and it is also done in consultation with the WC. After the approval of the Gram Sabha, the PIA shall submit the DPR for approval to the District Watershed Development Unit, District Rural Development Agency or District *Panchayat* (DWDU/DRDA/DP). The WDT also makes detailed resource-use agreements for surface and ground water use and common forest land among the members in a participatory manner. During the field work it was observed that, in the NGO implemented watershed few entry point activities such as renovation of village schools, *Panchayat* buildings, improvement of existing water bodies (tube wells, cleaning of government pond) and village sanitation improvement work were carried out and the entire village was informed about these activities. Due to wealth and power, some social mobility among lower caste was

observed. It was also noticed that a proper discussion on the location of different water harvesting structures on community land was carried out without consulting the villagers.

The villagers were unable to recall the name of all activities. No detailed information was given to them regarding the future construction of any watershed physical structures. In the GO implemented watershed the PIA did not consult the community before finalizing the DPR. Here, only the unemployed and poor people of the village came forward to participate in a hope of getting some employment during the entry point activities. A small proportion (5 percent) of landless households participated in the entry point activities. Entry point activities were confined only to the cleaning of village ponds. All the villagers were not invited to take part in the entry point activities. Their accidental presence at the entry point work enabled them to participate. In both the watershed areas, the WDT did not initiate the resource-use agreements for water bodies and common forest land among the villagers in a participatory manner. Further, sometimes it led to a conflict among the different resource users (discussed in detail in chapter five). The type of consultation and quality of entry point activities in the NGO implemented watershed was better than the GO implemented watershed.

3.3.6. Capacity building and training programme for secondary stakeholders

Capacity building and training programme for all primary and secondary stakeholders involved in watershed projects is an important component to operationalize the participatory approaches. There are provisions in the guidelines that deal with capacity building and training programmes for various secondary stakeholders involved in watershed projects at different levels, i.e., state, district, block and watershed village levels. Capacity building is equally important for both the facilitator of participation (at state level the PMC, assistant managers, at district level CBT, PD, at block level PIA, WDT, LST) and for those who are intended to involve (UGs, SHGs). The analysis of capacity building (CB) received by secondary stakeholders at the state and district level show that they attended a minimum number of workshops and training programmes. However, much variation was not found between the CB provided to the NGO and GO staff or officials. It was observed that no particular attention was given to the CB programmes to increase the awareness among the staff

about new responsibilities and different work cultures to undertake participatory approaches. It was found that due to the time and budget constraints no extra and innovative efforts were made by the secondary stakeholders while carrying out the participatory watershed project.

3.4. Planning phase

After the benchmark survey, WDT called a meeting of Watershed Association for the preparation of watershed development or treatment plan. This treatment plan should clearly mention the demarcation of watershed and details of activities carried out with their location. The PIA then finalizes the watershed development plan with the help of WCs and WA and submits it to the ZP/DRDA. The level of participation of the beneficiaries is high in its planning phase. Because, in this stage the communities identify their resource use problems, the scope for further resource use and help the external agency to find out the socio-economic and physiographic set up of the watershed area. To involve the community, a real collaboration between Planning Implementing Agency (PIA) and villagers is necessary. However, as per the watershed guidelines (2001), this can be made possible only through number of interactive sessions in the following forms:

- a) Formulation of grass root institutions (SHGs, UGs, etc.)
- b) Community meetings or public announcements and
- c) Training or capacity building programmes to empower SHGs, UGs or other watershed groups

Other activities take place at district and block level. But in this section the primary focus is on community participation in the activities carried out in the villages.

3.4.1. Formulation of village level institutions and Self Help Groups (SHGs)

According to the watershed guidelines, the Watershed Development Team (WDT) should tour the watershed villages. And build an appropriate mechanism for adoption of participatory approaches to empower and enable grass root institutions such as the Watershed Committee (WC), Self Help Groups (SHG), and User Groups (UG). It was observed that in neither of the studied watersheds there was a sincere effort made to involve the WC in the formulation of SHGs. In NGO implemented watershed with the efforts of the WDT, villagers accepted SHG repayment and the village bank concept. The participation of villagers in SHGs meetings is 60 percent. The women members

expressed their inability to attend the meetings as they are overburdened with their domestic work. Only 20 percent of the female have participated in the meeting. Other institutions such as *Suchana Kendra* (village information centre), *Gramya bank* (village bank), *Samadhan Kendra* (conflict resolution centre), *Krushik Bikash Kendra* (farmers club), *Khadya Panthi* (food basket), *Prathamika Swasthya Kendra* (village first aid centre), , *Samuhika Utsav Kendra* (common ceremony center), *Meena club* (adolescence club) and Youth club was also created in the village by PIA in the preparatory phase. However, these institutions became dysfunctional, soon after the withdrawal of the PIA from the village. Lack of funds and sensitization made the people uninterested in running these institutions.

In the GO implemented watershed, it was noticed that the community participation was somewhat small in SHG formation. All male and female members of the village were not invited to the meetings. Only 30 percent (10 percent female and 20 percent male) beneficiaries were aware and attended the meetings of SHGs conducted in the preparatory phase of the watershed. The process of formulating SHGs was very weak and slow, and it lacked adequate representation and membership of landless and women groups. No useful economic activities were planned through SHGs. Regularity and sincerity in conducting SHG meetings was absent. The analysis of the formation of SHGs showed that WC did not consult the villagers. The participation of women groups and their empowerment through SHG is not up to the mark. It is noticeable that the process of the formation and functioning of SHGs is more sincere in the NGO implemented watershed than in the GO implemented watershed. Generally development and training programmes have not been responsive to the activities undertaken by the women (Singh, 2010).

3.4.2. User groups

As mentioned in the guideline, the PIA should form User Groups (UGs) with the help of the WDT. The UGs are supposed to be homogeneous; having landholdings within the same watershed area and no discrimination should be made while forming the groups. In the NGO implemented watershed, though the UGs were created during the preparatory phase itself, the process was highly influenced by some of the members of the village panchayat, who were politically dominant groups and all groups were not completely homogeneous. Like the SHGs, UGs formation process was also slow and

weak in the GO implemented watershed. It was found that the UGs were formed in the implementation phase and not in the preparatory phase. Mostly the big farmers were organized first. These groups were not completely homogeneous in terms of caste and class. The WDT played a significant role in the formation of UGs, and people did not participate effectively. The elite people participated in the primary decision-making the process of the UGs. The watershed structures that were handed over to a same caste or community created a higher level of participation, whereas the structure delivered to heterogeneous communities did not motivate the community for the participation. There was a great deal of variations in the making, implementation and functioning of the UGs, it was more successful in the NGO implemented watershed than in GO implemented watershed.

3.4.3. Watershed committee

Watershed Committee (WC) is a body responsible for carrying out day to day watershed project works. It consists of 10-12 members nominated by the Watershed Association (WA). It is made up of different grassroots institutions, SHGs (3-4 members), UGs (4-5 members), *Gram Panchayat* (2-3 members) and all the members of the WDT. The committee should have at least one third women members and a minimum representation of the SCs and STs Caste and communities. WC coordinates the GP, WDT, DRDA/ZP and other governmental agencies. It should meet at least once in a month. In the NGO implemented watershed, meetings were organised every month during the preparatory phase. The highest number of members in the WC was from UGs and SHGs. It was found that only two members were selected from the GP. The GP members informed that the PIA did not want to share their authority with them and hence PIA did not involve GP members. On the other hand, regular WC meetings did not take place in the GO implemented watershed. All the members were called for the meeting only when there was a pressing need. In the WC there was no member from the GP; all the members were from SHGs, UGs and the WDT. The GP members complained that there was a lack of transparency and accountability maintained by the PIA.

3.4.4. Watershed association

According to the watershed guidelines, if the people in the watershed area are an exclusively small group confined to a particular village *Panchayat*, the *Gram Sabha*

(GS) of the *Panchayat* will be elected as the Watershed Association (WA). On the other hand, if the watershed area falls under the jurisdiction of more than one *Panchayat*, the members of the community who are directly or indirectly dependent on the watershed area will constitute the WA. The WA should conduct a meeting twice in a year to look into the improvements of the watershed development plan. It also monitors and reviews the watershed project's progress and approves the financial statements. The role of WA is confined to the overall supervision of work from the preparatory phase to withdrawal phase of the watershed project.

It was found in the NGO implemented watershed that a WA meeting was held, but the villagers called it a village meeting rather than a WA meeting. With respect to their presence in the WA meetings, the majority of the households responded positively (60 percent). However, the WA members completely failed to monitor the formation and working of the SHG, UGs and other village level institutions. It was found in the GO implemented watershed that 80 percent of the villagers were not aware of the concept of WA. The reasons are ignorance of the people about the working of different institutions and lack of community sensitization by PIA. The decision regarding the formation and functioning of various village level institutions such as the SHGs and UGs was taken either by the WC or the PIA itself.

3.4.5. Training or capacity building programmes to empower and sustain SHGs, UGs or other watershed groups

To strengthen primary stakeholders, efficient technical staffs are needed. The guideline stated that at village level, *Gram Panchayat* should be fully involved in the community organization or other training programmes. Proper training through community-based organization enables the community to undertake responsibilities of watershed works in different phases. The methods adopted for the training or capacity building in both the watersheds was mainly, open discussions, interactive sessions with UGs, SHGs, WC, WA, Gram Panchayat, watershed secretary and president. But these groups did not get separate training. Few of the SHGs and UGs meeting were organized for vocational training, for example, mushrooms farming and embroidery work. In NGO implemented watershed, the training programme has covered the topics such as horticulture farming, soil and water conservation, natural resource management, preparation of action plan, roles and responsibilities of different

watershed groups. The duration of these programmes was 2-3 hours and took place only 3-4 times. The PIA and WDT worked as a resource person.

During the field work, it was observed that in GO implemented watershed the training to UGs, SHGs and WC or other village level institutions were not viewed seriously by the PIA or WDT. The villagers informed that mass participation has not taken place in all the watershed meetings and inadequate training was given to the president and different UGs and SHGs. No systematic approach was adopted by PIA or WDT to organize capacity building the programme (CBP) or other training programmes. Due to the lack of training and inadequate exposure, the villagers were not very much confident to take up any watershed activities. 40 percent of the farmers informed that PIA promised them initially to give some training for non-land-based livelihood activities and training to women groups (SHGs) for tailoring works but they did not fulfill it. They did not organize minimum required training for UGs and SHGs.

It was noticed from attitudes of PIAs of both the watersheds that they too did not follow the training modules to impart the various skills to execute the watershed work successfully. The capacity building programmes (CBP) are a continuous process to bring awareness to the community and empower them to deal with the watershed management issues in different phases, however, it was missing. It can be concluded that there was a gap between the process of empowering the community and training given to them. The PIA or other watershed staffs did not organize capacity building programme or capacity building organization adequately, as a result, the level of community participation and awareness in the programmes found to be negative.

3.5. Identification of membership

After understanding the process of formation of grass root level institutions and their functioning, it is essential to identify the basis on which the membership is granted to the watershed beneficiaries. As per the watershed guidelines (2001), land ownership was one of the essential conditions for membership in UGs. A person possessing land can easily get a membership and can access more watershed resources. Most of the UG members are landowners, and the landless cannot access most of the watershed resources. Not only landless but women also do not figure in the WSDP to use the watershed resources.

The finding of the study support the view of Pangare (1998) where the activities undertaken by women groups in watershed development projects do not empower them to be equal partners with men. In few cases, women members complained that because of social obligations they are not a member of any UGs. On the other hand, sometimes PIA creates an environment that is not congenial for women to participate. Apart from land resources sometimes the defined ownership of the non- land based resources also create problems. After the intervention of watershed projects, the villagers became conscious about the use of common grazing land. If a person does not participate in the cleaning of shrubs on grazing land during the watershed implementation, villagers do not allow him to access it for his livestock.

The grazing land was treated as an open-access resource for the entire villagers, became a common property resource after the implementation of watershed. It restricted the user's rights to its members only. Regarding the construction of watershed physical structures, 55 percent of the respondents in the NGO implemented watershed and 70 percent in the GO implemented watershed did not have any individual farm pond on their land as they were unable to invest. The percolation ponds were constructed mainly on the upper reach area of the watershed therefore farmers having land on upper reach had a greater chance of getting a membership than the farmers of middle or lower reach. The upper reach land mainly belongs to the semi medium and medium farmers.

3.5.1. Membership in self-help groups (SHGs)

During an interview with watershed beneficiaries, it was found that, out of the total households, 50 percent of the households were part of SHGs in the NGO implemented watershed. Out of that, only 20 percent are males and the remaining is female. In the female SHGs, 60 percent of members either belonged to the OBC or ST communities and remaining 35 percent are SC; only five percent are from the general castes. In the male SHGs, the majority of the members (40 percent) are landless, 28 percent of them are marginal farmers, 25 percent are small farmers and only seven percent are semi-medium or rich farmers. In the GO implemented watershed, only 30 percent of the households are organized into some SHGs and even here the majority of SHGs members are female 55 percent and 45 percent are male members. In female SHGs,

the OBCs population had highest (45 percent) memberships, followed by the SC (20 percent) and ST (27 percent), and eight percent were from the general caste.

In male SHGs, the number of landless who got membership in some SHGs is 50 percent followed by 30 percent marginal and small farmers and 20 percent semi medium and medium farmers. The SHGs created are mostly female dominated. The SHGs created for male members are not very much functional during the post-project period of watershed. As per the guidelines, at least half of the total population directly or indirectly dependent on watershed resources should be enrolled in SHG but it is not found in practice in real field conditions. The percentage of the membership of the landless and female population in SHGs is reasonably good in the NGO implemented watershed in comparison to the GO implemented watershed. The number of members of landless, marginal and women groups is higher. The elite groups perceive SHGs an institution meant to help the poor. So they did not participate because of their sense of social dignity.

3.5.2. Selection or nomination

As per the watershed guideline, each watershed must have a secretary and he/she should be a matriculate and a resident of that particular watershed area. The secretary maintains the accounts and other records of watershed. The nomination or selection of the watershed president or secretary was made by watershed committee (WC). Watershed secretary calls and precedes the Watershed Committee (WC) and Watershed Association (WA) meetings. The chairman of WC and watershed secretary maintains the watershed development fund jointly, if no separate institutional arrangement is made by *Zilla Panchayat* (ZP)/District Rural Development Agency (DRDA). Table, 3.2 shows the awareness of respondents in the election of a watershed secretary and the president. It is found that the secretary and president are well educated. In the NGO implemented watershed, the watershed secretary belongs to the Scheduled Caste (SC) and the president belongs to the OBC and both of them are graduates.

The secretary of the committee is elected at a general body meeting during the preparatory phase. However, the watershed president is selected by the PIA. It can be analysed from the findings that 54.49 percent beneficiaries are aware of the election being conducted for the post of watershed secretary and remaining 45.50 percent are

unaware. The data collected from both the watershed areas shows that the land holding size plays a prominent role in the context of beneficiaries' awareness about the selection procedures of the watershed secretary. The medium farmers are aware of the selection process, and it is around 100 percent semi medium farmers in NGO implemented watershed areas (Plat, 3.4, interview with beneficiaries) and around 76 percent in case of GO implemented watershed areas are aware of the same. The result is quite serious in the case of landless and marginal farmers.

While having interaction with the beneficiaries, 34% percent of landless are aware about the selection of watershed secretary in NGO made watershed area, it is only 14.28 percent in GO implemented areas. In the case of marginal farmers, it is 38.70 percent in NGO made watershed area and 27.55 percent in GO made watershed areas (Table. 3.2). The marginal and small farmers occupy a good percentage to a whole population. And therefore their percentage towards the awareness about the selection procedures of watershed secretary is more in comparison to other caste and communities (numerically the percentage of other semi medium and medium farmers is lower than the marginal and small farmers). But they (marginal and small farmers) do not play much role in decision-making process and selection process. Medium and semi-medium farmers hijacked selection process.

Around 81.25 percent, small farmers in NGO implemented and 72.22 percent small farmers in GO implemented areas are aware of the selection process of watershed secretary. The land and power relation is still prevalent in contemporary society. In the GO implemented watershed both the watershed secretary and president belong to the OBC caste. As per the information provided by the watershed beneficiaries, selection of the secretary and the president is done without the consultation of all *Gram Sabha* members. Only 43.22 percent of the beneficiaries are aware and participated in selection procedures.

Table 3.2: Awareness of respondents about the selection of watershed secretary in NGO and GO implemented watersheds

Aware selection of WS secretary	Community of the respondent	Categorization of the respondents on the basis of landholding										Total	
		MF*		SF**		SMF***		MF****		Landless			
		NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO
Yes	SC	10	4	10	5	2	2			3	3	35	14
	ST	6	3	8	8	3	2			5		25	13
	OBC	8	14	17	22	4	9	2	6	7	4	40	55
	GC		6	4	4	2	6		4	0		6	20
	Total	24	27	39	39	11	19	2	10	15	7	91	102
No	SC	18	23	2						12	21	22	44
	ST	9	16	2	6					7	12	15	34
	OBC	11	26	5	8		6			10	7	24	47
	OC		6		1						2		9
	Total	38	71	9	15		6			29	42	76	134
	Grand total	62	98	48	54	11	25	2	10	44	49	167	236

Source: *Field study*, Note- *MF- marginal farmer, **SF- small farmer, ***SMF- semi-medium farmer, ****MF-medium farmer

Though, watershed guideline, stress more on the participation of SCs and STs, it was found that majority of the farmers who are not aware of the selection procedures, belong to SCs (32.83 percent) and STs (25.37 percent) communities. However, in the case of GC and OBC communities, it is 35 percent and 6.71 percent. Along with the different caste group households, the awareness level from all the land holding categories are also varies. Those who are not aware of the selection procedures of the watershed secretary are mostly marginal farmers (around 53 percent) and landless communities (31.34 percent). Though in GO implemented watershed the SC and STs have good representation but the upper castes (GC and OBC) farmers are mainly aware of the president or secretary selection procedures. While having interview with

the villagers (Plate,3.5) it is informed by them that, before the introduction of watershed programme the PIA mostly interacted with the educated, elite and politically active members in the village.

The selection procedures are mostly undemocratic and are decided by the elite groups and the SC and STs are called to the meeting just for the sake of representation. The post of watershed secretary and president are highly politically affiliated. The villagers believe that being elected to the post of the secretary or president will help them to strengthen their political career. The secretary and president belong to the ruling party in Odisha, Biju Janata Dal (BJD) and they are selected instead of elected. For appointing various watershed officials, PIA enjoys the autonomy to decide who should be the member and who should not be. It is observed that as secretary, volunteers and president are appointed on honorarium basis; it discourages them to work more sincerely. The analysis of data collected from the field makes it clear that the dominant caste and class hierarchies of the society represented mostly the watershed committee members. None of the landless or beneficiaries belonging to SCs, STs and women groups play effective role in preparatory phase of watershed development programme (WSDP). Even if they have representation, it is only for sake of record keeping. In the GO implemented watershed, the reasons for non-representation are, due to lack of knowledge about the formation of the committee. The politically active landlords and contractors are consulted for the formation of the committees. Though in NGO implemented watershed, the grassroots institutions have members from all the castes and communities, the socio-structural power relations create hindrances in the real participation. During the discussion with the PIA officials and farmers, it is observed that the indifferent attitude and manipulative machinations of selection procedures of watershed officials too discouraged people's involvement.

3.5.3. Meetings

Community meetings are one of the effective platform for participation of the villagers in community based development projects, such as Watershed Development Programme (WSDP). Watershed guidelines have entrusted *Gram Panchayat* (GP) with the responsibility of discussion and evaluation of watershed project works in its meetings. Watershed secretary should inform about the entire action plan, funds

allocated for different activities, future action plan and work progress to the *GP/GS*. Guideline also stresses on the role of PIA to motivate the *GP* to initiate resolutions to make public contribution, carry out PRA exercise, develop planning of watershed, and provide technical and other guidance to watershed development activities.

The meetings of *GP/GS* can be effective tool through which people can participate in decision-making processes in watershed programme and became aware about the activities. In preparatory phase of watershed programme in GO implemented watershed, only limited efforts like meetings are organized to have interaction and making community aware. In the NGO implemented watershed some awareness is created through street play activities. Watershed action plan is approved in *Gram Sabha* open meeting. However, villagers are not the main decision makers due to lack of knowledge and awareness. Around 53.29 percent of the beneficiaries participated in the meetings. Out of them 32.58 percent are marginal farmer, 17.97 percent of landless and 34.83 percent are small farmers. While all the semi medium and medium farmers are participated in the meeting, only 46.5 percent marginal, 64.58 percent small farmer and 36.36 percent landless beneficiaries participated in the meeting. If we look into the awareness level among beneficiaries, it shows that while only 21 percent beneficiaries are not aware of the meeting, it is the marginal (37.14 percent) and landless (40 percent) households who are mostly unaware. Though around 79 percent beneficiaries are aware of the meeting, around 32.57 percent of them do not participate in the meeting (Table.3.3). During the interaction most of them revealed that, watershed activities are dominated by the rich farmers. So they lost interest in participation.

The findings of GO implemented watershed show that no other cultural programme except street play or folk songs is carried out to make the community aware of meetings. Further analysis of data collected from the field shows that only 40.67 percent of the beneficiaries participated in the watershed meetings. It is quite low in comparison to NGO implemented watershed areas (53.29 percent). Here also small percentage of marginal farmers (18.75 percent) and landless (7.29 percent) households attended the meetings. Similarly the representation of small farmers is 38.54 percent and the semi medium farmers are 22.91 percent and medium farmers are 10.41 percent. As per the information given by the respondents 9.74 percent households are aware but do not go to the meeting, due to other engagements.

Majority of them (60.86 percent) belong to the marginal farmers. Out of the total beneficiaries around 49.57 percent are not aware about the watershed meeting. Most of them are marginal (56.41 percent) and landless households (32.47 percent). In GO made watershed meeting is not conducted regularly.

The topics generally discussed in the meetings are health, employment and the problem of water resources and it goes about 2-3 hours. No much discussion has taken place on watershed development programme. Apart from the meetings, the role of watershed secretary and president are important for creating awareness among the villagers about the watershed programme. But it is observed that, most of the time watershed secretaries are busy with their own personal work and do not stay in the village. They do not have much dedication and enthusiasm for the watershed meetings and community awareness. The analysis of data on community participation from the perspective of caste and community reflects that in both the GO and NGO made watershed areas the participation level of SC and ST communities are too low and that to below the average participation level. The participation of SC (49.12 percent) and ST (52.51 percent) communities in NGO made watershed area are quite higher in comparison to the GO made watershed areas (SC-29.31 percent and ST, 38.29 percent) as shown in Table 3.3. However, the data collected from both the areas shows that the SC and ST communities are being marginalized and ignored by the implementing agencies. The level of ignorance is quite high in GO made watershed areas. It is because of lethargic attitudes of the officials and their mentality towards villagers.

Table 3.3: Respondents attending watershed meeting by community and landholding size

Whether attended the meeting?	Caste/Community of the respondent	Size of landholding										Total	
		Marginal		Small		Semi-medium		Medium		Landless			
		NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO
Yes	SC	11	7	9	5	2	2			6	3	28	17
	ST	8	4	7	10	3	2			3	2	21	18
	OBC	10	5	13	20	4	12	2	6	7	2	36	45
	GC		2	2	4	2	6		4			4	16
	Total	29	18	31	39	11	22	2	10	16	7	89	96
No	SC	10	3	3						2		15	3
	ST	5	3	1						2	2	8	5
	OBC	5	6	3	2		2			10		18	10
	GC		2	2	1						2	2	5

	Total	20	14	9	3		2			14	4	43	23
Not aware	SC	7	17							7	21	14	38
	ST	2	12	2	4					7	8	11	24
	OBC	4	29	6	8		1				9	10	47
	GC		6		2								8
	Total	13	66	8	14		1			14	38	35	117
	Grand total	62	98	48	56	11	25	2		10	49	167	236

Source: Field study

After the analysis of the representation of different land holding farmers in the meeting, it is pertinent to note the age and the educational qualification of the beneficiaries present in the meeting (Table 3.4). It is found that middle-aged farmers (from the age group of; 30-40) dominated the meetings. The middle-aged respondents who are mainly engaged in the agricultural activities participated in the meeting hoping to get sufficient water to irrigation and other land development benefits. The participation of elderly and illiterates person is very less.

The old age who are not engaged in the agricultural activities and illiterates are discouraged by officials to participate in any development activities. Remarkably the participation of youth is higher in the meeting but it is only for the sake of attendance. They do not use the information given by PIA in meeting for the development of agriculture. Youth does not want to work in the agricultural fields. After having dropped out from the school, they migrate to other states to work as daily wage labour. In the NGO implemented watershed around 44.94 percent are middle-aged farmers most of them received primary education. Remaining are youth (33.70 percent) and old aged person (21.34 percent). Similarly in the GO implemented watershed majority are (46.85 percent) middle-aged, 33.33 percent are youths followed by 19.79 percent elderly farmers (Table 3.4).

Table 3.4: Age and educational status of the respondents participated in the meeting

Age of the Respondent	Educational Status of the Respondent								Total	
	Illiterate		Primary		ME		High school and above			
	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO
Youth	5	3	10	7	5	8	8	14	30	32
Middle aged	7	6	25	20	6	7	4	12	40	45
Old	14	9	2	6	3			4	19	19
Total	26	18	37	33	14	15	12	30	89	96

Source: Field study

Women participation is also quite less in the preparatory phase of the watershed development programme. It is noticed that women are not involved in any decision-making process. In NGO implemented watershed areas only 19.10 percent women attended the meetings. All the women who attended the meetings are either educated or are members of some Self Help Groups (SHGs). On the other hand, in GO implemented watershed also the women participation in meeting is low. Only 18.75 percent women have attended the meeting, most of them belong to OBC and GC caste and communities (Table 3.5).

The timing and location of meeting are not suitable for women groups. The meetings were mainly held in evening in Budhipadar village, which is 3-5 kilometres away from Saltarpali and Ghusuramunda villages. Hence, women of these villages found it difficult to attend the meetings. The meetings are mainly male dominated. Besides the time of the meetings are not suitable for them as they have to cook at home. The prevailing gender discrimination and social customs in the studied areas restricted the participation of women groups. Women participation is less in all watershed programmes but tribal women and scheduled caste women are more marginalised (Devi & Mishra, 2013).

Table 3.5: Gender-wise attendance at the meeting

Community of the Respondent	Gender of the Respondent				Total	
	Male		Female			
	NGO	GO	NGO	GO	NGO	GO
SC	25	14	3	3	28	17
ST	17	14	4	4	21	18
OBC	26	39	10	6	36	45
GC	4	11	-	5	4	16
Total	72	78	17	18	89	96

Source: *Field study*

The data collected from the field brought out some of the significant figures of people's involvement in meetings of GO implemented watershed. Firstly, it does not involve all the sections of the village. Secondly, some key informants such as big landowners, women groups, or someone from the family of *Sarpanch* are only called for the meeting. Comparatively the NGO watershed made better efforts to involve the

communities than the GO watershed. The interaction with the villagers to extract the reasons for non-participation in the meeting reveals that two factors are mainly responsible, irrespective of their caste and communities. The lack of information about the date and time of meetings (32.72 percent in NGO and 36 percent in GO made watershed areas) and secondly is lack of interest and time (28.74 percent in NGO and 22.28 percent in GO made watershed areas).

3.6. Community participation in implementation phase of watershed development programme

The implementation phase follows the preparatory phase. This phase is called as the backbone of the watershed project because 80 percent of the budget is allocated for this phase. This phase includes construction of different water and land related physical structures, tree plantation, field bunding, farm ponds, check dams and development of nursery. Much importance was placed on the construction of watershed physical structures for the conservation of land and water resources. In these activities community participation is expected in terms of money, labour and materials. However the involvement and the contribution of the community largely vary from caste to caste or class to class.

3.6.1. Construction of water, soil conservation and other physical structures

At the village level, Watershed Committee (WC) implements the watershed project and constructs the watershed physical structures under the guidance of PIA. Developing of land and water conservation structures can be in the form of contour bunding, plantation of trees, nursery development, horticulture and water harvesting structures (WHSs), such as; farm ponds, check dams, percolation tanks and groundwater level increment measures. Other activities comprise of village pasture improvement, restoration of existing common property resources and crop diversification practices. The NGO implemented watershed project officials, constructed the drainage line treatment structures, farm ponds (*Chahala*), check dams, percolation tanks (*Munda*) and dug well. Some of the necessary land development activities were also taken up such as field bunding, vegetative barriers loose boulder contour development (LBCD). Along with this sanitation programme, mango plantation, crop diversification, seed exchange programme, livestock development workshops and workshop for veterinary services were carried out.

In GO implemented watershed all the primary natural resource treatment measures are not taken up. During the interview the PIA and WC members listed out some of the activities which are undertaken during implementation phase which include, contour bunds, plantation, horticulture, farm ponds, check dams, percolation tanks, open well and existing dam repairing, tree plantation, LBCD. The PIA do not make any serious attempt to identify the real need of the poor and marginal farmers regarding the use of farm pond or percolation tank. The case study of no consultation with the farmer to construct farm pond is also found here. example of Sampat Sagar reveals the lack of consultation with the farmers.

Sampat Sagar (Name changed for identity protection) a marginal, SC farmer reveals that no prior consultation with the farmers held before the construction of physical structure. He did not get highly in depth farm pond because while digging it, a big rock came across and WDT left it incomplete.

Source: Field study

It is observed that WC was more concerned for the construction of soil and water conservation practices in comparison to other watershed development works. In the process of implementation of drainage line treatment, farmers whose land was closed to it got the maximum benefits of water. People's consultation concerning the location of the different watershed physical structure is not found. The problem of non-consultation with farmers before construction of farm pond resulted in flat in-depth and incomplete farm pond. Apart from the incomplete farm pond in few cases the money given to the farmers for the construction of structures on their land was not sufficient. In this regard, it was found that the well-off farmers came first for the development of the land and water-related structures. The marginal, small or poor farmers who could not invest money on their lands, contributed in terms of labour and materials such as; tractors or other things borrowed from their neighbours. Table 3.6 shows the type of contribution made by farmers for the watershed structures. It can be observed from the table that 61.67 percent of beneficiaries of the NGO implemented watershed made some contribution in different forms during the construction of watershed assets.

Among all, the labour contribution is highest (57.28 percent) as most of the poor farmers are unable to contribute money and materials (Table 3.7). Only 33.98 percent of the beneficiaries participated by providing the money and very few people (8.73

percent) have provided materials. The material contribution mainly consists of stone and mud or some machines needed for the construction of contour bunds and other treatment required for soil erosion control. In the GO implemented watershed, overall 46.61 percent of the beneficiaries have made a contribution for the construction of watershed assets. The money contribution is higher (46.63 percent) because most of the semi medium and medium farmers are participated and contributed in terms of money, instead of labour and materials. Labour contribution is 40.90 percent and material contribution is 15.45 percent. The labour contribution varies in both the watersheds. While in NGO implemented watershed areas it is higher among the SC households (42.37 percent) in GO implemented watershed areas, and it is higher among the OBC households (40 percent, Table 3.7).

Table 3.6: Type of contribution in NGO and GO implemented watersheds

Type of participation	Community of the respondent	Size of Landholding of Respondent										Total		
		*MF		**SF		***SMF		****MF		Landless				
		NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	
In terms of money	SC	2		3		2	2						7	2
	ST	1		2	2	3	2						6	4
	OBC	3	4	7	10	4	5	2	6				16	25
	GC		3	4	4	2	6		4				6	17
	Total	6		16		11		2					35	48
Materials	SC			2	2							1	2	3
	ST			3									3	
	OBC		2	4	5		2					2	4	11
	GC		3											3
	Total			9									9	17
Labour	SC	10	6	5	3						10	4	25	13
	ST	5	5	3	6						8	3	16	14
	OBC	5	8	6	6		2				7	2	18	18
	GC													
	Total	20		14							25		59	45

Source: *Field study*, Note- *MF- marginal farmer, **SF- small farmer, ***SMF- semi-medium farmer, ****MF-medium farmer

3.6.2. Tree plantation and development of nursery works

As compared to other works carried out during the implementation phase of watershed tree plantation or horticulture is not done significantly. In NGO implemented watershed, few farmers informed that '*Krusaka Bandhu*' (farmer's friend); the organization created in the village gave seeds only to his relatives and

friends at a subsidised price. Mango trees were planted in 7.5 hectare of community land. PIA also took some initiatives for the nursery development, but farmers did not show much interest. In GO implemented watershed the horticulture work was executed on private land. It comprised of lemon, bamboo, guava plants. The STs and OBC households planted nearby their house and bore wells that help the plants to grow faster. No plantation was done on community land and farmers were not encouraged for the nursery development.

3.6.3. Meetings

In comparison to the preparatory phase, the frequencies of meeting in implementation phase are lesser. In NGO made watershed, during implementation phase the meetings were held on a regular basis. It used to be held on 21st of every month. The topic discussed in the meeting was on the future work to be taken up, such as daily wage labour rate and uses of WHS. In GO implemented watershed, during the implementation phase village meetings were organised thrice a year. Other meetings of WC, SHGs and WDT, were conducted when it was needed, probably twice in three months. The watershed secretary, president and WC members and presidents of all UGs and SHGs along with PIA were only present in the meeting. Meeting was conducted at the president's or watershed secretary's house. Only 46.61 percent of the farmers attended the meeting during the implementation phase (Table: 3.7).

In both the watershed areas, it is observed that semi medium and medium farmers' participation is quite high (around 100 percent in NGO and 76 and 100 percent respectively in GO). Around 56.81 percentage of landless have participated in NGO implemented watershed areas, it is 24.48 percent in GO implemented areas. In the case of marginal farmers, it is 41.93 percent in NGO and 31.63 percent in GO implemented areas (Table 3.7). As the implementation phase creates more labour and other benefits opportunities for all categories of people, it encouraged the rise of participation of beneficiaries. The analysis of caste-based data mentioned in Table 3.7 shows that irrespective of caste and community the participation level has increased in the both GO and NGO implemented watershed areas in comparison to preparatory phase. Even the participation level of ST (62.5 percent) communities in NGO implemented areas is higher than average level of participation (61.67 percent) which was quite lower in the preparatory phase.

While around 59.64 percent of SC and 59.37 percent of OBC communities participated, almost all general communities participated in the implementation phase in NGO implemented watershed areas. The general caste households that are economically well takes more advantage through monetary contribution. However, the analysis shows that the participation level of SC (31 percent), ST (38.29 percent) communities are quite less in GO implemented watershed areas in comparison to preparatory phase. It is quite less compared to average participation level (46.61 percent). So it reflects that the SC and ST communities those are historically marginalised are being excluded from the process of development. The government that has implemented a project to bring an inclusive growth has failed in its implementation.

Table 3.7: Number of respondents attended the meetings in implementation phase of NGO and GO implemented watersheds

Response	Community of the respondent	Size of Landholding of Respondent												Total
		MF*		SF**		SMF**		MF***		Landless				
		NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	NGO	GO	
Yes	SC	12	6	10	5	2	2	0		10	5	34	18	
	ST	6	5	8	8	3	2	0		8	3	25	18	
	OBC	8	14	17	21	4	9	2	6	7	4	38	54	
	GC		6	4	4	2	6	0	4	0		6	20	
	Total	26	31	39	38	11	19	2	10	25	12	103	110	
No	SC	16	21	2		0		0		5	19	23	40	
	ST	9	14	2	6	0		0		4	9	15	29	
	OBC	11	26	5	9	0	6	0		10	7	26	48	
	GC		6		1						2		9	
	Total	36	67	9	16		6			19	37	64	126	
	Grand total	62	98	48	54	11	25	2	10	44	49	167	236	

Source: Field study, Note- MF*- marginal farmer, SF** - small farmer***, SMF** - semi-medium farmer, MF*** - medium farmer

3.7. Level of community participation in monitoring phase

In NGO implemented watershed in monitoring phase the WDT visit sometimes to take the review of on-going watershed works. WC meeting held regularly to discuss the physical and financial progress of the watershed programme. WC is also slightly

aware and monitored the release of funds and payments for the construction of structures. The GO implemented watershed performed poorly in the monitoring and evaluation phase of watershed works. Watershed projects witnesses less or no involvement of WC or local communities in its monitoring. Whenever the WDT or PIA used to review the works going on they only approach watershed secretary or president. They do not even visit all the sites of watershed physical structures to introspect the quality of work undertaken.

3.8. Community participation in maintenance of watershed physical assets in post project phase

After the implementation and monitoring phase, PIA consolidates or withdraws itself from the watershed villages before exit as per the guideline. PIA should consult the watershed beneficiaries regarding the maintenance of the watershed physical structures. They should create such a condition in which WDF can be utilised properly to maintain the created watershed assets. Proper training should be given to the community for the maintenance of structures and ensures sustainability and equity of the benefits of assets among all the beneficiaries. In this regard, PIA is expected to prepare a plan for the maintenance by using the WDF from time to time. *Gram Panchayat (GP)* may use its administrative and financial resources for the maintenance of the assets created during project and other common property resources (CPRs) such as grazing lands, tree plantations on village land. In both the watersheds, *GP* did not play any role in the maintenance of watershed assets. The officials of the PIA complained that farmers' involvement was decreased once they got WHSs or field bunds. On the other hand, farmers revealed that in post-project period insufficient meetings were organised to train or to make them aware regarding the maintenance of watershed assets.

The bund strengthening, clearing weeds and de-silting were the most common forms of maintenance practices which were undertaken. The WDF used in NGO implemented watershed for the maintenance of water tank and planted trees but in GO implemented watershed villagers complained that so far none of the maintenance work took place by using the WDF. The maintenance of watershed structures was more regular on the private land than on the community land. In GO implemented watershed it is observed that a percolation pond shared by 3-5 farmers. The pond is full of mud after the monsoon. But it is not cleaned by the farmers, due their

ignorance. It is found that the maintenance of pond mainly depends on the cooperation among the farmers rather than the rule.

In case of NGO watershed the condition of percolation and farm pond is little better (Plate, 3.1). The absence of coordination and improper communication among the farmers results in a situation like prisoners' dilemma in the case of watershed maintenance. All the farmers want to get more water of the pond; consequently, it degrades the maintenance of the structure, which leads to the situation of Hardin's 'tragedy of commons'. In this situation, everyone wanted to access the maximum water from the common village pond, and ultimately it results in a tragedy or problem of maintaining the pond. Another factor that plays a dominant role in maintenance is the economic status of the farmers irrespective of his caste and community. The marginal and small farmers can maintain the structures if it requires only labour. But for the big cracks and damage in WHS and land bunding which need an investment of money they could not. It is revealed by the two examples given below.

Henna Dharua, a ST small farmer aged 42 living in NGO implemented watershed area, revealed that poor farmers are unable to invest on maintenance of structures. Once the heavy flow of rain water had broken his field bunding. He constructed field bunding by utilizing watershed programme fund and also borrowed some money from his relatives for this work. He expected that after getting good agricultural returns, he would pay back his relatives. But due to agricultural loose, he failed to pay back and remained indebted. This incident ruined his socio-economic life and at present he is depressed.

Source: Field study

Maha Kumbhar aged 40, a SC small farmer from the GO implemented watershed areas show how financial incapability and lack of support from outside agencies ruin the sustainable development. He has three acres of land. He got two thousand rupees from watershed fund for the construction of field bund on his plain land. He constructed field bunding and it worked only for two years. During that period the agricultural productivity of his land has increased, but field bunding broke due the low quality of construction. As he is poor, he cannot effort to repair it. He failed to store the water for his agriculture requirement. And the sustainability of agricultural productivity has decreased.

Source: Field study

The post implementation scenario in NGO implemented watershed shows that while around 50 percent beneficiaries participated in watershed management, it is not

uniform in case of all the communities and land holding groups. The landless (30%) and marginal communities (35%) who really need water for their livelihoods take less interest to participate. The women participation is very minimal that is 20 percent. In case of GO implemented watershed it is 20 percent, 25 percent and 10 percent respectively for landless, marginal and women beneficiaries.

3.8.1. Sustainability of working of village level institutions

After the completion of the watershed project the sustainability of village level institutions such as SHGs, UGs and WC is checked. It is observed that most of the SHGs are not functional in post-project period because of non-cooperation among its members and insufficient revolving fund. Ten SHGs are formed in the NGO implemented watershed areas. However, in the post-implementation phase, only five are functioning. In GO implemented watershed areas, only three out of eight SHGs are functional in the post project phase. Some of the SHGs are functioning successfully in NGO implemented watershed. For example, Sibani SHG runs a hand stitched leaf plate and earned Rs. 3000/- per member. Sabhapati, SHG is currently managing a mid-day meal scheme of the primary school. They also received a loan of Rs. 4.5 Lakhs from Utkal Gramya Bank, Salebhata under the scheme of Swarna Gram Samridhi Yojna (SGSY). In NGO implemented watersheds nearly 60 percent of UGs are functional. The wealthy households are found to be more active because they are more aware about the watershed activities.

Another, institution WC considered as an essential village level institution is also functional. In GO implemented watershed, many SHGs are not functional in the post-project period. Women members informed that improper training given by PIA and no regular revolving fund are the primary causes of non-functioning of SHGs in the post-project period. The functioning of UGs created for the development of natural resources, and maintenance are found to be weak. Only 40 percent are functional. No effort is made to bring awareness to the villagers to take the collective action for the maintenance and functioning of UGs. The duties and rights of WC are not given proper attention. They are dependent on the watershed Secretary to take any decision or clarify any doubts.

3.8.2. Sustainability of livestock

In NGO implemented watershed nearly 60 percent of the livestock did not sustain in the post-project period. According to the villagers, two significant problems caused the unsustainability of livestock. Firstly, lack of marketing facilities and secondly absence of veterinary services at the village. In GO implemented watershed, 70% percent of the livestock did not sustain. Few of the (50 percent) people sold their livestock at the time of drought or to perform some socio-cultural ceremonies. The above discussion clearly brings out the issues involved in people's participation in the watershed development programme and in its management practices. The watershed programmes are not based on the local cultures and needs and hence are not able to evoke the community participation. One of the pre-conditions of watershed programme is to give the membership to recorded landowners. Due to this, the guidelines ignore a larger section of people in the society who do not possess land based on legal rights, the landless and women. Few of the people have distributed their land to all the family members without following proper legal procedures. As a result, the specific rules and conditions mentioned in the watershed guidelines placed them in a problematic situation. It is found from the analysis that the farmers or landless people, who take the land on lease, do not get any irrigation facilities from the watershed. Along with the landless, the women groups are also not benefited much from the watershed.

The customary right of male members over land has deprived women of involving themselves in the watersheds projects. The present study also reveals that the watershed project designed for providing timely, assured and equitable irrigation, ecological restoration and livelihood, failed in achieving desired results. The watershed project also failed to ensure the significant representations of all the social groups, more specifically the SC, ST and women groups in different watershed committees and user groups. Their level of participation is found to be low and not active in the decision-making process. Regarding the watershed guidelines, the representation of SCs, STs, landless and women groups is inadequate. Along with this, the unawareness and ignorance of PIA officials makes the participatory process more complicated. It is observed in the GO implemented watershed that the watershed secretary and the president are unaware of the objectives and rules of the watershed programme.

However, the situation is little better in the NGO implemented watershed. It is found that those attended the meetings or involved in the watershed activities are educated, head reach and farmers doing the crops in *Rabi* season. The participation of illiterate, old, women groups and tail reach farmers is very rare. Despite of the fact that, watershed is an entirely a non-political institution, elite capture (upper caste and class) and political involvement influences its functioning. It is observed that the participation of the beneficiaries in the repair works related to the watershed structures is more often occurred on an individual's land than on community land. In a nutshell a variation is found while analysing the overall situation of participation level of different caste and landholders in all the four phases (preparatory, planning, implementing, post implementation or monitoring and maintenance phase) of watershed programme.

The present chapter also justified the questions raised in the participatory framework given by Uphoff (1986) as discussed in earlier part of this chapter. It is observed that in preparatory phase mostly elite (in terms of caste and class) and big landholders participate more, who have a close association with PIA or with the intention to establish a good rapport with the PIA. They participate more to get the maximum benefits and want to grab the power to run the watershed project. However, the participation of marginal, women and landless is quite less, because of lack of awareness and closeness with the PIA. But the scenario has changed in planning and implementing phase, the marginal, landless and women groups are encouraged to participate in a hope of getting some livelihood sources.

In post implementation phase again the transformation has taken place, those who have ability (in terms of labour, money and materials) to maintain the watershed physical structure, participated more, irrespective of their caste and land holding size. The socio- cultural, institutional, economic, physical and technical factors affect the participation and becomes a major hindrance (will be discussing in detail in the forthcoming chapter). There is a need to address these problems so that the programme becomes more people-oriented. The next chapter will give a detailed picture of it.

CHAPTER-IV

Factors Affecting the Community Participation in Watershed Development Programme

4.1. Introduction

As discussed in the previous chapter, the levels of participation in either of the NGO and GO implemented watershed areas are not satisfactory, because of some socio-cultural, economic, institutional and physical, technical factors. However, the NGO made watershed performed comparatively, well. In this regard, several variables are identified for determining the reasons for non-participation. Even though there have been many policy changes in the implementation of watershed programmes along with the decentralization of power and resource management, there is little awareness about the causes affecting the level and collective action to manage watershed resources. Under a diverse socio-economic condition, setting up any new institution and have people's involvement is a very challenging task. It is not easy to convince all the beneficiaries to participate within a given period. If the community participation is to be institutionalized, especially over the long run it is essential to rationally analysed the variables affecting community participation.

In the present study based on the literature review and beneficiaries' perception, the variables are selected which influence the participation. The descriptive statistics method is used to identify the average response (mean value) regarding the average influence of each variable. Further, the factors and regression analysis is found to be appropriate to consider the influence of independent factors (socio-cultural, economic, intuitional and physical and technical) on dependent factors (community participation).

4.2. Descriptive statistics of participation variables

Table 4.1 and 4.2 reports the average collective response of watershed beneficiaries about their participation. Descriptive statistics summarizes the data in a meaningful and suitable way using quantitative analysis. Descriptive statistics helps in the interpretation of raw data in a more straightforward and precise manner. The mean value shows in Table, 4.1 and 4.2, mainly represents the mean and standard deviation

the each variable included in the study. The mean values of the variables show their impact ranking. The value of each variable identifies the influence of that variable on the participation.

4.2.1. Community participation in different phases of watershed

Variable one stands for the community participation in various phases of the watershed project (Table.4.1 and 4.2). Participation has become essential to make watershed development programme successful. However, variations in community participation are found in different phases of the watershed project (from pre-planning, planning, implementation, post-implementation and participation in meetings and decision-making). To involve the community in pre-planning and post implementation phase of watershed is the biggest challenge for the Planning Implementation Agency (PIA). The participation in pre-planning phase is found to be less as it needs serious efforts of PIA to involve the community (discussed in detail in third chapter). In initial phase of implementation of watershed project people are not very much interested to participate. As they are in dilemma whether they are going to get any benefit or not.

In post implementation phase the number of watershed meetings are less therefore community participation is affected. The table (4.1) and (4.2) shows that, the mean value of pre-planning and post implementation phase of watershed project is 4.06 and 4.09 in NGO implemented and GO implemented watershed, respectively. The mean value of variable post-implementation of NGO and GO implemented watersheds are 4.46 and 4.47 respectively. Apart from different phases of the watershed implementation project, two crucial activities in which they participate are watershed meetings and decision-making process. In NGO implemented watershed area, the mean = 4.46 is associated with the participation in meetings and mean value = 4.40 with decision-making participation. While in case of GO implemented watershed, the mean value of participation in meeting is 4.30 and mean value of decision making is 4.20.

4.2.2. Socio-cultural variables

Variable two stands for the perception of NGO and GO implemented watershed beneficiaries towards the socio-cultural variables that influence their participation (Table 4.1, 4.2). The mean and standard deviations in beneficiaries' responses

towards many socio-cultural drivers of participation in the watershed project are analysed. In NGO implemented watershed areas, conflict (variable) among different stakeholders has been perceived as the most significant variable of participation in the watershed project (mean = 4.29). Awareness of the watershed programme follows this with a mean value of 4.28. In case of GO implemented watershed both the variables, conflict (mean = 4.28) and awareness (mean value = 4.28) are found to be important determinants of participation.

4.2.3. Institutional variables

The institutional variables influencing the participation in watershed programme are associated with implementing agency (NGO or Government), property rights (whether private, central, state and common property regime), natural resource treatment works (like soil and water conservation activities, contour bunding, check dams, farm ponds, village pasture land.), level of participation in previous rural development project, the size of watershed user groups, trust and misconception or no clarity over the meaning of participation among the external agents. The beneficiaries' perceptions about the institutional factors affecting participation in watershed development programme are presented in Tables 4.1 and 4.2. In NGO made watershed the variables, type of PIA (mean = 4.19) and property rights (mean = 4.15) were found to be the significant variables influencing the participation. However, in GO implemented watershed, the variable, type of PIA (mean = 4.25) was found to be significant followed by variable property rights (mean = 3.83).

4.2.4. Economic variables

The economic benefit is one of the manifested outcomes of any watershed project that is why it is viewed as an important variable that may have a direct impact on participation. The leading economic variables of community participation in the watershed project include livelihood sources, equal distribution of watershed project benefits, poverty and market linkages. It is observed that livelihood is the important economic variable with the mean score of 4.03, in NGO and 4.04 in GO implemented watersheds.

4.2.5. Physical and technical variables

The result of descriptive statistics depict that, among all the studied variables the physical and technical variables have a comparatively minor impact on participation. However, it was found that the interaction with the technical officials and other PIA officials is one of the critical variables that affect the participation. This variable secured the highest ranking (mean = 3.93 in NGO and mean = 3.95 in GO implemented watershed).

After the descriptive statistics analysis, the reliability test was carried out to measure the internal consistency of the scale. For this purpose, Cronbach alpha coefficient was used. A value greater than 0.7 for Cronbach alpha (coefficient α) is used to ensure the internal consistency. Then the factor analysis is conducted to detect and remove the highly correlated variables from the empirical data and to restrict the variables within a certain number of groups.

**Table 4.1: Descriptive statistics of participation variables
(NGO implemented watershed area)**

Sl no.	Variables	Mean	Std. Deviation	Number of households
1	(V1) Participated in pre-planning phase	4.06	1.004	167
	(V2) Participation in planning phase	4.32	.761	167
	(V3) Participation in implementation phase	4.46	.674	167
	(V4) Participation in post implementation phase	4.46	.628	167
	(V5) Participation in meetings	4.46	.751	167
	(V6) Participation in decision making in watershed activities	4.40	.757	167
	(V7) Participation in maintaining the watershed structures	4.43	.749	167
2	(V8) Conflict among differ stakeholders (between PIA and beneficiaries or between land holders and landless)	4.29	.739	167
	(V9) Awareness about the watershed programme	4.28	.735	167
	(V10) Promotion of traditional and historical practices devised by local communities to conserve the natural resources	3.69	1.170	167
	(V11) Gender of the watershed beneficiaries	3.89	1.141	167
	(V12) Village politics	3.29	.856	167
	(V13) Power differential among the different cast and class people	3.72	1.085	167
	(V14) Level of social solidarity among the beneficiaries	3.67	1.205	167
	(V15) Heterogeneity in terms of cast and land holding	3.64	1.272	167
	(V16) Local leadership to mobilize the community for participation	3.49	1.251	167
(V17) Illiteracy of the beneficiaries	3.59	1.267	167	
3	(V18) Type of planning implementing agency (PIA) of watershed Project	4.19	.882	167
	(V19) Property rights over the watershed resources	4.15	.750	167
	(V20) Natural resource treatment work under taken during the implementation of watershed project	3.90	1.209	167
	(V21) Water availability	3.68	.701	167
	(V22) Level of people's participation in previous project	3.82	1.142	167
	(V23) The size of watershed user group	3.81	1.124	167
	(V24) Trust between PIA and communities	3.77	1.216	167
(V25) Misconception over the meaning of Participation	3.93	1.183	167	
4	(V26) Sustainability of livelihoods provided by the watershed	4.03	1.174	167
	(V27) Unequal distribution of the benefits by	3.87	1.037	167

	watershed to landless and land owning households			
	(V28) Poverty of the beneficiaries	3.84	1.032	167
	(V29) Number of family members working	3.35	1.026	167
	(V30) Good market linkages to sell the agricultural products	3.74	1.163	167
5	(V31) Land tenure system, whether it is temporary or permanent land Ownership	3.83	1.024	167
	(V32) Interaction with the technical officials and other PIA officials	3.93	1.154	167
	(V33) The percentage of land under village commons or open access	3.89	1.227	167
	(V34) The available infrastructure to access the watershed resources	3.72	1.101	167
	(V35) Environmental condition	3.69	1.312	167

**Table 4.2: Descriptive statistics of participation variables
(GO implemented watershed area)**

Sl no.	Variables	Mean	Std. Deviation	Number of households
1	(V1) Participation in pre-planning phase	4.09	.993	236
	(V2) Participation in planning phase	4.28	.853	236
	(V3) Participation in implementation phase	4.49	.655	236
	(V4) Participation in post implementation phase	4.47	.686	236
	(V5) Participation in meetings	4.30	.740	236
	(V6) Participation in decision making in watershed activities	4.20	.750	236
	(V7) Participation in maintaining the watershed structures	4.30	.687	236
2	(V8) Conflict among differ stakeholders (between PIA and beneficiaries or between land holders and landless)	4.28	.753	236
	(V9) Awareness about the watershed programme	4.28	.754	236
	(V10) Promotion of traditional and historical practices devised by local communities	3.50	1.201	236
	(V11) Gender of the watershed beneficiaries	3.85	1.153	236
	(V12) Village politics	3.74	1.134	236
	(V13) Power differential among the different cast and class people	3.66	1.113	236
	(V14) Level of social solidarity among the beneficiaries	3.56	1.242	236
	(V15) Heterogeneity in terms of cast and land holding	3.69	1.183	236
	(V16) Local leadership to mobilize the community for participation	3.63	1.219	236

	(V17) Illiteracy of the beneficiaries	3.64	1.262	236
3	(V18) Type of planning implementing agency (PIA) of watershed Project	4.25	.865	236
	(V19) Property rights over the watershed resources	3.83	1.218	236
	(V20) Natural resource treatment work under taken during the implementation of watershed project	3.97	1.148	236
	(V21) Water availability	3.87	1.150	236
	(V22) Level of people's participation in previous project	3.69	1.249	236
	(V23) The size of watershed user group	3.77	1.134	236
	(V24) Trust between PIA and communities	3.82	1.127	236
	(V25) Misconception over the meaning of Participation	4.12	.797	236
4	(V26) Sustainability of livelihoods provided by the watershed	4.04	1.127	236
	(V27) Unequal distribution of the benefits by watershed to landless and land owning households	3.75	1.150	236
	(V28) Poverty of the beneficiaries	3.88	1.005	236
	(V29) Number of family members working	3.76	1.009	236
	(V30) Good market linkages to sell the agricultural products	3.88	1.014	236
5	(V31) Land tenure system, whether it is temporary or permanent land Ownership	3.91	1.213	236
	(V32) Interaction with the technical officials and other PIA officials	3.95	1.121	236
	(V33) The percentage of land under village commons or open access	3.81	1.053	236
	(V34) The available infrastructure to access the watershed resources	3.74	1.086	236
	(V35) Environmental condition	3.68	1.073	236

4.3. Reliability test

Reliability test is carried out in research, to understand whether the questions in the questionnaire reliably measure the same latent variable (Rao, 2015). It helps in finding reliable cases for the analysis. In the present study, after collecting the data through a questionnaire survey, a reliability test was carried out on 35 variables using the Cronbach alpha coefficient method (Table, 4.3). The Cronbach alpha is found to be 0.936 in NGO implemented watershed area and 0.931 in GO implemented watersheds reveals the consistency among selected variables (Nunnally, 1978). These results support the validity and reliability of the questionnaire to measure the participation variables in a meaningful way.

Table 4.3: Reliability statistics

Type of PIA	Cronbach alpha	N of items
NGO	.936	35
GO	.931	35

4.4. Factor analysis

The purpose of factor analysis is to categorize a large number of variables or factors into small groups. These factor groups of data should be able to represent the relationships among the most considerable number of inter-related variables. In general, it is used to reduce a large number of variables into a few categories and group them on the basis of similar characteristics. In the present study, this technique is used to determine the groupings and reduce many variables into a few dimension/factors that affect the participation. Further, these factors are considered for the analysis. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity was carried out (Table 4.4) to check the sample adequacy (167 households of NGO and 236 households of GO made watershed) for factor analysis. The primary function of KMO test is to verify the sampling adequacy; ideally it should be more than 0.5. The values between 0.7-0.8 come under the category of acceptable, and values that are above 0.9 are excellent for the analysis. Bartlett's test is done to check the intensity of relationship among variables.

In view of Panda et al. (2012, p.445), "Bartlett's test of sphericity, tests whether the correlation matrix is an identity matrix, which would indicate that the factor model is inappropriate". The score of KMO and Bartlett's test of sphericity are found to be highly significant. In NGO made watershed area KMO measure was 0.874 while in GO made watershed KMO measure was 0.879. The generated scores of KMO (Table 4.4) from both the watershed areas supported the suitability of the data for the factor analysis. The Bartlett's test of sphericity is also measured and found to be significant (sig.). The value 0.000 in both the watershed areas demonstrates the importance of the study and show the validity and appropriateness of the responses gathered. Both the tests conducted revealed that sample size, questionnaire and data are found to be appropriate for the factor analysis of our study.

Table 4.4: Kaiser-Meyer-Olkin Measure (KMO) and Bartlett's Test

NGO implemented watershed	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.874
	Bartlett's Test of Sphericity	
	Approx. Chi-Square df Sig.	3249.471 435 0.000
GO implemented watershed	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.879
	Bartlett's Test of Sphericity	
	Approx. Chi-Square df Sig.	4318.829 435 0.000

4.4.1 Communalities

The Communalities signify the total amount of variance that the original variable shares with all other variables taken for the analysis. The Communalities are considered during the analysis to assess the acceptable levels of explanation of the included variables. Table 4.5 depicts the Communalities. Table 4.5 has two columns first column is the serial number of variables and questions (V1, V2, V11, V12....), the second one is extraction. The principal component analysis assumes initially that all the variance between all the variables is common. The proportion of the difference (variance) explained by the different variable shows Communalities. The primary function of the Communalities is to represent the quantity of variance explained in every variable with remaining variables that are found after the extraction (Table 4.5, extraction column).

While checking the Communalities or the variance, the thumb rule is that the commonalities of the variables should have a value greater than 0.50. If it is less than 0.50, then it is considered that the variable does not have sufficient explanation and is not being considered for the analysis. In this regard 5 variables have dropped from the analysis (V7, V12, V21, V29, and V35, Table. 4.5). These variables have communalities lesser than 0.50. In the present study, all the 30 variables of NGO and GO watersheds have commonalities greater than 0.50. Therefore, all of them have taken for the further analysis. 5 variables have dropped from the analysis as they have

Communalities less than 0.50. Table 4.5 shows the output of variables extracted through principal component analysis.

4.4.2. Initial Eigen values

The output of Table 4.6 shows the Eigen values related to each linear component (factor) before extraction, after extraction and rotation. The Eigen values related to each factor demonstrates the variance described by that specific linear component². The Eigen value is explained through percentage (Table 4.6, column 3, percent of variance). The first few factors are ordered according to their amount of variance and then subsequent factors. The subsequent factors do not explain greater amount of variance.

Table 4.5: Communalities

GO		NGO	
Sl no.	Extraction	Sl no.	Extraction
V1	.670	V1	.612
V2	.669	V2	.657
V3	.675	V3	.540
V4	.516	V4	.591
V5	.539	V5	.471
V6	.537	V6	.553
V7	.340	V7	.345
V8	.734	V8	.685
V9	.751	V9	.770
V10	.705	V10	.721
V11	.750	V11	.739
V12	.325	V12	.380
V13	.768	V13	.785
V14	.583	V14	.639
V15	.625	V15	.634
V16	.531	V16	.555
V17	.534	V17	.429
V18	.720	V18	.659
V19	.794	V19	.794
V20	.865	V20	.850
V21	.421	V21	.490
V22	.609	V22	.563
V23	.762	V23	.742

² For the further information, see the official webpage of sage publication at <http://www.sagepub.com/field4e/study/smartalex/chapter17.pdf>

V24	.725	V24	.688
V25	.678	V25	.763
V26	.876	V26	.825
V27	.657	V27	.811
V28	.578	V28	.869
V29	.290	V29	.347
V30	.745	V30	.780
V31	.823	V31	.830
V32	.846	V32	.789
V33	.735	V33	.756
V34	.678	V34	.834
V35	.375	V35	.280

Notes: Extraction Method: Principal Component Analysis

While running the SPSS for this purpose, it extracts all the factors having Eigen value more than 1. Factor extraction is done by calculating the Eigen values of the R-matrix. R-matrix is a correlation matrix; it shows the correlation coefficient between each pair of variables. To analyse the importance of any component (Eigenvector), the extent of the associated Eigen values is looked into. SPSS uses Kaiser’s standard of retaining factors, having Eigen values greater than 1 (Field, 2009a). In the present study, all the variables have Eigen values greater than 1. In the NGO implemented watershed area, the five extracted factors capture 64.274 percent of the variance of the 30 items; it can be estimated sufficient in terms of explained total variance. However, in case of GO implemented area, it is 63.082 percent of the variance. The five extracted factors are labelled as “Community participation”, “Socio-cultural”, “Economic”, “Institutional” and “Physical-technical”, respectively.

4.4.3 Extraction Sums of Squared Loadings

This section deals with the number of factors retained. The number of rows is made according to the number of factors retained. In the present study, the five rows in Table 4.6 correspond to five factors retained. The values are calculated based on their common variance. However, the values in this panel of table are comparatively always lower than the values of left panel of Table (labelled as Rotation Sums of Squared Loadings) as they are established on the common variance and are lesser than the total variance.

Table 4.6: Factors Extracted through Principal Component Analysis of sampled households of both the studied watersheds

NGO implemented watershed									
*C	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	**PV	***CP	Total	**PV	***CV	Total	**PV	***CP
1	9.781	32.605	32.605	9.781	32.605	32.605	5.761	19.204	19.204
2	3.512	11.708	44.313	3.512	11.708	44.313	4.509	15.029	34.233
3	2.644	8.814	53.127	2.644	8.814	53.127	3.593	11.977	46.210
4	2.150	7.165	60.292	2.150	7.165	60.292	3.037	10.125	56.335
5	1.264	4.213	64.505	1.264	4.213	64.505	2.382	7.939	64.274
GO implemented watershed									
*C	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	**PV	***CP	Total	**PV	***CP	Total	**PV	***CP
1	9.312	31.041	31.041	9.312	31.041	31.041	5.673	18.911	18.911
2	3.282	10.940	41.980	3.282	10.940	41.980	4.607	15.358	34.268
3	2.582	8.605	50.585	2.582	8.605	50.585	3.193	10.643	44.912
4	2.406	8.019	58.605	2.406	8.019	58.605	2.927	9.757	54.669
5	1.367	4.555	63.160	1.367	4.555	63.160	2.524	8.413	63.082

Notes: *Component, **Percent of variance, ***Cumulative Percent

4.4.4. Rotation Sums of Squared Loadings

The last column of the Table 4.6 labelled as rotation sums of squared loadings represents the Eigen values of the factors after rotation. Rotation enhances the factors structure and helps in equalizing the relative importance of all the studied factors. In NGO implemented watershed, it has demonstrated that before rotation the variance of factor 1 was 32.605 percent that is higher than other four factors (11.708 percent, 8.814 percent, 7.165 percent and 4.213 percent). While after extraction the percentage of variance of factor 1 stands at only 19.204 percent of the variance. In GO made watershed, the variance of factor 1 was 31.041 percent, as higher than other four factors (10.940 percent, 8.605 percent, 8.019 percent and 4.555 percent). After extraction, the variance level of factor 1 is 18.911 percent. However, in NGO implemented watershed area, together all the components significantly explain the

64.274 percent of the variance. In case of GO implemented watershed area all the components shows the 63.082 percent of the variance (Table 4.6)

In Table 4.6, this column (Total) shows the Eigen values. It can be observed that the first component always contains most variance and has the highest Eigen value. And the next and successive components account for as lesser variance. Table 4.6 shows that in NGO implemented watershed area the first component has highest variance the successive component 9.781, similarly in case of GO made watershed, the first component variance is 9.312.

4.4.5. Cumulative percent

The cumulative percentage column in Table 4.6 represents the variance accounted for the first and all subsequent principal components.

4.4.6. Rotated component matrix

The rotated component matrix in factor analysis is called as Rotated factor matrix in factors analysis. Before the rotation, the factor loading the factor matrix is done. The factors loadings in factor matrix cannot be easily interpreted. In factor matrix, one variable may have high loadings on one or more than two other factors. Therefore, rotation factor matrix is done to make the factor loadings interpretable. Table 4.7 and 4.8 shows the factor loadings of the extracted factors after varimax rotation. Varimax rotational method is used in the present study to get more simple and significant factor solutions. Generally in we find some variables corresponding to a particular factor in the rotated component matrix. Once we obtain these variables, we can assign them to a particular factor and give a suitable name to that factor.

From both the tables (Table 4.7 and 4.8), we find the number of variables that correspond to a particular factor. For example in NGO and GO implemented watershed areas, Factor 1 comprises of nine variables, conflict, awareness, traditional and historical practices to conserve the natural resources, gender, power differential, social solidarity, heterogeneity, local leadership, illiteracy. In this case, these variables can be clubbed together and termed as socio-cultural factors. Similarly, Factor 2 contains seven variables named, type of PIA, property rights, natural resource treatment work, participation in the previous project, the size of the

user group, trust and misconception over meaning of participation. Together all these variables created a factor called, Institutional factor.

In case of Factor 3, the variables are participation in the pre-planning phase of watershed, planning phase, implementation phase, post-implementation phase, participation in meeting and decision making constitutes the factor named, community participation. The variables sustainability of livelihood, unequal distribution, and poverty and market linkage suitably fit into the economic factor. However, the variables land tenure system, interaction with PIA officials, land under village commons and accessibility to infrastructure are clubbed together and termed as the physical and technical factor. Based on the results of factor analysis method, it can be concluded that firstly the 30 variables were grouped under the five dimensions or the factors according to their factor loading value. The result of high loading of the variable shows the strong influence of factor on the variable. The arranged rotated values of factor loading with values 0.5 have been taken for further analysis. The purpose of factor loading is to predict the extent of the factor to explain a variable.

Table: 4.7: Rotated component matrix (NGO implemented watershed area)

Loaded Items	Factor Loadings				
	F1	F2	F3	F4	F5
F 1: Community Participation					
(V1) Whether participated in pre-planning phase	0.795				
(V2) Participation in planning phase	0.788				
(V3) Participation in implementation phase	0.754				
(V4) Participation in post implementation phase	0.642				
(V5) Participation in meetings	0.577				
(V6) Participation in decision making in watershed activities	0.559				
F 2: Socio-cultural factors					
(V8) Conflict among differ stakeholders (between PIA and beneficiaries or between land holders and landless)		0.834			
(V9) Awareness about the watershed programme		0.832			
(V10) Promotion of traditional practices devised by local communities		0.822			
(V11) Gender of the watershed beneficiaries		0.797			
(V13) Power differential among the different cast and class people		0.778			
(V14) Level of social solidarity among the beneficiaries		0.773			
(V15) Heterogeneity in terms of cast and land holding		0.732			
(V16) Local leadership to mobilize the community for participation		0.514			
(V17) Illiteracy of the beneficiaries		0.485			
F 3: Institutional factors					
(V18) Type of planning implementing agency (PIA) of watershed project			0.841		
(V19) Property rights over the watershed resources			0.800		
(V20) Natural resource treatment work under taken during the implementation of watershed project			0.786		
(V22) Level of people's participation in previous project			0.741		
(V23) The size of watershed user group			0.712		
(V24) Trust between PIA and communities			0.688		
(V25) Misconception over the meaning of Participation			0.560		
F 4: Economic factors					
(V26) Sustainability of livelihoods provided by the watershed				0.841	

(V27) Unequal distribution of the benefits by watershed to landless and land owning households				0.904	
(V28) Poverty of the beneficiaries				0.831	
(V30) Good market linkages to sell the agricultural products				0.784	
F 5: Physical-technical factors					
(V31) Land tenure system, whether it is temporary or permanent land ownership					0.688
(V32) Interaction with the technical officials and other PIA officials					0.659
(V33) The percentage of land under village commons or open access					0.632
(V34) The available infrastructure to access the watershed resources					0.518

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization, a. Rotation converged in 5 iterations

Table: 4.8: Rotated component matrix (GO implemented watershed area)

Loaded Items	Factor Loadings				
	F1	F2	F3	F4	F5
F 1: Community Participation					
(V1) Whether participated in pre-planning phase	0.761				
(V2) Participation in planning phase	0.726				
(V3) Participation in implementation phase	0.723				
(V4) Participation in post implementation phase	0.691				
(V5) Participation in meetings	0.602				
(V6) Participation in decision making in watershed activities	0.544				
F 2: Socio-cultural factors					
(V8) Conflict among differ stakeholders (between PIA and beneficiaries or between land holders and landless)		0.850			
(V9) Awareness about the watershed programme		0.815			
(V10) Promotion of traditional practices devised by local communities		0.813			
(V11) Gender of the watershed beneficiaries		0.798			
(V13) Power differential among the different cast and class people		0.784			
(V14) Level of social solidarity among the beneficiaries		0.775			
(V15) Heterogeneity in terms of cast and land holding		0.762			
(V16) Local leadership to mobilize the community for participation		0.542			
(V17) Illiteracy of the beneficiaries		0.498			
F 3: Institutional factors					
(V18) Type of planning implementing agency (PIA) of watershed project			0.644		

(V19) Property rights over the watershed resources			0.816		
(V20) Natural resource treatment work under taken during the implementation of watershed project			0.815		
(V22) Level of people's participation in previous project			0.749		
(V23) The size of watershed user group			0.749		
(V24) Trust between PIA and communities			0.735		
(V25) Misconception over the meaning of Participation			0.831		
F 4: Economic factors					
(V26) Sustainability of livelihoods provided by the watershed				0.824	
(V27) Unequal distribution of the benefits by watershed to landless and land owning households				0.909	
(V28) Poverty of the beneficiaries				0.808	
(V30) Good market linkages to sell the agricultural products				0.794	
F 5: Physical-technical factors					
(V31) Land tenure system, whether it is temporary or permanent land ownership					0.761
(V32) Interaction with the technical officials and other PIA officials					0.729
(V33) The percentage of land under village commons or open access					0.640
(V34) The available infrastructure to access the watershed resources					0.614

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization, a. Rotation converged in 5 iterations.

4.5. Community participation in watershed project

Factor loadings in Table 4.7 and 4.8 of both the NGO and GO implemented watersheds, show that almost all the variables of community participation is on the higher side. Higher factor loading of the variables indicates that these variables influence the participation process significantly. Highest factor loading of variable pre-planning phase, (0.795) in NGO implemented and (0.761) in GO implemented watershed shows that, it is most essential variable which the influence the overall participation. Along with the pre-planning phase of watershed project other phases of watershed project needs proper attention to involve the community.

4.5.1. Socio-cultural variable

The high factor loading value of 0.834 of the variable conflict, in NGO, implemented watershed area and 0.850 in GO implemented watershed indicates that this variable strongly influences the socio-cultural factor. During the field study number of case studies of conflict (discussed in detail in chapter five) has found. The conflict mainly took place between PIA and watershed beneficiaries, and between the farmers. The causes of conflict was mainly concentrated on the sharing and distribution of the watershed project resources. Before the watershed project the villagers used to approach village chief for conflict resolution. But after watershed project the conflict resolution process becomes complex and now villagers are approaching the watershed officials for conflict resolution. Apart from the conflict other variables have also covered under the social-cultural factors, which affect the participation. These variables include awareness, traditional practices, gender, cast, class and level of social solidarity, heterogeneity, local leadership and Illiteracy. If community is aware about the programme and their traditional practices are encouraged in the participation they come forward for the participation. The male member participation is found to higher as most of the land related activities are carried out by them, the women, lower caste and class participation is low. Heterogeneity, leadership and illiteracy also affect the participation.

4.5.2. Institutional variable

In NGO implemented watershed high factor loading of the variable type of PIA (0.841) and in GO implemented watershed high factor loading of variable misconception over the meaning of participation (0.831), shows that theses variables strongly influences the overall institutional variable. It is observed that in NGO implemented watershed that the approach of PIA plays a significant role to involve the community. The beneficiaries are mainly motivated to participate in case they are confident over the PIA' work. However, in GO implemented watershed the variable, misconception over the meaning of participation found to be essential to involve the community. The PIA failed to explain the meaning of participation to the community. Therefore while implementing the watershed project; these variables need to be addressed adequately. If the property rights is well defined and the natural resource activities give direct benefits then the

participation is high. On the other hand level of participation in previous project is high then the community is more confident to participate. The smaller group of people are easily motivate for their involvement. The variable ‘trust between community and watershed officials is also found to be relevant.

4.5.3. Economic variable

Factor loading is high in case of variable ‘equal distribution of benefits of watershed resources’, it is found to be (0.904 in NGO and 0.909 in GO implemented watersheds). In watershed project the unequal distribution of watershed benefits is one of the important issues. The inequality of resource distribution is found between the landless and land owner community. The land owner community gets more benefits in terms of water harvesting structures, land levelling and other land related benefits. In case of landless they don’t get land related benefits. In this case, equal distribution of the benefits should be done among all the watershed beneficiaries to resolve the issue of inequality and poverty. Other economic variables such as sustainability of livelihoods, poverty and good market linkages also influence the participation.

4.5.4. Physical and technical variables

The factor loading was found to be high in the case of the variable, type of land ownership (whether temporarily or permanent) 0.688 in NGO implemented watershed, and 0.761 in GO implemented watershed. This variable mainly influences the overall physical and technical variables. It is observed that the permanent land holders have come first for the participation then the temporary and landless community. This is because watershed project primarily focuses on land and water development works. The variables like Interaction with the technical officials, land under village commons and available infrastructure are held responsible for the low participation. Frequent number of interaction establishes good rapport between officials and community. After the factor loadings of all the variables are complete, the five dimensions of study are identified and presented in Table 4.9. The identification of five dimensions of the present study is followed by the correlation analysis. Correlation analysis is applied to find out the positive or negative relationship between the dependent (community participation) and all

the four independent factors (socio-cultural, economic, institutional, and physical-technical).

Table 4.9: Factors/dimensions of the study

Sl.no.	Participation dimensions	Variables
1	Participation (Dependent)	Participated in pre-planning phase
		Participation in planning phase
		Participation in implementation phase
		Participation in post implementation phase
		Participation in meetings
		Participation in decision making in watershed activities
Factors affecting participation		
2	Social-cultural factors	Conflict
		Awareness
		Traditional and historical practices
		Gender
		Power differential
		Social solidarity
		Heterogeneity
		Local leadership
3	Institutional factors	Type of planning implementing agency (PIA)
		Property rights
		Natural resource treatment work
		Participation in previous project
		The size of user group
		Trust between PIA and communities
		Misconception over the meaning of participation
4	Economic factors	Sustainability of livelihoods
		Unequal distribution of the benefits
		Poverty
		Market linkages
5	Physical-technical factors	Land tenure system
		Interaction with the technical officials and
		Land under village commons
		Infrastructure availability

4.6. Correlations analysis

Table 4.10 (Pearson Correlations) indicates the relation between different dimensions. The correlation coefficient is the degree of the strength of the linear relationship between two dimensions. Field (2009b) says that “primarily the most important criterion is that the

significance value is less than 0.5”. However, if exact significance value is much lower, then we can be much more confident about the strength of the experimental effect. The values we use are 0.05, 0.01, and 0.001 (p.193). The correlation coefficient carries the values ranging between +1 and -1. The zero value shows that there is no relationship between dimensions. A+1 value represents the perfect positive relationship. It means that if one dimension changes its value, then other dimensions also amend its value. However, in case of -1, it shows the negative relationship. If one dimension increases its value, the other one will not increase its value. Values ranging between 0 and 0.3 (0 and -0.3) indicate weak positive relationships. Values between 0.3 and 0.7 (0.3 and -0.7) point out a moderate positive relationship. The values ranging between 0.7 and 1.0 (-0.7 and -1.0) shows a highly positive (negative) relationship. In the present study, none of the correlations is found to be non-significant or having the value of p bigger than 0.001. Inter-correlation between the dimensions varies between low to moderate values. The socio-cultural (value 0.292) and institutional (value 0.598) dimension are found to be highly correlated with each other in NGO made watershed. It shows the positive relationship that means change in socio-cultural value will affect the institutional value. After correlation is over, the regression analysis is carried out to find out the effect of each factor on overall community participation.

Table 4.10: Correlation between dimensions (Pearson Correlations)

NGO implemented watershed area					
Factors	Participation	Economic	Institutional	Physical-technical	Socio-cultural
Participation	1				
Economic	.567**	1			
Institutional	.401**	.344**	1		
Physical-technical	.210**	.228**	.178**	1	
Socio-cultural	.413**	.292**	.598**	.133**	1
GO implemented watershed area					
Factors	Participation	Institutional	Economy	Physical-technical	Socio-cultural
Participation	1				
Institutional	.303**	1			
Economy	.515**	.345**	1		
Physical-technical	.222**	.167*	.194**	1	
Socio-cultural	.330**	.524**	.388**	.120	1

*Correlation is significant at 0.05 level (two-tailed)

**Correlation is significant at 0.01 level (two-tailed)

4.7. Regression analysis

Regression analysis refers to the statistical procedure that helps in establishing the relationships among variables. Regression analysis uses the empirical data for finding out; to what extent all the four independent factors affect the community participation in the watershed programme. Four factors socio-cultural, institutional, economic and physical technical are found to be significant for participation and acts as predictors of the criterion variable (community participation). Table 4.11 and 4.12 of both the NGO and GO implemented watershed show the results of regression analysis. Tables indicate a range of unstandardized and standardized coefficients. In Table 4.11 and 4.12, Model 1 of NGO and model 2 of GO watershed, the 'Economic' variable (0.474 in NGO and 0.427 in GO implemented watershed) obtains the highest beta coefficient. It indicates the higher significance among other predictors in the Model. The t-value for the significance of each of the four predictors represents significance at 0.05 and 0.01 levels. Table 4.11 and 4.12 also provides obtained value for R (correlation coefficient), R Square (Regression coefficient) and adjusted R Square.

In this present study, the R value is found to be 0.632 in NGO made watershed and 0.576 in GO made watershed, signifies the higher level of correlation. It tells that all the four independent variables (socio-cultural, economic, institutional and physical technical) positively correlate with the dependable variable (community participation). Statistically, it is found to be true that the higher the value of R square implies, higher the level of explanatory power of the model. In the present study, the value of R square is 0.399 in NGO implemented watershed. This R-square value indicates that the predictor variables can explain 39 percent of the variance in the dependent variable. In case of GO implemented watershed, the value of R square is 0.332. Similarly, the predictor or independent variables explain the prediction of the 33 percent of the variance in the dependent variables. The external predictors will explain remaining variations.

The Adjusted R square represents the appropriateness of the model. Ideally adjusted R square value should be equal to or close to the value of R square. In both the models

(Model 1 of NGO implemented and Model 2 of GO implemented watersheds), the value of adjusted R square is 0.385 and 0.320 respectively. These adjusted R square values are close to the R square value of 0.399 and 0.332 respectively. These values support the fitness of the model. The standard error value of 0.45094 of Model 1 and 0.48668 of Model 2 indicates the reliable explanation of the model. Durbin-Watson Statistics (D-WS) helps to detect the autocorrelation problem present in the model. The ideal value of D-WS is 2. In both the models of our study, we find the value of Durbin-Watson (D-WS) is 1.919 and 1.751 respectively. It means that there is no autocorrelation present among the variables included in the model. The analysis of variance is carried out by taking into account these factors as predictor to identify the difference between the participation factors, such as socio-cultural, economic, institutional, physical-technical.

Table 4.11: Results of regression analysis of NGO implemented watershed

1 Model	Unstandardized Coefficients		Standardized Coefficients	t	Sing.
	B	Std. Error	β		
(Constant)	1.272	0.297		4.290	.000
Economic	0.474	0.069	0.455	6.857	.000
Institutional	0.066	0.047	0.111	1.417	.048
Physical-technical	0.034	0.036	0.060	.953	.042
Socio-cultural	0.134	0.050	0.206	2.690	.008
Model 1	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	0.632	0.399	0.385	0.45094	1.919

Predictors: (Constant), Socio-cultural, physical-technical, institutional

Dependent variable: Participation

Table 4.12: Results of regression analysis of GO implemented watershed

2 Model	Unstandardized Coefficients		Standardized Coefficients	t	Sing.
	B	Std. Error	β		
(Constant)	1.481	0.266		5.571	0.000
Economic	0.427	0.062	0.405	6.896	0.0000
Institutional	0.069	0.039	0.113	1.764	0.042
Physical-technical	0.037	0.033	0.062	1.126	0.031
Socio-cultural	0.128	0.044	0.187	2.902	0.004
2 Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	0.576	0.332	0.320	0.48668	1.751

Predictors: (Constant), Socio-cultural, physical-technical, institutional

Dependent variable: Participation

4.8. Analysis of variance

Table 4.13 shows two ANOVA models, one each from NGO and GO implemented watershed areas. The residual of an observed value represents the deviation between the observed value and the expected value of the statistical error that are not observed. In simple terms, it is the observable quantity of the statistical error that has not been observed (for example, a sample mean value). The use and concept of residual and statistical error can be best explained by taking the example of the current data set. In the present study, the sample mean may be able to represent properly the whole population mean. But in this case, we can say that the difference between the response of each sample watershed beneficiaries and unobservable population mean (entire population of watershed beneficiaries) is called a statistical error.

However, the variance of the response of each watershed beneficiaries in a taken sample and the observable sample mean denotes a residual value. The Sum of Squares signifies three sources of variance viz; Model, Residual and Total. The ‘Total’ variation is the separations into the difference that can be represented by the independent variables (Regression) and the difference that cannot be represented by the independent variables (Residual). In the analysis of the variance, the term ‘df’ stands for the degrees of freedom

related to the sources of variance. In any case, the total variance has N-1 degrees of freedom. The regression degrees of freedom are equal to the number of coefficients calculated minus one.

The Mean Square is defined as the number of Squares divided by their particular degree of freedom. In our study together with five coefficients (including the intercept), the degrees of freedom for the model is given as $5 - 1 = 4$. The error in degrees of freedom is given by $df = 166 - 4 = 162$ in case of NGO implemented watershed area. While in GO implemented watershed area, it is given as $235 - 4 = 231$. The F statistics show the acceptability chances of the model. In other words, a predictor having low p-value probably indicates the acceptability of the model, as the changes in the predictor's value are associated with variations in the response variable.

The R square value (0.399 in case of NGO made (Table 4.11) and 0.332 (Table 4.12) in GO made watershed area) is supported by the $F = 26.938$ ($p < 0.05$, Table 4.13) in NGO and 28.710 ($p < 0.05$) in GO implemented watershed areas. This is significant at 5 percent level of significance (the sin. value is less than 0.05). Apart from this, the standard estimate of error (Table. 4.11 and 4.12) value is 0.45094 in NGO made watershed and 0.48668 in GO made watershed areas clearly indicates the reliable prediction of the model. Thus, we can conclude that the model correctly fits into our present study for analysis. The results of variance analysis show that the four selected dimensions are substantially different from each other. The following regression equation is made based on the independent and dependent variables considered during the study.

Table 4.13: Analysis of variance

NGO implemented watershed area						
1	Model	Sum of Squares	Df	Mean Square	F	Sig.
	Regression	21.911	4	5.478	26.938	.000
	Residual	32.942	162	.203		
	Total	54.853	166			
GO implemented watershed area						
1	Model	Sum of Squares	Df	Mean Square	F	Sig.
	Regression	27.201	4	6.800	28.710	.000
	Residual	54.714	231	.237		
	Total	81.914	235			

Predictors: (Constant), Socio-cultural, physical-technical, economic, institutional.
Dependent variable: Participation.

Independent variables: The four dimensions obtained using factor analyses are considered as the independent variables for regression analysis. These dimensions include Socio-cultural (X_1), Economic (X_2), Institutional (X_3) and Physical-technical (X_4). These variables are called independent as they are not affected by the dependent variable (community participation). In fact these variables directly influence the participation.

Dependent variable (Y): Community participation in watershed development programme is taken as the dependent variable. This variable is called dependent as it changes if there is change in above four variables.

The mathematical demonstration of the regression equation of the NGO implemented watershed area is estimated in this way;

$$Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 \quad (1a)$$

Considering the values from Table 4.11, the regression equation of NGO implemented watershed area is written in the following form;

$$Y = 1.272 + 0.474X_1 + 0.066X_2 + 0.034X_3 + 0.134X_4 \quad (2a)$$

Community participation = $1.272 + 0.474 \times \text{economic} + 0.066 \times \text{institutional} + 0.034 \times \text{physical and technical} + 0.134 \times \text{socio-cultural}$.

Similarly for GO implemented watershed, the regression equation is as follows;

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 \quad (1b)$$

After putting the values of variables (Table 4.12) the equation is like this;

$$Y = 1.481 + 0.427X_1 + 0.69X_2 + 0.374X_3 + 0.128X_4 \quad (2b)$$

Community participation = $1.481 + 0.427 \times \text{economic} + 0.69 \times \text{institutional} + 0.37 \times \text{physical and technical} + 0.128 \times \text{socio-cultural}$.

In the above regression equations (1a, 2a and 1b, 2b) of the NGO and GO implemented watershed areas, a_0 and b_0 are constants and describe the values of dependent variables. If the values of other independent variables are zero, a_0 and b_0 are also called intercept because it decides where the regression line touches the Y-axis. The coefficients of the independent variables of NGO implemented watershed are a_0, a_1, a_2, a_3 and a_4 . Similarly,

the coefficients of the independent variables of GO implemented watershed are and b_0 , b_1 , b_2 , b_3 and b_4 . Each unit change in independent variable value causes a change in the calculation of the mean value of the dependent variables. It can be depicted from Table 4.13 that the socio-cultural factors (0.134 in NGO and 0.128 in GO implemented watershed area) follows the economic factors (0.474 in NGO and 0.427 in GO made watershed) in having more influence on the overall participation.

The main reasons attributed to the highest influence of economic factors in participation process are linked to livelihood, poverty, employment, short term and long term benefits and market linkage. The watershed project enhances the agricultural and non-agricultural job opportunities (details will be discussing in chapter- 6). Hence, community participation in the watershed development programme is highly motivated by the economic needs. Majority of the watershed beneficiaries are poor therefore, the primary objective of their participation is to access some monetary benefits from the watershed projects. However, semi medium and medium farmers participate with two motives, firstly to get more economic benefits and to influence the decision-making process.

The socio-cultural factors such as conflict, awareness, heterogeneity, gender, power differential, influence the community participation. Among the socio-cultural factors, the most significant variable is conflict. Due to conflict, the farmers are often discouraged to participate. As number of case of studies of conflict have found during field study, the next chapter will be discussing it in detail. Gender is another crucial variable that is highly correlated with the participation level. The institutional factor is also a key determinant of involvement; however, in comparison with economic and socio-cultural factor it has a mild impact on participation. The physical and technical factors contribute least to the overall participation. The highest variable under this category that affects the participation is land tenure system.

CHAPTER- V

Conflict and Conflict Resolution

5.1. Introduction

Although the concept of conflict was discussed in the previous chapter, not much attempt was made for the elaborate explanation on the causes and resolution of conflict. The present chapter focuses on the various causes and conflict resolving bodies in traditional and modern society. The concept of conflict refers to a disagreement between two individuals or institutions or groups. In social anthropology and sociology, the term social conflict may be defined as a struggle over values to gain status, power and resources. The aim of the conflicting parties is not only to achieve the desired values but also to neutralize or eliminate their rivals (Coser, 1956). In his book 'The functions of social conflict' (1956), Lewis Coser sees the social conflict from the perspective of structural-functionalism, which refers to a process of reintegration to the social change. The concept of conflict in sociological theories emerged during the nineteenth and early twentieth centuries.

However, in the mid-twentieth century the functionalists did not pay much attention to the conflict within the society. They were much more concerned about the integrating mechanisms like culture, norms, and common values that help in maintaining social order or stability rather than those phenomena that cause conflict and social change. From the functionalist point of view, the work of Talcott Parsons is significant for analysing conflict in society. Talcott Parsons (2007), a structural functionalist, states that the smooth functioning of social systems depends on maintaining equilibrium between the total flow of demands and supply of resources among the elements of society such as; the polity, economy, status, and culture, together all these constitute a social system. Any disturbance that affects this equilibrium of demand and supply resource flow in society leaves that society in a state of disequilibrium or dysfunction or prone to revolution. However, Lockwood (1956) argued that Parson created a fictionalized conception of the social world. He emphasized more on a systematically generated mechanism that maintains the equilibrium in society than a disequilibrium or disorder. For the

functionalists, conflict is a pathological state of the society. In the late 1950s, Ralf Dahrendorf criticized the Parsonian model of society which is based on consensus, integration, and stability. Dahrendorf reflected two dimensions of the society one are consensus, and the other is a conflict (cited in Turner, 2002). All the conflict theorists have taken the concept of power as a central element in their analysis of conflicts. C. Wright Mills (1999) talked about the sharing of power among the leaders of military, industry and politics (also known as power elite groups). He states that as ordinary citizens are powerless therefore directly or indirectly they are coerced to follow the elite, groups. There are three types of powers exercised by the power elite groups in any society, i.e. Authority (power given by powerless of the society voluntarily), Manipulation (power exerted by a particular group but unknown to the powerless) and Coercion (the type of power in which helpless are forced to follow the powerful). The members of the power elite groups share a similar origin, education, and lifestyle. Conflict refers to a mode of interaction between two or more persons in which the parties concerned attempt to control each other's behaviour.

The chances of conflict are more when two related parties are divided by incompatible interests or goals or fall in a state of competition for the control of scarce resources. While discussing culture and conflict Avruch (1996) differentiates conflict from dispute and concludes that "Conflict refers to some fundamental incompatibility in the very structure of a relationship and dispute refers to a particular episodic manifestation of a conflict. A dispute is a social activation "it occurs when at least one party goes public with the conflict, brings it to the attention of others in the group or community or decides to act on it" (Avruch, 1996, p. 242). The functional conflict theorists emphasize the importance of the interests of a group of norms and values. In this regard the way in which the pursuit of interests generates various types of dissatisfaction among groups as routine aspects of social life rather than abnormal or dysfunctional aspect. In case of natural resource management, conflict of interest arises between the users and non-users. Different degrees of access to resources are often a cause of conflict among its users (Stanbury, Pamela & Lynott, 1992). These resources could be agricultural lands, water, and common grazing land and forests resources. Both users and non-users prefer to

manage these resources in their way. The disagreements and incompatibility among two or more groups in using and managing these natural resources is an inevitable phenomenon in all human societies. Since the implementation of natural resource management programs (NRMP), the intensity of conflict has increased over the time. Further, the conflict among the user groups affects the level of participation and sustainability of the livelihood. Due to the relevance of conflict in general and in the area of NRMP in particular, identification of the sources and causes of conflict is essential for prioritizing the same. Accordingly an understanding of the historical and cultural background and the duration of the conflict is necessary (Hasnain & Hasnain, 2006).

Conflict is not a single entity, but it is generated by multiple groups as they lay claim to natural resources again it is at centre stage in cultural politics (Baviskar, 2003). Tania (2003) in her study in Indonesia found that, after the fall of Suharto regime in 1998, resource conflicts have generally been classified into two categories: 1) vertical conflicts that arose between rural people and the state or state-sponsored corporations; and 2) horizontal conflicts that took place between one social, ethnic or religious group against another. Differences arise because different stakeholders have different needs and perceptions. In this situation, the failure to arrive at a decision that meets the needs of all stakeholders results in conflict. For instance, to avoid conflict in the case of watershed project management, male preferences with respect to the use of water for irrigation needs to be compatible with female concerns for use of water for domestic use and other purposes.

Concerning the watershed development program, understanding conflict is necessary as the watershed is an essential unit of managing land, water, and other natural resources. Conflicts in watershed programs may occur at different levels, they may take place between the Watershed Committee (WC) and the User Groups (UGs), the WC and the Self-help Groups (SHGs), the SHGs and the UGs. Sometimes it may also arise within Watershed Association (because it is heterogeneous entity), or between farmers and the PIA for the selection of a site of watershed physical structures or among watershed secretary, presidents and UGs. Conflict may also occur between landholders and landless

and between the farmers having land on upper reach and lower reach farmers. The mechanisms adopted to resolve these conflicts involved both formal and informal systems. The formal methods include local courts while in informal methods a negotiation was done by mediators, mostly the elderly members of the village. It was observed that the conflicts arose due to some factors like, lack of planning of management of watershed resources without the consultation of the local community, limited involvement of people in watershed project, the institutional arrangements, lack of awareness and lack of coordination between the PIA and user groups. Other factors of conflict include weak monitoring and evaluating procedures, unequal distribution of watershed resources and the ineffective role of the village council in resolving the conflicts.

On the other hand, it was observed that the chances of conflict are less due to some elements of gender, class and age as they restrict the violent attitudes of certain groups and individuals. Women groups avoid expressing their grievances because of fear, lack of trust and social pressure. The poor and women feel marginalized and face economic constraints, and they are mostly excluded from decision-making procedures in the conflict resolution process. The elderly too are less likely to involve in a conflict because of their physical constraints. In the present chapter, an attempt is made to understand causes of conflicts associated with the sharing of watershed resources. This chapter also analyses the traditional and modern patterns of conflict resolution process in watershed program.

5.2. Traditional conflict resolution approaches

The collective consciousness among the people to take any decision regarding the village affairs was higher in the traditional society than in the modern society. Conflicts over the use of natural resources, particularly the water and land resources were not frequent in the rural social structure. Though the conflict among the people residing in one village or one locality was very rare, intra-community conflicts did not occur. The social customs, values and norms used to keep away the villagers from intra-village conflicts. But if the intra-community or intra-village conflict arose, it was resolved by the traditional village

chief or village council members. However, the frequency and intensity of conflicts were very less. The inter-village and inter-community conflict was also resolved by the village chiefs and villages council members. As agriculture was a dominant source of livelihood in most of the cases, the reason for the conflict was related to water for irrigation from the ordinary village pond. Sometimes there were conflicts over the use of grazing land and forest products. On the other hand, there is no competition among the villagers when water is used for domestic purpose. For irrigation, they mainly depended on rain water and as it is a universal need, collective action for the rainwater conservation was in place. They had a good system of water management. Before the introduction of the watershed program, the traditional village councils were playing an essential role in managing the water problems and conflicts.

In a traditional society, if any conflict relating to the conservation of natural resources gets evoked than the community in that village would solve it. If they failed to solve the disputes by themselves, they used to take the matter to the village chief. Village chief used to interfere only if the villagers approach him/her. After that the traditional village council would resolve the conflict. In case the dispute could not be settled at the village level, it used to be referred to the next level of appeal, i.e., statutory *Panchayat*. If they were unable to solve the problem, they approached the police and law courts. In all the villages covered under the study, it was observed that the traditional village chief belonged to either the elite group or an upper caste group. All the villagers irrespective of their caste and community used to abide by the chief's order. It was also observed that the people of the most respectable caste, Brahmin community, would also respect the chief even if he belonged to a tribal community.

In the past, the conflicting parties of both the watersheds directly approached the *Gauntiya* (a village chief) to register their complainant. *Gauntiya* was an elderly man of the village and he got the position of a village chief based on his ownership of land (medium farmers, who possess land more than 20 acres) irrespective of his caste or community. The traditional leadership of *Gauntiya* was hereditary. *Gauntiya* in turn used to instruct both the conflicting parties to inform the villagers regarding the place and time

of meeting in which their conflict has to be resolved. The meeting would be held in the evening as it was a convenient time for all the farmers. By evening, all of them would get back from their agricultural fields. Sometimes the meeting would run more than a day till the conflict got resolved.

Usually, the meeting used to be held in the village *mandap* (stage). In case of rain, the meeting would be shifted to the residence of *Gauntiya*. The conflicting parties usually take the responsibility of passing the information to all the villagers. On the day of meeting, all the elders of the village used to gather at a specified place. The participation of women in the meeting was tiny and even if they were present; their opinions were not taken into consideration. Women were called only if they were involved in the conflict or if they were the eye witnesses in a conflict. In some cases, their husband would speak on behalf of them. In the assembly, the villagers were free to ask the questions to the conflicting parties. The process was somewhat democratic in nature. The village community's views were taken seriously in a traditional village council, before arriving at any judgment. The *Gauntiya* did not make the decision independently, but he also involved other elders present at the meeting to analyze the dispute and to cross-examine the witnesses if necessary.

In a conflict resolution if a complainant referred any witnesses, the *Gauntiya* used to cross-examine the truthfulness of witnesses from many aspects. In this case, the witness might have to take an oath to his/her ancestors and it was considered to be taken seriously. The village elders had rights to question them regarding the causes of the dispute. They used to ask the time and place of crime, the reason for their presence, the matter he/she saw, what they did. Depending on the nature and seriousness of the case, the meeting was organized. In some instances, the problem was resolved during the first gathering of the villagers.

However, if it was not solved, then they called the meeting again, and if the case was too complicated, it used to take two or three meetings. After the examination of the facts and views of the witnesses, the village chief used to discuss all the dimensions of the case and based on the nature of the crime the penalties were announced. *Gauntiya* used to deliver

the judgment and tell the culprit to pay the compensation in cash or kind to the opposite party. The physical or mental punishment was prohibited. Instead penalties were in the form of compensation by way of money, repairing anything that has been damaged. For example, if they broke the water harvesting structure or open well, they had to get it repaired by using their labor and money. If someone took more water from the village pond or littered with it, he/she had to organize a feast for all the village council members along with some other elders and they would extract a promise that he would not do it again.

There were some other forms of penalties also. For example, giving a feast or some bottles of local wine to the village council members and throwing a party. If the convicted party did not obey the judgment passed by the village council, the villagers socially and economically ostracized him/her. The following two case studies of conflict between Teka Ghiblea and Dino Bhoi (Case I) in the NGO implemented watershed project and between Prohit Karmi and Indro Sahu (Case II) in the GO applied watershed throw an insight into the functioning of the traditional council.

5.2.2. Case I

In the NGO implemented watershed area, fifty-year-old Teka Ghiblea (Name changed for identity protection) and fifty-seven-year-old Dino Bhoi (Name changed for identity protection) of the Danipali village had a conflict during the year 2000. This conflict was of an intra-village and inter-community in nature. While Teka Ghiblea belongs to the Gouda (OBC) community, Dino Bhoi is a Sahara (ST) farmer. Both of them own land near the Ghaikhayi Canal that bypasses the Danipali village. Teka Ghiblea is a semi medium farmer owning more than five acres of land and Dino is a marginal farmer having less than 2.5 acres of land adjacent to the property of Teka. While Dino has his land in the lower region of that canal, Teka has his land in the upper reach. Being a marginal farmer Dino was poor, and agriculture was the only source of livelihood for him. In the month of May-June, the water level in the canal was low and the monsoon was uncertain.

Therefore all the villagers and the elderly members and the *Gauntiya* had appealed to all farmers to share the existing water equally. As there was no proper drainage system, the water has to pass through Teka's land to reach Dino's land. In this context, Dino requested Teka to release more water to his land but Teka refused and built a bund in drainage so that more water cannot flow from his land to Dino's land. Because of this, Dino could not get more water for irrigation. Teka also did not listen to the appeal of Dino's friends and relatives. Finally, Dino along with his relatives approached the village council and council chief (*Gauntiya*). After this, they arranged a meeting in the village for finding a solution by taking both the parties into consideration. In the meeting, the *Gauntiya* heard both the parties and also the witnesses from both the sides.

The *Gauntiya* after consultation with the elders arrived at a decision that Teka was found guilty of not allowing more water to Dino's land, and he also put a barrier that prohibited the free flow of water. As a solution to this conflict, the village council members warned Teka not to repeat the mistake. After the meeting, Teka had to offer wine and meat to all villagers present at the meeting. Teka obliged by the decision of *Gauntiya*. The above case indicates that the traditional village chief had the power to resolve the conflicts. The power and authority that is vested with village chief promotes social solidarity and maintains the social order. The resolution of this conflict shows that the village chief took a fair decision, and no discrimination was made on the basis of landholdings of the farmer. This indicates that everyone is equal before the law.

5.2.3. Case II

In the GO implemented watershed a conflict broke out in Bhudipadar village because of less availability of water in a village pond in 1995. The conflict was between Prohit Karmi a 40-year-old farmer, and Indro Sahu, a 52-year-old farmer. Both of them are OBCs. While Prohit Karmi belongs to Dumal community, Indro Sahu belongs to Teli community. Prohit Karmi a small farmer owns land near the pond that falls opposite to the side of the main road. Indro Sahu, a marginal farmer has land closer to the pond. During summer, the pond gets dried up, and only a little water was available for irrigation. Indro Sahu's land was closer to the pond so he could use most of the water for

irrigation. Other villagers would take the water only for domestic purpose. Villagers did not like this attitude of Indro, but they could not oppose it openly.

Once Prohit was drunk, and he abused him in front of Indro's house in his absence. However, the same was informed to Indro by his family members and that made him angry. This situation got serious into a verbal duel and later into a physical conflict. To control the situation, other villagers intervened and tried to settle the issue. For a permanent solution, an informal meeting was called by the *Gauntiya*, which was attended by other village elders and other farmers. After having a discussion with both the parties and witnesses, the *Gauntiya* consulted the elder farmers who were present at the meeting. In the meeting, the majority of the villagers supported the Prohit but they did not support his physical violence. Therefore, the village council members found Indro guilty and imposed some penalty on him. In this case, he was warned not to use much water of village pond during the summer or at the time of low rainfall. Prohit was warned not to abuse Indro again. Further, they were asked to offer wine to the villagers present at the meeting. Both of them accepted the decision of elders and village council members.

From the above case, it can be observed that the village council members used to hear the views of people and took the decision in a democratic way. And collective interests of the people usually prevailed over the individual interests. In every conflict resolution meeting, the priority of the *Gauntiya* and the village elders was to create a win-win situation for both the parties and to avoid the conflicts in future. However, in few cases even though the aggrieved individuals did not get the right compensation, but they abided by the decisions of village chief and elders. According to some of the respondents, if the accused was not able to pay compensation at the time of conflict resolution he/she could ask for extra time limit, like one or two months. But in this regard the other party too should also agree on giving him more time to pay back. The time limit depends on the nature of the damage, for example if it was physical injury and the aggrieved person wanted compensation in terms of money for the treatment soon. But in case, someone breaking the bund or changed the course of the channel from the village pond to the agricultural land he could be given the time to get it repaired till rainy season.

It can be concluded that conflicts may have erupted in the villages of both the watersheds due to differences in need, priority and greed for excess use of resources. Sometimes the elite group of users wants to access the resources at the expense of marginal sections of society which leads to conflict. It was found that few of the higher economic class like semi medium and medium farmers own the watershed physical structures easily than unprivileged class (marginal and landless people). Conflict may arise because of differences in accessibility between the haves and have-nots. It was observed during the fieldwork in GO implemented watershed that small farmer belonging to the Brahmin caste got the farm pond first his land due to his social prestige than small farmer belong to the Scheduled caste (SC). In few of cases, it caused the conflict between the upper caste and lower caste people.

It was also observed that the political influence played a greater role in the decision-making process. The *Sarpanch* and the *ex- Sarpanch* had played a significant role in this regard. The social groups who had power or who do not have power try to get authority over the others. In few cases, it was found that conflict arose to share watershed resources because of unequal distribution of power and authority. Before the implementation of the watershed the type of authority prevailed in all villages was a traditional type of authority. In the traditional form of authority, subordinates follow their superordinate. Much before the implementation of the watershed, the above two cases show the traditional type of authority to resolve the conflicts.

The villagers (subordinates) consented to the decision of village council members or elders (superordinate). Therefore, the chances of conflict were less and resolved at the village level itself. But in some cases when the traditional village council (*Gauntiya* system) failed to solve the dispute, *Gauntiya* referred the particular case to the statutory *Panchayat* to resolve it and in worst cases if the statutory *Panchayat* also failed to answer it, the *Sarpanch* of the statutory *Panchayat* used to refer this matter to the police. It is notable that in modern society even if some conflict arises regarding the sharing of watershed resources, firstly they approached formal institution such as watershed officials. The role of village council members started declining. It was also observed that

a dominant group can go with a conflict for a longer period whereas a poorer group that lacked support in terms of money and power cannot sustain and would withdraw.

5.3. Inter village and inter-ethnic conflict

During the field study, it was observed that few cases that fell under the category of inter-village and inter-ethnic conflict were referred to outside the village Panchayat. In that meeting, the *Sarpanch* of the villages, conflicting parties, witnesses and elderly members or *ex-Sarpanch* were used to be present. The following case studies from both the study areas illustrate the conflict between two farmers belonging to two different villages.

5.3.1. Case III

In 1998, a conflict between two farmers belonging to two different villages was referred to *Sarpanch* in an NGO implemented watershed. Conflict arose between Jharu Nag, a 55-year-old farmer of Danipali village and Manglu Sagar, a 48-year-old farmer of Jharbandhali village. They belonged to Gonda community and both of them were landless and used to cultivate the government forest land for nearly five years. As the land did not belong to them, a proper demarcation was not made by them. While Jharu's land is situated in an upper reach of the watershed area, Manglu's land is located in middle reach. Once Jharu had cut some trees and shrubs for selling and domestic use, which was nearer to the Manglu's land. On seeing the act of Jharu, Manglu abused him and also lodged a complaint with the village chief. After having a discussion in the meeting, *Gauntiya* (village chief) found both of them guilty as they had encroached upon the government land and fine was imposed on each of them.

Manglu accepted the judgment, but Jharu refused. He told that though the land was not his own, he has been cultivating it for five years, so he has rights over the trees. As the village councils failed to convince Jharu, they had no option but to refer this case to the *Sarpanch* of Bendra Panchayat. After a few days, the *Sarpanch* called a meeting in which Manglu, Jharu and senior members from both Danipali and Jharbandhali village were present. After listening to both the parties their respective witnesses and also the village chiefs of both the villages, the *Sarpanch* imposed fine on both of them. Jharu was told to give some share of money to Manglu as he sold the trees while Manglu was told to offer

some wine to villagers present at the meeting. Both of them accepted this judgment. After the introduction of Statutory *Panchayat* and *Gram Sabha*, the traditional village council did not play a significant role in conflict resolution. Before the introduction of the watershed project (2004-05) during post the 90s, most of the cases of inter-village conflicts were restricted to the common grazing land, water bodies and forest lands. During that period, cases were directly taken to the *Gram Sabha* and then to the traditional village chief. After the introduction of watershed program the inter-village conflicts relating to agricultural irrigation, accessibility of common land and water bodies or intra-generational conflict for the construction of Water Harvesting Structure (WHS) on private land were mostly taken to the Planning Implementing Agency (PIA). With the implementation phases of the watershed project during 2004- 2010 the conflicts were more over the sharing of water of percolation pond, use of forest land, grazing the land and other natural resources on common land. Planning Implementing Agency (PIA) did not define ownership of these resources to the user groups.

The intra-generational conflict also took place taking the issue of construction of WHS on private land. The introduction of horticulture in GO implemented watershed and diversification of crops and cultivation during *Rabi* season in NGO implemented watershed created a competition among the beneficiaries to get more and more water. The sanitation program introduced in NGO implemented watershed also created demand for the more water for domestic use. As discussed earlier that after the implementation of watershed project villagers mainly approached the PIA for the conflict resolution.

Apart from this the NGO implemented watershed established a conflict resolution center (*Samadhan Kendra*) in the village. Ten members of this group are elderly members of the village. Along with these members, the conflicting parties and watershed secretary and the president also had to be present at the meeting. Conflicting parties had to call all the members and told them the timings of meeting. The conflict resolution centre was situated in the Jharbandhali village, but this institution did not sustain in the post-project period. The analysis of the data shows that the conflict takes place not only between two

individuals, but it can happen between two villages as well. If it arises between two villages the communication and exchange of goods and services get disturbed.

The social gathering of two villages gets suspended for example celebrating festivals and rituals together and engaging in the marital relationship. The inter-village disputes or conflict may arise at the time of implementation of watershed if the people see that, adjoining village is getting more facilities for water conservation. Besides this conflict also occurs when people cross the boundary of one village to access the watershed resources, forest resources, and common land resources. The case study 'IV' of NGO implemented watershed and case study 'V' of GO implemented watershed shows the findings of inter-village conflicts. The people of Danipali village of NGO implemented watershed accused PIA for unequal distribution of watershed benefits in two villages that led to conflict between people of two villages. In case of GO implemented watershed areas, the competition among the population of all three villages to get more benefits from the watershed project, gave rise to the conflicting situation.

5.3.2. Case IV

In 2006, the PIA officials of NGO implemented watershed organized a meeting in Danipali village. During the discussion over watershed works to be carried out, a group of people who were not satisfied with the works of PIA started abusing. Later on the conflict arises between the villagers of Daniplai and Jharbandhali villagers. The officials of PIA failed to resolve this conflict that led to the breaking of communication between the two villages for a year. The implementation of the watershed project was stopped in the Danipali village in 2006 that runs only for two years (from 2004-05 to 2005-06). At the time of interview during the field work; it was found that people did not approach the elder members of both villages and not even the *Sarpanch* and statutory *Panchayat* of the village to solve this problem.

The respondents replied that they did not approach any other conflict resolution body as the matter was related to the implementation of the watershed project for which PIA is solely responsible. A similar type of case study was also observed in the GO implemented watershed, where the people of two villages were dissatisfied with the work

of PIA. The PIA constructed more number of land and water conservation physical structures in Bhudipadar village than in Saltalpali and Grusumunda village. The conflict broke out between people of Saltalpali and Bhudipadar village. The resentment of Saltalpali villagers over PIA took the form of anger.

Sudam Bhoi of Saltalpali village and Mahadev Biji of Bhudipadar village once fought with each other. While Sudam belongs to Saura community and is a small farmer having 4 acres of land, Mahadev belongs to the Gauda community and is a marginal farmer having 1.5 acres of land. Sudam's land is situated in the upper reach of the watershed and Mahadev's land is in middle reach. Both of them share the water from the village pond adjoining to Gusuramunda village. In summer either there was no water or very less water was found in the pond. Even the availability of lesser water in the pond (*pokhri*), did not allow the lower reach farmers to get it due to silt and weeds and improper drainage system. To reach the lower reach farmer's land the water had to pass through the lands situated in the upper and middle reach farmer's land.

The farmers having land at lower reach had to struggle to get some water to save their crops during drought period. In 2010, there was a severe drought in this area. Mahadev, who has land in middle reach, was likely to lose all his crops. Once he lost his patience and shouted at Sudam, who was able to manage to get some water from the pond through drainage (nally) system as his land was closer to the pond. Mahadev wanted Sudam to allow some water to his land and also to strengthen his drainage channels so that water can flow to his land. But Sudam did not do it as he was much worried about his own crops. Mahadev was annoyed with PIA because in most of the cases they provided irrigation facilities to semi- medium and medium farmers. At the time of watershed project implementation, he did not have any source of irrigation. On the other hand, Sudam who was availing water from his private open well also got access to water from the common village pond. This situation aggravated and the conflict between Mahadev and Sudam changed into inter-village and inter-community conflict. In this case, neither PIA nor elders of the village had intervened to resolve the conflict.

After shouting at each other for a while, Mahadev and Sudam became silent. In this context, the structural functionalist perspective as discussed by Talcott Parson (as cited in Reddy, 1986) is relevant. The structural-functionalist perspective stated that if some disturbance affects equilibrium state of demand and supply resource flow in society, it leads to conflict. Equal distribution of resources maintains balance in various social systems i.e. polity, the economy, status, and culture. In case of Mahadev and Sudam, the unequal distribution of watershed resource caused conflict between them. In NGO implemented watershed, PIA was successful to resolve the conflict, in few cases but when the conflict became more serious, PIA was unable to resolve. In GO implemented watershed the conflict not only took place between the beneficiaries but also found among the user group presidents and watershed president.

5.3.3. Case V

In 2006, a conflict erupted between a group of people and watershed secretary in Gusuramunda village of GO implemented watershed. Both the conflicting parties were belonging to the same community called Dupal. At the time of implementation of the watershed project, a five feet in-depth small compost pit was given to few of the farmers to store the cow dung. The farmers who did not get the compost pit got annoyed with the secretary. One evening they gathered at common village place, shouted at the watershed secretary for not providing the compost pit to every individual. The friends and relatives of secretary got involved in an argument and the intensity of the conflict got increased. After the intervention of some of the other villagers, the dispute was stopped.

The villagers accused Secretary, favouring friends, relatives or his acquaintances only. The secretary defended himself saying that PIA officials instructed him to construct a limited number of compost pit due to limited fund. However, the compost pit was a requirement for all the villagers to store the cow dung to use it at the time of cultivation. Due to non-availability of compost pit, sometimes stored cow dung was sowed. Because of the competition, the villagers who do not need compost pit demanded cash as their co-farmers got some money to construct it. However, their request went in vain since the secretary did not listen to them. They approached the watershed president and watershed

officials but unfortunately they too did not respond positively and never interacted with the villagers. As discussed earlier that much before the introduction of watershed project most of the conflicts were resolved by village council member or the *Sarpanch* of the village. But after the introduction of the watershed project, the PIA officials used to resolve the conflicts. The officials never carried consultations either the traditional village chief or the village *Sarpanch*. In most cases, the parties directly went to the watershed officials ignoring the village elders or *Sarpanch*. After the withdrawal of the watershed officials from the villages, they used to approach watershed president or watershed secretary. During the interview, some of the beneficiaries stated that the non-existence of alternative conflict resolution bodies in traditional days, they used to approach the traditional village chief or the *Sarpanch*.

But now a day in most of the watershed resource cases they have to contact watershed officials to receive direct and fast benefits. The benefit-oriented interest had encouraged the wealthy and few upper caste farmers to maintain close relations with PIA. It was observed that almost all the cases related to watershed resources shared during 2004-2010, farmers would request the PIA officials to intervene and resolve the conflicts. It was stated by some of the beneficiaries that, if the conflict arose due to incomplete or low in-depth farm pond (Plate, 4.1) the PIA officials did not listen to the marginal farmers and hijacked the cases. The un-welcomed intervention of the watershed officials sometimes discourages the farmer to approach PIA for conflict resolution and it made the situation more complicated.

5.3.4. Case VI

In 2006, a conflict arose between two brothers over construction of farm pond on the private land. They were Khadi Pradhan, a 45-year-old farmer and Jibardhan Pradhan, a 32-year-old farmer of Jharbandhali village of NGO implemented watershed. After the implementation of the watershed, they got back their mortgage land. The PIA helped them financially to get it back. Both of them were marginal farmers and were belonged to the Dumal community. While Khadi Pradhan's land is situated in the upper reach of the watershed, Jibardhan Pradhan's land is located in the lower reach. The construction of

field bunding took place on the high land. The land was not divided between two brothers. It was still in the name of their father (Arjun Pradhan, 60-year-old). But the real land owner (Arjun Pradhan) had agreed to get it registered in the land of his younger son (Jibardhan Pradhan).

Field bunding started on their land before the cultivation. When field bunding was in progress on the land of Jibardhan Pradhan at that time Khadi Pradhan started abusing him. Khadi Pradhan wanted the field bunding on his land. Later on both of them (Khadi and Jibardhan), started fighting with each other. Looking into the situation the PIA stopped the construction work and asked them to compromise. However, both of them did not agree for any compensation or agreement. PIA tried to solve this matter but failed to satisfy both the parties. After this incident both of them approached the *Sarpanch* of Salebhata *Panchayat* to intervene in this matter without consulting the village chief and their father. They narrated the incident to the *Sarpanch* in the *Gram Sabha* meeting. After discussing the issue in the *Gram Sabha* meeting, the village *Sarpanch* called a meeting at *Panchayat* office at Bendra, where elder members of *Gram Sabha* were invited. After hearing the point of view of both the parties and their respective witnesses, *Sarpanch* requested them to compromise but they did not. *Sarpanch* postponed this matter for one month, which did not bring any solution.

Therefore, *Sarpanch* instructed both the parties to meet the PIA as this case was related to the watershed project. They approached PIA but PIA refused to intervene as the fund for construction of field bunding, and implementation phase of the watershed was over. In the end, none of them got the field bunding on their land. In this case, the view given by Jayawardane (1963) was found to be true. As he discussed that in conflicting situation one party wants to control, each other's behaviour and conflicting parties go for a competition to the control of scarce resources. The two brothers, Khadi and Jibardhan Pradhan were competent for field bunding construction on their lands.

5.3.5. Case VII

At the time of construction of watershed physical structures, the presidents of every user groups wanted to have watershed structures first on their lands. They feared that the materials used for the construction would be finished. In NGO implemented watershed, same kind of incident was observed, but it did not lead to any serious conflict between the PIA and beneficiaries or between the President of watershed and members of the watershed association. In GO implemented watershed a conflict broke out between 60-year-old Himansusekhar Pradhan (watershed president) of Gurusamunda village and Ram Pradhan of Bhudipadar village. Ram Pradhan is a small farmer; he possesses the land at lower reach whereas Himansusekhar Pradhan is a semi medium farmer and possesses land at upper reach. It was an intra-ethnic group conflict as both of them belonged to *Dumal* communities. During the implementation of watershed Ram Pradhan requested the WDT members and PIA to construct a farm pond (*Chahala*) first on his land. As his land belonged to the lower reach of watershed, he needed water for irrigation. Himansusekhar owned the land situated on the upper reach of the watershed area. He had a private source of irrigation for his crops. To attain their personal gain, in watershed committee meeting both Ram Pradhan and Himansusekhar Pradhan insisted the PIA officials to quickly start the construction of watershed physical structures works in their village first though they were more concerned with their personal gains. The verbal abuse in watershed meeting between the Ram Pradhan and Himansusekhar became serious. After two weeks, in next meeting, the PIA officials convinced both of them to resolve their disputes. But Ram Pradhan and Himansusekhar did not resolve their conflict. The above case highlights the weakening of the traditional authority that was based on social status. The traditional type of authority helped in maintaining harmony in the village and there were very lesser chances of conflict.

Earlier the village social system was based on mutual sharing of natural resources and mutual understanding among the villagers. The maintenance and distribution of resources were symbolic in nature. The disputes were resolved inside the village territory, but the above case indicates that the conflict was moved out of the villages. The mutual understanding and the symbolic interaction for the use of resources had also decreased. It

had direct impact on the village solidarity and villagers respect for the traditional authority. The following case further illustrated the declining of the village authority by the watershed officials thereby further eroding the people's faith on village council for conflict resolution.

5.3.6. Case VIII

In 2008, a conflict arose between Sadhu Bachor and Bhala Banchor of Budhipadar village in the GO implemented watershed. Both of them possessed the same percolation pond (*munda*). While Sadhu's land was situated in the upper reach of the watershed, Bhala's land was in lower reach. Sadhu was a small farmer, and Bhala was a marginal farmer. Both of them belonged to the Dumal community. Sadhu cultivated groundnuts (*mungfalli*) and black gram (*urad*) and Bhala cultivated paddy. At the time of cultivation, there was sufficient water in the percolation pond. Even though there was water but it could not reach the Bhala's land due to no proper drainage system from Sadhu's land. Bhala wanted more water because generally paddy consumes more water in *Kharif* season, but Sadhu did not have any problem as his crops did not require more water. He was trying to keep his land little dry as it will be good for growing the crops. But Bhala who needed more water approached Sadhu to allow some water to his land. But his request was not positively responded by Bhala as his crop would have been affected. Even Bhala requested the office bearers of the watershed, but they did not help him.

After few days in Sadhu's absence, Bhala cut the field boundary of Sadhu and opened the outlet. Sadhu was shocked on seeing the outlet open, and the boundary of his field adjoining to Bhala's land was broken. Because of the heavy flow of the water some of his plants got damaged, and he feared that they may die. Sadhu and his wife along with his brother in law rushed to Bhala's home and shouted at him. It pulled other villagers there. Bhala tried to convince Sadhu about his intention to save the paddy. Sadhu did not accept his request rather he was beaten by Sadhu and his relatives. Later he was rescued by the villagers. Next day Bhala complained about this incidence to PIA officials and watershed secretary. They just consoled him and told him that they would convince Sadhu. Bhala

was not satisfied with their judgment, and he filed a case in Ramapur police station against Sadhu.

Later on watershed president intervened and convinced both the parties for compromise. Bhala was quite unhappy with this judgment, but he had to accept it. It was observed that in most of the cases the marginal farmers and landless failed in getting justice. The watershed president and secretary favored the landlords and elite group of the villages in the event of conflict resolution process. In traditional village conflict resolution system, both the marginal and large farmers were treated equally before the law. It was observed that with the intervention of watershed program, the marginal farmers who used to be treated as equals lost their power. On the other hand, if the conflict occurred between a semi medium or medium farmer the watershed officials do little fair justice. It was found that the transparency and accountability in resolving the dispute were better in NGO implemented watershed than in GO implemented watershed.

5.4. Grass-root level institutions and PIA's role in conflict resolution

Before the introduction of the watershed project, people were mostly dependent on informal institutions (friends, elderly members of the village.) for the conflict resolution. However, it was not mentioned in the watershed guideline (2001) that PIA has to resolve the conflict but PIA was given the credit for the smooth functioning of the watershed project in a particular area. The cases discussed below will reflect at what level the PIA was able to resolve the conflicts among the beneficiaries. Generally watershed development team, secretary and president got involved in conflict resolution.

5.4.1. Case IX

In NGO implemented watershed, a conflict occurred between PIA officials and watershed beneficiaries in 2006. Baru Sagar, a 60-year-old marginal farmer of Jharbadhali village, had a conflict with watershed officials. He belongs to Gonda community, and he has three sons named Shushil Sagar (40 years aged), Kausal Sagar (35 years aged) and Rudra Sagar (32 years aged). Agriculture and daily wage labour were their principal occupation. During the implementation of watershed they got a farm pond (*Chahala*). When they were digging a pit, a big stone hampered farm pond work and which was very low in-

depth. Baru drew the attention of PIA officials about this matter. However, his grievance was not responded positively due to financial constraints. PIA official asked them to contribute some money so that re-digging could have been possible, but they were not ready for same.

Once when the PIA officials were constructing farm pond on some other land, Baru went there and shouted at them. However, it was only verbal abuse. Baru did not approach any of the conflict resolution body before approaching PIA officials. On the other hand, PIA was unable to deal with the conflicts with the farmers but they did not approach any elder members of the village for mediating in the matter. The PIA did not encourage the traditional local socio-cultural approach to dispute management. Further, it discourages people's faith in their created conflict resolution institutions. It also created a situation for the watershed beneficiary regarding whom they should approach for the conflict resolution if once PIA withdrew from the watershed area.

5.5. Socio-cultural aspects of conflict and watershed development programme

It came into notice that the conflict was not only confined to the sharing of watershed resources but also related to the social relations. And sometimes the social conflict got diverted to sharing of watershed resources. It was found that most of the inter-caste conflicts arose and symbolically they reflected in day to day social interactions in watershed activities. A case study of the dispute between Bhimsen Saa and Katula Muduli explains that the roots of conflicts are infused in the caste differences, and they manifested into a conflict of watershed resources sharing.

5.5.1. Case X

In Jharbandhali village of NGO implemented watershed if the villagers face some natural calamities like flood or drought, they do a ritual called Indro puja (God of water) for the well-being of all the villagers. Before the implementation of watershed, in the year 2002 this village received very scanty water. For organizing a religious ceremony, a group of people was collecting money from all the villagers. In that group a 40-year-old farmer, Bhimsen Saa had an argument with the 42-year-old Katula Muduli about raising the money. Bhimsen Saa belongs to Pandra community, and Katula Muduli belonged to

Keuta community. There is a tradition in the village that at the end of the ritual all the villagers cook and eat together and distribute local wine, and meat among all households present there. Katula too was present at that ceremony. While distributing the food to Katula, Bhimsen objected as Katula did not contribute the fund. However, because of the intervention of few elder members of the village Katula was allowed to take food.

The action of Bhimsen led to a dispute between Bhimsen and Katula. From that day, onwards both of them were not on talking terms. After the implementation of the watershed project, it got manifested as a conflict related to sharing of water of village common open well. Both of them had their kitchen garden adjoining to the common open well. Bhimsen was a small farmer, and Katula was a marginal farmer. Katula cultivated some vegetable, and his economy was more or less dependent on vegetables while Bhimsen grew the vegetables only for his consumption. Before the implementation of the watershed, that open well was not cleaned, and much water was not available. The level of water got increased with the intervention of watershed community development fund. The hostile relationship between Bhimsen and Katula was observed in the distribution of common open well water. During the *Kharif* season in 2002, starting from the sowing of seeds to harvesting, they were involved in abusing each other. As Bhimsen's land was nearer to the open well, he wanted to take all the water before Katula use it. In the month of August, there was no rain, Katula's vegetables were dying. As there was very less water in well Katula could avail more water only if Bhimsen would use less water. On the other hand, Bhimsen's plantations did not need much water as his land was closer to open well, and the soil moisture of his land was better than Katula's land. One day Katula borrowed a pumping machine from a medium farmer of the village and drew up water from the well without consulting Bhimsen. On seeing this, Bhimsen went to the watershed office in their village and requested the officials of watershed to impose fine on Katula. The watershed officials intervened in the matter, but Katula was too poor to pay any penalties imposed on him. Finally, officials asked both the parties to compromise and co-operate each other, and they warned Katula not to use all the water in future. This clearly demonstrates how interpersonal relations affected the use of water.

5.6. Conflict over leadership

At the village level, many grass-root level institutions were created such as Self Help Groups (SHGs), *Kisan Mitra* (farmer's friend), *Gram Sabha*, Statutory *Panchayat* and watershed committee. Most often conflicting situations arise when the leaders of some institutions come together for a particular meeting with selfish interest. At the time of the creation of different committees of watershed, it was observed that the leaders of various institutions contested for the post of president and watershed secretary. During the discussion with the contesting candidates it was found that most of them wanted to occupy the positions of president and secretary for monetary grants and the power associated with the positions so that they could help their friends and relatives to construct the water harvesting structures easily. The *Ex-sarpanch* or current *Sarpanch* played a significant role in the selection or nomination of the name of the watershed president or secretary. It was observed that watershed president and the secretary cannot win or cannot do their work without any political support. Local level political interference sometimes disturbs decision making of the watershed president or other leaders. For instance, the president of GO implemented watershed was an *Ex-sarpanch* of the village and belongs to the Biju Janata Dal (BJD). Therefore, sometimes the Congress party supporters opposed the decision of president accusing him of showing partiality. In NGO implemented watershed direct interference of the politics was not seen but during election both the president and secretary of the watershed campaign for the BJD. The different interest of the various groups in society, including political groups led to conflict.

The political group is a system of participation in society in which people participate for their wellbeing. In this regard according to Coleman (as cited in Reddy, 1986) a new system of involvement can create differences in values and interests and as a result it can become a ground for conflicting reactions. The above argument discussed by the theorists from the school of incompatibility of interests was prevalent in the field area. The individual and community interests over the use of resources along with ethnic differences have made the situation more and more complex and conflict oriented. For some beneficiary, a watershed project created an opportunities to avail the water and

other natural resources but for few other groups it deprived them of achieving their interests.

It was observed in the case of landless and marginal farmers of Saltalpali village of GO implemented watershed that the benefit of micro-finance they received after the watershed was very less than their expectations. On the contrary, the people of Gusuramunda village of the same watershed project were getting some extra benefits, created a frustration in the minds of Saltalpali villagers which resulted in conflict. It was also observed that sometimes minor conflicts between neighbouring villages over common grazing land or forest resources situated on community land occurred as the ownership over common land is not confined to any group. But if it falls under a particular village jurisdiction and neighbouring village access it, there is a potentiality of violence.

The demand for the grazing land is more throughout the year, but it is more intense at the beginning of *Kharif* season. Most of the farmers use bullocks for cultivation, and they feed them green grass. At the same time, conflict for water resources also tends to occur as water is the essential need, especially those farmers who do not have any water harvesting structure on their land. The watershed beneficiaries stated that most of the time the inter-village conflicts arose over the use of wood or cutting trees of common forest between two villages. Ideologically all the villagers should co-operate with each other to manage the watershed resources; however, it was not found in practice.

5.6.1. Case XI

It was observed that on few occasions, the conflict between Danipali and Bakti village of NGO implemented watershed occur during the *Kharif* season. The farmers of both the villages use the water of Gaikhai canal. Danipali village is situated in the upper reach of the canal whereas Bakti village is on the lower reach. During June 2003, there was very little rain. All farmers having land nearby the canal were trying to get more water by using the electrical machine, mostly semi medium and medium farmers. The Bakti villagers accused the Danipali villagers that they took all the water, therefore; there was no sufficient water to irrigate their crops even once. The people of two villages together

at the bank of canal one day and started abusing each other. After getting this information, the *Sarpanch* and other elder members of both the villages came there and tried to convince the people. However, the problem was not solved completely as they failed to decide which village can get how much water. But at that point of time it was told to all the farmers that canal is joint property, and both the villages can use its water. The elders of both the villages ensured that in future this would not happen.

From the analysis, it is clear that before the introduction of the Watershed Development Programs (WSDP) especially in the traditional society, the conflicts over natural resources use were very rare. The conflict resolution was not a very complicated process, and the traditional village chief used to resolve the disputes with the help of the village elders. The nature of penalty was dependent on the paying ability to conflict parties. If the culprit was able to pay money, he had to pay or else he had to put in his labour to get the things repaired. Sometimes he or she was warned by the village chief not to repeat his/her mistakes in future. The people used to respected their traditional culture and village chief. The next conflict resolution body after the village chief was the village *Sarpanch*, and it was observed that when the traditional village council failed to solve the case it is resolved by the *Sarpanch* of statutory Panchayat. The cases hardly went to the third level i.e.; police station. The introduction of WSDP made the situation little complicated. The Project Implementing Agency (PIA) was primarily responsible for sorting out any problem related to the watershed management or watershed resources use. In case of a conflict regarding the watershed resource use people approached the PIA first to address their grievances rather than traditional village chief. Few of the farmers believed that their proximity to the watershed officials might fetch them extra benefits in terms of watershed assets and financial help. Some of the villagers went to the PIA frequently in the hope of getting some permanent employment. It was also found that the introduction of WSDP, during 2004-05 has created a competition for the use of natural resources. It brought significant changes in conflict resolution system. Before the introduction of the watershed project, the causes of conflicts were lesser or it was only confined to the overuse of forest resources. But after the introduction of the watershed project various dimensions of the conflict emerged. People competed for the use of more

natural resources of village common land at the cost of others and individuals also struggled for the private ownership of few of common property resources. For instance, in case of the GO implemented watershed the plantation for all the village community done on non-arable private land became the individual property. Fighting for leadership, money, profit-making attitude and fight for the construction of water harvesting structures has increased the tension in the studied areas.

The causes of conflicts were found to be similar in most of the cases. However, in all the cases the PIA failed to resolve the conflict completely. Besides the inability of the PIA to resolve the conflict, the lack of adjustment of the new institution with the traditional one has also created a problem in the process of conflict resolution. The ideology of the community participation in a watershed program that the beneficiaries control their watershed resources and run the program smoothly with the collaboration of external agency by themselves is yet to be realized. Conflicts in the NGO implemented watershed were more than that of the GO implemented watershed because in the NGO implemented watershed more development took place on the community land in addition that people were more aware of the use of watershed resources.

In the GO implemented watershed more watershed physical structures were carried out on the private land and people were not very much aware of their rights over different natural resources. As mentioned in the earlier chapter (chapter third) that the level of community participation in various implementing phases of watershed i.e. from pre-planning to post-project period is affected by various factors. Conflict is one of the major factors that hinder the participation. The higher level of the conflict results in lower the level of community involvement. Along with the promotion of community participation, the very objective of the watershed project is to improve the livelihood practices. With the modifications in watershed guidelines, the livelihood improvement is added as a major area that should be enhanced. The forthcoming chapter will discuss the impact of the watershed project on livelihoods of the community.

CHAPTER-VI

Watershed Development Programme and Rural Livelihoods

6.1. Introduction

The institutions of collective action and system of property rights shape the utilization of natural resources. The patterns of usage in turn impact the outcomes of people's agricultural production systems. Together, strategies of collective action and property rights motivate people to undertake sustainable and productive management approaches. And they affect the level and distribution of benefits and livelihood from natural resources. The introduction of the watershed is not a goal in itself, but a means of resource management that augments the livelihood of watershed beneficiaries. "A livelihood comprises of the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a livelihood is sustainable which can cope up with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihood at the local and global levels and in the short and long run" (Chambers and Conway 1991, p.6).

In this background, the present chapter tries to examine the impact of the watershed project on rural livelihood. This chapter comprises of three sections. The first section deals with the introduction, livelihood framework, given by DFID (2000a), Baumann, Sinha (2001), and description of the existing sources of livelihood. The second section is about the empirical findings from the study areas. It analyses the impact of the watershed on different livelihood assets. The third section concludes the chapter. The DFID initiated WORLP programmes to eradicate poverty and to provide sustenance to the poor people residing in the most backward districts of Odisha. These programmes adopted 'Watershed Plus' approach, which in turn, follows 'Livelihood Guidelines' made by the Odisha Watershed Development Mission (OWDM) since June 2004. The PIAs of the two districts namely Balangir and Nuapada adopts these guidelines. WORLP classifies the budget allocation into two categories (i) watershed fund and (ii) livelihood fund. For a

micro-watershed of 500 hectare (ha), WORLP provided Rs. 47.50 lakhs as shown below (comprised of both watershed and livelihood capital).

Table 6.1: Budget allocation under the WORLP scheme

Budget head	Budget per hectare (In Rs)	Budget per micro watershed of 500 hectare (Rs. in lakh)
Watershed Fund	6000	30.00
Livelihood Fund	3500	17.50
Total	9500	47.50

Source: Odisha watershed development mission, 2010).

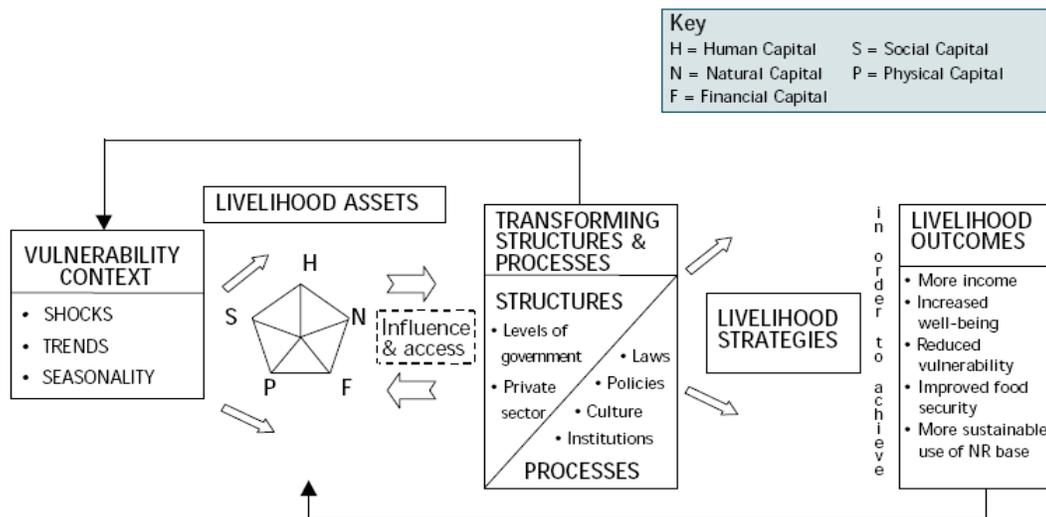
In all the WORLP schemes the Project Implementing Agency, (PIA) conducted a ‘Well-Being Rankings’ of the all the households in the micro-watershed villages to identify the targeted groups. The ‘Well-Being Ranking’ is a Participatory Rural Appraisal (PRA) tool that categorizes the families based on their socio-economic status. It categorises them into the four well-being rankings; very poor, poor, manageable and well-off. WORLP projects intervened in those areas where 80 percent of the population is below the poverty line. During the 1990s, DFID developed Sustainable Livelihood (SL) framework consisting of five core elements of livelihood, i.e. financial, human, natural, physical and social capital (Figure 6.1).

The vulnerability in DFID’s framework shows that livelihoods are vulnerable. There are different elements like economics shocks, critical trends and seasonality that influence and shape the livelihoods. People have limited or no control over the factors mentioned above. The DFID defines the people’s strengths as “assets” or “capitals. Their livelihoods are drawn on some of the defined capitals. Therefore, the livelihood framework focuses on five critical capital assets (human, social, natural physical and financial). These assets are converted into positive livelihood outcomes (in the form of income, increased well-being status.). Apart from this, the framework also analyses the structures and processes operating at different levels.

The policies, laws, culture and institutions operate at various levels, from the household to the international level, and in all spheres including the government and the private sector. They regulate the accessibility of different types of capital, the livelihood

strategies and the decision-making bodies (DFID, 2000b). Along with the five capital assets discussed by the DFID, Baumann and Sinha (2001) have added political capital to analyse the impact of natural resource management programme on rural livelihood (Figure 6.2). The concept of political capital has incorporated the analysis of the institutional set up for watershed development. This analysis is because watershed development is centrally planned poverty alleviation programme and work as a means to safeguard the political allocation of limited resources of the state. Political capital permits significant insights into the dynamics of watershed systems and the shifting costs of change (Baumann, 2000).

Figure 6.1: Sustainable livelihood framework by DFID (2000)



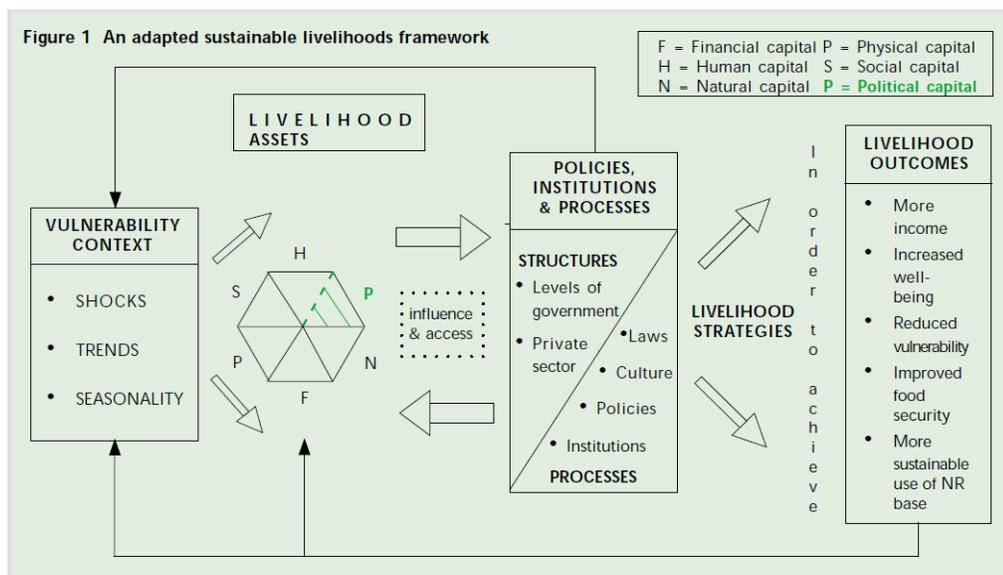
6.2. Existing sources of livelihood

The analysis of the information given by the beneficiaries show that, three primary sources of livelihood existed. These three sources of livelihood comprise of agriculture related activities, the collection of Non-Timber Forest Products (NTFPs), and daily wage labour work. Agriculture is the main occupation for almost all beneficiaries. Paddy is found to be a principal crop. Along with this, they also cultivate pulses, oil seeds, *moong dal* (green gram), and *chana* (chickpeas, brown). Before the implementation of the watershed project (nearly ten years back) along with agriculture, the forest was also a

primary source of livelihood. Majority of the landless and women groups were engaged in the collection of herbs and NTFPs such as *kendu* leaves (*diospyros melanoxylon*), *mahua* flower (*madhuca longifolia*), *neem* seeds (*azadiracta indica*), *sal* leaves, firewood and bamboo. They sold these products in the market and used to earn their livelihood.

However, owing to gradual degradation and deforestation the dependency of the people on the forest for their livelihood has decreased. But still forest continues to be one of the primary sources of livelihood. The respondents informed that they walked around four to five kilometres to collect fuel wood and *sal* leaves for making the disposable plates due to the degradation of forests and increase in the population. They sell these plates in Balangir town and earn nearly 500-800 rupees per month. Sometimes, they have to go to the forest near Sambalpur (approximately 140 kilometres) for the collection of other NTFPs. Some of the beneficiaries work in the *kendu* leaf factory as a subsidiary source of livelihood. During the field visit, it was found that few people adopt illegal means to procure forest products. They sell fire wood and trunk of trees in the market or to the furniture making agencies. Many people earn their livelihood from daily wage labour work apart from the agriculture and forest resources.

Figure 6.2: Sustainable livelihood framework given by Baumann and Sinha (2001)



6.3. Intervention of watershed development programme and livelihood

The introduction of the watershed programme is expected to have a direct bearing on the livelihood. The impact of the watershed project on the livelihood of both the NGOs and GOs implemented watersheds is measured by taking different indicators, such as the impact on financial, natural, social, physical, human and political capital. In the following section, an attempt is made to analyse the effects of the watershed programme on different aspects of people's livelihoods through the perception of respondents.

6.4. Financial capital

In the DFID's sustainable livelihood framework, financial capital is defined as the financial resources available to people. This can be in the form of savings, credit, remittances and any other sources. The impact of the watershed project on financial capital is essential to analyse because it is linked with the overall socio-economic status of a beneficiary. Improvement of financial capital is the indicator of better employment opportunities and income. It was observed that better employment and good returns from agriculture increased the income level and created the potential for more savings. During the study, the impact of the watershed on financial capital was observed by assessing many factors. These factors include impact on agricultural productivity, crop yields, cropping pattern, employment, impact on women labour days, migration, household income expenditure, saving, credit and indebtedness. There were different means adopted for the measurement of improvement of financial capital by the farmers. The means adopted by the farmers are discussed below.

6.4.1. Increased agricultural production

There are mainly three ways by which the rainfed area, rehabilitation and development is possible. These are increased agricultural productivity, improved natural resource conservation, and more equitable and sustainable management of common property resources (Dishingkar, 2004). As mentioned earlier, both the areas are rainfed areas; it is found that watershed improved the financial capital by improving the agricultural productivity. Three varieties of paddy cultivation are practised in both the watersheds.

These are small duration paddy called *saria*, which is harvested in *Kharif* season, medium duration paddy like *arnapura*, *lalata* and long duration paddy with high yielding varieties such as *swarna*. Table 6.2 shows the changes occurred in the production of some principal crops after the introduction of the watershed. It is found that watershed has a moderate impact on paddy production in comparison to other crops. Along with *dhan* (paddy), in NGO implemented watershed, main *Kharif* crops (monsoon crops) are moong (green gram), *arhar* (split pigeon peas), *chana* (chickpeas brown), *kultha* (horse gram), *mungfalli* (ground nut) and jute. These are cultivated mainly on the *att jami* (plain land). Most of the farmers also grow jute, split pigeon peas and paddy together. The farmers sometimes go for line sowing of green gram, split pigeon peas and jute. In this type of mix cultivation, they do four lines of green gram and split pigeon peas in one line and jute in between. They harvest moong after sixty-five days of cultivation, jute after hundred days and split pigeon peas after one hundred eighty days. In this type of mixed farming before the watershed project they used to produce around 50 kilogram (kg) of green grams, 20kg of split pigeon peas, 10 kg of jute, and 40 kg of horse gram per acre.

Apart from this if farmers go for groundnut cultivation as a single crop, they produce one quintal per acre. Few of the farmers also go for transplantation of tomato seeding. The growing of chickpeas brown and mustard seeds is also found. The productivity of chickpeas brown and mustard seeds per acre are one quintal and 10 kg respectively. However, the implementation of the watershed has increased the productivity of green gram, groundnut and chickpeas brown. Now per acre production of green gram, groundnut and chickpeas brown are 80 kg, one quintal 50 kg and 30 kg respectively. The output of remaining food grains or cash crops has remained unchanged.

Table 6.2: Changes in productivity of different crops before and after watershed

Type of WS	Type of food grains	Before WS (in quintals/ per acre)	After WS (in quintals/ per acre)
NGO	Paddy	13 quintals	17 quintals
	Green gram	50 kilogram (kg)	1 quintal
	Split pigeon peas	20 kg	No change
	Chickpeas brown	1 quintal	1 quintal 50 kg
	Horse gram	40 kg	No change
	Ground nut	1 quintal	1 quintal 30 kg
	Jute	10 kg	No change
GO	Paddy	15 quintals	18 quintals
	Green gram	70 kg	1 quintal
	Split pigeon peas	60 kg	No change
	Chickpeas brown	1 quintal 30kg	1 quintal 80kg
	Ground nut	1 quintal 20kg	1 quintal 50kg

Source: Field Study

Even though the watershed project increased the per capita crop production, it was not observed to be equal among all the land holders. It is important to know that prior to the introduction of the watershed, only 30 percent of the semi medium and medium farmers were raising *Rabi* crops (winter crops) but after watershed 70 percent farmers are growing *Rabi* crops. In case of small farmers and marginal farmers, only 30 percent and 10 percent of the farmers were engaged in cultivation that has increased up to 40 percent and 20 percent respectively in the post-project period. To make the farmers aware about the cultivation of suitable crops in different seasons, the PIA has set up an institution called *Krishi Bikash Kendra* (farmers club). However, it failed to motivate all farmers to participate.

In the GO implemented watershed area, the pre-project agricultural production of paddy, green gram, split pigeon peas, chickpeas brown and ground nut was one quintal, 70 kg, 60 kg, one quintal 30 kg and 20 kg respectively. Few farmers also pursued the transplantation of potatoes. During post-project, the productivity of green gram and ground nut has increased about one quintal and one quintal 50 kg per acre respectively. However, there was no significant increase in the production of other food grains. The contribution of irrigation sources on private land in watershed activities has increased the production of food grains. Here majority of the wealthy farmers can afford the private

irrigation sources as compared to the NGO implemented watershed. The introduction of the watershed had increased the *Rabi* cultivation, before the watershed, around 40 percent of the semi medium and medium farmers used to go for *Rabi* cultivation, now it is 60 percent. However, the situation is same in the case of small and marginal farmer. While 30 percent of the small and one percent of marginal farmers were going for *Rabi* cultivation before the watershed project, now it has grown up to around 50 percent and 20 percent. After the watershed project, remarkable development has been found in the cultivation of sunflower and vegetables like tomato, potato and onions.

It is learnt that just after the completion of the watershed project initially for two years the production was higher, as the water level was higher in different water bodies. So many reasons were found for the variation in production, such as, the size of land holding, ability to invest agricultural hybrid seeds and fertilizers, high level of motivation, possession of skills, cropping pattern, awareness to market price. The semi medium and medium farmers have been found to invest more in agricultural inputs and participated more in watershed activities. In case of small and marginal farmers although the ability to invest in agriculture is less, lack of participation in the watershed project has stood as a hurdle in the improvement of agricultural production. It was observed that due to lack of involvement and cooperation among the farmers, they are not able to access the watershed assets. However, in most of the cases the influential farmers using their man and mussel powers extracted the available resources. Thus, it reflects the fact that merely implementing the watershed project is not sufficient for irrigation, water, agricultural production and sustainable livelihood.

6.4.2. Yield components

As a result of the watershed project, the yield components of the crops have improved. However, the yield growth rate in the NGO implemented watershed areas is higher than the GO implemented watershed. The factors for higher growth are the use of better irrigation, high yielding variety (HYV) seeds, advanced fertilisers and lesser use of traditional implements. In NGO implemented watershed, it was observed that before the introduction of the watershed project around 40 percent of the farmers were cultivating

indigenous crops. But after the introduction of watershed almost 90 percent have adopted HYV seeds. It is pertinent to note that, before the advent of the watershed project, most of the farmers were using 3-4 varieties of HYV seeds but now they are using around 7-8 varieties of HYV seeds. Another change is found concerning the use of chemical fertilisers and pesticides. Principal fertilisers that were used by them were made up of cow dung. This situation has changed after the introduction of the watershed project. Presently, almost all the farmers are using chemical fertilisers in their fields. The farmers stated that the declining of common grazing land caused the decline of livestock in the villages and, as a result, there is a shortage of compost now.

The change was also marked in the use of agricultural equipment. The tractor, which was very rare in pre-watershed period, has replaced the plough. In case of GO implemented watershed, it was found that before the introduction of the watershed project around 60 percent of the farmers were cultivating indigenous crops. But after the introduction of watershed, almost 90 percent of the farmers have adopted HYV seeds. The data shows more or less similar type of results regarding the changes in usage of HYV seeds, and fertilizer usage and tractors use for cultivation. In addition to this the yield rate has also increased. The growth rate of yield is higher among the semi medium and medium farmers than marginal and small farmers.

Lack of accessibility of irrigation and poverty are the major constraints for the marginal and small farmers to improve the yield rate of their cultivation. The PIA officials failed to provide them a sustainable source of irrigation. The agricultural equipment provided by the PIA to watershed officials has failed to meet the requirement of poor and marginal farmers. Again due to lack of participation in watershed activities and improper coordination between watershed officials with all the categories of farmers, poor farmers were not able to get the information about the machines that could be provided to them at subsidised price. In both the watersheds, the semi medium and medium farmers irrespective of their caste and communities informed that the yield rate of their crops has increased.

6.4.3. Cropping pattern

The watershed had a real impact on the cropping pattern in all the villages. In NGO implemented watershed areas while previously most of the farmers were cultivating only cereals and paddy, now as a part of the multi-cropping system they are growing vegetables and horticulture along with paddy and pulses. As a part of watershed activities, the PIA officials have organised a farmers' workshop to make the farmers aware of some new pattern of cultivation and also some horticulture. However, it has not brought much change in the cropping pattern. Only 20 percent of the farmers have changed their cropping pattern (cereals) other than paddy. Others feared that if they change the cropping pattern they may lose all the crops. Still all are cultivating the crops according to their wish. During field work, some farmers revealed that, as they do not have proper training to cultivate other crops or horticulture they are still continuing with paddy cultivation. In the case of GO implemented watershed, noticeable changes did not take place in the cropping pattern. After the watershed project, 70 percent of the farmers, are going for the double crop (cereals and paddy) while it was only 20 percent before the implementation of the project. Most of the farmers complained that they have not received proper information regarding cropping pattern and availability of water either from the block office or the PIA officials.

6.4.4. Employment

Watershed projects usually generate vast rural employment, more irrigation coverage and increased cropping intensities along with soil and water resource conservation (Bhattacharya, 2008). In both the watershed areas, the raising of crops during *Rabi* season by many farmers has increased employment opportunities for the landless. Along with the agricultural labour work, the poor people also got some non-agricultural daily wage labour work. The beneficiaries from NGOs implemented watershed areas experienced substantial increase in male employment rate (Table 6.3) after the intervention of watershed projects. While the employment opportunity for male labourer in agricultural sectors has increased up to 100 percent, it is 50 percent in case of non-agricultural sector. Opportunity for female labour has increased in the non-agricultural sector (100 percent)

than in agricultural (50 percent). The watershed project converged with the Indira Awas Yojana (IAY) and sanitation work created employment opportunities.

Similarly in GO implemented watershed after the introduction of watershed project the average employment in agricultural related activities of male and female has gone up to 33.33 percent and 0 percent respectively, and in non-agricultural activities the average income has increased up to 100 percent and 33.33 percent. Though the primary objective of the watershed project is to create the employment opportunities for both the landless and land owner, landowners have got the more benefit since the land related activities has dominated the watershed project work. It was also found that the introduction of the watershed has generated more non-agricultural employment opportunities for female as compared to the male, and it has created more agricultural work for the male than female.

Table 6.3: Average employment in farm and non-farm activities before and after watershed

	Sources	No. of days		No. of days		percent of increase	
		Before watershed		After watershed		Male	Female
		Male	Female	Male	Female		
NGO	Agricultural	30	10	60	15	100	50
	Non-agricultural	30	15	45	30	50	100
GO	Agricultural	45	10	60	10	33.33	0
	Non-agricultural	10	30	20	40	100	33.33

Source: Field study

6.4.5. Impact on women labour

The introduction of the watershed project has increased the labour opportunities for women. In NGO implemented watershed the revolving fund given to SHGs encouraged women to start the business like goat rearing, poultry, *mudi* (puffed rice) business and *Kirana* shop (grocery). PIA officials also initiated the institution called Meena club for the adolescent girls of the village. This club aimed at providing vocational training like tailoring, food processing, making of toys and facilitated them to market it. During the focused group discussion with women members, it was informed that nearly 30 percent of the girls got the benefit by this club. But the club did not function properly because of non-cooperation of parents of girls and lack of good trainers provided by the PIA. Earlier women used to work in other's field or sometimes as housemaids in wealthy households.

But after watershed project some of them are engaged in small scale business and livestock rearing. In GO implemented watershed no club established exclusively for the women groups. Some of the women groups complained that at the beginning of the watershed project the PIA promised them to give sewing machine and training for the tailoring but they did not fulfil. After the watershed project due to the availability of water, few of the women groups have started cultivating vegetables and earned the money.

6.4.6. Migration

The social, economic, political and environmental problems are the primary cause that forces people to migrate. The rate of migration is one of the indicators to access the employment potentiality of a region. The data collected from both the watersheds established a positive relationship between the watershed project and migration of people. Table 6.4 shows the migration rate of watershed beneficiaries. The data is analysed by using descriptive statistics in Statistical Package for Social Sciences (SPSS version, 20.0). The table depicted that in NGO implemented watershed before the introduction of the watershed project out of the total sampled population nearly 34.1 percent were migrating to the other neighbouring states for work. But while having the interview, beneficiaries informed that there was a significant decline in the migration after the watershed. Now only 19.2 percent are migrating. It was found that migration was mainly confined to the SC (40.4 percent) and ST (28.1 percent) communities before the implementation of the watershed project.

However, after the implementation of watershed it is higher among SC (37.5 percent) and OBCs (31.3 percent) beneficiaries. There were many factors that caused the migration of the people before the introduction of watershed programmes. Figure 6.3 shows these primary factors that compelled the people to migrate before the implementation of the watershed. These factors are non-availability of daily wage labour work (60 percent) and possession of less fertile land (30 percent). Other factors include adjusted with the city life (five percent), to earn more (three percent) and for better education (two percent). After implementation of the watershed, a remarkable reduction was found in these

factors. Most of the OBC households (70 percent) migrated in the post-watershed period to earn money. In the case of GO implemented watershed the percentage of migrants was reduced after the watershed project. The total population used to migrate were 29.2 percent that has reduced to 17.8 percent after the watershed project.

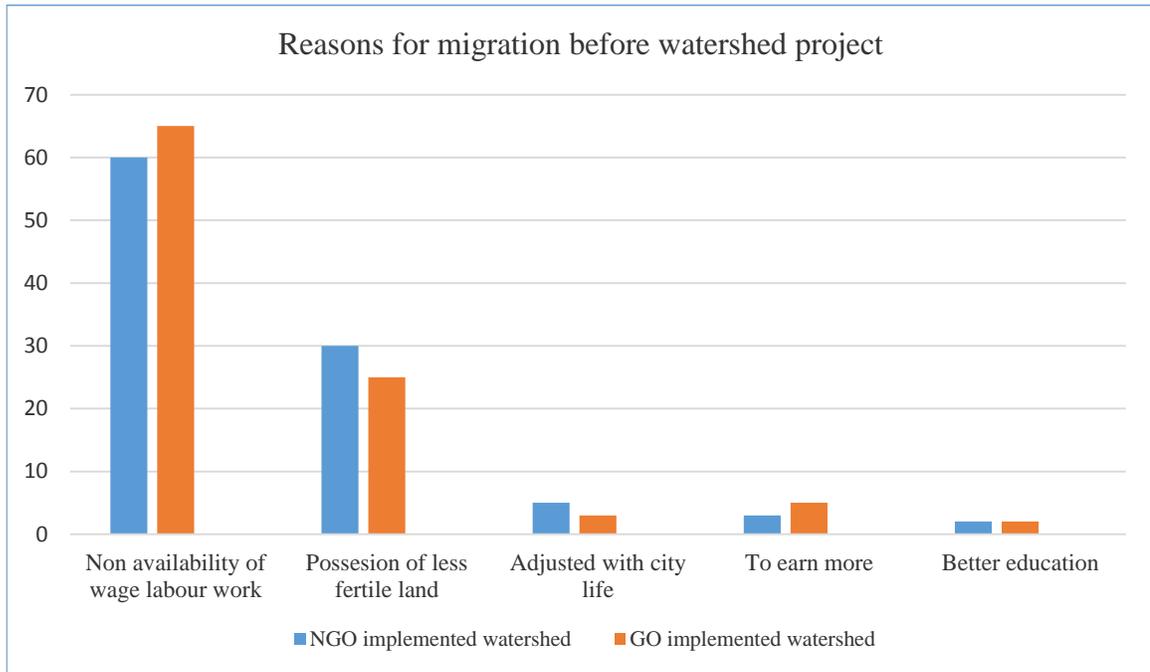
The analysis of data shows that migration rate was higher among the SC and ST, beneficiaries in the pre-post watershed period. The findings of the field study show that the non-availability of wage labour work (65 percent) and less possession of fertile land (25 percent) were the dominating factors of migration before the watershed (Figure 6.3). Other respondents informed that the reason for migration was to earn more (five percent), adjusted to the city life (three percent) and for better education (two percent). The analysis of data collected from both studied areas shows that the reason for migration differs from community to community. It was found that many SC and ST families migrated to brick-making factories in Hyderabad (Andhra Pradesh) and textile factories in Surat (Gujrat) and Bhadohi (Uttar Pradesh) because of their poverty. Among OBC, it was for getting the better employment or to earn more money. The general caste people mainly migrated to get a higher education. On the other hand, the youths of the village once acquainted with a new lifestyle in the places of migration wanted to stay there.

Table 6.4: Rate of migration before and after implementation of watershed project

Category	NGO made Watershed		GO made Watershed	
	Before	After	Before	After
SC	23 (13.8)	12 (7.2)	23 (9.7)	18 (7.6)
ST	16 (9.6)	6 (3.6)	21(8.9)	13 (5.5)
OBC	13 (7.8)	10 (6.0)	18 (7.6)	7 (3.0)
GC	5 (3.0)	4 (2.4)	7 (3.0)	4 (1.7)
Total	57 (34.1)	32 (19.2)	69 (29.2)	42 (17.8)

The rate of seasonal migrants is higher than the permanent migrants. The watershed has enhanced the economic status of the farmers for which the migration rate has decreased in all the studied villages.

Figure 6.3: Reasons for migration



Source: Field Study

6.4.7. Household income

Watershed project in both the studied areas has good impact on household income. To know the impact of watershed project on the income level, the data on before and after watershed is compared. Table 6.5 shows the average income level of different communities from agricultural and non-agricultural labour sources before and after the watershed in both the studied areas. The analysis of the data collected from NGO implemented watershed shows that a huge growth was observed in the case of annual income from the source of agricultural labourer in post implementation period. However, the growth rate was not similar for both male and female. While in the case of male the growth rate was 115.38 percentage, it was 83.33 percentage for female. With regard to the growth of annual income from non-agricultural labour activities it shows that while 76.47 percentage growth held in the case of male labourer, it is 57.14 percentage in case of female. In the GO implemented watershed areas it was observed that the average annual income of a male agricultural labourer has increased from Rs. 1175/- to Rs. 1925/- (63.82 percentage growth). The annual income of female agricultural labourers has gone up to Rs. 666.66/- from Rs. 466.66/- (42.85 percentage growth). A significant growth

(57.89 percentages) was also marked in the average annual income of a male labour from non-agricultural activities. Before watershed it was Rs. 1266.66/-. Now it has increased to Rs. 2000/-. Apart from this the annual income of a female labour from non-agricultural activities has enhanced from Rs. 550/- to Rs. 750/- in post project period (36.36 percentage growth) (Table 6.5). The result indicates the gender difference in increment of level of income. Caste based occupation was found to be dominant form the results. Upper caste people refrained from labour work for conforming to caste based stereotype.

6.4.8. Opportunity for family labour

The watershed project has generated employment for almost all the family members. In NGO implemented watershed it has created employment for female members as labour in both agricultural and non-agricultural sector through SHGs and promoted the business of making disposable plates. The *Rabi* cultivation encouraged by the watershed also provided the labour work to women groups. In GO implemented watershed, the opportunity for family labour work was relatively lower than the NGO implemented watershed. It may be because the *Rabi* season cultivation was not as much improved as in NGO watershed villages. Again the SHG revolving was not very much sincere as discussed earlier.

Table 6.5: Community-wise average annual income from different labour sources (in Rs.)

Type of WS	Labour source	Communities								Total average income	
		ST		SC		OBC		GC			
		M	F	M	F	M	F	M	F	M	F
NGO	*AL before WS	1000	400	800	300	1100	500	1000	-	975	400
	AL after WS	2000	600	2100	600	2500	1000	1800	-	2100	733.33
	NAL before WS	1200	500	1000	900	1200	-	-	-	1133.33	700
	**NAL after WS	2200	1000	1800	1200	2000	-	-	-	2000	1100
GO	AL before WS	1200	500	1000	300	1300	600	1200	-	1175	466.66
	AL after WS	2000	700	1900	500	2200	800	1600	-	1925	666.66
	NAL before WS	1200	600	1100	500	1500	-	-	-	1266.66	550
	NAL after WS	1800	800	1700	700	2500	-	-	-	2000	750

Source: Field study, Note- *AL- Agricultural Labour, **NAL- Non-Agricultural Labour, *WS- Watershed, M-Male, F-Female

6.4.9. Household consumption of vegetables

Under watershed projects, there was the construction of dug wells, open wells and tube wells, which encouraged the villagers to cultivate vegetables for their consumption and also for selling. In NGO implemented villages after watershed few of the farmers have constructed small water tank on the back side of their home for domestic use. They accessed water from big water tank made under the watershed project. Along with the domestic, use few of the households started growing vegetables to sell in the market due to the availability of water in the tank. Some of the poor farmers began consuming the home grown vegetables. Before the watershed, they were unable to afford the vegetables

in their diet. About 30 percent of the beneficiaries informed that because of the watershed they are taking healthier food. It also helped to reduce the rate of malnutrition.

The discussion in the watershed meeting on the importance of vegetable intake also encouraged some of the farmers to cultivate vegetables. Ironically, some of the poor SC (40 percent) and ST (30 percent) households were deprived of accessing the tank water for their vegetables and domestic use. They complained that their houses are situated in the interior part of the village, and PIA officials did not provide a long pipe to carry water to their houses. In comparison to NGO implemented watershed areas, not much change in GO implemented watershed areas is observed concerning vegetable cultivation. It is found that in GO made watershed areas around 10 percent of the poor people got the benefit from watershed and started growing vegetables. They accessed the water from a private dug well and seeds from block office on subsidised price. Here also to some extent watershed helped in eradicating malnutrition.

6.4.10. Indebtedness

The problem of the indebtedness is found to be prevalent. It was observed that the indebtedness ruined the socio-economic life of the poor people. The data collected show that villagers used to take a loan for various purposes, like medical treatment, agriculture, daily expenses, drought and social ceremonies like marriage and funerals. The data collected from NGO implemented watershed area, indicates that in the pre-watershed period, 50 percent of the beneficiaries took a loan for various purposes like to fulfil their basic needs or daily expenses and agricultural investment (Figure 5.4). The main source of taking loan was non-institutional sources like *Mahajan* (Money lenders). 70 percent of the farmers informed that during their tough period, they take a loan from money lenders. Twenty-five percent of the farmers took a loan from their friends and relatives. Very few (five percent) people used to borrow money from institutional sources like a cooperative bank. Villagers informed that they could not draw money from the cooperative bank because they don't have security to keep with the bank. The bank does not trust the villagers as they have faced many defaulters in the village. The PIA has created an institution called *Gramya* Bank (village bank) to provide a loan at the fair interest rate

(12 percent). It was a ten-member committee, consisting of the representation of the entire social categories. A person could withdraw only two thousand rupees and had to repay it within six months, and all the members had to save ten rupees per month. But this institution did not sustain as most of the loan takers became defaulters. It was observed that after watershed only 40 percent have taken a loan. Among all the factors, the medical and daily expenses forced people to take a loan.

The formation of SHGs had paved the farmers to avail loan (30 percent) that are more accessible and non-exploitative in nature. However, still money lenders are the dominating source (50 percent) of the loan than friends and relatives (14 percent) and cooperative banks (6 percent). An example of the marginal farmers of NGO implemented watershed shows pathetic condition of indebtedness

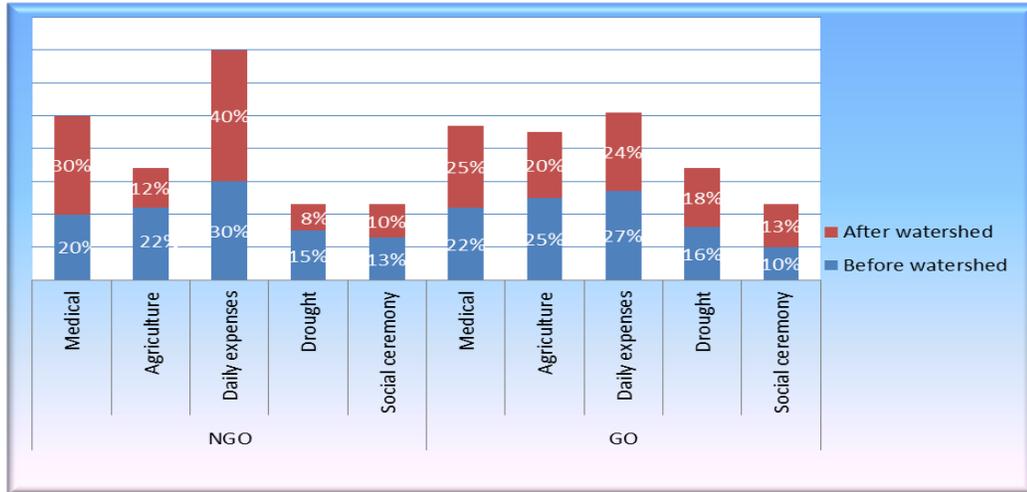
Harihar Nayak (Name changed for identity protection) a 50 year old SC, marginal farmer in 2001 migrated to Godavari district of Andhra Pradesh, along with his family for daily wage labour work. He was indebted to his master (*Sardar*) and at the end he was unable to repay him therefore he pledged his daughter, and came back to the village in 2005.

Source: Field Study

In GO implemented watershed around 40 percent of the beneficiaries used to take loans for different purposes. More or less the reason of indebtedness was similar as compared to NGO implemented watershed (Figure 6.4). Before watershed money lender (*Mahajan*) was the primary source of drawing loan; nearly 80 percent of the people were dependent on *Mahajan* for a loan. While 17 percent took loans from their friends and relatives, only three percent villagers used to take a loan from some institutional sources, like bank and SHGs. Minor changes occurred after implementation of the watershed project, regarding the sources of taking loans. Now around 60 percent of villagers are taking a loan from the moneylender, 18 percent from friends and relatives and two percent from cooperative banks. After watershed project due to the weak formation of SHGs, only 10 percent of the villagers are taking a loan from this institution. Watershed also gives microcredit to the beneficiaries, especially the landless and marginal communities. Micro-credit

generates self-employment and self-employment. It ultimately results in sustainable development and ensure peace in the society (Sarker,Salam & Islam, 2012).

Figure: 6.4: Purposes of credit before and after watershed



Source: Field Study

6.4.11. Savings

The study shows that the watershed projects had very less impact on the savings of the beneficiaries. The poor invested their benefits from the projects mainly on food and other necessities. The wealthy households used to save their money in the banks. From a gender perspective, women could save more than men as the SHGs motivated women groups to start small savings to start petty businesses.

6.5. Natural capital

According to the DFID model, the natural capital refers to the resources derived from the land, water, wildlife, biodiversity and environmental resources. Although five capital assets are considered to be essential for the livelihood, natural capital plays a crucial role in the livelihoods of rural people. It is significant because the poor people around the world primarily are dependent on natural resources (Sarker, 2009). In the context of Watershed Development Programme (WSDP), one of the prime objectives is to improve the livelihood of the beneficiaries by improving the base of natural capital. The watershed guideline (2001) mentioned that the watershed project aims at improving the socio-economic status of the community by improving their natural resources. The watershed

project had a direct impact on natural capital in the form of cultivable land development, availability of fodder, development of grazing land and water availability.

6.5.1. Development of cultivable waste land

Both watershed areas show that after the introduction of the watershed project, PIA took some steps to allot the waste (*Gochar*) land to the landless. As per the information given by the farmers of NGO implemented watershed, PIA brought nearly 20 percent of the waste land under cultivation. And these lands were given to the poor people of the village for cultivation. PIA also constructed percolation pond for the irrigation of this land. In GO implemented watershed also because of the effort of PIA, around five percent of the wasteland was allotted to the landless for cultivation.

6.5.2 Increase in irrigation efficiency

The watershed guideline (2001) mentions that creation of adequate irrigation is crucial for the livelihood improvement. Therefore in both the watershed areas PIAs allotted a greater amount of fund for irrigation development. Therefore, the changes that occurred in irrigation sources due to watershed project needs to be analyzed. Before the implementation of the watershed, the primary source of irrigation was rain water, but after watershed along with rain water other irrigation sources too were availed by the farmers as discussed earlier. In NGO implemented villages, before the watershed nearly 80 percent of the population was mainly dependent on the rainwater for the irrigation. Very small proportion (20 percent) of the farmer had some other sources of irrigation. After the implementation of the watershed project, it has increased up to 60 percent.

In the GO implemented watershed also irrigation increased the potential up to 65 percent that was 40 percent earlier. Along with the institutional development, the massive investment in the construction of Water Harvesting Structures (WHSs) has enhanced the irrigation efficiency to some extent but not to the desired level. The community participation in the post-project period in the management of watershed structures has checked water logging, salinity and soil conservation. Figure 6.5 and 6.6 shows the ownership of diverse irrigation sources by different caste groups before and after watershed project in both the NGO and GO implemented watersheds. Before the

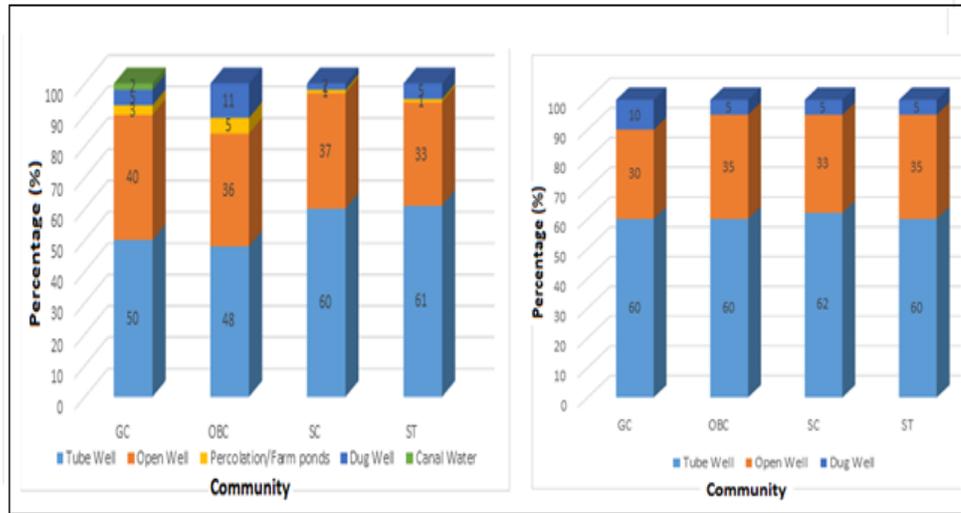
implementation of the watershed, five types of irrigation sources in NGO implemented areas existed. These consist of tube wells, open well, percolation or farm pond, dug well and canal water. The analysis of data shows that before watershed primarily, the tube well and open well constitutes the primary sources of irrigation for all the caste and communities. Watershed has developed other sources of irrigation (water tank and check dams) along with the existing ones. The study shows that after the implementation of the watershed project, most of the OBC and GC households are accessing water tank (GC six percent, OBC five percent), open well (GC 26 percent, OBC 20 percent) tube well (GC 28 percent, OBC 28 percent) and check dams (GC 20 percent, OBC 21 percent), percolation and farm pond (GC 14 percent, OBC 15 percent). In case of SC and ST categories, majority of the households own only three or four sources of irrigation i.e. open well (SC, 30 percent and ST, 33 percent), tube well (SC, 38 percent, 31 percent), check dams (SC, 20 percent and ST, 18 percent), and percolation pond (SC, 10 percent, ST, 13 percent).

Before the watershed, very few GC households were availing canal water but after watershed, they shifted to the use of tank water. However, data collected from the GO implemented watershed region revealed that there were only three types of irrigation available before the watershed project (tube well, open well and dug well). On the other hand, after the implementation of the watershed project the check dam and percolation or farm pond are constructed for the conservation of water for irrigation. But variation is found in accessing the irrigation water among all the castes and communities. It is observed that most of check dam and percolation pond water is being accessed by the OBC (20 percent) and GC households (15 percent). In most of the cases SC and ST households are availing the water from open well (SC 36 percent and ST 34 percent) and tube well (SC 50 percent and ST 48 percent) and only few accessed water from check dam (SC 2 percent and ST 3 percent) and percolation/farm pond (SC 10 percent and ST 12 percent).

It is observed that after implementation of watershed, OBC and GC households own more of the percolation/farm pond irrigation sources. The numerical strength of OBC and

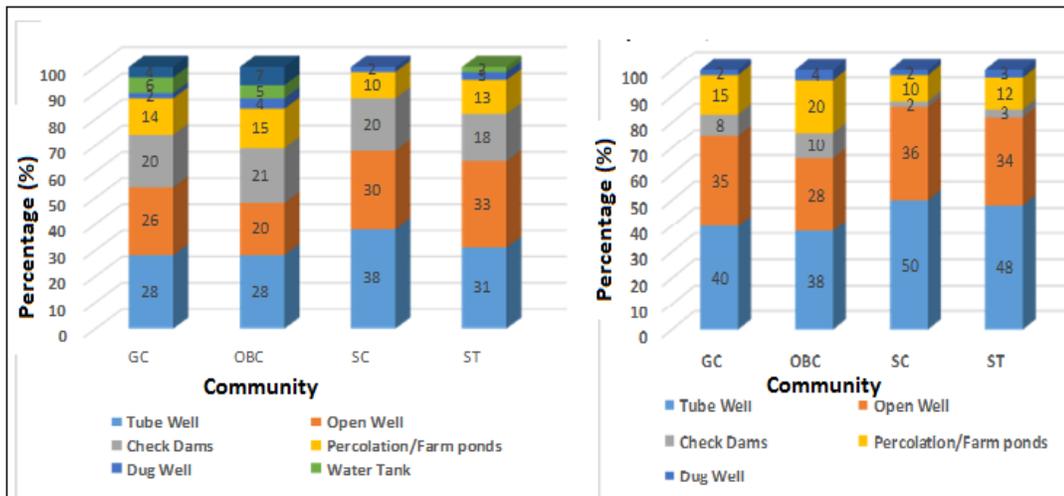
sound financial status of GC families helped them to acquire more irrigation sources. Tube well and open well found to be dominating sources of water for all purpose in both before and after the watershed project period. Due to lack of awareness and poverty, most of SC and ST households are unable to access different sources of irrigation.

Figure: 6.5: Distribution of irrigation sources among all caste groups before watershed in both NGO and GO implemented watershed areas



Source: Field Study

Figure: 6.6: Distribution of irrigation sources among all caste groups after watershed in both NGO and GO implemented watershed areas



Source: Field Study

6.5.3. Increase in different sources of drinking and domestic water facilities

The increase in the number of tube wells and drinking water facilities has brought a positive impact on the health condition of the villagers. Before the watershed less number of tube wells was present in the villages. Due to the water shortage some of the villagers used to depend on the pond and open well water that was unhygienic. The watershed in both the areas had increased the number of tube wells that provided clean water for drinking. Before watershed when there was no good rainfall the ground water level used to go down during summer and consequently water in tube wells used to dry up. However, the situation has changed.

Now the rise of the water table due to the watershed has kept the tube well and bore wells functional throughout the year. In the summer season, the villages are not facing much water crisis, which they used to. In both the watersheds the tube well as well as bore well is found to be the primary source of water for drinking purpose and domestic use. The accessibility of drinking water facilities has increased among the OBC and GC households in comparison to other communities. Because of power and money the OBC and GC communities influenced the PIA to construct tube wells in their locality.

6.5.4. Water availability and area under irrigation

Under the watershed development programme, various initiatives have been undertaken to bring the rainfed areas into the irrigated area. The increment of the area under irrigation after the watershed in village indicates the efficient functioning of the watershed programme. Watershed helped the farmers to irrigate their dry land agriculture. 80 percent of the semi medium and medium farmers of NGO implemented watershed reported moderate impact of the watershed project on their dry land agriculture. The marginal and small farmers felt the average impact of watershed. Approximately 40 percent of them got the irrigation water. Similar findings was also observed in the case of farmers of the GO implemented watershed; 50 percent of the semi medium and medium and 30 percent of the small and marginal farmers reported that they brought their dry land agriculture into irrigated land after watershed. However, the impact observed in the case of NGO implemented watershed areas is quite different than the GO

implemented watershed areas. The water availability in water harvesting structures made in NGO implemented watershed is more than in GO implemented watershed. This is because more in-depth and excellent quality of construction works.

6.5.5. *Rabi* irrigation

It was observed that before the implementation of the watershed, all the studied villages suffered from an acute shortage of water for irrigation in the *Rabi* season. In addition to this the irregular rain during the *Kharif* season and sometimes drought caused low moisture level in soils, which further needs more water for irrigation in *Rabi* season. The irrigation sources created by the watershed project have been utilized by the beneficiaries for bringing more land under *Rabi* crop. In NGO implemented watershed, 57 percent of the farmers started some cultivation or vegetables during *Rabi* season. Before the watershed projects, it was only 20 percent. Apart from this none of the landless people were cultivating before the watershed. But after the watershed project 20 percent of the landless started cultivation in government land temporarily. They started growing up the potato, onions, and some leafy vegetables. In GO implemented watershed area as PIA helped to renovate some of existing water bodies, 30 percent of the farmers started *Rabi* cultivation while it was only 20 percent before the watershed. Here none of the farmers was motivated to take the government land for the cultivation due to the uncertainty of irrigation water provided by the watershed.

6.5.6. Groundwater

The watershed project increased the ground water level. Before the implementation of the watershed, the women had to walk several miles to fetch water because the tube well water got dried up during the summer season. But after the watershed project the villagers never faced complete drying up of the tube-wells. The practices of water conservation through different water harvesting structures had increased the potentiality of ground water level. These structures helped in retaining the surface water during the monsoon season. The available water in the village pond and tube wells in summer season indicates the recharging of groundwater. The bund construction across the agricultural land stored the water in the agricultural field that helped in developing soil

moisture and augmentation of groundwater. According to the respondents of the NGO, implemented water, presently the amount of water flow from tube well is quite right. The water level of bore wells and open wells also increased. In GO implemented watershed villagers too felt the positive impact of the watershed project on groundwater level. Before the implementation of the watershed project the village pokhri (pond) used to get dry up at the beginning of summer season. But after the implementation of watershed water is available for more than two months in summer.

6.5.7. Land

It was found that the use of land became multipurpose after the implementation of the watershed project. The watershed land was used before only for the cultivation. But after the watershed project, the beneficiaries started using the land for horticulture like plantation of *sajna gaccha* (moringa oleiferalam), mango trees, lemon plantation and other plants. They also started growing grass on barren land to feed their livestock. The cost values of land increased, but the farmers were unable to estimate the price per acre as it depends on the fertility and location of the land. The price of the land was higher if the fertility of the land is more and it is situated to some nearby water bodies such as village pond or canal.

6.5.8. Fodder

The practice of livestock rearing and its sustainability is dependent on the availability of fodder on a sustainable basis. In both the NGO and GO implemented watersheds a change occurred in the livestock composition after the introduction of the watershed project. While the population of some of the livestock has increased, others showed a decreased (Table 6.5). In NGO implemented areas in the post-project period the increment in the area of grazing land, micro-finance and fodder production motivated the farmers to purchase more livestock to sustain their livelihoods. As a result, the number of bullock, cow, goats and poultry increased too (Table 6.6).

The landless mainly went for the livestock rearing. The number of buffalo, sheep and duck declined due to the poor veterinary service. Most of the livestock are kept by the ST

and OBC caste and communities. The poor farmers, who do not have livestock, borrowed the bullock paying Rs. 100-150/- per day for ploughing activities. It was observed that in GO implemented watershed the number of bullock, buffalo, cow, goats and poultry got increased while the population of sheep decreased (Table 6.6). The fluctuation in the numbers of livestock and the factors behind it were as same in both the NGO and GO implemented watershed. Because of improved irrigation facilities some of the households started double cropping, which increased the demand for cattle.

As watershed has also brought some improvement in fodder production, it has encouraged some of the self-help group members to take a bank loan for goat and sheep rearing. On the other hand, since most of the villagers are illiterate and they are not aware of insurance of livestock, it leads to the decrease in the number of livestock. And even if they go for insurance they cannot get the claimed money easily. Most of the beneficiaries also stated that because of poverty they cannot pay the insurance premium in time and, as a result, their insurance scheme lapses. They had an awful experience with the crop insurance organization during the drought years which also discourages them from going for insurance of livestock. Besides, if the livestock falls sick, there is no local veterinarian for treatment.

The status of livestock in the case of SC households in both the watershed areas show that it has gone down in GO implemented areas whereas increased slightly (14.70 percent) in NGO implemented areas. Along with the above-discussed factors, lack of cowsheds has discouraged those communities to keep livestock. Apart from this the number of livestock has also decreased among the GC beneficiaries in both the watershed areas after its intervention. The GC people only keep the cows due to their caste superiority. More or less the analysis of data of both the watershed project shows the similar kind of results.

Table 6.6: Community-wise livestock status before and after watershed project

PIA	Community of the respondent	Livestock status														Total	
		Bullock		Cow		Buffalo		Goats		Sheep		Poultry		Duck			
		*B	**A	B	A	B	A	B	A	B	A	B	A	B	A	B	A
NGO	SC	3	5	4	8	5	-	7	16	10	8	-	2	5	-	34	39
	ST	5	15	5	11	4	3	10	27	15	10	3	7	-	2	42	75
	OBC	7	12	10	17	-	2	8	20	15	10	-	3	-	-	40	64
	OC	-	4	5	3	-	-	-	-	-	-	-	-	-	-	13	9
	Total	15	36	24	39	9	5	25	63	40	28	3	12	-	2	129	185
GO	SC	5	6	-	3	-	1	4	6	10	-	3	-	-	-	22	16
	ST	20	28	3	5	2	-	5	10	-	4	-	2	-	-	30	49
	OBC	20	32	10	13	-	6	10	19	-	-	3	7	-	-	40	77
	OC	-	-	-	5	-	-	-	-	-	-	-	-	-	-	5	2
	Total	45	66	13	24	2	7	19	37	10	4	6	9	-	-	103	144

Source: Field study, Note- B*-before watershed, A**-After watershed project

6.6. Social capital

Social capital consists of a membership in formal and informal groups, access to the institutions of society, social networks or social relations and trust. In other words, the term social capital is consisting of trust, reciprocity, norms, standard rules and social sanctions and addition to this, its connectedness with the social institutions (Pretty & Ward, 2001). Apart from this, social capital refers to social relations, which is based on social network and trust among the co-participants. Two main components of social capital are trust and social networks (Starosta, 2014). Social capital is the base for development and stability in all the society (Firozjaeyan & Khosrowshahi, 2014). It is found in the study areas that watershed has an indirect impact on the social and acculturation aspect of the beneficiaries. However, the acculturation and cultural essentialism should not always be seen as mutually distinct examples (Tan, 2014).

6.6.1. Membership in different groups and access to institutions of society

The impact of the watershed projects on the beneficiary's memberships in the informal and formal institutions was found to be positive. In the post-project period, the number of SHGs and their memberships increased. The villagers also became members of other formal groups such as UGs, and WC and WA created during the watersheds. It helped in enhancing their livelihood. It is pertinent to note that, in both the watershed areas the

membership of SC, ST, women and landless in Self Help Groups (SHGs) and User Groups (UGs) is not high which could directly affect their livelihoods. Their accessibility to the other social, economic and political institutions also affected the availability of the livelihood options.

6.6.2. Social network or social relations

The watershed project brought some positive changes in social networks or social relations. Before the introduction of the watershed, the social interaction among the people was mostly confined to their villages. The inter-village communication was not very much prevalent. The watershed activities such as village meetings and the entry point activities have increased the inter-village interactions. Due to the watershed project the income level of the beneficiaries has increased and as a result, they have started inviting their relatives and other kin at the time of festivals and rituals that also reinforced the social network among them. The watershed also had some of the adverse impacts on social relations. It was felt by some of the beneficiaries that before the implementation of watershed, the villagers used to help each other at the time of construction of water harvesting structures and during the time of drought or crop failure. But after the watershed, PIA paid the wage to the persons who contributed his/her labour, even if he or she helped their neighbours or friends.

The introduction of money in each and every aspect discouraged farmers to cooperate among kin relations without money. Therefore, the sale of labour started prevailing among all the villagers. It was also observed that the social relationship was disturbed to some extent in all the studied villages. Earlier the cooperation among villagers to celebrate different cultural activity was high. Villagers used to celebrate many festivals and rituals together (for example; Indra Puja). Performing the various rituals and celebration of festivals in the past increased the intimacy of social relations. But after the intervention of watershed and other developmental projects the social relationship was affected. The festivals and rituals became more private/individual affairs than of the community. The traditional institutions, norms and values bound all the villagers together. The decline of these cultural activities has weakened the social relations among

the villagers. Earlier in their dependence on nature had encouraged them to organize festivals together. However, the development of agricultural infrastructure after watershed had decreased the spirit of united worship of nature for better output.

6.6.3. Trust

The trust between the development agency and beneficiaries constitute one of the major components of social capital. Watershed has improved their standard of living since its implementation they have started trusting the external development projects. However, the response of few poor households was negative. They were of the view that like other projects the watershed too did not match their expectations. They did not receive many benefits. It was observed that as watershed covered more than one village, it was difficult to maintain the trusting relationship with all the beneficiaries. It was mentioned in the earlier chapter that, there used to be a village chief. All the villagers had a regards for the traditional chief's authority and obliged to hear the decision taken by him. But the role of village chief has declined after the implementation of the watershed.

As a result, the collective consciousness has weakened. In post-project period gradually the trust among the villagers has deteriorated due to the sale of labor, individualism, and the politicization of watershed and the declining role of the traditional village chief. Presently, though some farmers are cooperating in physical structures management of the watershed, most of them do not trust each other. Due to lack of trust most of the structures made on community land were not managed properly. In the case of management of percolation pond, all were struggling to get more water to increase their agricultural productivity and no one was bothered about his co-farmer.

6.6.4. Decision-making and participation

The participation in the watershed management shows the decision-making power of the community. The ability to take a decision regarding the use of watershed resources is an important component of the social capital. In NGO implemented watershed it was found that few of the watershed activities had empowered the community to take decisions in watershed management. However, in most of the cases community was still dependent on the PIA for their resources use and management. On the contrary, the beneficiaries of GO

implemented watershed informed that, as PIA did not involve all the villagers in the decision-making process therefore only a few people were empowered to control their watershed resources. Further lack of capability and participation affects the sustainability of watershed projects.

6.6.5. Women empowerment

In both the studied areas, the watershed has influenced the process of women empowerment. It has a direct bearing on the employment opportunities of women. The SHGs helped women's groups to start some small business and also helped them to access the common property resources, for example, forest resources. The number of women collecting *sal* leaf from village forests and making disposable plates out of it has increased after the watershed. The SHG group meetings have built leadership qualities and confidence among qualities. After the introduction of the watershed project, it was observed that the women's participation has increased in *Anganwadi* centers. It shows that watershed has encouraged them to participate in other village development activities also. It has also made them aware regarding the importance of education. Though their participation was very less in the watershed meetings, SHGs meetings have increased their self-confidence.

6.7. Human capital

According to the DFID's sustainable livelihood framework model, skills, knowledge, labor and good health constitutes the core of the human capital. It is the essential and most important for all capitals and is interrelated with the development of other assets. It can be measured through the quality of life of human beings in a particular society. The indicators used to measure human capital include total household expenditure on food consumption, clothing, education, health, entertainment, infrastructure development and maintenance and fuel. Table 6.7 and 6.8 shows the annual household expenditure on different items in pre and post-watershed project in both the studied areas.

6.7.1. Expenditure on food consumption

The assessment of expenses on food before and after watershed project in both the studied areas shows that the food intake has increased after the introduction of the watershed project. In the NGO implemented watershed, it was observed that before the watershed on an average (means value) beneficiaries were spending Rs. 13597.37 per annum, which has increased to Rs. 14044.31. After the implementation of the watershed, there was no marked improvement in food consumption as the increased income has been shifted to other necessities like education and health. In the case of the GO implemented area, before the watershed, the spending on food was Rs. 14229.66 which has increased up to Rs. 14597.88/-, a minor impact has occurred.

6.7.2. Expenditure on health

Comparing the pre and post-watershed phases, it was found that in the NGO implemented watershed, the expenditure on health has increased from Rs. 1618.26 to Rs. 1767.90 and in the GO implemented area from Rs. 1269.49 to Rs. 1377.97. As most of the villagers are not adapted to the modern medical facilities and are practicing homemade herbal remedies, no sharp increase on health expenditure was observed. The attitudinal change on women's health was noticeable after watershed project in both the studied watersheds. Before the watershed, all child deliveries were taking place at home, but due to some awareness through lectures in SHGs and watershed meetings, the villagers started using institutional facilities.

6.7.3. Expenditure on education

Concerning the expenses on education, before the introduction of the watershed, in the NGO implemented watershed areas, out of all the households, only 121 households used to spend around of Rs. 1033.06. The minimum expenditure was very less. It was zero and the highest value was Rs. 3000. After watershed, minimum and maximum values fluctuated between Rs. 100 and Rs. 3500 with an average spending of Rs. 1136.36. In the GO implemented watershed, only 99 households used to spend on education and the average spending before the watershed was Rs. 1753.54 with minimum and maximum value of Rs. 500 and Rs. 3500, respectively. After watershed, average expenditure

decreased to Rs. 1675.00 and minimum and maximum reduced to Rs. 100 and Rs. 3500 respectively. There was no significant change observed in the educational status of the villagers in both the watershed areas, because of the attitude of people towards educating their children. They preferred earning over education. During the interactions with the villagers, they informed that, due to less number of employment opportunities in their locality they are discouraged to educate their children. Gender bias in education was also evident in both the studied areas.

6.7.4. Expenditure on clothing

In both the studied watersheds, the changes in expenditure on clothing, as reported by the people were very minor. In the NGO implemented watershed area, previously, an average of Rs. 514.07 from the income used to be spent by the villagers on clothes. After watershed, it increased to Rs. 631.14. In GO implemented area, the expenditure has increased from Rs. 904.66 to Rs. 928.18 after the implementation of the watershed.

6.7.5. Expenditure on Entertainment

A noticeable change was observed in terms of spending on entertainment in GO made watershed. Before it was Rs. 289.29 and presently it is Rs. 800. The purchasing power has increased due to the watershed project. The celebration of different festivals, rituals, and radio and disk TV connections are indicators of it. Now at the time of a festival, people purchase some sweets, and they also decorate their houses. However, the impact on the beneficiaries differed from the community to community. In the NGO made the watershed area, earlier the average expenditure allocated for the entertainment was Rs. 469.57 and now it is Rs. 470.11.

6.7.6. Expenditure on infrastructure and maintenance

The impact of the watershed on infrastructure and maintenance in the present study refers to the renovation and construction of water harvesting structures, school buildings, *Anganwadi* centers and housing. The findings of both the study areas revealed that development of watershed physical structures has improved the infrastructure assets. However, the variation is marked between the support and maintenance development in

both the studies areas. In NGO made the watershed area it is higher than the GO made watershed. In NGO implemented watershed area before the introduction of the watershed only 32 households has accessibility to some infrastructure facilities and an average they were spending Rs. 756.25/- but presently, 70 households are accessioning and can maintain the infrastructures and their average spending is Rs. 794.29/-.

6.7.7. Expenditure on fuel

The analysis of Table 6.7 and 6.8 shows the expenditure of households of both the studied areas on fuel. The consumption of fuel is one the necessity of day to day life. So the impact of the watershed on fuel consumption has been examined. It was observed that wood is the dominating fuel used for the cooking. Before the introduction of watershed in NGO implemented watershed area all the 167 families used to spend the minimum Rs. 100/- and maximum Rs. 3000/- on fuel and average expenditure was Rs. 388.92/- which has increased to a limited amount. After the introduction of the watershed, the maximum values rose up to Rs. 3500/- and average spending is Rs. 519/-. While, no changes have occurred in minimum values (Rs. 100/). In case of GO implemented area before the introduction of the watershed it was Rs. 100/- minimum and maximum is Rs. 2000/- and the average expenditure was Rs. 321.43/-. After the introduction of minimum, watershed cost was the same Rs. 100/-, maximum and average have increased to Rs. 2200/- and Rs. 388.43/- respectively.

Table: 6.7: Total household expenditure before watershed in NGO and GO Implemented area

Total household expenditure before watershed in NGO Implemented area					
Items	N	Minimum	Maximum	Mean	Std. Deviation
Expenditure on food before watershed	167	10000	22300	13597.37	1627.739
Expenditure on health before watershed	167	150	4000	1618.26	721.744
Expenditure on education before watershed	121	0	3000	1033.06	457.464
Expenditure on cloth before watershed	167	100	1200	514.07	273.910
Expenditure on entertainment before watershed	69	100	2850	469.57	491.787
Expenditure on infrastructure and maintenance before watershed	32	200	3000	756.25	631.403
Expenditure on fuel before watershed	167	100	3000	388.92	467.857
Total household expenditure before watershed	167	12700	28810	17206.65	2636.735
Total household expenditure before watershed in GO Implemented area					
Items	N	Minimum	Maximum	Mean	Std. Deviation
Expenditure on food before watershed	236	13000	43500	14229.66	2006.789
Expenditure on health before watershed	236	800	2500	1269.49	388.671
Expenditure on education before watershed	99	500	3500	1753.54	640.999
Expenditure on cloth before watershed	236	100	2000	904.66	513.084
Expenditure on entertainment before watershed	3	100	2000	800.00	1044.031
Expenditure on infrastructure and maintenance before watershed	17	100	1000	491.18	367.524
Expenditure on fuel before watershed	236	100	2000	321.69	282.044
Total household expenditure before watershed	236	14200	45700	17480.19	2233.204

Source: Field study

Table: 6.8: Total household expenditure after watershed in NGO and GO Implemented area

Total household expenditure after watershed in NGO Implemented area					
Items	*N	Minimum	Maximum	Mean	Std. Deviation
Expenditure on food before watershed	167	1400	22500	14044.31	1900.019
Expenditure on health before watershed	167	200	4500	1767.90	802.558
Expenditure on education before watershed	121	100	3500	1136.36	511.534
Expenditure on cloth before watershed	167	150	4500	631.14	426.693
Expenditure on entertainment before watershed	85	100	3000	470.11	487.497
Expenditure on infrastructure and maintenance before watershed	70	100	3200	794.29	562.766
Expenditure on fuel before watershed	167	100	3500	519.64	541.069
Total household expenditure before watershed	167	4650	34050	18147.48	3129.537
Total household expenditure after watershed in GO Implemented area					
Items	N	Minimum	Maximum	Mean	Std. Deviation
Expenditure on food before watershed	236	13200	43600	14597.88	2021.195
Expenditure on health before watershed	236	800	16500	1377.97	1071.389
Expenditure on education before watershed	106	100	3500	1675.00	740.793
Expenditure on cloth before watershed	236	200	2100	928.18	507.896
Expenditure on entertainment before watershed	14	100	2100	289.29	526.300
Expenditure on infrastructure and maintenance before watershed	27	100	2500	996.30	634.569
Expenditure on fuel before watershed	236	100	2200	388.43	340.981
Total household expenditure before watershed	236	14500	46000	18036.86	2514.182

Source: Field study

**N: The total number of households*

6.8. Physical capital

The physical capital includes the infrastructure, transport, energy, communication, housing pattern and household level physical assets. In the context of the watershed programme, the physical capital refers to the necessary infrastructure, production tools and resources that facilitate people to make their livelihoods. The wells, livestock and

houses are few of the examples of physical capital. These capitals may not necessarily give the direct benefits, but indirectly helps in enhancement of other types of capital; e.g. financial capital. In the studied areas the impact of the watershed on the physical capital assessed in terms of housing patterns, livestock and ownership of other assets with a comparison to before and after watershed project period.

6.8.1. Housing pattern

The watershed project has brought some changes in the housing pattern of poor people in NGO implemented watershed (Table 6.9). These poor people come under Below Poverty Line (BPL) and mainly belonged to the SC and ST households. It was found that few of the poor households (seven percent) had utilized the microfinance to repair their houses. As the watershed project had converged with the *Indira Awas Yojana* (IAY) scheme many of the beneficiaries got the *pucca* and semi-*pucca* houses after the watershed. A significant improvement was seen among the OBC households those were staying in the hut after the implementation of the watershed. Similarly, the analysis of the housing pattern of beneficiaries of GO implemented watershed shows the number of GC and OBC people that live in semi-*pucca* houses.

After the implementation of the watershed, minor changes occurred in the housing pattern of the beneficiaries those stayed in *pucca* and hut houses irrespective of their caste and communities. The reason is that their agricultural productivity and income had not increased much, or they invested their income somewhere else. A moderate improvement was marked in the case of SC and OBC households those stayed in the kutchra houses. After the watershed, a majority of these SC and OBC households shifted to their semi-*pucca* houses. However, in the context of housing pattern among the GC communities no change was observed. They come from the well-off category. Apart from this, it was noted that the socio-cultural beliefs of villagers influence the construction of new houses. Some of the beneficiaries confessed that they believed in the presence of their forefathers' spirits in their old house. As a result, they were unwilling to demolish completely the old house. They also believed that they may have to face the wrath of

their forefather for doing so. Therefore, some of them opted to demolish partially the old house and used the old foundation to construct their new house.

Table 6.9: Beneficiaries according to house type before and after watershed project

Type of WS	Community / caste of the beneficiaries	House owned								Total	
		Pucca		Semi-pucca		Kutcha		Hut			
		B*	A**	B	A	B	A	B	A	B	A
NGO	SC	3	7	5	8	42	38	7	4	57	57
	ST	4	8	3	6	25	20	8	6	40	40
	OBC	7	15	3	7	30	35	24	7	64	64
	GC	4	5	1	0	1	1	0	0	6	6
	Total	18	35	12	21	98	94	39	17	167	167
GO	SC	6	8	7	12	41	30	4	8	58	58
	ST	5	9	10	13	27	20	5	5	47	47
	OBC	15	22	25	35	58	42	4	3	102	102
	GC	6	8	7	10	14	9	2	2	29	29
	Total	32	47	49	70	147	101	16	18	236	236

Source: Field study, Note- B*-before watershed, A**-After watershed project

6.8.2. Household level physical assets

The income received from *Rabi* cultivation and other wage labour activities have helped the beneficiaries to increase the household assets in the post-watershed period (Table 6.10). However, the variation was marked in asset keeping of the different caste and communities. In both the studied areas, a substantial increment was found in the case of bicycle and plough among all the assets. These were mostly used by the SC, ST and OBC caste and communities. The remaining assets were more or less constant. Irrespective of their caste and communities, the beneficiaries were encouraged to purchase the bicycle and plough as these assets helped them to earn their livelihood. They used the plough for the cultivation and bicycle to sell and buy their agricultural productivity. Some of the beneficiaries of the watershed have also added few items of entertainment (such as television and radio) in their day to day activities.

Table 6.10: Beneficiaries by assets owned – before and after watershed

Type of WS	Community of the beneficiaries	Other Assets owned												Other assets	
		Cycle		Motor cycle		T.V		Radio		Plough		Tractor			
		*B	**A	B	A	B	A	B	A	B	A	B	A	B	A
NGO	SC	20	25	2	2	4	6	6	6	4	7	1	1	1	2
	ST	23	28	4	6	4	5	3	3	5	5	0	0	2	2
	OBC	34	40	5	5	10	12	5	7	8	12	3	4	3	8
	GC	4	5	3	3	3	4	2	2	2	3	2	2	3	5
	Total	81	98	14	16	21	27	16	18	19	27	6	7	9	17
GO	SC	20	23	3	3	3	3	3	3	8	8	2	2	2	2
	ST	25	30	6	7	4	4	1	3	10	10	1	1	1	3
	OBC	30	34	10	10	8	10	8	8	15	18	6	6	8	10
	GC	8	10	3	3	3	3	5	6	5	8	5	5	5	6
	Total	83	97	22	23	18	20	17	20	38	44	14	14	16	21

Source: Field study

Note: Note- B*-before watershed, A**-After watershed project

6.8.3. Other assets

Other assets come under physical capital found in both the study areas were craft cutter, table, chair, bullock cart, fridge and mobile phones. The watershed project has a positive impact on these assets kept by different caste and communities in both the studied areas. Comparatively the number of assets has increased more in NGO implemented watershed area than in GO implemented watershed. It was found that the OBC community has increased their assets after the watershed in comparison to other castes and communities.

6.9. Political capital

Along with the other capitals, political capital is one of the critical capital assets that shaped the livelihood of the people (Baumann, 2000). The impact of the watershed

project on political capital is essential to discuss because it has a direct or indirect effect on the livelihood of the people.

6.9.1. Awareness about the right to the selection of PIA, watershed secretary and president

The watershed guideline (2001) mentions that the local community can select the PIA. At the grass root level, they can also exercise the right to choose their watershed secretary and president. On the contrary, the local community were not aware in this regard and lacked political capital. The watershed has a less impact on the enhancement of political capital. In the NGO implemented watershed, the PIA himself intervened in the village with the consultation of few upper caste people (*Rajput* family) of the village. The politically well off families played an influential role in the selection of the watershed secretary and president even though the selection was made at the open meeting. For instance, the *ex-sarpanch* supported a particular person to be the watershed secretary or president.

6.9.2. Political awareness

The political awareness of the community has increased after the implementation of the watershed. In both the studied areas, people became aware of the impact of their selection of their representatives. In the context of watershed development, the president and secretary play a significant role in making decisions that have a direct bearing on the livelihood of the community. The people became aware that any leader chosen by them should follow the path of people-centric development.

6.9.3. Caste and power structural relations

It was observed that watershed project did not have a very efficient impact on the caste and power structural relations in all the studied villages. In both the studied areas, it was informed by the respondents that the caste and power structural relationships still exist in the village. The upper caste people dominate the lower caste people socially and politically. To avoid the caste conflict in most of the cases, the PIA allotted the percolation pond to the persons belonging to the same caste or community. If the water of the pond has to be shared equally, then the lower caste people always felt marginal. From

the above analysis, it is concluded that the watershed program has improved the livelihood of the beneficiaries of both the NGO and GO implemented watershed areas in varying degrees. While the watershed projects could address the livelihood problems to varying degrees, some issues related to sustainability remained unsolved. Broadly, watershed projects consist of some activities that have a potential for increasing the productivity of different livelihood capital assets (financial, human, social, natural, physical and political).

The impact on the financial capital is assessed in terms of agricultural productivity, crop yields, cropping pattern, employment, impact on women labour days, migration, household income expenditure, saving, credit and indebtedness. In both the studied areas, watershed improved agricultural productivity, but it was not felt vividly by the farmers of all castes and communities. As a result, along with the sustainability the problem of inequality remained unresolved. The semi medium and medium farmers have taken better advantage of watershed than the marginal and small farmers. The marginal farmers did not get many benefits due to their inability to invest, lack of participation in watershed activities, unawareness on the use of different agricultural equipment, inadequate training, lack of knowledge of market fair price to sell their products. The NGO implemented watershed made some extra efforts to create awareness among farmers about viable agricultural practices.

An institution called Krishi Vikash Kendra (farmers club) was established, but it did not sustain. In the GO implemented watershed, it was observed that most of the time wealthy farmers accessed most of the village pond and well water by using the electric machines. They also exhausted most of the resources of common grazing land and common village forests. Thus, it reflects the structural power relations that alienate the poor farmers from accessing resources. It was found that the growth rate of the yield in the NGO implemented watershed was higher than the GO implemented watershed. The factors for higher yield were the creation of better irrigation, awareness about the High Yielding Variety (HYV) seeds, advanced fertilisers. It was observed that in both studied areas, farmers were not sufficiently encouraged to change their cropping pattern. The

watershed did not bring any significant change in the cropping pattern as the majority of the farmers are still cultivating paddy as a principle crop. However, the irrigation facilities motivated some of the farmers to take up *Rabi* cultivation and double cropping. In the NGO implemented watershed, proper dissemination of information increased the confidence of the farmers helping them to change the cropping pattern. On the contrary, in the GO watershed, the majority of farmers did not opt for the same. The active participation of the well-off households provided them more benefits from the watershed.

The semi medium and medium or well-off households took the initiative in the construction of water harvesting structures on their land because of their ability to invest in agricultural land. In addition to this, their close relationship with the watershed and block development officials made them aware of the cropping patterns and use of modern agricultural equipment and irrigation facilities. Another important component of financial capital is to create employment opportunities for both the landless and land owning people. In this context, it was found that the land-owners benefitted more because of the land related activities dominating the watershed project work. It was also found that the introduction of the watershed has generated more non-agricultural employment opportunities for women as compared to men. It has also created more agricultural work for men than women. The sustainability of employment was higher in the NGO watershed than in the GO watershed because of their good quality of water harvesting structures, sincere efforts to provide a revolving fund to the SHGs and distribution of microfinance. The watershed has created both agricultural and non-agricultural employment opportunities for the landless and women groups.

The microfinance and SHGs funds encouraged few poor people to start some petty businesses that had a substantial impact on their livelihood. The SHGs loan had a significant effect on the women's employment rate. The watershed project also helped a small group of women to grow vegetables in their backyards. After the watershed project, the water level of the tube well and dug well increased that helped the women to get easily drinking water for domestic use. It was also found that at the time of implementation of watershed, construction of different watershed physical structures

provided employment for the landless people. The increase in the job opportunities within the village had reduced the migration rate to some extent. Before the watershed, many people used to migrate to the other states in search of labour work. The better employment chances enhanced the income level of the households, consequently reduced their debt and marginally increased their living conditions. Apart from the manifested functions, the latent function of the watershed includes consumption of vegetables, reduction in debt, and increase in savings. The water availability motivated the beneficiaries to start cultivation of vegetables. The increased income helped them to reduce debt and increase their savings. In both the studied watersheds, non-institutional sources were the dominant sources of credit. In the NGO implemented watershed, a remarkable improvement was found in this regard as most of the beneficiaries started taking loans from SHGs. But in case of GO made watershed, this process was considered too weak.

Watershed has also improved the natural capitals like groundwater level, soil moisture, utilization of wasteland, land value, availability of irrigation water and fodder. The farmers informed that the watershed had a minor impact in bringing cultivable waste land under cultivable land. The NGO implemented watershed had a moderate impact on drinking water, *Rabi* irrigation and fodder in comparison to the GO watershed. Slow and low-quality water harvesting structures work carried out in GO implemented watershed affected the sustainability of most of the natural capitals. In both the watersheds, it was found that the social networking and social relations strengthened due to the watershed programme. Before watershed mostly the intra- village relationship was prevalent. But after the watershed, the inter-village interaction also increased to some extent.

On the other hand, it was also observed that the social relationship was disturbed slightly in all the studied villages. Before the watershed, the cooperation among villagers to celebrate different cultural activity was high. But after the watershed, the cultural activities became more private that further weekend the social relationships. The semi medium and medium farmers trusted the PIA official more than marginal and small farmers. After the intervention of watershed, the labour exchange between farmers that

used to be held as kin relations took monetary form. However, it has empowered the women in the decision-making process to some extent through the SHGs meetings. It was found that the women empowerment and participation of the landless and marginal community in watershed activities is higher than the GO implemented watershed areas. Watershed has helped the beneficiaries in increasing human capital as well. In this regard, the noticeable improvement was found in educational status, expenditure on health care, clothes, and food consumption. Before the watershed, the villagers spent their earning on food. The increased income after the watershed motivated them to spend on some other aspects of life that ultimately improved their standard of living. Comparatively, the NGO implemented watershed has a greater impact on human capital than GO implemented watershed as it is directly linked to the financial and natural capital. It was also found that the watershed project enhanced the household's capacity to achieve the physical and political capital.

The number of bicycles and ploughs increased after the watershed. The development in housing pattern was marked after the watershed. In both the watersheds, changes have occurred concerning beneficiaries staying in the kuccha houses. In case of the political capital, the awareness regarding the right to the selection of PIA, watershed secretary and president and other involvement in political issues has improved after the watershed. Though the livelihood assets in NGO implemented watershed region are quite feasible than in GO made watershed, the issues related to the sustainability of livelihoods remain common in both the studied areas. However, a variation was found in the degrees of sustainability. It was marked because of the differences in approaches to improve the livelihood, economic standards of beneficiaries, accountability, the level of community participation and political mobilization awareness, and institutional setup.

CHAPTER-VII

Summary and Conclusion

7.1. Introduction

The present chapter is divided into three sections. The first section summarizes background of the research and brings out the need and importance of the study. The second section analyses the summary of the empirical findings of research and linkages of present findings with the theoretical literature. The third section deals with the scope for future research. At the end of the chapter, based on the analysis of the findings of both from the NGO and GO-implemented watershed projects, concluding remarks and important policy changes are suggested. Important measures are suggested to institutionalise the community participation and make the watershed programme more people-oriented for sustainable development of rural livelihood.

7.2. Reconceptualising the background of the present study

Rainfed agriculture is one of the most important sources of livelihood for the millions of population in India. Massive investment has been made towards this. Several programmes and schemes have been initiated to explore the potentiality of rainfed agriculture, to improve the standards of livelihood and natural resource base. Since the Fifth Five-Year Plan (1951-61) of the Government of India along with other programmes the watershed development programme has emerged as a more viable strategy to improve the rainfed agriculture and livelihood of rural community. As part of this various area development programmes such as DPAP, IWDP, DDA and NWDPRAs were implemented adopting the watershed approach. However, after implementation of first generation of the watershed projects during 1970s and 1980s the results were not found to be very successful and issue of sustainability of these projects arose. Therefore, during early 1990's it became a matter of concern for the Government, NGOs and other agencies to find out a solution to make this programme more sustainable. So, a lot of discussions were held, conferences were organised and a few committees were set up by the Government. Along with technical inputs, human inputs are of immense significance to

make the programme successful. Owing to a lack of community participation the watershed projects implemented in different parts of the country did not yield the desired results. Consequently, the Central Government in collaboration with State Governments and research institutes have consistently tried to promote the decentralization process, following the bottom up approach to facilitate the participatory exercise in watershed programme. It is evident through the changes in watershed guidelines in 1994, 2001, 2003, 2008 and 2012. In response to this, tremendous changes in watershed guidelines and policies were incorporated in different states in India, including Odisha. Like other states, the Government of Odisha adopted participatory approaches in watershed management from the beginning of Eighth Five-Year Plan.

The new participatory approach shifted from its earlier emphasis on top-down approach with bottom-up approach to encourage community participation in watershed resource management. The concept of community participation in watershed management has evolved since then to highlight the importance of collective action in resource management by recognizing the people's right to influence decision making. Consistently through all the guidelines, emphasis was given on community participation in all phases of watershed programme including planning, implementation, post-implementation and maintenance. More specifically importance was given on participation of SC/ST, women groups and effective role of *Panchayat Raj Institutions (PRIs)*.

Though last two decades much emphasis was given on community participation and a lot of changes have taken place in policy context, the desired goals are not achieved by different watershed programmes. While some have depicted success stories, some tell us about failure. Sengupta, 1991; 1996; Shankari, 1991; Singh, 1994; Oppen 1980; Rao et al., 2010; Singh and Mishra, 1999; Puri, 2004; Shieffraw et al., 2003; Kumar and Palanisami, 2009, have identified the factors that influence the sustainability of participatory watershed management. The literature suggests that globally the rapid depletion of common property resources, including watershed resources is occurring. It has negative impact on the livelihood of various communities.

The social scientists, non-governmental organization (NGOs), technocrats and government organizations working in this sector for last few decades have not addressed the question of sustainability in the long run. If community participation is a solution to all these problems, no such attention has been paid on how arrangements for coordination and concerted action amongst watershed beneficiaries might be established and sustained. The researchers involved in studying watershed are mostly from technology and economics background. It is hardly seen many sociologists and social anthropologists working on watershed management. Even though various researchers have mentioned numerous reasons for the failure of watershed programmes none of these studies is comprehensive. The unequal distribution of livelihood sources among the watershed beneficiaries, impact of diverse socio-cultural environments on participation has also not been critically evaluated. The conflict among different stakeholders, socio-cultural, economic, institutional and physical-technical factors are relevant in these aspects. With the above background the present study has intended to find out the answer to the following questions.

- ❖ Why is the level of participation not equal at different phases of watershed implementation (pre-planning, planning, post implementation and maintenance phase) among all the watershed beneficiaries, irrespective of their caste and landholding size?
- ❖ Does the type of planning implementing agencies (Government or NGO) have any influence on facilitating the participatory approaches?
- ❖ What are the factors that encourage or discourage the community to participate in the watershed development programme?
- ❖ How does the unequal distribution of watershed benefits lead to conflicts among the watershed beneficiaries and whether the conflict has any influence on the participation?
- ❖ Whether the different capital assets created by the watershed project are able to sustain the livelihood of the beneficiaries?

To attain the above said objectives the study was conducted in the Balangir district of western Odisha. In comparison to other districts in western Odisha this district is endowed with highest number of dry lands, frequently affected by droughts, has highest number of watershed projects under the WORLP scheme. Using multistage purposive sampling method two micro watershed programmes, one implemented by NGO (Jharabandhali) and other by Government agencies (Alekha mahima) was selected for the present study. Based on the land holding sizes and using simple random sampling method around sixty percent households were selected from both the watershed areas proportionately. The total sample size consists of 403: of 167 households from Jharabandhali (NGO implemented watershed) and 236 households from Alekha Mahima (GO implemented watershed). The institutional setting of both watersheds is different, one is implemented by Government and second one by an NGO. Incidentally, both watersheds were handed over to the community during the same period by following the same guidelines (2001 watershed guidelines). They are located in similar geographical and agro-climatic zones.

Data collected were both qualitative and quantitative in nature. The primary data was collected using household schedule, case study, observation methods, PRA techniques and some unstructured questionnaires. Discussions were organized with public and other stakeholders. In-depth interviews were held with officials from Odisha Watershed Development Mission, State Government, NGO personnel and local leaders. For secondary information government records and literature were reviewed. The data collected was analysed using SPSS (version, 20.0) and other statistical methods like factor analysis, linear regression analysis, percentage, cross tabulation. The qualitative data analysis was done by comparing the indicators and parameters set by the watershed guideline with the findings of real field conditions. While analysing the structure and function of watershed committee the study has attempted to examine water management not only as a technical aspect but also as a social reconstruction.

To fulfil the objective of the study several theoretical perspectives on common property resource management have been used. While analysing the level of community

participation the views of Hardin, Wade, Ostrom, Olson, Meinzen Dick and Bromely are linked and debated. The approach of Pangare (1998) and Arya (2007) is used to discuss the role of gender participation. While debating on conflict and conflict resolution the structural functional theory of Talcott Parsons, theory of conflict are interpreted. The livelihood framework given by the Department for International Development (DFID) and Baumann and Sinha (2001) is generally considered to be the standard framework to assess the impact of watershed on different livelihood capital assets (social, human, natural, financial, physical and political capital assets). In order to understand the problem in perspective, our study has adopted a theoretical perspective which assumes that for any sustainable water and livelihood management there should be harmony between technical, financial, historical aspects of community based watershed management and socio-cultural and institutional aspects of water management. Any organisation which does not have this compatibility will not have the active participation of its members.

7.3. Discussion on empirical findings

The traditional systems of water management among the villagers in both watershed areas were more culture-specific in nature. The celebration of diverse rituals during the times of drought to conciliate the Gods and Goddesses, who are the protectors of nature, was a cultural manifestation of their attitude towards nature. In the past, their traditional knowledge assisted them in planning their resource management, agriculture and other livelihood activities. It also helped them in meeting and coping with the contingencies of any forthcoming disasters. The *kata* and *munda*, which were the major sources of irrigation, were a community constructed, maintained and operated irrigation system. The farmers who had their lands near that *kata* constituted a Water Users' Committee, which was headed by the traditional village chief. The chief was responsible for the distribution and allocation of water and the settlement of disputes and enforcement of rules. In this traditional system of water management everyone could procure water so that even the last field in the same outlet of the tank was irrigated. Irrespective of caste and community affiliations, all farmers used to help each other by developing a feeling of one-village notion. The participation of the villagers in the management of *kata* was quite strong. The

development interventions in water resource management have affected the traditional agro-based rituals, which the villagers used to observe during the times of drought. Even though some of these rituals are still observed, they have lost their meaning and purpose. The collapse of the traditional ways of observance of these rituals has also weakened the social solidarity, which was the major asset for any developmental activities in rural India.

The loss of ecological knowledge and the change in their worldview, from subjugation to nature to that of dominance, have made them more and more dependent on the watershed officials. These traditional systems of watershed management are deteriorated over time due to State interferences and also due to socio-cultural, political and economic changes that have taken place at the village level as a result of 'development' initiatives by the State and other agencies. The age-old water harvesting and storage systems, such as *kata* and *mundas*, are becoming the institutions of the past due to the absence of maintenance by the local community or State. Watershed programme, which was introduced with a participatory approach to conserve the natural resources and sustain the rural livelihoods has failed to mobilise the community to participate in the same spirit they used to in traditional society.

The watershed association, which was not devised based on local culture and needs of the local communities, failed to evoke the participation of beneficiaries. By restricting the rights of membership in water harvesting structures only to the recorded land owners, the watershed guideline, 2001 itself has ignored a larger section of people in the society who do not possess legal rights to the lands that they cultivate, especially the landless and women. The customary right of male members over fathers' property has deprived women from land ownership, which ultimately deprived them from the membership of water harvesting structures. The faulty method of implementation adopted by the implementing agencies has failed to bring the beneficiaries into the platform of cooperation. The result from study areas shows that watershed programme has failed to ensure the significant representations of all social groups, especially the SC, ST and women groups in different watershed committees and user groups. Their level of

participation was found to be low and not effective in decision making process. However, the empirical results show that in the NGO implemented watershed, the management of watershed assets and community participation are better in comparison to the GO implemented watershed.

It was observed in the GO implemented watershed that the watershed secretary and the president were unaware of the objectives and rules of the watershed programme, however the situation was a little better in the NGO implemented watershed. In both the studied watersheds it was found that most of those attending the meetings or involved in the watershed activities were educated, head reach and farmers doing the crops in *Rabi* season. The participation of illiterate, old, women groups and tail reach farmers was rare. Despite the fact that watershed is a completely a non-political institution, 'elite capture' and political involvement influences its functioning. It was found that the upper caste households who earlier served in statutory *panchayat* have captured the president or secretary post in contemporary watershed committees. In the context of maintenance of watershed physical structures in post implementation phase it was observed that the percolation pond built in a private land and handed over to a group of people having land in that particular area is showing poor performance in comparison to the percolation pond build in a common land and handed over to a group of people having land in that particular area.

In case of maintenance of check dams, it was found that due to a lack of technical acumen, financial viability, cooperation and coordination the villagers have failed to maintain it properly in post-implementation phase. Owing to a lack of proper information about cleaning of the check dams sometimes the situation like prisoners' dilemma is rising. However maintenance situation is better in NGO implemented watershed areas than GO made. The overall finding from the field supports the view of Olson (1965) that a small group can better manage the resources. It was observed during post-project period that the small groups formed for the maintenance of watershed physical structures and SHGs are more vibrant and doing well. The analysis of survey data shows that the statement given by Baland and Platteau (1996) is partly correct. The watershed structures

which were handed over to a particular caste or community created higher level of participation, whereas the structure handed over to heterogeneous communities did not produce greater participation. In the context of class it was found that the class similarity encourages all beneficiaries to participate in maintaining watershed structure throughout. The finding also justified the questions raised in the participatory framework given by Uphoff (1997). It is observed that, in preparatory phase mostly elite (in terms of caste and class) and big land holders participated more, who have close association with PIA. They participated more to obtain the maximum benefits and wish to exercise the power to run the watershed project. However, the participation of marginal, women and landless is quite less, It is due to a lack of awareness and closeness with the PIA. But the scenario has changed in planning and implementing phase, the marginal, landless and women groups were encouraged to participate in a hope of getting some livelihood sources.

In post implementation phase again the transformation has taken place, those who have ability (in terms of labour, money and materials) to maintain the watershed physical structure, participated more, irrespective of their caste and land holding size. The overall finding in both watershed areas shows that the role of women is more or less confined to the SHGs. However, their presence in watershed management is highly negligible due to the prevailing social norms, domestic burden, indifferent attitude of watershed officials and PIA and villagers' perception about women's work domain and abilities. The findings of the study support the view of Pangare (1998) that the activities designed for women groups in watershed development projects do not empower them to be equal partners with men. In the GO implemented watershed, it was noticed that the community participation was fairly low in SHG formation. The process of formulating SHGs was weak and slow and it lacked adequate representation and membership of landless and women groups. However, in the case of NGO as the process of formation and functioning of SHGs was more sincere, it has encouraged the villagers to participate to some extent.

To sustain the community participation and livelihoods of local communities, some special efforts like formation of a lot of rural grassroots level institutions (*Suchana Kendra, Gramya bank, Samadhan Kendra, Krushi Bikash Kendra*) was done by NGO.

However, after the withdrawal of the PIA from the village these institutions became dysfunctional. A lack of funds and sensitization made the people uninterested to run these institutions. While discarding Hardin's (1968) theory of tragedy of commons, the overall community participation in both watershed areas supported the argument developed by Bromley et al. (1992), Ostrom (1990) and Wade (1988), which stated that common property regimes regulate the rules on individuals to achieve the benefits of resources.

Hardin argued that as the members in a group are highly involved in competition rather than cooperation, the outside intervention is required for the better management of resources. However, the finding of the study shows that the beneficiaries managing the watershed resources collectively are much benefited than the villagers working individually or depending on outside authority. Although Hardin's theory has been implemented in the context of developed country, the convincing finding of Hardin's theory cannot be generalised in countries such as India, where culture is based on cooperation rather than competition. The factor and regression analyses of empirical data collected from both the NGO and GO implemented watersheds, show that the, economic factor has greater influence on participation. The main reason attributed for this is economic activities are directly linked with the livelihood, poverty, employment, short term and long term benefit of the beneficiaries. The second highest factor which has influenced participation is socio-cultural followed by the institutional factors and physical technical factors. As mentioned earlier that participation is highly infused in the social system that could be probably a reason for the relevance of the social-cultural factor. Participation is highly influenced by the economic and socio-cultural factors; therefore institutional factors have mild impact. The physical and technical factors also have minor impact on overall participation. The gradual loss of ethical values, cultural values, breakdown of traditional village institutions, commercialization of agriculture, growth of individualism and emergence of multiple leadership patterns have demotivated the beneficiaries to participate in watershed activities in a true sense. The lack of compatibility between traditional and modern institutions and socio-cultural, economic, institutional and physical-technical factors have not only demotivated the beneficiaries but also increased the conflicts among them. The traditional institutions that were

embedded with the values, beliefs and cultural ethos were widely respected and followed, whereas the modern institution whose emphasis is on rationality and are value free systems of management ignores the culturally evolved normative guidelines. Even though the new institution, watershed management, gave more emphasis on community management, in reality they participate in the system under the direction of government officials or implementing agencies.

It raises a question of sustainability of community participation. The fifth chapter provides a clear picture of conflict and conflict resolution process which have taken place before and after watershed programme. Before the implementation of watershed programme the villagers used to work under the leadership of the village chief. The cause of conflict was more or less confined to the sharing of water resources. The collective consciousness and collective spirit was also higher in resource management. The villagers were participating spontaneously. Even though sometimes the clan and community factors used to influence the decisions on conflict management taken by the village chiefs, in most of the cases the chiefs used to give an impartial judgement taking the voice of village elders in a more democratic way.

Though the principle of timely and assured irrigation was not there due to a lack of water availability, the principle of equitable water distribution was quite strong at that time. The ethical values, village festivals and the respect to the village chief encouraged the village farmers to cooperate with each other. However, the scenario relating to conflict and conflict resolution in post watershed period is undergoing transition. Besides faulty implementation, a mismatch of new institution with the traditional one has made the process of conflict resolution more complex. The breakdown of traditional management system, sudden withdrawal of PIA, and the evolution of multiple leaders created a confusing situation for the beneficiaries regarding whom they should approach in times of conflict. The clash between traditional village chief and the watershed officials disturbed the age old process of conflict resolution. It was observed that semi-medium and medium farmers accessed most of the watershed resources while the small and marginal farmers could not; therefore conflict has arisen between them. In both GO and

NGO watersheds, Brahmins and upper caste people had power and social prestige which gave them an upper hand in the use of watershed resources.

The traditional type of authority helped in maintaining harmony in the village before the introduction of watershed and there were less chances of conflict. After the implementation of watershed, the role and functions of traditional authority have changed. The functional theory of Talcott Parsons (1986) is also found to be applicable in the present context. The unequal distribution of watershed resource caused conflict between the watershed beneficiaries. However, the idea behind the watershed guideline that 'let the beneficiaries resolve their disputes by themselves' are yet to be realised.

The sixth chapter illustrates the influence of watershed on livelihood by using the livelihood framework given by DFID (2000), Baumann and Sinha (2001). They have discussed six capital assets, viz. social, human, natural, financial, physical and political. Watershed project has improved agricultural productivity, but it was not felt vividly by the farmers across caste groups and communities, as a result, along with sustainability the problem of inequality remained a problem. The semi-medium and medium farmers have taken more advantage of watershed programme than the marginal and small farmers.

The marginal farmers did not get many benefits, due to the inability to invest, lack of participation in watershed activities, unawareness about the use of different agricultural equipment, inadequate training, lack of knowledge of market fair price to sell their products. It was found that the yield growth rate in the NGO implemented watershed was higher than the GO implemented watershed. The reasons for higher growth rate are the creation of better irrigation, awareness about the High Yielding Variety (HYV) seeds. It was observed that in both the NGO and GO implemented watershed farmers were not sufficiently encouraged to change their cropping pattern. Watershed project created more employment opportunities, but the sustainability of employment opportunities was higher in the NGO watershed than in the GO watershed because of the good quality of water harvesting structures, regular fund to the SHGs and distribution of micro finance. Along with employment opportunities, it has helped in increasing income and food consumption of villagers and reduced migration of labour and indebtedness due to undertaking of *Rabi*

cultivation. Apart from this the SHGs created to provide loan to the beneficiaries before introduction of watershed non-institutional source was the main source of credit.

The introduction of Watershed has facilitated in improving the natural resources. The NGO implemented watershed has moderate impact on drinking water, *Rabi* irrigation and fodder in comparison to the GO watershed. Low quality of water harvesting structures constructed in GO implemented watershed, affected the sustainability of natural capital. However, in general the rise of natural capital has benefited various communities in different context. The small and marginal farmers seem to be more benefited with regards to runoff reduction, accruing benefits of drinking water facilities whereas large farmers are able to gain more from the irrigation impact of watershed because of their better investment capabilities. The benefit of availability of fodder was found to be neutral. It has resulted positively in reducing the workload of women in terms of fetching drinking water, collecting fuel wood and fodder for livestock in both the study areas. In both the watersheds, it was found that, the social networking and social relations strengthened after watershed programme.

Before watershed mostly the intra- village relation was prevalent but after watershed the inter-village interaction has taken place. On the other hand, it was also observed that the social relation was disturbed slightly. Before watershed the cooperation among villagers to celebrate various cultural activities was high. But after watershed the cultural activities became more private affairs. Earlier the villagers used to help each other voluntarily but watershed project has commercialized everything. Watershed has helped the beneficiaries in increasing human capital as well. In this regard, remarkable improvement was found in educational status, expenditure on health care, clothes, and food consumption. It was also found that the watershed project has enhanced the physical and political capital. The number of bicycles and ploughs has increased after the watershed. After watersheds changes have occurred with regard to beneficiaries staying in the kuccha houses. In case of the political capital, the awareness regarding right to the selection of PIA, watershed secretary and president and other involvement in political issues has improved after the watershed.

7.4. Conclusion

Though the introduction of watershed has not succeeded in achieving the desired goal, but still it has brought some positive changes in all aspects of human life. However, this change is not equal for all communities, all class, all gender and all areas. The variation observes due to difference in people's participation, their interest and process of implementation. The beneficiaries who used to participate in traditional system of water management have not shown much interest to participate as they feel that the new intervention has ignored their need and voice. Because of their lack of knowledge about local system and culture the implementing agencies have failed to mobilize the people to participate in full spirit. The overall scenario shows that the NGO implemented watershed is more suited and has facilitated participatory approach comparatively than the GO implemented watershed areas.

Due to difference in their methodological approaches in implementing the project, the outcome was varied. The NGO as a PIA worked like a facilitator to re-establish the community life. It tried to strengthen the communitarian life. But in case of GO as a PIA adopted more mechanical and bureaucratic approach. During implementation of the project it acted as an instructor rather than a facilitator. The villagers are failed to maintain the watershed structure properly during post implementation period, owing to a lack of technical acumen, financial viability, cooperation and coordination and rise of conflict. It also raised a question mark on sustainability of the system.

Though watershed has helped in increasing the employment opportunities, income, and food consumption of villagers and reduced migration of labour and indebtedness due to undertaking of *Rabi* cultivation, the growing conflicts among the villagers, development of individualism are likely to create hurdles in coordination of beneficiaries in water use and management in future. Even the watershed activities carried out in post implementation period have failed in bringing much visible impact in enhancing employment opportunities. The landless and marginal communities who were benefited because of labour work during implementation period are highly discouraged now. It seems that the livelihood conditions of landless communities have not been significantly

enhanced. Apart from some minor labour work, there was nothing much to improve their livelihood. As discussed in the second chapter, since the study area is one of the lowest rainfall areas in the State, it will be difficult to predict water always in the check dam. Added to this, the poor maintenance of watershed structures further accentuates the problem of water for *Rabi* crops, which is completely dependent on the check dam water. Failure of *Rabi* cultivation impacts employment opportunities and economic progress of the rural communities that may again lead to distress migration. If the sustainability of structure is not taken care then it is difficult to sustain the community livelihoods.

The above findings restate the theoretical position held in the thesis that ‘for sustainable watershed and livelihoods management there should be harmony between technical, financial, historical aspects of community water management and socio-cultural and institutional aspects of water management. Any watershed committee which does not have this compatibility will not have the active participation of its members’. So long all the beneficiaries are not taken into confidence and are not provided with opportunities for their full participation, the greater goal of management of watershed system is difficult to sustain. This has a recoiling effect on the livelihoods of the village communities.

7.5. Suggestions

After the analysis of factual data collected from the field of research, our study suggests the following proposals that may help us make the watershed programme more successful, more feasible for community participation, improve the livelihood and strengthen a sustainable watershed management programme.

- ❖ The guideline should follow a flexible approach for the accommodating of membership in any resources use or user group. It must include those groups of people who do not possess land or are landless.
- ❖ The guideline should also adapt to the local social structural factors in the making of watershed committee, SHGs, UGs etc. during its implementation for improving social justice and equity of caste, class and gender.

- ❖ Before the implementation of any Watershed Development Programme (WSDP) a detailed study should be conducted by the concerned PIA to map out the social dynamics and possible areas of conflicts.
- ❖ A conflict resolution model needs to be developed, which should meet the expectation of social set up for management of disputes. Conflict resolution approaches should be culturally mediated. The approaches should be based on the type of the problem.
- ❖ Extensive research should be carried out to understand the traditional local natural resource management practices, coping strategies during the drought time, use of community's ecological knowledge, different use of land and water resources situated on private and community land and use of arable and non- arable land.
- ❖ All stakeholders involved in the project should establish a strong collaboration.
- ❖ The beneficiaries should be aware about the economic and environmental pros and cons of watershed projects.
- ❖ The PIA should maintain good rapport with the other Government departments to impart necessary technical acumen to the villagers. The Participatory Rural Appraisal (PRA) method should be carried out more seriously to involve the beneficiaries meaningfully.
- ❖ After the handing over of the watershed physical structures to the community, the PIA should not withdraw itself from the village, but should further train and cooperate with the villagers for the maintenance and repairing of these structures for some more time. The capacity building programmes (CBPs) should be a continuous process rather limited to a time period.
- ❖ It is necessary to check the efficiency and reputation of PIA, before giving the responsibility of the implementation of the watershed project.
- ❖ In order to achieve and encourage the participation of marginal farmers and women groups in meetings, time and place of meetings should be prepared according to their convenience. The male members should also be given proper counselling to treat women with dignity as equal counterparts and bring them in watershed meetings.

- ❖ The digitization of all watershed reports should be made to ensure more transparency and easy accessibility of the information for encouraging further research.

7.6. Scope for future research

Future scope to the existing research more exploration can be made on traditional systems of resource management. Studies may be able to cover more samples and more geographical areas to test community participation, analysing the operationalization of other guidelines such as Hariyali guidelines 2003, guideline 2008 and guideline 2012. The present study touched only the changes brought about by the watershed project in livelihood (economic) aspects; however, in-depth discussion can be made regarding the changes brought about by the watershed in other structures of the social system, like, polity, culture and society as a whole.

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Appendix

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**Community Participation and Sustainable Livelihoods: A Study on Watershed
Management, Odisha
(Interview Schedule for Watershed User Groups)**

Section-1: Household Survey

Name of the Respondent:

Sex: 1. Male 2. Female

Age:

BPL: 1. Yes 2.No

Caste- (sub-caste)-

Type of family-

Section 1: General Information

1.1. Geographic Information

State		District		Block	
<i>Gram Panchayat</i>		Village		Name of the user group	

1.2. Household Composition (Include members who stay permanently)

Sl. No.	Name (Start with head of House Hold)	Relation with	Sex	(Male-1/Female-2)	Age*	Marital Status	Educational Qualification	Main Occupation	Subsidiary Occupation	Current Annual Income.(Rs)
1										
2										
3										
4										
5										
6										
7										

1.3. Housing and other Amenities before and after Watershed

Housing and other amenities	Codes :	Before	After
House type	1-Pucca/ 2-Semi-Pucca/ 3-Kutchha/ 4-Hut/ 5-Temporary		
Sanitation	1-Yes, 2-No		
Kitchen room	1-Separate/2-Attached		
Cowshed	1-Yes, 2-No		
Cowshed	1-Separated, 2- Attached		
Main source of drinking water	1-Tube well, 2- open well, 3-stream, 4-pond		
Main cooking fuel	1-Wood, 2-charcoal,3-kerosine, 4-Cow dung, 5-Gas		

1.4. Ownership of Assets before and after Watershed

Particulars	Before (Yes,1; No,2)	Number	After (Yes,1; No,2)	Number
Cycle				
Motor cycle/scooter				
Chair				
Table				
Tractor				
Pump sets-deasel/elec				
Plough				
Bullock cart				
Craft cutter				
Fridge				
Radio				
TV				
Music System				
Others				

1.5. Land Holding (in Acres)

Landholding	Before		After	
	Wet	Dry	Wet	Dry
Leased in (a)				
Leased out (b)				
Own cultivation (c)				
Total Land				

1.6. Impact of Watershed on Production and Main Cropping Pattern (in *Kharif & Rabi*)

Sl. No.	Name of the crop	Area cultivated(in acre)		Production (in Quintal)		Price received		Total price received	
		Before	After	Before	After	Before	After	Before	After
1.	Crop 1								
	Crop 2								
	Crop 3								
2.	Crop 1								
	Crop 2								
	Crop 3								
Total									

1.7. Costs of Cultivation (for *Kharif*)

Sl. No.	Items	Crop-1		Crop-2		Crop-3	
		Before	After	Before	After	Before	After
1	Crop Name						
2	Total cost						

1.8. Costs of Cultivation (*for Rabi*)

Sl. No.	Items	Crop-1		Crop-2		Crop-3	
		Before	After	Before	After	Before	After
1	Crop Name						
2	Total cost						

1.9 Wage Labour details

Type	Number of days		Income	
	Before	After	Before	After
Farm				
Non-Farm				
Total				

1.10. Impact of Watershed on Migration

Number		Place#		Period*		work@		Income		Reasons!	
Before	After										

1. Within block 2. Within district 3. Within state 4. Outside the state, * 1. Permanent 2. Seasonal, @ 1. Domestic work 2. Construction labour 3. Industrial labour 4. Service 5. Other (specify), ! 1. No/less land 2. No employment opportunity 3. Low production 4. To earn more 5. Adjusted with city life 6. Other (specify)

1.11. Sources of Family Income

Sl. No.	Sources of work	Number of family members engaged		Nature of work				Annual income in rupees	
				Continuous/ Seasonal		Duration of work (From - To)			
		Before	After	Before	After	Before	After	Before	After
1.	Agriculture								
2.	Horticulture								
3.	Wage labour								
4.	Employment (Govt.)								
5.	Employment (Pvt.)								
6.	Common Property Resources								
7.	Business								
8.	Dairy								
9.	Fishery								
10.	Goat rearing								
11.	Sheep rearing								

1.12. Sources of Water for Irrigation and Drinking

Sources	Drinking						Domestic						Irrigation			
	Before			After			Before			After			Before		After	
	S	R	W	S	R	W	S	R	W	S	R	W	K	R	K	R

Canal																
Tank																
Open Well																
Tube Well																
Stream																
River																

S: Summer season, R: Rain season, W: Winter season

1.13. Ownership of Livestock

Sl, No.	Livestock	Total in numbers	
		Before	After
1	Cow		
3.	Buffalo		
4.	Bullock		
5.	Sheep/ Goat		
6.	Poultry		
7.	Other (specify)		

14. Source of Credit

Source	Reasons	Source	Reasons
Before		After	

1.15. Savings

Source	
Before	After

1.16. General Impact of Watershed

Soil conservation works	Responses			
Reduction in soil erosion (%)	>50	25-50	<25	Nil
Enhanced yields crops (%)				
Paddy	>40	20-40	<20	Nil
Pulses	>40	20-40	<20	Nil
Oilseed	>20	10-20	<10	Nil
Other crops	>20	10-20	<10	Nil

Second crop/ <i>Rabi</i> crops	>20	10-20	<10	Nil
Water harvesting works				
Runoff reduction (%)	>80	40-80	<40	Nil
Assured drinking water supply	Adequate with quality	Adequate	Less	
Increase in irrigated area (%)	>30	20-30	10-20	Less
Status of water harvesting structures	Working with	Partially functional	Dysfunctional	Broken
Employment generation (No. of additional days / year)				
Male				
Agriculture	>20	10-20	<10	No increase
Non agriculture	>20	10-20	<10	No increase
Self	>20	10-20	<10	No increase
Female				
Agriculture	>20	10-20	<10	No increase
Non agriculture	>20	10-20	<10	No increase
Self	>20	10-20	<10	No increase

1.17. Availability of CPRs

Availability of CPRs				
Fodder	Excess	Adequate	Less	No increase
Fuel	Adequate	Just enough	Less	
Grazing land	Achieved	Partly achieved	Not possible	
Improvement in vegetation	>50	25-50	<25	>50
Maintenance of CPRs				
Participation of women	Solely managing	Partly helping	Not involved	Solely managing
Periodical desilting of water bodies (manual)	Yes, by all stakeholders	Yes, but by SMF and landless	Not done	Yes, by all stakeholders
Maintenance of retention well	Yes, UGs doing by themselves	Yes, UGs doing using WDF	Not done	
Livestock				
Shifts (%)				
Cattle to tractor	All operations	Only large and medium farmers	Few farmers	No body
Sheep to goat	All sheep replaced	Mixed	No change	

Draft to milch animals	Only milch animals	Mixed	No change	
Existing to improved breeds in household poultry	Improved breeds	Part of both	Existing breeds	

18. Household Expenditure

Items	Expenditure (Rupees)	
	Before	After
Food		
Health		
Education		
Clothe		
Entertainment		
Infrastructure and Maintenance		
Fuel		

Section-2

Indicators of level of Community Participation in Watershed Management Programme

In pre-planning phase

- 2.1** Has any land and water development activities have taken place in you village?
1- Yes (), 2- No ()
- 2.2** If yes please mention the name of activities
a- (), b- ()
- 2.3** Have you ever heard about the Watershed Management Programme (WMP) in your area?
1- Yes (), 2- No ()
- 2.4** If yes, what is the source of the information?
1- Village leaders (), 2- Officials (), 3-Friends/ Relatives (), 4- Meetings (), 5. NGO Personnel (), 6- Others (specify)-
- 2.5** When you came to know about this programme?
1. 7 years back (); 2. 5 years back (); 3. 3 years back (); 4. 2 years back
5. 1 year back (); 6. Recently (); 7. Can't recall ()
- 2.6** Was there any water problem in your village prior to watershed?
1. Yes (); 2. No ()
- 2.7** If yes, what were those problems?
.....
.....
- 2.8.** Do your villagers ever discussed to handle this situation?
1. Yes (); 2. No ()
- 2.9** If yes, what you discussed and what you planned?

.....
.....
2.10. Had your villagers approached any Govt/NGO for implementation of watershed?

1. Yes (); 2. No ()

2.11. If no any GO organization or NGO personnel approached your villagers for watershed?

1. Yes (); 2. No ()

2.12 Has any meetings been organised by the PIA? 1. Yes (); 2- No ()

2.13. If yes then, please give the details

Regularity of meetings*	Total number of meetings	Year of conduct	Topic discussed in the meeting	Average participation rate (in %)

* 1- Once in month; 2- Once in three months; 3- Once in a six months; 4- Once in a year

2.14. Have you ever attended any such meetings prior to the implementation?

1. Yes (); 2- No ()

2.15. If yes, please give the details

Meetings	Year and month	Place of meetings	distance travelled	Duration of meeting	Topic	Your Role
1						
2						
3						

2.16. Do the officials considered the view of your villagers? 1. Yes (); 2. No ()

2. 17. If you have not attended the meeting, mention the reasons?

a) No information about the date and time of meetings ()

b) Lack of interest and time () c) No equal opportunity for all to speak ()

d) Others (specify)-

2.18. Is there any other means adopted by the Project Implementing Agency

(PIA, other than meetings) for the awareness about the WSDP and its benefits?

1-Yes (); 2- No ()

2.19. If yes, please mention the means.

a) Posters (), (b) Distribution of pamphlets (), (c) Announcements through public address systems () (d) Street plays and such other media (), (e) Any other (specify)

Section-3: Planning Phase

3.1. Did any organization or officials consult you before implementation of the WSDP to know your specific needs? 1. Yes (); 2. No ()

3.2. If yes, then on which needs? (a) Personal needs (); (b) Management and implementation of watershed (); (c) Community needs (); (d) Others (specify)-

3.3. Did any group meetings were conducted by officials to discuss on process of implementation of activities of watershed programme, like construction of structures, etc.?

1. Yes (); 2. No ()

3.4. If yes, did you attend? 1. Yes (); 2. No ()

3.5. If yes, please give the following details of meetings you have attended

Order of meetings	Year and month of the meeting	Place of meeting and distance travelled	Duration of meeting	Topic	Role#
1					
2					

1. Listened; 2. Participation in discussion; 3. Gave my suggestion; 4. Only attending not listening; 5. Any other.....

3.6. Had you given any suggestion in meeting? 1. Yes (); 2. No ()

3.7. If yes, mention

3.8. Do you feel the committee had taken your suggestion into account? 1. Yes (); 2. No ()

3.9. Did all the members along with PIA members prepare the plan for WSDP?

1. Yes (); 2. No ()

3.10. Does any women members participated? 1. Yes (); 2. No ()

3.11. Have you given your consent for the implementation of the project?

1. Yes (); 2. No ()

3.12. Did your villagers face any problem while preparing the plan?

1. Yes (); 2. No ()

3.13. If yes, what type of problem?

.....
.....

3.14 who had solved the problem? 1- People themselves (); 2- Officials ()

3.15. If have not attended any of these meetings, what were the reasons? Put a tick mark (√) against you answers

(a) Lack of information (), (b) Lack of time and interest (), (c) No equal opportunity for all to speak () (d) Others specify ()

Section- 4: Implementation Phase

4.1. Have you participated in the implementation process of watershed project?

1. Yes (); 2. No ()

4.2. Did you or your family ever participate in any works for the welfare of the village community? 1- Yes (); 2-No ()

4.3. If yes, please give the details

Kind of activity	Nature of Participation				In case of labour	
	Labour (In days)	Monetary (In Rs.)	Material	Other	Who participated from your family	Duration of participation

4.4. Did any meeting held regarding the implementation of Watershed project?

1. Yes (); 2. No ()

4.5. If yes, who has organised the meetings? (a) PIA members (), (b) Leader of User Group (), (c) With the collaboration of both UGs and PIA ().

4.6. In what manner meeting was organised? (a)- Group meeting (),

(b) - Village meeting (), (c) - Individual contact ()

4.7. Do you or your family participate in all works related to implementation of Watershed in your area? 1. Yes (); 2. No ()

4.8. If yes, Please give the details

Activities	Participated	In terms of money/days/material	Not participated	Reasons for no participation
	Yes/ No			
Investment in Watershed Development				
Development of watershed structures				
Maintenance of WS				
Other (specify)				

4.9. Do all the villagers participate in implementation activities?

1. Yes (); 2. No ()

4.10. Do you have any idea about the guideline of Watershed implementation?

1. Yes (); 2. No ()

4.11. If yes, where you came to know?

1. IMPA (); 2. Own interest (); 3. Village leader (); 4. Friends ()
5. TV/Media ()

4.12. Do you feel the IMPA has followed the proper guideline in implementation of this project?

1. Yes (); 2. No ()

4.13. If No, mention your view.

.....
.....

4.14. Is there any conflict raised in your case at the time of of implementation of this project?

1. Yes (); 2. No ()

4.15. If yes, mention.

.....
.....

4.16. Do you feel that the accountability and transparency is being maintained by IMPA?

1. Yes (); 2. No ()

4.17. If no, mention your grievances.

.....
.....

4.18. Mention your personal view towards the IMPA.

.....
.....
4.19. Do you have any idea how much money sanctioned for this project?

1. Yes (); 2. No ()

4.20. If yes, mention.
.....

4.21. If no, have you ever tried to know?

1. Yes (); 2. No ()

4.22. If yes, what you did?
.....

4.23. When this project was handed over to your villagers?

4.24. Is there any committee formed to take care of this project?

1. Yes (); 2. No ()

4.25. If yes, are you member of this committee? 1. Yes (); 2. No ()

4.26. If yes, who made you the member?

1. IMPA (); 2. Self-motivated (); 3.UG president (); 4. Friend ()

5. Village leader (); 6. Few village youth ()

4.27. If yes, when you became member?

1. At the time of formation (); 2. Before 1 year (); 3. Before 6 months ()

4. Before 1 month (); 5. Recently ()

4.28. Have you paid any money to become member? 1. Yes (); 2. No ()

4.29. If no, why? 1. No money (); 2. Nobody asked (); 3. President paid for me ()

4. IMPA paid ()

Section-5: Post-Implementation Phase

5.1. Have you recently visited the Watershed site in your village? 1. Yes (); 2. No ()

5.2. If yes, what is the condition of watershed now? 1. Excellent 2. Very good

3. Good (); 4. Ok (); 5. Partially destroyed (); 6. Fully destroyed ()

5.3. Who is taking care of its maintenance? 1. Govt. (); 2. NGO ();

3. Villagers (); 4. No Idea ()

5.4. Is there any meeting held in your village to discuss about watershed within last year.

1. Yes (); 2. No ()

5.5. If yes, have you attended the meeting? 1. Yes (); 2. No ()

5.6. If yes, give the details.

Order of meetings	Year and month of the meeting	Place of meeting and distance travelled	Duration of meeting	Topic	Role#
1					
2					

5.7. Do meetings are conducted regularly in your watershed area to discuss about use and maintenance of watershed structures? 1. Yes (); 2. No ()

5.8. Can you recall how many general body meetings held last year?

1. 1 Time (); 2. 2 Times (); 3. 3 Times (); 4. More than 3 times ()

5. No idea ()
- 5.9. Are you aware about the election in User Groups? 1. Yes (); 2. No ()
- 5.10. If yes, what is mode of election? 1- By election (); 2- By selection ()
- 5.11. What is the tenure of office bearer?
1. One year (); 2. Two Year (); 3. Three year (); 4. More than three years ()
- 5.12. Have you ever voted in the election? 1. Yes (); 2. No ()
- 5.13. If no, what is the reason?
1. Nobody has informed me (); 2. My name is not in the list ()
3. I am not aware about the voting system (); 4. It is not necessary ()
5. Anything (Specify).....

5.14. Do you or any of your family members participated in Watershed Maintenance activities? 1. Yes (); 2. No ()

5.15. If yes, give details.

S. No.	Activities/structures	Number of person	Contribution in terms of				Frequency
			cash	Labour (days)	material (In Rs).	Any other	
	A.)Farm pond/percolation pond/Check Dams						
1.	Construction of pond/ Dams						
2.	Removal of weeds						
3.	Reconstruction/Repairing of surplus weir						
4.	Bund strengthening						
5.	Desilting of pond/ Dams						
6.	Others (specify)						
	B. Tree plantation						
7.	Watering the trees						
8.	Gap filling & Weeding						
10.	Others (specify)						
	D. Renovation of tanks						
11.	Bund strengthening						
12.	Planting trees						
13.	Desilting of tank						
14.	Reconstruction of surplus weir						
15.	Others (specify)						

5.16. Are you satisfied with the quality of work undertaken by the PIA?

1. Yes (); 2. No ()

5.17. If no, what are the reasons for not being satisfied?

.....

.....

5.18. Have you ever informed your grievances to UG leader or officials?

1. Yes (); 2. No ()
- 5.19.** If yes, whom you informed?
 1. UG President/Secretary (); 2. Sarapancha (); 3. PIA (); 4. Any other ()
- 5.20.** What was their reply?

- 5.21.** Do you feel that the leaders of watershed are doing well?
 1. Yes (); 2. No ()
- 5.22.** Is there any conflict raised between you and other villagers or officials relating to watershed or water sharing? 1. Yes (); 2. No ()
- 5.23.** If yes, kindly narrate.

Section-6
Factors Affecting the Community Participation in different phases of Watershed Management Programme (WSMP)

- 6.1.** I have participated in pre-planning phase of WSMP
 a. Strongly disagree (); b. Disagree (); c. Neutral (); d. Agree ();
 e. Strongly agree ()
- 6.2.** I have participated in planning phase of WSMP
 a. Strongly disagree (); b. Disagree (); c. Neutral ()
 d. Agree (); e. Strongly agree ()
- 6.3.** I have participated in implementation phase of WSMP
 a. Strongly disagree (); b. Disagree () c) Neutral ()
 d. Agree (); e. Strongly agree ()
- 6.4.** I have participated in post implementation phase of WSMP
 a. Strongly disagree (); b. Disagree (); c) Neutral ();
 d. Agree (), e. Strongly agree ()
- 6.5.** I have participated in the watershed meeting
 a. Strongly disagree (); b. Disagree (); c. Neutral ();
 d. Agree (); e. Strongly agree ()
- 6.6.** I have participated in decision making process
 a. Strongly disagree (); b. Disagree ();
 c. Neutral (); d. Agree (); e) Strongly agree ()
- 6.7.** I have not participated due to domestic work

Table; 6.1. Factors affecting the community participation

Reasons for no- participation	Responses 1) Strongly disagree, 2) Disagree, 3) Neutral, 4) Agree, 5) Strongly agree
Conflict among differ stakeholders (between PIA and beneficiaries or between land holders and landless)	
Awareness about the watershed programme	
Promotion of traditional and historical practices devised by local communities	
Gender of the watershed beneficiaries	
Village politics	
Power differential among the different cast and class people	
Level of social solidarity among the beneficiaries	
Heterogeneity in terms of cast and land holding	
Local leadership to mobilize the community for participation	
Illiteracy of the beneficiaries	
Type of planning implementing agency (PIA) of watershed Project	
Property rights over the watershed resources	
Natural resource treatment work under taken during the implementation of watershed project	
Water availability	
Level of people’s participation in previous project	
The size of watershed user group	
Trust between PIA and communities	
Misconception over the meaning of Participation	
Sustainability of livelihoods provided by the watershed	
Unequal distribution of the benefits by watershed to landless and land owning households	
Poverty of the beneficiaries	
Number of family members working	
Good market linkages to sell the agricultural products	
Land tenure system, whether it is temporary or permanent land Ownership	
Interaction with the technical officials and other PIA officials	

List of Plates

Plate. 2. 1: Village of NGO implemented Watershed	Plate. 2. 2: Village of GO implemented Watershed
	
Plate. 2. 3: <i>Metakani Devi</i> (Ancestral Goddess) in NGO implemented Watershed	Plate. 2. 4: <i>Patkhanda Devi</i> (Ancestral Goddess) in GO implemented Watershed
	

Plate. 3.1: Farm pond in NGO implemented watershed



Plate. 3.2: Incomplete farm pond in GO implemented watershed



Plate. 3.4: Interview with the watershed beneficiaries of NGO implemented watershed



Plate. 3.5: Interview with the watershed beneficiaries of GO implemented watershed

