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Indra's Power.
Participatory Irrigation, Farm Productivity and Poverty in Rural Orissa

A RESEARCH PAPER PRESENTED BY

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Abstract

In recent years Participatory Irrigation Management as a concept has attracted widespread attention. It has been accepted as state policy in a number of countries. In India, Andhra Pradesh was a pioneering state in implementing the concept Orissa was a late starter but by 2002 had already brought out a suitable legislation. This paper draws on findings of an empirical study of participatory irrigation management in the coastal part of Orissa to argue that the newly adopted management practice could lead to a rise in productivity among the small farmers. This paper also argues on the basis of a rapid rural appraisal that rises in productivity does not necessarily translate to reduction in poverty.

Contents

List of Tables

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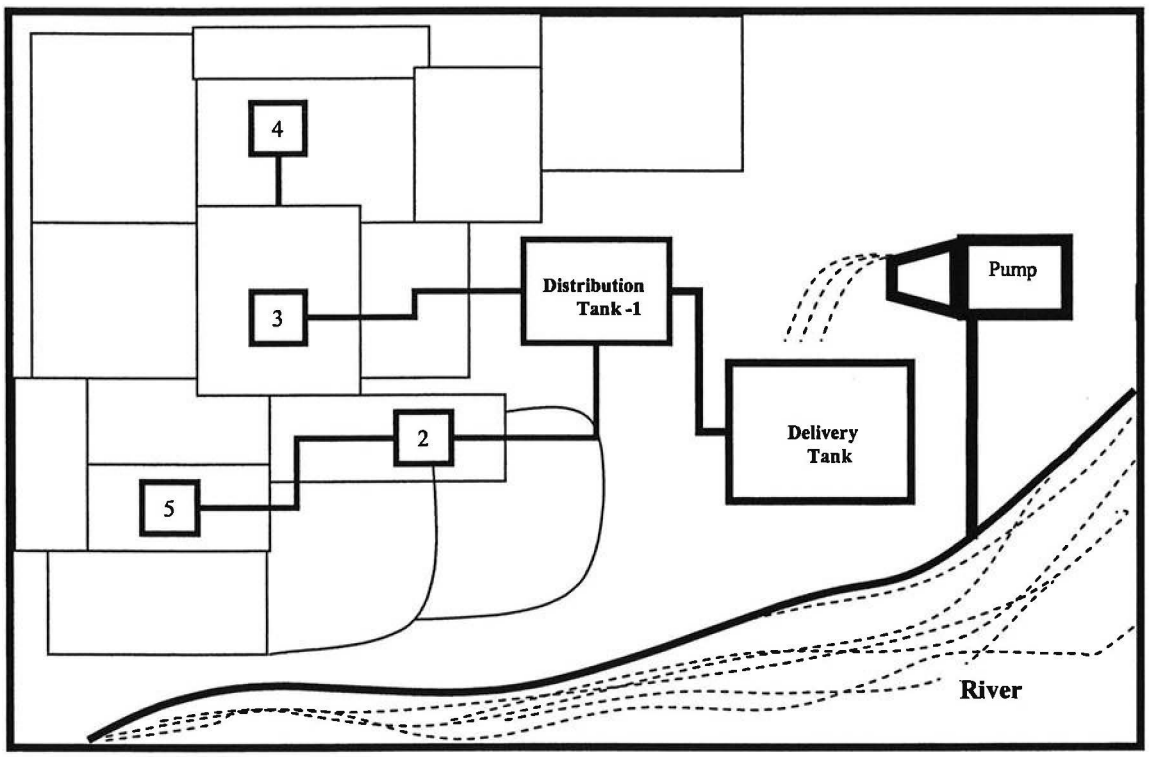
Location of Study

Schematic description of a typical lift irrigation project



"The water crisis is mainly a crisis of governance. Working towards effective water governance requires an enabling environment and appropriate institutional structures that allow stakeholders to work together for effective water management." (Global Water Partnership, Towards Water Security: A Framework for Action, 2000).

"Now the God Indra[1] is in our hand. Now the entire irrigation system is under our control we manage our system and repair our system, we spend our money for it. We have complete ownership on it. We are quite happy. In fact credit goes to our leaders who make it a success. We normally subscribe the money as per the decision of managing committee. We have faith on these leaders, they are quite capable to negotiate with OLIC and manage the entire show. Only problem we encounter is power. The erratic supply and faulty billing of electric charge put us in trouble"

Upendra Nath Parida,aged 72
Small-farmer from coastal Orissa

[1] Indra refers to the God of rains in Hindu mythology.

ACRONYMS

ADB – Asian Development Bank

AP – Andhra Pradesh

APFMIS - Andhra Pradesh Farmers Manage Irrigation Scheme.

DFID – Department for International Development

DOWR – Department of Water Resource (Government of Orissa)

FAO – Food and Agricultural Organisation

FOT – Farmers Organisation Turnover programme

Govt. – Government

ICAR – Indian Council of Agricultural Research

IFPRI – International Food Policy Research Institute

IIMI – International Irrigation Management Institute

IndianINPIM – India Network of Participatory Irrigation Management

INPIM – International Network of Participatory Irrigation Management

IWMI – International Water Management Institute

LIP – Lift Irrigation Point

OLIC – Orissa Lift Irrigation Corporation

PDC – Power Distribution Company

PIM – Participatory Irrigation Management

PSU – Public Sector Undertaking

RRA – Rapid Rural Appraisal

Rs. - Rupees (Indian National Rupees)

WB – World Bank

WUA – Water Users Association

CHAPTER ONE

1. 1 Introduction

Water is an integral requirement for agriculture. Traditionally, water plays a vital role in agricultural production. Water management is a critical aspect towards the enhancement of agricultural productivity. Water management is fundamental to meet the emerging demand of food security in developing countries.

Majority of agricultural producers in developing countries are small farmers (Schneider, 1988). Yet their economic performances are constrained by lack of access and control over the resources including land, water, technology, and credit (Schneider, 1988). Although the small farmers are increasingly gaining importance in rural development literature, the development programmes rarely reach them effectively (Schneider, 1988). The failure of development programmes in reaching the poor may be the root cause of the new development paradigm of participation of poor in the development process. During the second half of the last century, participation of users in resource management has been increasingly gaining importance .Water management and irrigation forms the core areas of resource management in agricultural practices. Irrigation can be referred to as the means of manipulating/ harvesting the water for agricultural use (Molinga and Bolding, 2004b). Irrigation enhances agricultural production and productivity through expansion of cultivated area and crop intensification. Well-managed irrigation systems have the potential for improving agricultural production by improving the productivity of land. Agriculture, in developing countries contributes to the major source of livelihoods through improving crop production and providing employment to the majority of the population (Chambers, 1988). Irrigated land contributes roughly 60 percent of rice production and 40 percent of the wheat production in the developing countries of the world (Bhattari; Sakthivadivel and Hussain, 2002). It is implied that irrigation can contribute towards reduction of rural poverty.

Irrigation literature and policy, around the world, have adopted the paradigm of participation to a large extent during the last two decades (Shackleton, 2002). Increase in productivity through land and water management can come through effective participation of users in the process of irrigation management. It has been seen as a major

intervention to combat the issue of rural poverty around the world (Chambers, 1988). The factors which have dominated the irrigation policy and irrigation literature in recent periods are equity, efficiency, and sustainability of irrigation infrastructure through Participatory Irrigation Management (Hereafter referred to as PIM). Yet not much attention has been paid towards understanding the nature and scale of its effects on the small farmers (Bhattari; Sakthivadivel and Hussain, 2002).

This paper seeks to look into the relationship between participatory irrigation, farm productivity and the questions of poverty among small farmers. This is sought to be done through a study of small farmers of a specific area and their experience with the concept of participatory irrigation management in the state of Orissa in India. To investigate the relationship between PIM and farm productivity of small farmers, the study has used experiences from similar attempts. The paper has relied extensively on the evidence from the state of Andhra Pradesh (A.P), which is one of the pioneering states in India to adopt PIM. Andhra Pradesh experience with PIM is often regarded a successful model.

1. 2 Background of Study:

This section of the paper gives a brief background of the State of Orissa and the background of the state enterprise irrigation agency called the Orissa Lift Irrigation Corporation (Hereafter referred to as OLIC). The paper seeks to investigate the participation levels of small farmers under the OLIC system and the new systems of PIM being introduced as part of the current irrigation reforms in the state.

1. 2.1 Socio-Economic Background of Orissa:

Orissa is situated in the north-eastern part of the Indian peninsula. The state is spread over an area of 1, 55,707 sq. km. According to 2001 population count, the population of Orissa stands at 36.71 million (Govt. of Orissa, 2002-3). It is one of the poorest states in India with forty nine percent of its population living below the poverty line as against the national average of twenty six percent (Govt. of Orissa, 2002-3). Per capita income in the State of Orissa stands at Rupees 6767 (roughly $150)[2], as against the national per capita income of Rs.10024 ($222) (SAPS, 2001). Nearly eighty five percent of the population live in rural areas and depend primarily on agriculture for their livelihoods. As per census

[2] Average value of one $ = 45 Indian Rupees in the year 2001 it averagely stands at this value now.

figures (2001), agriculture provides direct and indirect employment to around sixty percent of the total work force of the state (Govt. of Orissa, 2002-3). Agriculture forms forty four percent of the State's Gross Domestic Product (SAPS, 2001).

1.2.2 Irrigation Potential of Orissa:

The total cultivable area of the State comprises of 6.559million hectares (Govt. of Orissa, 2002-3). About 5.9 million hectares can be brought under irrigation (Govt. of Orissa, 2002-3). Net irrigation potential created in the state stands at 2.543 million hectares, (in the year 2001-2002) constitutive of Major and medium irrigation projects, irrigating 1.19 million hectares and Minor irrigation accounting for 0.456 million hectares (Govt. of Orissa, 2002-3). Minor Lift irrigation which forms part of minor irrigation in the state accounts for 0.338 million hectares as against other sources of minor irrigation, estimated at 0.558 million hectares. The created irrigation potential accounts for forty three percent of the total estimated irrigable area of the state (Govt. of Orissa, 2002-3). Lift irrigation contributes thirteen percent to the total irrigation potential of the state (Govt. of Orissa, 2002-3). The primary focus of this paper is on lift irrigation. Lift irrigation denotes a "point" where water is pumped up before distribution. Groundwater is the most common source, but water is also lifted from reservoirs, canals, drains and other sources (Chamber, 1988).

1. 2.3 Land Holdings Pattern in Orissa:

The land settlement data 1995-96 records the total number of operational holdings[3] in the state at 3.966 million (Govt. of Orissa, 2002-3). Area under operational holdings comprises of 5.244 million hectares (Govt. of Orissa, 2002-3). The average size of operational holdings is 1.3 hectare (Govt. of Orissa, 2002-3). Small farmer holdings account for 81.97 per cent while the remaining 18.03 per cent comes under the category of medium and large holdings (Govt. of Orissa, 2002-3). Small farmers constitute 81.97 per cent of the total farming population managing 50.27per cent of the total operational land holdings (Govt. of Orissa, 2002-3). The big farmers (land holding of more than 2 hectares) constitute 18.03per cent of the total farming population accounting for 49.73 per cent of operational land holdings (Govt. of Orissa, 2002-3). The data indicates that

[3] Operational holdings is referred as the size of cultivated land holding

small farmers (land holding of less than two hectares) should be the major affected people for any agrarian policy intervention in Orissa.

1.2.4 Lift Irrigation in Orissa:

The most important lift irrigation methods in Orissa are tube well and river lift systems, run with small 7 to15 hp power pumps. On an average each LIP covers 10 to 20 hectares of land and 25 to 50 farmers (Mishra, 2002). In India the crop productivity from pump irrigation is higher than canal irrigation (Caurasia, 2000).

Lift irrigation services were traditionally provided by the state public sector enterprise called Orissa Lift Irrigation Corporation (hereafter referred as OLIC). The OLIC functions under the Department of Water Resources (hereafter referred as DOWR) in the Ministry of Water Resources of the Govt of Orissa. The OLIC was established in the year 1973. The main objective was to tap both ground and surface water through lift pumps called lift irrigation points (here after referred as LIP) and provide irrigation facility to areas, devoid of flow irrigation. On record, LIPs number 15000, spread over all the thirty districts of the State having an irrigation potential of .338 million hectares. However, in practice, 10,448 LIPs are functional and the potentiality for assured irrigation[4] stands at 0.125 million hectares (Mishra, 2002). This implies that over a period, significant reduction of irrigation potentiality of OLIC has taken place to the tune of 45per cent. The OLIC gets an annual subsidy from the government for operation and maintenance (hereafter referred as O&M) of the systems. There has been a gradual decrease of O&M budget resulting in deterioration of the systems. The water tariff, under levied and improperly collected is not sufficient to meet the O&M cost. The present irrigation potentiality of individual LIPs is approximately thirty percent below the designed potential (Harsha, 2003). These problems have moved the state government towards encouragement of participation of farmers in irrigation management (SAPS, 2001).

In the year 1995, Participatory Irrigation Management was adopted as state policy under the World Bank assisted Farmers Organisation Turnover programme (FOT). In 1996, the Government started the process of PIM by encouraging farmer groups to take up the management responsibility of the irrigation systems. This process was followed up by the

[4] Irrigating the crop fully out of irrigation water during non-rain season.

Orissa Irrigation (Amendment) Rules brought out in the year 1999. By 2000 these actions had culminated in the beginning of the irrigation reform process in the state. In 2002, the government introduced a new act called Orissa Pani Panchayat [5] Act, 2002 for institutionalising the status of Water Users Associations and its operation. Adoption of PIM in Orissa works within the assumptions that PIM would bring efficiency, equity and sustainability of irrigation (Govt. of Orissa, 2002-3).

1.3 Statement of the Problem:

The Govt. of Orissa has been facing a bad financial situation, with huge revenue deficits (Govt. of Orissa, 2002a). The outstanding debt burden at the end of 2000-2001 was $ 4674.4 million and in the absence of immediate remedial action the debt is likely to go up to$ 8236.2 million by 2005-2006 (Govt. of Orissa, 2002b). At present, the State's own revenue together with its share of central taxes and grants from the federal government is not even sufficient to meet the expenditure on salary, pension, interest payment and repayment of principal. The State is no longer in a position to subsidise the activities of public sector enterprises (Govt. of Orissa, 2002b). The impact of economic stagnation has been felt in the state's irrigation sector as well. The state also has serious governance problems (Saxena et al., 2003).

Investment in the irrigation sector in Orissa has been relatively high in comparison to other states of India. On an average 20 to 25 per cent of the state's plan outlay has been spent on irrigation in the past decades (Selvarajan, 2001). Yet the agricultural growth and productivity continues to be considerably low, constrained by different factors like low irrigation efficiency, irrigation coverage, poor water management, and cultivation of rice as the dominating crop. As per a survey conducted by ICAR (Selvarajan, 2001) 30 to 60per cent of the farmers cultivating in the command areas[6] (the irrigable area of a project) do not get adequate water. The agricultural growth in the State has been marginally over one per cent per annum over the last two decades (Selvarajan, 2001).

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5 The literal meaning of Pani Panchayat is water council

6 "command area" means an area irrigated or capable of being irrigated either by gravitational flow or by lift irrigation or by any other method from a source funded by Government or by Co-operative Society and includes every such area whether it is called '*ayacut*' or by any other name under any law for the time being in force(Definition of command area as given by the Orissa Pani Panchayat Act,2002);

Per capita food grain production of the state, in the year 2000, measures at 156 kg., against the national average of 208 kg., (Govt. of Orissa, 2002a). The yield of food grains (2000-2001) is 9.58 qtls/ hectare against the national average of 16.36 qtls/ hectare (Govt. of Orissa, 2002a). Rice is the main food crop in the state (Govt. of Orissa, 2002a). The yield is quite low at 10.41 qtls. /hectare, way below the national average of 19.13 qtls/hectare (Govt. of Orissa, 2002a). Around 70 per cent of the food grain production comes from paddy (WB, 1995). The agricultural performance of the state is poor, constrained as it is by inefficient irrigation management.

The PIM process in lift irrigation was started in the year 2000 with funding support from Department for International Development, UK (DFID) as part of the Public Sector Reform Programme. The practice of OLIC system shows that farmers do negotiate as a group with OLIC for their own irrigation needs. In most cases, there are farmer leaders who deal with OLIC and take all the decisions on behalf of the other farmers. The PIM as irrigation reform process can enhance the technical improvement and increase the irrigation efficiency. Nevertheless, the question remains whether participation can bring equity in distributing the results of PIM. Can the benefit reach the small farmers? Participation in irrigation management through Water Users Association (here after referred as WUA) relies on collective action for equity and efficiency of water distribution as a way of decentralizing control over irrigation.

1. 4 Research Question:

This research seeks to investigate the relationship between the PIM and the farm productivity of the small farmers. The focal question of this research is:

Does the membership in Water Users Association (WUA) lead to positive increase in the farm productivity of small farmers in Orissa?

To find out the answer to this focal question, the paper will investigate the following sub questions:

a) How the concept of participation is helpful to understand the theory of Participatory Irrigation Management?

b) Does the theory of PIM show potentiality to capture the ground complexities of irrigation management?

c) What is happening to the small farmers in the PIM process in Orissa?

d) What is the learning from the Orissa experiments of PIM?

1. 5 Justification of the Research:

One of the uniqueness of this paper is its focal question. Hardly any study is available regarding the relationship between the WUA membership and farm productivity of the small farmers. This paper looks at the possibility of PIM benefit to the small farmers. The concepts of equity and efficiency have been oversimplified in some of the theoretical literature of PIM (Kurian, 2003). Claims like empowerment and collective action are qualitative in nature and it is difficult to find absolute measurement variables on these claims (Reddy et al., 2004). However the most common criteria can be production and productivity which is the most convincing objective of irrigation (Chamber, 1988). Nevertheless the claim of PIM on farm productivity is quite a simple and straightforward measurement in quantitative terms.

We need to recognise the complexity and diversity of the local ground reality. This can contribute positively to the PIM process. This paper seeks to look critically at whether irrigation reforms (PIM) is leading to benefits to all the users efficiently. In doing so, the research would investigate as to whether collective action enables the opportunity for equity and efficiency which may result in enhancing the farm productivity of small farmers, who are working under the PIM framework in Orissa. The Government has a target to cover all LIPs under PIM by the year 2005 (Govt. of Orissa, 2002b). Irrigation reforms in Orissa are in transition. Hence the findings of this research, being the first of its type can be helpful in determining the future direction of PIM in Orissa. This research may encourage the policy makers to think of the need for further research and studies leading to a better applicability of PIM initiatives in Orissa. Intensive research in this area can lead to reformulation of the policies and implementation approaches.

1. 6 Research Methodology:

This research is dependent on both primary and secondary data. The secondary data has been used for establishing the theoretical foundation of the paper. The secondary data,

taken from different empirical findings of Food and Agricultural Organisation, International Institute of Irrigation Management, International Water Management Institute and International Network of Participatory Irrigation Management are used as evidences of PIM experiences for forming the analytical base of the paper. The analytical parts are a mix of secondary data and primary data. The primary data was collected by Rapid Rural Appraisal (hereafter referred as RRA) in two LIPs in September 2004. The two LIP groups were selected on the basis of their experience in irrigation management under two different systems. In the first group a" Water Users Association" has been managing the irrigation system since 1997 and in the second group; the LIP is with the OLIC. The Rapid Rural Appraisal gives empirical evidence to analyse the PIM objective and the PIM implication trends in the state of Orissa.

A local consultancy firm and a local NGO have conducted the RRA. The key informants of RRA are the farmers who are the direct target of PIM reform programmes of Orissa. Additional telephone interviews were also conducted to gather information for further substantiation of the findings.

1. 7 Limitations of the Research:

The PIM in lift irrigation is a new concept for Orissa. However since no study on this subject exists, this research may lack in different backgrounds understandings on PIM practice in Orissa. It is also dependent on the authors' own experience in Lift Irrigation Reform Project from 2000 to 2002 in Orissa. The findings are mostly based on the primary data.

Considering the time and space limitations, the research has depended on RRA in two different LIPs, which may not necessarily represent the practice in the entire state. Finally the RRA is sharply targeted for this academic research with face to face interviews with the farmers. This short exercise of RRA may not be able to capture all the socio-economic and political dimensions of PIM. A basic limitation exists in the form of communication and coordination problems with the surveyors and the author because of the physical distance involved.

For getting data on the progress of PIM in Orissa, I have depended on the sources of the Govt. of Orissa. There are no internet references regarding the progress of PIM in the

state. I had to collect some data from OLIC by using my own personal networking, which naturally can't be claimed as official sources of data.

1.8 Organisation of the Paper:

The paper is divided into five chapters.

Chapter. 1 Introduction

Chapter. 2 This chapter discusses the theory of PIM. It also discusses the main concepts in PIM, the concepts of participation and collective action. This part seeks to provide an analytical framework for this paper.

Chapter. 3 The objective of this chapter is to provide an overview of PIM in Andhra Pradesh which can be used for referencing the empirical evidences from Orissa.

Chapter. 4 The chapter forms the core analytical part of this paper. This chapter analyses the primary data collected from two different groups of farmers from Orissa. While analysing, the reference would be taken from secondary data. This discussion would help in finding out the answers to the research questions.

Chapter. 5 The chapter summarises the research paper and provides the key observation, which may open up avenues for further research.

CHAPTER – TWO

"Irrigation development must confront the issues of governance and enlist human and other resources and procedures to arrange appropriate institutions and organisations in addition to appropriate irrigation technologies"

- E. Walter Coward, Jr.
Irrigation and Agricultural Development in Asia

2.1 Introduction:

The last two decades have witnessed wide spread irrigation reforms in different countries around the world (Pangare, 2001). Reform process enhances greater involvement of farmers to take over management responsibility (Mollinga, undated). Participation of farmers has become the core area of irrigation reforms around the world. These reforms have re-shaped the relationship between irrigation agency and the farmers.

The chapter seeks to establish an analytical framework for the paper. The analytical framework aims to analyse the focal question mentioned in the chapter one. This chapter starts with an introduction. The section two starts by defining the concepts which are often used in this paper. The section discusses the theory of participation and collective action. Specific attention in this would be to see how the concept of participation establishes the theory of PIM. Section three draws the analytical framework.

2.2 DEFINING CONCEPTS:

2.2.1 Irrigation:

Irrigation is harvesting the water by using different means and diverting it to the agricultural field to meet the agricultural requirement. Irrigation can be referred to as a form of land and water management for enhancing the agricultural production by manipulating the availability of water as per the requirement of crop. Irrigation allows stabilisation of yields, expansion of cultivated areas, and intensification of land use through double and triple cropping and enhances the farm productivity (Mollinga and Bolding, 2004a).

2.2.2 Irrigation Reform:

> A very relevant definition has been provided by Mollinga (2004a): "Any process of purposive transformation of institutional features of irrigation agencies, the laws and regulations that constitute them and irrigation water

use, and the relationships of these agencies with the water users and other relevant actors" (p:2).

From this definition, it can be said that irrigation reform is the reformulation of the role of stakeholders with suitable institutional arrangement for irrigation water use and building relationship between stakeholders such as irrigation department to water users' association. The present irrigation reform stresses the need of farmers' participation. The focus of reform is self-governance.

2.2.3 Small farmer:

Normally the category of farmer is defined by the size of the land they hold or cultivate (Sachidhar, 1988). For the purpose of this paper the definition of small farmer is taken as per the Orissa government norms based on the size of land holding. The Govt. of Orissa has defined a small farmer as someone holding less than 2 hectares of land (Govt. of Orissa, 2002-3).

2.2.4 Productivity:

The concept of productivity explains the output and input relationship. Agricultural production is a contribution of number of factors such as soil, seeds, fertiliser, temperature, and so on. So, it is difficult to say that only irrigation can enhance productivity. Still water is a crucial factor for agricultural production or productivity (Ellis, 1992). For the purpose of this study production of a crop per unit of land has been taken as the measure of productivity. Since the study focuses on the comparison of performances between two different management styles in the same year this simple definition of productivity has been used to compare both the systems.

2.2.5 Farm

A farm can be defined as "A property composed of a single tract or separate tracts of land equipped as a unit for agricultural production" (Dadisman; Arnold and Branch, 1919 cited in Stanton, 1978:728).

2.2.6 Equity

The concept of equity refers to fairness in distribution. Equity means distribution of total output produced by individuals or social groups within the society (Ellis, 1992). Equity in this paper refers to equity in access to irrigation water.

2.2.7 Efficiency

Efficiency refers to making the economic optimum use of a given set of national resources, i.e. achieving the highest level of material welfare for the consumers of society as a whole, for a given set of prices in resource and output markets (Ellis, 1992).

2.3 Conceptualising Theories

2.3.1 Participation:

Participation has been the core issue for community development projects. The concept has been used by the neo-liberals as a condition for enhancing democratic decentralization (Gaventa, 1999). It has been used in the notion of empowerment of people for greater involvement in development process to attain the development objectives. Participation has been defined by different scholars in different ways. But the basic principle of participation that "the involvement of people can have greater impact on the development process" is found in all the definitions. Two standard definitions are given below:

> WB defines participation as "a process through which stakeholders influence and share control over development initiatives and the decisions and resource which affect them" (World Bank, 1998).

Paul's definition as cited in UNDP SCOPP documents, 2000 is quite elaborate and defines Community Participation as an active process by which beneficiary and client group influence the direction and execution of a development project with view of enhancing their well-being in terms of income, personal growth, self-reliance or other values they cherish.

The definitions put emphasis on participation as a process of empowerment of the people. Empowerment can come through the enabling process. The process should have more space for people who can take part and become independent enough to carry forward the process of development.

WB sees participation as a process. Effective participation can turn the process in the participants' favour. Paul also sees participation in the light of WB but he adds explicitly the economic benefits of participation, which ultimately leads to economic independence.

Participation can ensure sustainability and efficiency only if the participating people model the process on their specific situational context, requirements, needs and objectives.

Who participates in reality? Who can influence the process and divert the benefit in his/ her favour? Can participation have real potential to empower the excluded or to reverse the trend in their favour? Is there a risk of the process re-establishing the existing economic and social differences among the group members? A basic dichotomy exists here. Many policies treat participation only as part of a development objective. Whereas for others, it is an important means towards the eventual empowerment of the disadvantaged and marginalised. This paper seeks to examine these questions in light of the PIM experiences discussed in the chapter three and the empirical data analysis in chapter four.

2.3.2 Collective Action:

Collective action can be referred as community group efforts to manage common resources. This concept provides understanding regarding how individuals interact with each other in a community to pursue common interests as set up by the group or the community.

Each individual makes his own choice by calculating his own interests. The aggregate of the behaviour of individuals in a group influences the group action. Choices of an individual may be based on self interest and rational calculative behaviour, but it is also constrained by others (Reisman, 1990).

Most of the issues in collective action deal with inadequate information, conflicting interests or the nature of resource itself (Ostrom, 2003). Olson (1965) examines the optimism expressed in the theory of collective action. When people lack information, coordination becomes difficult despite having common goals. For example in a WUA managed irrigation system all the members do not have the same access to information. The big farmers tend to have more information than the small farmers leading to an understanding gap between the members even if they happen to share a common goal. An example of conflict interest could be seen when a big farmer in WUA would plan to cultivate commercial crop while a small farmer could be planning for subsistence crop. The idea of collective work to attain group interest should follow logically from the

premise of rational group behaviour. The basic fact in this concept is that all the group members would gain and be better off if they act rationally to attain the group objective (Olson, 1965). Many factors are responsible for successful cohesion of a group which act spontaneously in group action. Chambers (1988) has referred to these factors as those of "group interest, social homogeneity, leadership and tradition of collective action" (p:169). The size of the group largely influences the group action. Smaller the size of the group, lesser is the number of conflicting interests among the members of the group. Factors like group cohesiveness and visible motivational incentive can hold individual motivation to act for the group (Olson 1965). Collective action requires inputs from social as well as technical aspects as capacity building of the group functioning which is largely entrusted with the leaders (Sellamna, undated).

2. 3.4 Participation and Resource management:

There are many examples in different parts of the world where over a long period community managed irrigation systems have been quite successful (Coward, 1980; Pradhan, 1989; Sampath and Young, 1990 cited in Ostom, 1992:11). Community participation in resource management is an old practice in India. In Pre-British India, irrigation was essentially managed by the local community (Srinivas, 2003). The farmers' participation in irrigation management is not a new concept, appearing long before the current reform process. In recent times, particularly in the second half of twentieth century, "Community participation in development" has become the new paradigm around the world, rooted in the neo-liberal thinking of market oriented growth. Participation in neo-liberalism is quite a challenging concept. The neo-liberal concept of participation in agrarian development policy targets the small farmer. The concept is based on the argument that small farmers are more efficient user of resource in comparison to the big farmers (Chambers, 1988). Ellis pointed out these positions of neo-liberal thinking and proposed that promotion of small farmer oriented agrarian policy and their claim on growth and income distribution needs thorough and careful investigation (Ellis, 1992).

2. 3.5 Irrigation and Rural Poverty:

The impact of irrigation to address the issue of rural poverty is recognised in irrigation literature (Bhattrai, 2002; Vermillion, 1997). According to these authors irrigation

enhances food production and enables food security for small farmers. Crop intensification increases agricultural productivity which in turn enhances the income of farmers. It can enhance the employment opportunity for landless labour and rural entrepreneur (Chambers, 1988). The study of International Food Policy Research Institute (Oram et al., 1979 quoted in Chambers, 1988) has shown projection for the next 15 years from a baseline production in 1974-76. The projection shows that eighty percent of food production is anticipated from irrigation in the five largest South Asian countries; the projection for India being eighty three percent. However there are strong contradictory views on food production and food availability at household level. Amartya Sen in his work "poverty and famine" strongly demonstrated that enough food production through productivity gain may not necessarily transform peoples' access to food. He argues "who produces the food" and "who has power to obtain the food" is important when we see production relation with poverty (Sen, 1981). Sen implicitly argues for equitable and efficient distribution of production. Both agricultural production and distribution need to be emphasised. However in subsistence agricultural economies like Orissa, increasing productivity and production will form the initial core issues before we take up the concept of equitable distribution. I will use the variables discussed above as cause and effect relation of irrigation and farm income in the analytical framework of the paper.

2. 3.6 Participatory Irrigation management (PIM):

Irrigation reforms around the world have been part of a wider political and economic transformation process, which emerged with the neo-liberal paradigm of economic development (Mollinga, 2004a). The conventional approach of government can be referred as the supply oriented approach where government agencies supply water, maintain the irrigation systems and take care of operation and management of irrigation services under the central supervision of government. The new paradigm of PIM can be referred as demand oriented approach, where irrigation users manage their system (Groenfeldt, 2004).

The approach upholds the assumption that the farmers who depend on irrigation water for their livelihoods have a strong motivation to manage water more efficiently than the irrigation agency (Groenfeldt, 2004). This theory emphasises the failures of the state-led and supply-driven approaches. State failure was quite clearly observed in the works of

Guha, (1983), Blaikie, (1985). The failures of the state created space for irrigation reforms around the world. Irrigation reforms have progressed in two different ways; irrigation management transfer (IMT) and participatory irrigation management (PIM). The primary objective of IMT is to lessen the financial burden of the government by handing over the operational and management responsibility to farmers. On the other hand PIM tries to create space for all users to participate in the irrigation management for achieving equity in water distribution and sustenance of the irrigation system. The element of participation is strong in PIM and practically absent in IMT. The focus of the PIM is on efficient resource allocation to the individuals (Kurian, 2003). The assumption is that, these individuals would also act to attain their common objectives and enhance the equity and efficiency through optimization of resources utilisation.

2.3.7 Participation, Collective Action and PIM:

The realization of the crucial role of the users in resource management, participation and collective action encouraged many countries to adopt participatory approaches in their irrigation policies. Under the participatory approach the consumers and the suppliers meet and mutually decide their rules of law, guiding principles, individual duties and responsibilities that can bring efficiency, self sustainability and productivity of the irrigation system. The historically proven community irrigation systems can provide alternative to irrigation management (Ostrom, 1992). Social relation and social network among the community members can be promoted for efficient and sustainable resource management (Kurian, 2003).

It is clear from the above discussion that participation of farmers and collective action holds the centrality in the theory of PIM.

2.3.8 Establishing a working definition of PIM for the study:

Irrigation reforms in the world have been mostly supported by the World Bank. The Bank's definition of PIM refers to the involvement of irrigation users in all aspects and at all levels of irrigation management. "All aspects" includes the initial planning and design of the new irrigation projects or improvements, as well as the construction, supervision and financing decision rules, operation maintenance, monitoring, and evaluation of the system. At "All levels," mean the full physical limits of irrigation system and up to the policy level (Groenfeldt, 1998). Uphoff, (1985) argues that the participation at planning

level under WB project is only limited to need identification (cited in UNDP, 2000). In theory participation of end-users in formulation of policy can be identified as a core area of PIM. However in practice this has never really been feasible. Participation of the end-users has generally been limited to the implementation process. As discussed above the participation in the context of WB is basically a means to attain the project objectives. This is a case of top down approach where participation of people is sought for in order to attain the objectives only. Technical efficiency of irrigation system, equitable distribution of water and economic use of water would improve through farmer's participation according to the WB. The impact of participation would ensure that there is a sense of ownership among the users for effective control over water. Along with improvement of the operation and maintenance of the system this would contribute to the increase in the productivity of the farmer (Peter, 2004). The process of PIM can improve the farm productivity of the group participating in the irrigation management process (WB, 1998). Productivity can be measured at individual farm level by access to water, yield, income, crop intensification, crop diversification (Rao, 1984). As measures of participation in the WB's PIM policy, WB considers six factors which ensure participation in PIM. These are information sharing, consultations with farmers, joint assessment of projects, shared decision making, collaboration, and empowerment (WB, 1994a). Though the policies of World Bank tend to include all factors including empowerment, as discussed earlier, the emphasis of WB projects are more towards effective management of the irrigation system and much less towards empowerment of the disadvantaged and marginalised farmers.

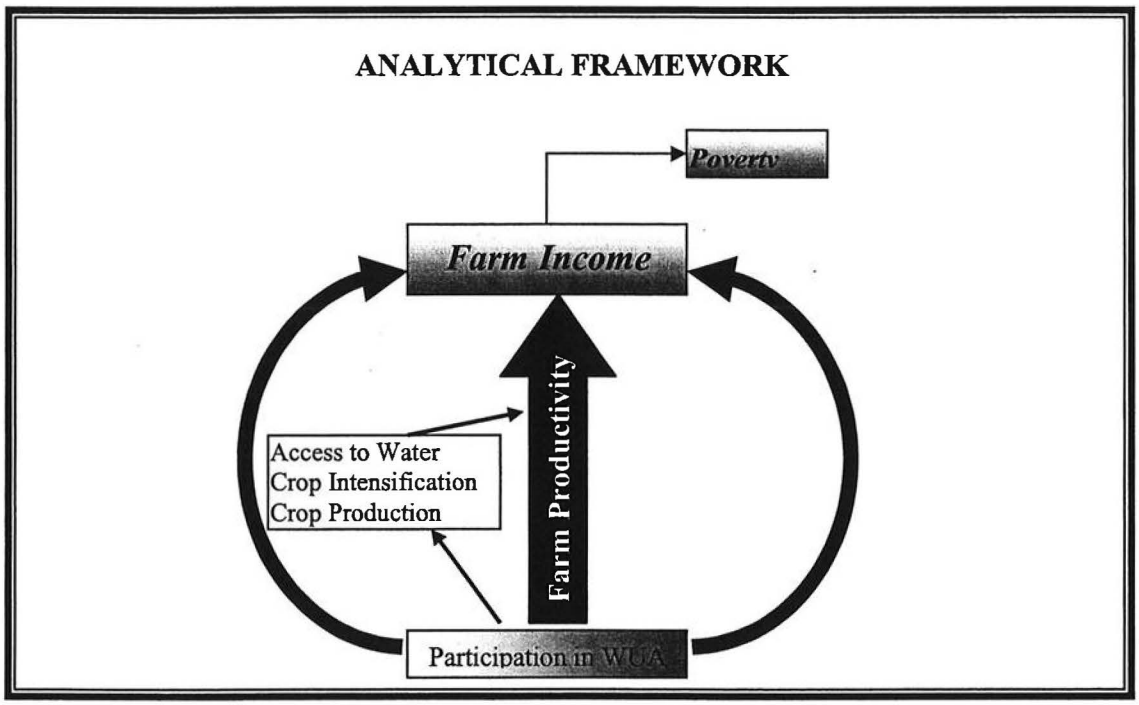
I would conclude this section by establishing a basic acceptable definition of participatory irrigation management. "PIM denotes management of water and irrigation system by the end-users to achieve optimal utilisation of their non-water agricultural resources. PIM involves collective action and aims towards higher individual productivity, higher individual income and in the long run achievement of equity and empowerment".

2.4 Analytical Framework:

There are clearly two ways of looking at the performance of PIM as applied to any particular group of farmers organised as a WUA .The first and the more limited way

could be to lay emphasis on immediately identifiable criteria of performance. An example could be the exact increase in the output per hectare in the fields of a group member. However a much more difficult-to-measure way of looking at the performance could be to look at the final objectives namely the equity and empowerment elements. Quite obviously the primary difference between both the approaches centres on the possibility of measurability in the former and the relative difficulties in measuring the later. I am of the opinion that both the ways of evaluating performance have their individual importance and this paper has tried to seek answers to the questions on both the fronts.

Based on the above arguments the analytical framework for this research paper has been established. The greater objective has been identified as reduction of poverty as a reflection of the equity principle. Given below is the basic diagram showing the analytical framework for this paper.



As per the concepts discussed above, well-managed irrigation systems have potentials to combat rural poverty through enhancing farm productivity. Vermillion in his IWMI research on impacts of Irrigation Management Transfer used farm productivity as

variable to assess the irrigation impact[7]. He takes three variables to measure productivity. The variables are cultivated area in relation to access to water, crop intensification, and yield (Vermillion, 1997). I have generally followed the view of Vermillion and taken his variables as the identifiable measurable criteria in my paper. Because of measurability of these variables it will be possible to assess the welfare impact of irrigation. Different international organisations like IIMI and NIPIM have used these variables for measuring the impact of irrigation (IIMI, 1997; WB, 1994b). The analysis will try to measure the productivity of small farmers in comparison with the big farmers under two different systems of management.

The analytical framework of this paper is based on dealing with both the qualitative and quantitative, measurable and difficult-to-measure aspects of performance of the concept of PIM when applied to a group of end users.

[7] See Vermillion, L. D (1997) Impacts of Irrigation Management Transfer: A Review of the Evidences.

CHAPTER - THREE

3.1 Introduction:

Irrigation reform lays emphasis on the crucial role of maintaining irrigation performance through efficient management of irrigation system. Shift from government supply driven management to farmer oriented demand driven management approach became the new reform paradigm in irrigation policy discourse during the 1980s. The experience after two decades of demand driven irrigation management has shown that irrigation performance did not necessarily always attain the targeted efficiency level. Evidences of failure have been found in different studies (WB, 1994b; IWMI, 1997). The studies have pointed out poor system efficiencies and less economic performances of irrigated agriculture (Vermillion 1997). The often-seen unsatisfactory results of irrigation reforms suggest a re-look at irrigation reform policies.

This chapter discusses reform policies. The discussion would focus on reform and implications in AP and policies in Orissa. The chapter is divided into four sections. Section two starts with a background discussion on irrigation and irrigation reform in India. Section three discusses the reforms in AP and its impact, with the focus on farm productivity. Section four elaborates on the reform policy of Orissa, the small farmer and farm productivity.

3. 2 Irrigation Reform Background in India:

Irrigation reform is a socio-economic and political process where different actors with their different interests interact under the defined institutional framework to attain the reform objective set in the beginning. In each reform programme there is involvement of powerful external agencies like the World Bank, who fuel the reform process. In every case the reform comes as a part of economic reform in the country and government plays a major role to initiate and facilitate the process. The implicit objective of the government for irrigation reform is to reduce the increasing financial pressure of irrigation on government rather than to improve the conditions of the farmers (IWMI-TATA, 2003).

Water sources in India have been traditionally considered as public property. The proof and concepts of this can be found in some of the religious epics of India. Evidence found from the Indus valley civilisation suggests existence of a well developed irrigation system

in India in and around 1500 B.C. In some parts of India centuries old community managed micro irrigation system are visible even now (Baginski, 2002). "To fetch the needs of population during the medieval period, small canals were constructed and water from small streams was directed into them through the construction of check dams" (Chaurasia, 2000:190). Prior to the 19th century, irrigation was in the hands of the farmers who were developing and managing the irrigation system by using their local resources (Peter 2004). During the colonial rule, by the early 19th century, irrigation was centrally governed and already being managed only by technocrats. After independence in 1947, the government of India followed the prevalent colonial practice and irrigation continued to be managed by the State (Srinivas, 2003). During the 1970s-80s, the difficulties of maintaining and sustaining irrigation systems were realised by the government. The problems were created by the potential threats to the sustainability and efficiency of the irrigation systems (Peter, 2004). The national government started thinking of the involvement of farmers and towards shifting the responsibility to the farmers. Participation of Farmers and Non Governmental Organisations was officially recognised as a priority in the year 1987 in the National Water Policy. The participation of farmers was kept limited to distribution of water and collection of water fees (Government of India, 1987). During the early 1990s, the government recognised the need of broader user participation for sustainable and efficient irrigation systems. The idea of user participation in irrigation has been incorporated to achieve targeted production of irrigation system, which is one of the key objectives of investment in irrigation (Kanwar, (1988); Central Water Commission, (1992) cited in Maloney and Raju, 1994). The paradigm of PIM has been recognised at the national policy level, which was subsequently followed by various states after the mid 1990s (Peter, 2004). In a federal democratic set-up like India, states play the most important role in irrigation policy and implementation. Often the new approach of irrigation reform has been followed by different states as a part of their process of economic reform programmes, supported by the World Bank.

3. 3 Factors for Irrigation reform in AP:

The need for irrigation reform policy in AP emerged primarily because of the following factors.

3. 3.1 Low performances of irrigation systems:

A sharp decline in the irrigation potential running up to 58 per cent was seen in the pre-reform days. In the year 1998, the total irrigation potential created, stood at 4.8 million hectares while the actual net irrigation provided was to only 2.8 million hectares (Raju, 2001). Investment in irrigation continued to remain high irrespective of the low level of performance. E.g. The total investment in irrigation during the eighth five-year plan period (1992/1993 – 1996/1997) was 24 per cent of the total plan expenditure of the state (Raju, 2001).

3. 3.2 Low farm productivity:

The productivity growth of farm had declined to less than 2 per cent per annum. The main reason of low productivity was identified as low performances of irrigated agriculture .E.g. the rice yields averaged only 2.6 tonnes/ha during the 1990s (Raju, 2001).

3.3.3 Under financing of O & M:

Low maintenance of irrigation infrastructure led to continuous deterioration in the condition of irrigation infrastructure. This was due to low cost recovery from water tariff coupled with other factors, such as significant part of (75per cent) the O&M budget being spent on wages of personnel. Inadequate spending on O & M led to deterioration. E.g. per hectare expenditure on O&M in 1995/96 was only Rs. 99 against the tenth Finance Commission (1997) recommendation of the O&M standard at Rs. 300/ha (Raju, 2001).

3.3.4 Agricultural productivity as Core Issue:

Sustenance of irrigation and enhancement of productivity is a crucial factor in Andhra Pradesh economy. Since 60 per cent of the state agricultural production comes from irrigated area (40 per cent of the State's gross cropped area), these factors are of paramount importance (Raju, 2001).

3. 3.5 Implementation Strategy of the AP Reforms:

Irrigation reform process in AP was quite dynamic in its approach. Series of policy actions including the publication of a white paper (government stand on any issue, which is formally published is called a white paper under legislative practices in India), passing of a special legislation called APFMIS 1997, adequate financial provision for the process

and a strong role played by the irrigation department in the process makes AP unique as a pioneering state in India and often considered a model.

3.3.6 Features of Irrigation Reform in AP:

- Introduction of a well defined policy framework with adequate institutional arrangements was central to the reforms. The legislation is called Andhra Pradesh Farmers' Management of Irrigation Systems Act, 1997 (APFMS, 1997). The act transforms WUAs into legal entities backed by legal rights and obligations. It provided functional and administrative autonomy to WUAs.
- Formation of WUA became mandatory for all types of irrigation systems in the state.
- Capacity building programme package for farmers as well as irrigation department staffs were introduced.
- Adequate financial reform for enhancing quality of reform programme (Raju 2001) was provided. Farmers wanted to take over the responsibility of a fully functional irrigation system rather a deteriorated and defunct one. The irrigation department also needed sufficient fund to expedite the process. Adequate financing enhances greater flexibility to expedite the reform process. In case of AP reform programme Rs. 240 per hectare was allotted for actual rehabilitation work. Before the reform, the allotment for O & M per hectare was Rs. 99 out of which only Rs.14 used to be spent on O&M. And rest of money were spent on covering the salaries and fixed overhead cost (Pangare, 2002). Another important factor is that in around 70per cent cases this Rs. 240 per hectare was handed over to the WUA (Pangare, 2002) to take over the rehabilitation work. Adequate founding is one of factors which contributed positively in the reform process in AP.

A strong influencing factor in AP was the populist political will of the ruling leadership in the government. There has been a constant conscious effort to make institutional reformulation matching to the overall need of the reform programme in AP (Pangare, 2004).

3. 3.7 Stages of AP Reform:

1. Generate Political support at the highest level. This was essential to provide motivation at the government level.
2. Create favourable and conducive environment through publishing a white paper on the need for reforms. Massive awareness campaign helped to create awareness in the state.
3. Develop legal framework through passing special legislations for the reforms.
4. Formation of farmer organisations – WUAs and Distributary Committees in all the irrigation systems operating in the state.
5. Clear-cut implementation strategy – Implementation of the programme with role clarity for farmer's organisation, irrigation department and other stakeholders including government agencies.
6. Capacity building of WUA, Irrigation department and other stakeholders and government agencies
7. Ensuring transparency and accountability in the working of Farmer Organisation and Social audit
8. Monitoring and mid course corrections (this stages are cited in Peter, 2002: 77).

These stages are a sequential flow of the entire reform process in AP, which made the process dynamic and interactive.

3.3.8 Impact of AP Reform:

This section provides an overview of the impacts of irrigation reform in AP. The focus is on the economic benefits of reforms translated through increase in irrigation potential and productivity.

3.3.9 Increase in Net Irrigated Area:

According to the official figures of the irrigation ministry in Andhra Pradesh, a sharp increase was seen in the net irrigation potentiality in the state. As a result of the reforms

an additional area of 204800 hectares was brought under cultivation. The gap between irrigation potential and net irrigated area in the state, which stood at 600,000 hectares, got reduced to 400,000 hectares (The Hindu Newspaper, 1999 cited in Jairath, 2000).

One of the major thrusts of the reform was to improve the decreasing potentiality of irrigation in the state. Oblitas (1999) in a study from Sriramsagar Project found that the irrigation area had doubled (approximately 60 per cent) after the reform (Oblitas, 1999 cited Pangare, 2002). Empirical evidence found by Reddy (2000) in Tadikal project located in Karimnagar district found that the net irrigated area had gone up from 21.1 percent in 1995 to 79.4 percent in 2000. Increases of irrigation potential before and during the reform period can be observed from the following table sourced from Reddy's study of 2000 in Sriramsagar project (Reddy's study cited in Pangare, 2002):

Table: A Increase in Irrigated Area

Sriramsagar project: District Karimnagar (Area[9] in Acre)

Year	Total Command	Area Irrigated Wet	Irrigated Dry	Actual Command Irrigated	Increase in net irrigated area in per cent.
1995	30860	3020	3498	6518	21.1
1996	30860	6907	2863	9770	31.6
1997	30860	9280	5350	14637	47.4
1998	30860	13147	5402	18549	60.1
1999	30860	18366	6003	24369	78.9
2000	30860	18505	6003	24508	79.4

Source: Pangare (2002 p. 41)

The increase of irrigation potentiality was due to the WUA action in cleaning the irrigation channels and the water sources, so that water could reach the distance plots, which rarely received water. WUA participation enhanced the efficient economic use of

[9] An acre translates roughly 0.4 hector. Traditionally farmers in Orissa and AP use terminology of acre for measurement of their land holdings.

water among the fellow farmers (Pangare, 2002). This resulted in increased access to water for the farmers who got water very rarely in their fields.

Water tax was increased three times in comparison to the water tax charges before the reforms. The increase in water tariff became possible because of the wider participation of farmers and participation of different political parties in the process of consultation (Pangare, 2002). This increase in water tax led to higher sustainability of irrigation systems.

Improvements in O&M took place under the coordination of WUA because the qualities of rehabilitation work undertaken by WUAs were much better. Investment was prioritised according to the need of the farmers and farmers efficiently utilised the funds (Pangare, 2002). Across the state it was found that the increasing awareness level among the farmers put pressure on WUA leaders and irrigation department staff to perform better and maintain transparency on rehabilitation work. Irrigation officials were now more accountable and transparent in their work (Pangare, 2002).

3. 3.10 Increase in Productivity:

After the reform the average yield has increased form 20 to 30per cent (Raju, 2001). There is a 10per cent increase in productivity. The paddy production has gone up from 30 – 35 bags per acre to 40 – 45 bags per acre (Jairath, 2000). Raju mentioned that the paddy yield has increased from 2.5 tonnes per acre to 3.5 tonnes per acre (Raju, 2001). This gain became possible due to the improvement in irrigation system and greater participation of all stakeholders in the process. The remarkable effect of irrigation reform is the sense of ownership it created among the farmers which became a major contributing factor for the success of irrigation reform in AP (Raju, 2001 & Pangare, 2002).

3.3.11 Emergence of New Leadership:

Leadership is one of the core issues for successful functioning of a WUA. The reform process in AP contributed emergence of young dynamic leadership within the WUA. The farmers in WUA realised the role of an enthusiastic leadership. As per the opinion of a farmer cited in Pangare's study "a new leadership was developing due to the reform process which is young and dynamic and concerned with the welfare of the farmers"

(cited in Panagare, 2001: 27). Although critics like Mollinga, and Jairath[10] claim that the reform has been captured by the elite farmers, the fact is that successful leadership is always entrusted with few capable individuals who do have knowledge skill and capability to manage the affairs. The crucial point is to see how the leadership is aiming towards distribution of benefits.

Various components like collection of water tariff, O&M, water delivery, equity in distribution, irrigated area, crop yields, farm income, and efficient utilisation have increased sharply as a result of irrigation reform in AP. The above impacts contribute to the increase in farm productivity in AP (Raju, 2001).

3.3.12 Improvement of Irrigation system:

The technical improvement in irrigation system is quite visible after the reform. Substantial amount of money was spent on rehabilitation work of the irrigation system. The improvements in irrigation system were reflected in productivity gain. It shows that participation can bring in technical efficiency of irrigation system provided enough funds are available to rehabilitate the systems before WUAs take over the system.

3.3.13 Participation of small farmers:

From the above discussion it can said that PIM in AP had a positive impact. It enhanced the farm productivity. However it is quite difficult to find specific data on the effect of reform on small farmers' productivity. Regarding the participation aspect of AP reform, I will use reference from the work of Mollinga (2004b) and Jairath (2000). The work of Mollinga demonstrates that the benefit of reform in AP have been captured by the large influential farmers. They have turned the policy to their side. His findings are based on the Tungabhadra Right Bank Project.

3.3.14 Participation in WUA:

State wide election for WUA management committees were held just after passing the APFMIS in June 1997. The election was conducted for 10000 WUA on a single day. The government declared a financial incentive of Rs. 15000 on every election of a consensus

[10] See Mollinga, Peter. P (2004) in Politics of Irrigation Reform and Jirath Jasveen (2000) Participatory Irrigation Management in AP Contraditions of a Supply Side Approach,

candidate. The idea of the government behind this proposal was to reduce the expenses of conducting state wide election and to avoid conflict among the communities for electing the president for WUA. But the results were found to be different. Around 85 percent of the elected presidents were big farmers having strong political affiliation with major political parties (Mollinga, 2004b). Most of the managing committee members were found to be from dominant castes. Almost half of the presidents of the groups were seen to have taken contracts for rehabilitation work (Mollinga, 2004b). Hardly any interaction between members of WUA and the leaders was visible. Very few WUA meetings were taking place. There were examples where meetings were held between presidents and irrigation engineers only. The primary discussion in the meeting was about rehabilitation work. Maximum 25 to 30per cent members attended the meetings (Mollinga, 2004b).

3.3.15 Participation in Water Distribution:

The policy stipulated that the member having land inside the commands area were entitled to get water from the system. WUA should decide how water is to be distributed (Monllinga, 2004b). The evidence found that the local Member of Legislative Assembly (MLA) was actively interfering in the matter of water distribution. WUAs were not active on the issue; rather the managing committee members were implicitly following the decisions of the MLA for their political benefits (Mollinga, 2004b).

3.3.16 Capture of Reform by Elite farmers:

It can be said that there is very limited space for a deprived small farmer to participate and to make his voice heard. There is no doubt that the technical factors of irrigation system have improved to a large extent. This improvement in irrigation efficiency is largely due to adequate funding for rehabilitation work. At the end, the process has been taken over by the elite influential big farmers. For example in the name of WUA, the big elite farmers were found to be taking contract of rehabilitation work. They are in the managing committees and often decisions were taken on behalf of all other farmers with out consulting all the farmers.

The fact remains that equitable distribution of PIM results were understandably a political issue since the reform process was initiated with the highest level political will of the ruling leadership at that point of time .The constitution of management committee was

being trapped within the ruling political party. It is quite understandable that when the system is controlled by one particular political group, enhancement of equitable distribution becomes almost impossible. The interest of all the members of WUA is rarely taken care of.

Thus a perusal of the available literature on the reform process in Andhra Pradesh point towards mixed results regarding the success/failure of the endeavour. Considerable increase in facilities and productivity was accompanied by the leadership passing into the hands of the big, elite farmers and in many ways a new elite replaced the government as the managers of the micro irrigation systems.

3. 4 Irrigation Reform Background, Orissa:

The Orissa Irrigation Act, 1959 read with Orissa Irrigation Rules, 1961 laid the legal procedure relating to irrigation systems, mode of operation, maintenance, and irrigation services in Orissa (SAPS, 2001). Irrigation Act, 1959 prescribes that the water sources should be constructed by the farmers out of their own investment. This idea did not work due to several reasons. One of the major causes was that the farmers could not raise the required funds. To overcome these difficulties and to support users the government of India followed by the state government started a programme called the Command Area Development (CAD) in the early 1970s. Under CAD programme, funds were provided for construction and rehabilitation work by the government (SAPS, 2001).

Weak financial position of the government, gradual decrease in government budget for irrigation and low level collection of water charges resulted in continuous deterioration of irrigation infrastructure. With this background, several policy interventions took place during 1990s in Orissa. Interventions for institutional changes were also made under the broader purview of state institutional reform programme. E.g. constitutions of the Department of Water Resource, State Water Resource Board are the major interventions during 1990s (SAPS, 2001). New State Water Policy formulated in the year 1994 laid emphasis on the need for greater participation of farmers in planning, management, operation and maintenance of irrigation system, efficient use of irrigation water and equitable distribution of water, maximum economic benefits through judicious conducive use of both surface and ground water, promotion of participation in all aspects of water

planning and management and extension of irrigation facility to the deprived, vulnerable geographical areas and farmers (Govt. of Orissa, 1994).

The DOWR & Govt. of Orissa worked for the institutional capacity building, management of fund for irrigation schemes, and improvement of cost recovery of irrigation systems. This policy intervention attempted to reformulate the role of irrigation agency and farmers which focuses on joint partnership for development of water resource in the state (SAPS, 2001). But due to lack of proper legislative support and funds, these policies were largely limited to the papers only. It was only in the year 2000 that the drive for PIM intensified with funding support form DFID. The major policy intervention for PIM took place during the year 2002. It took years before Orissa legitimized the PIM policy. It was in June 2002 that the Govt. of Orissa passed the act known as Orissa Pani Panchayt Act, 2002. The act legitimized farmers' participation in management of irrigation system. The status of WUA and its power, duty, responsibility and functioning were also adequately recognised by this act.

The act recognises that efficient and equitable supply and distribution of water by farmers for improvement of agricultural production is crucial for the welfare of the state. The act emphasises the aspect of farmers' participation for sustainability of irrigation system, its maintenance, dependable water supply and equitable access to water to be made possible through farmers' organisations called Pani Panchayat (Govt. of Orissa, 2002a).

3. 4.1 Steps for PIM in Orissa:

Year	**Interventions**	Remarks
1993	Constitution of State Water Resource Board	Economic reform and institutional reform programme supported by World Bank
1994	New State Water Policy by WRB	
1995	Commencement of OWRCP & Farmer Organisation and Turnover Programme.	
1999	Orissa Irrigation (Amendment) Rule, September 1999.	
2000	Intensification of PIM in all LIPs in Orissa	Supported by DFID as PSU Reform programme
2002	Orissa Pani Panchayat Act 2002	Legislation of Act to support PIM (major policy intervention).
2003	Orissa Pani Panchayat Rule 2003.	Institutional framework to operationalise the PIM

Source : Govt. of Orissa Economic Survey 2003, and World Bank OWRCP report no. 14888 – IN, Govt of Orissa Gazette 2003

3. 4.2 Goal of PIM in Orissa:

The goal of PIM in Orissa is conceptualised in the following policy statement of Govt. of Orissa. "To motivate the farmers in Command areas, organize them into Water Users Association or Pani Panchayats, encourage them to maintain the irrigation systems and distribute the water among themselves by adopting suitable cropping programme and rational use of water" (1Govt. of Orissa Resolution no.Irr.WB(FOT)38/2000 dt.26.9.2000). The objective for WUA is "to promote and secure distribution of water among its users, adequate maintenance of the irrigation system, efficient and economical utilisation of water to optimise agricultural production, to protect the environment, and to ensure ecological balance by involving the farmers, inculcating a sense of ownership of the irrigation system in accordance with the water budget and the operational plan" (Govt. of Orissa, 2002a: 9).

3.4.3 The objective of PIM in Orissa:

- Ownership of farmers in irrigation system
- Farmers right to water and hence grater control
- Reliable and equitable in distribution of water
- Saving in water thus giving rise to higher crop intensity and increased irrigation coverage.
- Farmer's freedom to adopt their own cropping pattern
- Better operation and maintenance
- Collative strength to fight for rights and services including agricultural extension.
- Securing other agricultural inputs and credit and arranging storage and marketing facility
- For bridging the gap between potential created and potential utilised (Govt. of Orissa, 2002-3)

The process for PIM was initiated in AP and Orissa in the same year, 1997. AP initiated a full scale approach in the same year with institutional and structural backup through passing adequate legislation for the PIM. But Orissa took 6 years to bring the required

legislation to launch PIM with adequate policy back up in the year 2002. The delay implies lack of adequate political motivation in Orissa. Where as the target has been fixed by the government under PSU reform programme to cover all LIPs under PIM by the year 2005 (Govt. of Orissa, 2002b). In 2000 the government launched massive media campaign to motivate farmers to join the PIM. The year 2000 can be considered as the beginning of full-scale in the state approach to PIM. Major policy intervention took place only in the year 2002.

In case of WUA in lift irrigation, the WUA needs to take over the ownership of pump and management of the irrigation system. After the ownership and management transfer takes place, WUA enters into another agreement with Power Distribution Company (PDC) to buy electricity. The fund for electricity charge, operation, and maintenance of pump and irrigation system, and future replacement of pump are raised from the water tariff collected from the WUA members (Govt. of Orissa, 2002a).

The policy urges that the concept of PIM is to be carried forward with three main stakeholders; farmers, irrigation department, and agriculture department (SAPS, 2001). The DOWR provides free technical assistance to the WUA .The agriculture department provides all extension services to WUA. The policy has paid adequate attention to enhance the economic benefit of PIM though enhancing agricultural productivity (Govt. of Orissa, 2002a). The logo used as symbol of PIM in Orissa has a symbolic meaning (logo of PIM is given below). The logo signifies that the three stake holders have joined their hands for efficient management of water. The policy considers the three main stake holders as the farmers, irrigation and agriculture departments. The capacity building of the stake holders is also given attention.

Installing of new LIP is possible only after formation of WUA. The Water and Land Management Institute (WALMI) was assigned the nodal agency role for conducting capacity building training programme for this campaign. The District Administrations (Collectors) were assigned duties to expedite the campaign in their respective districts (Govt. of Orissa, 1999). The irrigation department and NGOs at village levels implement the concept. The PIM in lift irrigation came as part of the public sector undertaking reform in Orissa.

3.4.4 Do PIM Practices fallow the PIM policy in Orissa?

So far as the irrigation reform policy is concerned, the policy covers all the initiatives to make PIM success in the state. As we see from the AP case, the success of the process is highly dependent on the will to accelerate reforms on part of the leadership and the implementation standards under which the reform process is carried out. In case of AP the process was expedited by the charismatic leadership of the Chief Minister with a high level Political commitment and support (Pangare, 2002). But in case of Orissa this aspect is lacking, which is recognised from the fact that Orissa took 7 year to pass the legislation. A period of two years (after the major PIM policy enactment in 2002) is too short to analyse the success or failure of irrigation reform in Orissa. However an assessment can be drawn from the sample field study from Orissa. Based on that assessment, we can have an initial representative impact of the irrigation reform in the state.

CHAPTER - FOUR

4.1 Introduction

This chapter investigates the crucial issue of irrigation reform benefit to the small farmer and analyses the issues in the context of PIM in Orissa. The analysis is based on primary data and can give us a representative image of PIM in Orissa.

This chapter is divided into three sections. Section two is related with justification and methodology of the primary data collection. Section three deals with data presentation and analysis.

4. 2 Justification and Methodology for Primary Data Collection:

The primary data was collected for this research from sixty individual farmers. These farmers are categorised into two groups of thirty farmers each. The categorisation is based on their role in the management of the individual system. One group is managing irrigation by forming a WUA (here after referred as the PIM group). The other group is receiving water under OLIC management (here after referred as OLIC group). The figures presented in the analysis are rounded to the nearest value.

The PIM group, selected for the survey is called Baba Batakeswar Pani Panchayat of the village Patrapur. The group is an early adopter of PIM in the state. They adopted the PIM in the year 1997, the same year as the state. The group has substantial experience of managing lift irrigation under WUA and is quite confident and optimistic. The farmers interviewed under OLIC group were selected by random sampling. The consultancy agency had picked up the names by picking them out from unorganised scrambled names. Both the samples are collected from a district called Kendrapara, which is on the east coast of Orissa. As per official records, lift irrigation contributes 17 per cent of total State's irrigation potential, whereas in Kendrapara the contribution is 32 per cent of the total irrigation potential of the district (Govt. of Orissa, 2002-3). It can be assumed that Kendrapara gives a better representation of lift irrigation in the state. The other

motivating factor is the author's association in lift irrigation reform project in the same district for a period of two years (2000-2002).

The survey was conducted by a national level consultancy farm called ESEN Management Catalyst Pvt. Ltd., Bhubaneswar with help of a local level NGO called Anchalika Gramya Unnayana Parisad (AGUP), Kendrapara.

4.3 Data Presentation

4.3.1 Socio-economic Settings of the Groups:

The socio-economic status is an important influencing factor for participation in irrigation management. As demonstrated in Chapter 3, AP PIM experiences show that the elite farmers having political power and economic status have captured the benefit of PIM in the state. It is therefore appropriate to start the data presentation from the socio-economic status of the group. For this research I have taken educational background, caste, size of land holding, and occupation as socio-economic indicators of farmers. Education plays an important role for enhancement of knowledge. We have seen that the farmer having access to information and knowledge is more powerful than the one who does not have adequate access to these in the PIM experience. Caste is an important factor of social differentiation in the Indian social structure. Land holding size is the basic determinant of individual economic status in an agrarian society. Land size has implicit relationship with the farm income in an agrarian community (Koppen, 2002). Occupation pattern contributes to the economic condition of a farmer.

Ten percent of respondents were illiterate in each sub-group. Total 40 percent of members have education up to primary level school in both the groups. One farmer in PIM group is a degree holder (secretary of WUA in the PIM group). Primary school education seems to be the average education level for majority of the farmers. Thirteen percent farmers are from lower castes in OLIC group, whereas all farmers are from general caste in PIM group. Small farmers constitute 87 percent and big farmers (holding more than 2 hectare land) constitute 13 percent in OLIC group. In case of PIM group 94per cent are small farmers and 6 per cent are big farmers. Agriculture is the major source of occupation for 93per cent of farmers with government service accounting for 7 per cent in OLIC group. Agriculture is major occupation for 90per cent of farmers with

government accounting for 10per cent in the PIM group. The mean holding of OLIC group is 1.3 acre[11] and standard deviation is 0.84 acre .The mean holding of PIM group is 1.3 acre and standard deviation is 1.12 acre.

4.3.2 Farm productivity:

Access to irrigation enhances the scope of crop intensification and result in increase in the farm production and productivity (Bhattarai, Sakthivadivel, & Hussain 2002). In the data presentation, farm productivity has been seen from different dimensions. the initial data analysis relates to the average production of the groups under OLIC and PIM management systems. Subsequently the productivity of small farmers under both the systems would be analysed.

Two crops namely the Kharif and Rabi crops of paddy have been taken to measure productivity. Paddy is the dominating crop with other crops accounting for limited importance in a farmer's life cycle. Farmers value irrigation only if they can grow Rabi crop in the same piece of land. Kharif and Rabi are the name of crop seasons in India. Kharif crops starts with the monsoon rain from the month of May to October. Rabi crop season follows the Kharif crop season. Kharif crops do not need irrigation because it is normally rain fed except for supportive irrigation in case of short fall of rain. Rabi crops completely depend on irrigation. In comparison to Kharif, the potentiality of irrigation system normally decreases by 30-40 per cent during Rabi, since the crop is completely dependent on irrigation (HARSHA 2003). In the survey area the crops were Kharif paddy, Rabi paddy, green gram, black gram, and vegetables. This study is primarily focussed on Kharif and Rabi paddy. Green gram and black gram do not need any irrigation and farmers avoid growing vegetables due to high risk factors. It was observed that farmers were aware about other cash crops, but lack of resources, high input cost and high risk discouraged the cultivation of cash crop.

[11] An acre translates roughly 0.4 hector. Traditionally farmers in Orissa and AP use terminology of acre for measurement of their land holdings. The land holding being extremely small reduction of acre to hetaerae would convert the land holdings into very small fractions which might nut looks proper in presentation. That is the reason why acres are instead of hectare has been used in the paper.

Table: 1 Land Utilization and Production:

Group	Cultivated Area in Acre.	% of Land Utilisation	Total % of farmer	% of S.F (Small Farmer)	Production in Quintals	Production Acre/Quintal(Productivity)s
Kharif Paddy						
OLIC	151	100	100	100	794	5.3
PIM	62	100	100	100	486	8
Rabi Paddy						
OLIC	12.5	8	37	35	174	14
PIM	40	65	93	97	590	14.74

The above table shows that land utilisation and crop production is higher in case of PIM group. Productivity of Rabi crop is much higher than Kharif in both the groups. The productivity of Rabi rice in PIM group is marginally higher. During the Rabi crop 37 percent of farmers of the OLIC group are able to utilise 8 % of their land, where as 93 percent of farmers of the PIM group are able to utilise 65% of their land. Hence PIM group shows comparatively higher productivity and land utilisation vis-à-vis OLIC group.

Small Farmers: Small farmers show higher productivity in both the crop seasons in PIM group. Small farmers' utilisation of land for Rabi cultivation in OLIC group stands at 35 percent against 97 percent in the PIM group. Only one small farmer in PIM group did not cultivate Rabi paddy due to personal reason despite availability of water.

Since Rabi paddy is dependent on irrigation, the small farmer is less likely to take risk until and unless he has access to irrigation. Small farmers with PIM group being assured of irrigation take risk of investing in Rabi crop and manage to enhance their farm production.

Table: 2 Access to Water for Rabi paddy cultivation

Group	# of S.F get irrigation	% of S.F out of total S.F	# of Acre irrigated	Average size of land irrigated	# of B.F get access to irrigation	% of B.F access to Irrigation	# of Acre Irrigated	Average size of land irrigated
OLIC	13	50	8.4	.64	2	50	4	2
PIM	27	97	38.5	1.4	1	50	1.5	1.5

B.F. refers to Big Farmers.

This table shows a comparative data regarding access to water of small and big farmers under both the systems. Access to water of small farmers in OLIC group stands at 50 percent as against 97 percent in the PIM group. The mean land holding of small farmers in OLIC (under LIP command area) is 1.4 acre, where as the average irrigated size of land is .64 acre. It implies that although 50 percent of small farmers are getting access to water on an average 55 percent of their land does not get irrigated. The mean holding of small farmer in PIM group (under LIP command area) is 1.3 acre against average availability of irrigation of 1.4 acre. It is implied that small farmers in PIM group have adequate access to water.

In both cases 50 percent of big farmers get adequate irrigation. The mean land holding of big farmers under OLIC is 4 acres and they are getting average irrigation for 2 acres. Under the PIM system the mean is 2.5 acres and average availability of irrigation stands at 1.5 acre. A crucial point is that only the land holdings under surveyed irrigation area have been taken into consideration for the mean calculation. Some farmers have larger land holdings outside the surveyed LIP areas.

Table: 3 Crop Intensification:

Different crops	OLIC		PIM	
	# of Small farmer	% of Small farmer	# of Small farmer	% of Small farmer
Kharif Rice	26	100	28	100
Rabi Rice	13	50	27	97
Groundnut	3	11	0	0
Vegetable	2	8	0	0
Green gram	15	57	7	24
Black gram	2	8	0	0

Crop intensification has significant impact on the farm production practices. Better irrigation practices ensure reliable water supply to agricultural fields. Reliable water supply encourages farmers for intensification of farm practices on the same unit of land.

The analysis of the paper is primarily based on Kharif and Rabi paddy. The practice of cash crops is limited to a few farmers. There are progressive farmers within the OLIC group who would prefer crop intensification, but they are constrained by limited access to water. In the incumbent case of three small farmers an average land holding of 3.2 acre can be seen against cash crop intensification of a limited .8 Acre. Farmers in PIM group prefer to cultivate Rabi paddy rather than cultivating vegetable or groundnut due to the expenses and the risk involved in it.

Above findings suggest that scope for crop intensification is higher in PIM group compared to the OLIC group. Only access to water would not lead to cash crop intensification. Backward and forward linkages hold relevance for the farmers in both the groups.

Table: 4 Crop Production:

Crop Production of SF in Acre/Quintals.						
Type of crop	OLIC			PIM		
	Area cultivated in Acre	Production	Yield P/A/Qtls.	Area cultivated	Production	Yield P/A/Qtls.
Kharif Paddy	123	593	4.8	57.5	393	6.8
Rabi Paddy	10	136.5	13.6	38.5	571	14.8

The data indicates that small farmers in PIM group show more production from one unit acre of land in comparison to the OLIC group small farmers in both Kharif and Rabi. An interesting observation can be drawn by comparing this data with the group production

data presented in table one. The average group production for Kharif under OLIC system is 5.3 quintals per acre against the average production of 4.8 quintals per acre of the small farmer. The production of small farmers is 9.5 percent below the average production of group. In case of small farmers under PIM in Kharif the average production is 17 percent more than the average group production. The average production of small farmer under OLIC system during Rabi is 13.6 quintals per acre as against the group average of 14. The average production of small farmers under PIM system is 14.8, which is marginally higher than the group average. This data indicates that small farmers show higher productivity gain under PIM system.

Table: 5 Farm Income of Small Farmer.

	OLIC	PIM
Total land holdings	86	56.5
Gross value of the farm production	277000	375800
Average value of Output Rs./Qntl	390	390
Average cash value of production per acre	3221	6651

The farm income has explicit relationship with the economic condition of farmers. Performance of irrigation can be assessed from the farm income of the individual farmer. The income from the farm is dependent on production figures, which in turn depends on productivity and crop intensification. Since productivity and intensification are dependent on inputs, the primary one being assured and regular water, better management of supply of water seems to be crucial to achieving higher production and consequently higher income. The primary data indicates that the average cash value of production per acre of small farmers in PIM group is more than double compared to the small farmers of the OLIC group.

4.3.3 Perception on PIM and OLIC System of Irrigation Management:

This part is based on different perceptions of farmers. I have sought to know the level of participation in PIM as observed in the field. Is there sufficient space available for the small farmer to participate? How do the farmers of PIM system participate? What is the perception of farmers under OLIC system about irrigation management by WUA?

4.3.4 Motivational factor to join WUA:

This question was asked to farmers under PIM group. Approximately 95% said access to water and enhancement of production were the most important motivational factors. For 5% these two factors were moderately important. The case of a farmer, holding only 2 acres against the average group size of 4.5 acre is interesting. He claims that the membership of WUA does not always lead to better access to water. As his land is far from the irrigation channel, he gets water only if the pump functions well. However he is in favour of irrigation management by PIM in comparison to the OLIC system. The motivational factor for him is participatory management and not just production.

4.3.5 Membership and farm production:

The question asked to the farmers was whether a relationship exists between membership in WUA and farm production of the members. All farmers operating under OLIC perceived the relationship to be very clear. The response from PIM group of farmers was different. Twenty five farmers (83%) felt that membership could enhance farm production while 4 persons (13%) opined that the relationship was not so straightforward. The average land holding size of these farmers is 1.9 acre. Their view was that while PIM membership could bring access to irrigation, farm production requires input support, output linkage & risk aversion support. From the above view of farmers it can be said that the membership enhances opportunity for farm production. This relationship while not being direct and straightforward is one of the primary factors.

Changes in Farm practice after joining WUA:

The question was asked to the farmers under PIM regarding any change in farm practices after joining the WUA. All claimed changes in their crop practices. Approximately 97 % referred to significant change in their farm practices such as growing High Yielding Variety (HYV) and short duration Rabi paddy. However all of them opined that the WUA membership has opened up farming opportunities for them.

4.3.6 Membership in WUA and Farm income:

The question was asked regarding whether membership in WUA has led to increase in farm income? A majority of 53% percent felt WUA system of irrigation management leads to increase in farm income. Rest of the farmers felt that even if one has good

irrigation practice and access to water, farm income may not necessarily increase. The main reason was given that most of them grow food crops for food security and lack resource to grow cash crops. However, it was seen that the farm income of this particular group of farmers had also gone up due to double cropping of paddy. Before formation of WUA Rabi paddy cultivation was not possible for most of the farmers. The reflection of this situation can be seen in case of OLIC group. Only 30% of small farmers under OLIC group are able to grow Rabi paddy. This discussion indicates that membership in WUA has an implicit relation to the farm income. However substantial increase in income from farming would depend on input output support and resources. The small farmer would need integrated planning at policy level.

4.3.7 Participation and Irrigation Management

The questions were asked to study what participation means to farmers? Invariably all farmers viewed a positive relation between farmers' participation and the technical efficiency of irrigation system. The technical efficiency is referred here as improvement in maintenance of pump and irrigation channel and adequate supply of water to the field. But 10% farmers (land holdings of 2 acres) expressed concern about the participatory and decision making process under PIM. The specific issues of irrigation planning, conflict resolution and fixation of water tariff were discussed. It was found, 27% farmers do not participate actively in all three aspects of irrigation management process by PIM. They opined that due to lack of time and lack of knowledge, every body can't participate in this process. This responsibility needs to be carried out by the farmer who is quite knowledgeable to handle this. Important to them is access to water, which is being handled by their leaders. It was found that the members of executive committee are getting re-elected since its inception in the year 1997 in the village. It was also found the LIP is functioning quite well. The command area has gone up during the period from 20 acres in 1997 to 50 acres in 2004. The membership has also increased from 23 to 57 today.

Leadership has played a vital role in enhancing the efficiency of LIPs. A very interesting point is that agriculture is not the primary source of income of 2 out of the 6-member executive committee of WUA. They are teachers in the local state government school. Agriculture is a secondary source of income for them. The societal image was more

important to them than the income from irrigation. The type and quality of leadership does matter for success of PIM. The issue of access to water to majority of members is well established under this WUA. The leaders are the elites in this community and they have held the power since the beginning. The leaders seem to be quite capable in handling responsibility. Participation in a theoretical sense did not matter much to the farmers in a well-managed WUA. The decision making process is exclusively in the hands of executive committee. They decide the water tariff. They dictate the conflict resolution process. However conflicts are less because of transparency in management.

4.3.8 WUA: Is it more beneficial to the small farmer:

The following conceptual question was asked to the farmers under both the systems. Was WUA comparatively more helpful to the small farmers than big farmers? All the farmers under OLIC group replied in the positive. Twenty-nine (97%) farmers in the PIM group said that WUA plays an important role to enhance their access to water. The most important factor for a small farmer was that he can discuss and negotiate the irrigation related problems with his fellow farmers within the village, which he found quite difficult when the LIP was under OLIC .One small farmer who is a share-cropper and does not have his own holding had a different view. According to his experiences, WUA was not able to address issues related to irrigation. This kind of situation is quite normal; any system of management can't satisfy all its members. One need not ignore the concern of the small share-cropper. This farmer is a sharecropper and his location of the land may change from time to time as per availability of tenant land in the command area. I consider this as management error rather than management inefficiency. But WUA being more helpful to small farmers is the perspective, I found in this study. The obvious other dimension of the success of PIM is the homogeneity of the group and the size of the group.

4.3.9 Irrigation performances between OLIC and PIM systems:

Five factors were used to study the better performance in both the systems of management. The factors are (1) Water availability, (2) uninterrupted supply of water, (3) pump maintenance, (4) Irrigation channel maintenance and (5) Better return from water tariff. All the respondents under both the systems viewed that PIM system of irrigation management as better than OLIC system of irrigation management.

4.3.10 Participation of farmers in PIM:

Two questions were asked to assess the degree of participation of farmers in PIM system. First question was regarding attendance of meeting by the farmers. 73% farmers said they attended almost all the meetings. 27% said they attended half of the meetings. The average size of the land holding of these 8 (27%) farmers is 2 acre. They considered that attending all the meetings is not possible and is not required on their part.

The second question was asked about "how often farmers do express their ideas in WUA meetings?" A majority 80% said that they shared their views almost in all the meetings while 17% claimed that they shared their views in half of the meetings they attended. One farmer said he shared his views very rarely. This farmer's land holding is 2 acre, but only half an acre of his land is within the LIP command area. He is receiving adequate water in that half an acre of land. So he felt that he did not have much to say in the WUA meeting.

Participation did not matter much to the farmers, as long as they were satisfied with the management of irrigation by leaders. Productivity of small farmers has increased. Technical efficiency of irrigation system has increased. Approximately all the members including small farmers are having a positive perspective regarding PIM. The theoretical sense of participation of small farmer in irrigation management has not been achieved. Interestingly, the issue of equity and efficiency were adequately addressed by the WUA. This seems to have helped in higher productivity gain to the members.

CHAPTER – FIVE

5.1 Introduction:

In this chapter I have tried to find answers to the focal question of this research, basing it on the primary survey and references to other experiences. I will try to emphasise and explain the main findings and would end the paper with certain recommendations which may be useful for policy.

The focal question of this paper is ***"Does the membership in WUA lead to positive increase in the farm productivity of small farmers in Orissa?"*** The answer to the focal question as seen in the data provided by the primary survey is in the affirmative. Participatory irrigation management has led to higher crop intensification thus leading to higher productivity. A comparison of both the groups have shown that the risk taking capacities of the small farmers have been strongly dependent on access to water. Plagued with the problems of subsistence agriculture in rural Orissa the small farmer would dare only when he/she is sure of getting water as and when it is needed for the survival of his crops. The data regarding the few farmers who grow Rabi crop in the OLIC group and the high number of farmers who grow the same crop in the PIM group is quite indicative of the higher risk taking capabilities of the latter group of farmers over the former.

The importance of access to water is significant in coastal Orissa, often affected by floods and cyclones. The Kharif crop is entirely dependent on the monsoon rains .Failure of rains could lead to devastation of crops .Orissa often sees huge floods during the rainy season. An occasional cyclone could play havoc with the crop cycle. Small farmers in coastal Orissa invariably depend on the Kharif crop for the survival of their families. In a situation like this access to water in a non-rain period enables the small farmer to grow a Rabi crop which could provide food security in the years in which Kharif fails and a surplus in good years. This research into the differences between the management practices have shown that the confidence level among the WUA small farmers is quite striking and note worthy. Surety of access has led to higher confidence levels, higher risk taking capacities and higher productivity through higher crop intensification.

What has been the actual participation level of small farmers? I found that the small farmer is much more interested in the delivery of water rather than who is the decision

maker. It was quite visible that just on the lines of AP an elite group was controlling the group under study. Yet the small farmers did not seem to have much complaint. It was increasingly visible that the new system gives an assurance of timely supply of water and as long as this is being met, the small farmer was not very interested in the theoretical sense of participation. I found a strong linkage between farm productivity of small farmers and PIM as a management practice but could not find much evidence of participation in the theoretical sense.

5.2 Lessons and Findings from the Orissa Experience:

The factors of management and participation and its relation to farm productivity are well delineated in this paper. The paper has looked critically into two systems of irrigation management and its effects on small farmers. An important factor is to analyse the contextual complexity and diversity of the community. This section would focus on the important lessons of the paper.

5. 2.1 Contributing Factors of PIM:

The empirical evidence from Orissa, explained in chapter four demonstrate the positive effects of PIM. In the PIM group, dynamic leadership was identifiable as the most important factor for the success of the group. Other identifiable factors for successful collective action are socio-economic structure of the group and the size and homogeneity of the group. The group members belonged to one caste, similar education status and the land holding patterns of the members are almost identical. What is the most important contributing factor for the group's success? As per the theory explained in chapter two the differences in the socio-economic status among the group members, the objective of the group, social homogeneity are the important factor for the success functioning of the group. The experience in the paper and the theory differ on the point of equal access to knowledge. The members in management committee of WUA are the elite farmers who are comparatively more educated. They are able to manage the group quite efficiently. Equal access to information might be an ideal situation. The findings shows that benefit would not automatically accrue because of equal access to knowledge but would be strongly dependent on how the knowledge is translated into practice and the capability of the individuals to do so. The study found that the leadership is capable in managing the

irrigation and transfer the benefit efficiently to each member of the group, irrespective of the fact that all members do not have equal knowledge. The leadership was found as the key factor for collective action.

5.2.2 IMT and PIM:

We saw in the chapter three that IMT was a success in case of AP. The government was able to shift the responsibility to the farmers and reduce the financial burden. The water charges were increased up to three times (Pangare, 2004). Yet the reform benefit did not always reach the small farmers .A success of IMT did not translate to a success in PIM. However the Orissa case shows that though the management of irrigation is in the hands of elite farmers, the benefits are reaching the farmers.

Benefits had often been captured by the elite farmers in AP whereas in Orissa the benefit was adequately transferred to the small farmers. It is interesting to note that though the productivity has increased under PIM functioning the income gain has not translated adequately to combat poverty, the main reason being inability for crop diversification and concentration on non-remunerative food crops.

5.2.3 Financial sustainability of PIM:

In case of AP the World Bank and government claim that the increase in water charges can make the system sustainable. But the fact is that at present the WUAs in AP are surviving due to funds from the reform programme (Pangare, 2002). At the same time the reform benefit is in the hands of vested interest group. The claim of increasing water fee up thee fold is highly debatable (Jairath, 2000). So the financial sustainability of the PIM groups throws up new questions. The study in Orissa shows that if the benefit can be transferred to all users and the objective of WUA can accommodate the interest of all farmers, sustainability can be attained. It can be seen as the inclusion of the poor into the PIM process rather than expecting the poor to start off with participation in the whole process of management. It is demonstrated in the language of Upendra Nath Parida who is an elderly person and a small farmer having 2 acres of land. He is a member of the managing committee. [14]He says ***"Now the God Indra[15] is in our hand. Now the entire***

[14] Upendra nath Parida aged 72, is quite a respected person in the community. He is not physically active due to his old age but he gives moral strength to the other managing committee members. His membership in managing committee is considered more respectful rather than functional.

irrigation system is under our control we manage our system and repair our system, we spend our money for it. We have complete ownership on it. We are quite happy. In fact credit goes to our leaders who make it a success. We normally subscribe the money as per the decision of managing committee. We have faith on these leaders, they are quite capable to negotiate with OLIC and manage the entire show. Only problem we encounter is power. The erratic supply and faulty billing of electric charge put us in trouble". However In case of lift irrigation in Orissa the questions of financial sustainability remain. It was found during the study that the even after 7 years of management transfer the power charges have not been made very clear to WUA. The transfer of billing from OLIC to WUA had not taken place. Currently power is supplied with a high degree of subsidy. With increasing privatisation of electricity distribution in Orissa higher tariffs are bound to come in .This process would make WUAs vulnerable as and when complete transfer takes place from OLIC to WUA. This issue needs to be studied in detail. There is an inherent social responsibility of government, involvement in irrigation. Sudden withdrawal of government support and ignoring financial capacity of farmers may lead to unintended results.

5.2.4 Participation in PIM:

As per the policy framework of reform, the users are expected to participate in information sharing, project planning, decision making and all aspect of irrigation management. But the findings from the field show that proper inclusion could be done if the interest of the poor was protected with genuine efforts. In fact the fancy words top-down and bottom-up needs to be thoroughly examined. Practical implementable solutions need to be studied. My point is not to give up the participatory approach; rather my point is to look beyond the conventional debate of participation and empowerment. It is important to see the practicality and complexity in the context of ground reality.

5.2.5 Economic Impact of PIM:

Increased productivity is an important factor to deal with the issue of rural poverty But the relationship between increase in farm productivity and farm income is not very direct. There are various reasons. The farmers mostly cultivate paddy to meet their consumption

[15] Indra refers to the God of rain in Hindu mythological literature.

requirement. Paddy, not being a cash crop, brings in a limitation in increase in the farm income. As mentioned in chapter one Paddy accounts for 70 percent of Orissa's agricultural production. The major part of this limitation is related to the support for backward and forward linkages, which is a crucial input in growing cash crops. The PIM policy of Orissa has incorporated the agricultural input and extensional support to the farmers under PIM. Yet the result of this policy has not reached the farmers, which is clearly reflected in the survey areas. The entire crop intensification focus continues to remain on paddy.

My findings indicate that the access to irrigation is a crucial means for increased food security for the small farmer. However the transformative effect of irrigation into income depends on the nature of backward and forward linkages. We can say that PIM is crucial to food security but it is not sufficient for enhancement of the income.

5. 2.6 Leadership and PIM:

The equity impact of irrigation depends on the technical efficiency & governance. Maintaining the technical efficiency greatly depends on the management of irrigation system (Bhattarai, 2002). Effective leadership can ensure overall performance of irrigation systems.

Equitable distribution and efficiency of PIM benefits among all the beneficiaries can be ensured by the combination of non-manipulative, positive leadership combined with active participation of individual members. The success of a particular WUA can't be easily replicated across the state. But the specific learning from one successful WUA can definitely be applied to another situation. Leadership continues to be the single most important factor for successful functioning of PIM and equitable sharing of benefit among WUA members.

5.3 Recommendations for Policy:

The change over from technocratically managed non-participative models of micro irrigation management to participative management by end users leads to higher level of productivity while remaining highly dependent on the homogeneity of the end user group, the participation levels of the members and crucially the nature of leadership. The participative model may lead to better management but to believe that this as a stand

alone model would lead to reduction in rural poverty is not borne out by this investigation. At the policy level provision for forward and backward linkages continues to hold crucial importance if the increase in farm productivity is to be turned into increase in farm income leading to participatory management being a crucial tool in the attack against rural poverty.

5. 3.1 Pro-poor Agriculture policy:

The credit facility for procuring input and technology needs to be linked with the agricultural policy. Provision of soft loans to small farmers for cultivation of cash crops needs to be considered.

The crop insurance policy needs to reach the small farmer. Adequate infrastructural support in relation to output marketing, pricing policy, storage, transportations are important for enhancing pro-poor motivation to grow cash crops. These are not new aspects. In principle the existing policy is having all these components. One needs to find out implementable solutions within the existing policy framework.

5. 3.2 Scaling-up Approach:

The approach adopted for implementation of PIM in Orissa and AP is referred to as the Big Bang approach in irrigation literature. Big Bang approach means sudden adoption of PIM in the entire irrigation system existing in the state. This sudden approach expects a revolutionary change within a short span of time (INPIM 2004). This approach of sudden intensification of PIM all through the state can transfer the responsibility and attain the numeric target of IMT to WUA. But this approach may not ensure the participation of WUA members in irrigation management. The Big Bang approach presupposes every group of farmers has the same level of capacity to adopt PIM. It ignores the contextual complexity of the situation, place, and group. The reform policy needs to adopt a steady, gradual and incremental scaling-up approach. Continuous monitoring, evaluation and learning need to be incorporated in the PIM approach. The PIM approach in Orissa needs to adopt this approach and move slowly based on successful learning from the experiences and build capacity for intensifying the approach.

5. 3.3 Capacity Building of Stakeholders:

The PIM policy in Orissa focuses on the capacity building of farmers. However, little attention is paid towards capacity building of other stake holders of the PIM process. The PIM changes the traditional supply driven patron-client relationship to demand driven partnership relation. PIM demands reformulation in the attitude of irrigation bureaucrats and change in the culture of irrigation agency to adapt to the changing behaviour of irrigation management. Policy needs to take care in enhancing the motivation for irrigation department staff, rather than treating them with suspicion and pressurise them to work for the PIM.

5. 3.4 Awareness Building Campaign:

Awareness and education need to be focused. This may reduce the information and knowledge gap between small and big elite farmers. It can bring adequate motivation to the farmers to adopt PIM and claim their right in the WUA. Enforcement of an act or legislation can not establish the democratic principle and empower the people, until and unless the targeted people realize the benefit and actively participate and claim their democratic right, no principle of democracy can be success. (Mollinga, 2004)

5.3.5 Adequate Funding:

Before adoption of the PIM, enough funding should be available with the government to spend adequately on the process. Before handing over the LIPs to the farmers, the LIPs need to be completely revitalized and made completely functional to irrigate its command area. So the policy may ensure adequate funding before implementation of PIM.

The transfer of ownership and management needs to be done step by step. Carrying out rehabilitation work, water fee collection, transfer of O & M and finally complete ownership transfer could be a suggested as a step by step model.

5.3.6 Concluding Remarks:

It is quite simplistic to draw a general conclusion and make any claim from a small microscopic study based on RRA. This research is quite limited to its very specific and basic question, which tries to find out the benefit accruing to small farmers under both the systems. The findings of this research are quite interesting and open up a new dimension to the irrigation literature. The leadership aspect in PIM and the relationship between

participation and the complex socioeconomic ground reality and reformulation of policies need to be further studied. This research, it is hoped would lead to more substantial studies which may help to put the powers of INDRA in the hands of the people.

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