Evaluating the Impact of a Flood Control and Drainage Project on Poverty Using Participatory Poverty Assessment Method

by

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MASTER OF SCIENCE IN WATER RESOURCES DEVELOPMENT

Institute of Water and Flood Management

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A Thesis by

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It is hereby declared that this thesis or any part of it has not been submitted elsewhere for the award of any degree or diploma.

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Dedicated to

My Beloved Husband

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ABSTRACT

Every water resource project has its own objectives, mainly to reduce the losses or to improve people's quality of life thus helping poverty alleviation. The Tripalli Flood Control and Drainage (FCD) sub project located in Tungipara upazilla of Gopalgonj district is such a project. The sub project area is surrounded by three rivers; the Modhumoti, Ghagar Orsaildah and Tungir Gang. These three rivers are interconnected by some narrow channels. In addition, three canals, which are connected with the Ghagar Orsaildah river, enter into the sub project area. Any rise in water level at any point of these rivers causes a rise in water level at the connected canals and creates water logging problem inside the villages. The project was implemented to alleviate such problem and thereby to reduce poverty. The aim of the study is to evaluate the impact of the Tripalli sub project on poverty alleviation by using participatory poverty assessment tools. Focus group discussions and interviews were used to choose the poverty indicators. The indicators based on economic and social conditions of a family were used to categorize each family under better off, average, poor and very poor groups. For economic indicators, the lower and upper limit for better off, average, poor and very poor groups are 57-64, 42-56, 24-41 and 16-23, respectively. For social indicator, the lower limit and upper limit for better off, average, poor and very poor groups are 25-28, 15-24, 8-14, and 7, respectively. The impacts are evaluated following the before and after project approach considering 1996 as base year and 2010 as current year. The results of this study show that the changes in cropping pattern, cropping intensity, crop yield, employment opportunity and flood damage related maintenance cost are positive in current year. Compared to the base year, the number of families in current year in better off group has increased by 15.38%, in average group by 35.92%, in poor group by 30.88% and in very poor group this number has decreased by 87.18%. The annual rate of poverty reduction is 1.07% within the project area during 1996-2010 whereas the poverty level has increased by 0.12% per year in Khulna Division during 2000-2005. Literary, the project contribution to poverty reduction is 1.19% per year. Though the number of poor families has increased, the number of very poor families has decreased significantly. The main objective of a FCD project is to improve the condition of very poor group. In that respect the Tripalli sub project can be considered as a successful project.

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ABBREVIATIONS AND ACRONYMS

APT	Analysis of Poverty Trends
BBS	Bangladesh Bureau of Statistics
BRPMP	Bangladesh Rural Poverty Mapping Project
BWDB	Bangladesh Water Development Boards
CBN	Cost of Basic Needs
CEGIS	Center for Environment and Geographic Information System
DCI	Direct Calorie Intake
FAP	Flood Action Plan
FCD	Flood Control and Drainage
FEI	Food Energy Intake
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GoB	Government of Bangladesh
HIES	Household Income and Expenditure Survey
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
IRRI	International Rice Research Institute
IWFM	Institute of Water and Flood Management
KII	Key Informant Interview
LGED	Local Government Engineering Department
MDG	Millennium Development Goal
MoF	Ministry of Finance
NGO	Non Government Organization
NWMP	National Water Management Plan
PPA	Participatory Poverty Assessment
PPRC	Power and Participation Research Center
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Paper
SA	Self-Assessment
SSWRDSP	Small Scale Water Resources Development Sub-Project
UNDP	United Nations Development Program

UNICEF	United Nations Children's Emergency Fund
WARPO	Water Resources Planning Organization
WMCA	Water Management Co-operative Organization

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Bangladesh having 230 rivers is located in the mouth of three great rivers – the Ganges, the Brahmaputra and the Meghna. Flood is a quite natural phenomenon of Bangladesh. About 80% of the land is a delta area, which is vulnerable to flooding from these rivers. Over 80% of the country's annual precipitation occurs in the rainy season from June to October. Moreover, during the same period these three rivers drain a volume of water through the country, which is more than four times larger than that of national rainfall (Yoshitani et al., 2007). The higher stream flow of each river and a rainy condition lead to the annual disaster, the country is known as an area of frequent floods. The major challenge for Bangladesh is to protect its crops, which are grown in the flood prone area, from the devastating damage of such floods. The total area of flood prone land in Bangladesh is approximately 6 million ha and till now a total number of 425 Flood Control (FC) projects have been implemented covering a total area of approximately 5 million ha (NWMP, 2004). There are also some flood control projects in which drainage facilities are also integrated. These projects not only control the flooding but also reduce the drainage congestion. The flood in Bangladesh can be divided roughly into four types: 1) By an increase in the amount of water in rivers, 2) By heavy rainfall and poor drainage system, 3) By flash flood found in mountainous areas, and 4) By high tide.

Floods are the most frequent and costly natural hazards, causing almost 90% of all the damages related to natural disasters. Floods may cause large-scale loss of human life with wide spread damage to the economy. The primary effects of flood damage include physical damages like damage to bridges, buildings, sewer systems, roadways, and even casualties like people and livestock death due to drowning. The primary effect of flood is due to direct contact with the flood waters. Farmlands affected by floods face a huge loss as they usually result in crop loss. Livestock, pets, and other animals are often carried away by the strong currents of the flood water.

Flood water also causes loss of fisheries when it overflows the rivers and adjacent or connected canals, ponds or marsh lands. In Bangladesh, due to decades of experiences of the worst floods, we may be able to prevent loss of life or the death tolls, but still now each flood leaves a huge loss to our economy as it causes enormous damage to the crops and livestock. In addition with these, floods also cause diseases that are related to scarcity of pure drinking water as floods damage the local sources of potable water.

Since the establishment of the Water Master Plan in 1964, Bangladesh has been conducting measurements for floods, which focus on controlling flood waters by large-size structures. In the past few decades, many embankment facilities have been built in the country as a part of the activities for flood prevention or drainage improvement. As a part of this development, Bangladesh Water Development Board (BWDB) has built about 4,000 km of banks before 1980. Total length of the banks maintained by BWDB currently is about 9,143 km (Yoshitani et al., 2007).

The Flood Action Plan (FAP), established later with the help of UNDP and the World Bank, had been brought along with traditional structure-oriented plans at first. FAP finalized its plan in 1995; however, except for two of the pilot projects, actual actions have not been taken yet.

Aside flood measures regarding large-sized constructions, a small range of developmental activities of water resources have currently been proceeding in Bangladesh, including the building of small-size embankments of rivers. Such activities within a small range have been conducted since 1995 by the Local Government Engineering Department (LGED), which is a different organization from BWDB. About 300 projects with a total area of 160,000 ha have been in operation since 2004 (Yoshitani et al., 2007).

LGED started implementation of small scale water resources development sector project (SSWRDSP) since 1992. So far it has implemented 276 such projects covering an area of 164230 ha. The SSWRDSP aimed to ensure sustainable

agricultural production in about 0.2 million ha of cultivated land and to alleviate poverty through income generation (Hossain and Ishaq, 2001).

Though the aim of the SSWRDSP is to alleviate poverty, it is difficult to say that this type of project is exactly reducing poverty without an assessment. The assessment of poverty is not a simple task. Because poverty is a multi dimensional concept extending from levels of income to consumption to lack of education and poor health (Hussain et al., 2006). The multi dimensional concept of poverty is a key to human poverty approach, which focuses not on what people do or do not have, but on what they can or cannot do (UNDP, 2000). This approach is reflected in the choice of poverty indicators. However, the definition given by Ravallion (1992) is well accepted: “Poverty can be said to exist in a given society when one or more persons do not attain a level of material well-being deemed to constitute a reasonable minimum by the standards of the society.”

So, the definition and scale of poverty often depend on society. A single definition of poverty does not work well with every society. Poverty should be defined in accordance with social standards and people’s level of satisfaction. Thus, the effective method for poverty alleviation also needs to be designed according to local standard of healthy living style. Different local issues should be taken into account while designing poverty indicators for a specific area. Such issues may include the income and intention of expenditure of the local people, local market price index and cost of standard living. Active participation of people from different community is essential in this method of designing poverty indicators to assess poverty.

1.2 Objectives of the Study

The specific objectives of the study are:

1) To map the techno-social processes and activities of the Tripalli sub-project.
2) To identify the indicators of poverty for different groups of people by using participatory poverty assessment (PPA) tools.
3) To evaluate the impact of the Tripalli sub-project on poverty alleviation.

1.3 Justification of the Study

The water development project of Bangladesh has an implicit goal of reducing poverty (BWDB, 2002), but without a study it is difficult to assess whether a project is exactly reducing poverty or not. So, evaluating the impacts of flood control projects on poverty is essential. In this study, the impact of the Tripalli sub-project on poverty is evaluated.

1.4 Limitations of the Study

Although the study is conducted successfully, it has some limitations which are as follows:

1. The study is dependant on some primary data on socio-economic aspects. However, such related data of the Tripalli sub-project area were not available in the related offices. Furthermore, secondary data on poverty of the area were needed to make a comprehensive analysis of the contribution of the project to poverty reduction. However, due to the unavailability of such data, the proper comparison could not be made.

2. The people of the area had to recall their poverty status for the year of 1996 during the interview. However, they faced difficulties while recalling the information of 14 years back before the sub-project implementation.

1.5 Organization of the Thesis

The thesis contains six chapters. The organization of the chapters is as follows:

Chapter One: In this chapter, research problem is formulated on the basis of the condition of the study area. It highlights the objectives of the present research. Justification of the study is also included in this chapter.

Chapter Two: Chapter two provides the basic concepts of PPA including definition of PPA, history and origin of PPA, some PPA tools, and examples of poverty assessment in some countries through PPA. It also discusses the studies of poverty in Bangladesh and status of poverty in Bangladesh.

Chapter Three: This chapter explains the conceptual and theoretical basis that underpins this thesis. It discusses the methodology in detail and analytical framework used in the study to identify the poor and non-poor families of the concerned areas. This chapter also shows the data collection methods used for the study.

Chapter Four: This chapter is divided into four parts. In first part it describes the background history of the project and its operation and maintenance process of the project. After that it expresses the set of indicators to assess poverty and to identify the score for different groups. Then the impacts of the project are identified. Finally the change of poverty is evaluated through the set of indicators.

Chapter Five: The chapter pulls together the findings and lessons that are relevant for poverty reduction from the stand point of water development intervention.

CHAPTER TWO
LITERATURE RIVIEW

2.1 Introduction

Poverty wears a multitude of faces and has numerous dimensions (UNICEF, 2000). Poverty is a complex phenomenon (Chetwynd et al., 2003). It is usually defined in relation to income, often measured in terms of per capita GDP (Gross Domestic Product). Extreme poverty is often defined as an income of less than 1 dollar per person per day. However, according to the cost of basic needs (CBN) method, 40% people of our country are staying below the poverty line and the poverty reduction rate is 1.78% per annum (BBS, 2006). To overcome this situation, economic development of the poor people by flood control can be an effective tool. Rahman (2004) shows that the poor people are affected more than others by the damages caused by the floods. So the flood control projects can play an important role to improve the lives of the poor. The impact of any flood control project can be evaluated by different poverty assessment methods. Most of them can not address the conditions of life that vary from country to country, state to state or locality to locality. Income per day per capita or calorie intake per day may not be always the same in every situation. For this, a particular set of indicators may not be considered as a standard and applicable in poverty assessment for all societies and the set of poverty indicators may need customization based on local situations. The participation of local people is important to identify the indicators of poverty to evaluate the impacts.

2.2 Poverty Assessment Methods

There are many poverty assessment methods, which are used according to their suitability and effectiveness. In choosing methods, one must take into consideration the place and level (large or small-scale) factors because of the type of data available, timing and budget constraints. The actual situation of the incidence of poverty depends on long-term data available; otherwise it is difficult to estimate the actual condition of the incidence of poverty.

In this study, the participatory poverty assessment method was used to estimate the incidence of poverty by the set of indicators developed by local people. The different poverty assessment methods are discussed first.

2.2.1 Head count index

Hussain et al. (2006) described head count index based on the income poverty line. The head count index, poverty gap and squared poverty gap are used to measured the incidence, depth and severity of income poverty, respectively. The head count (HC) index indicates the proportion of population regarded as poor. If the population size is n and q is the number of poor people, then the HC index may represented as:

$$HC = \frac{q}{n} \qquad (2.1)$$

On the other hand, poverty gap (PG) highlights that the poor are below the poverty line. If z is poverty line, y_i is the income of an individual I, then the PG will be:

$$PG = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{z - y_i}{z}\right] \qquad (2.2)$$

The PG may also be calculated as the product of income and the HC index ratio as given below:

$$PG = I \times HC \qquad (2.3)$$

Where *I* is the income and

$$I = \frac{z - y_q q}{z} \text{ with } y_q = \frac{1}{q}\sum_{i=1} y_i \qquad (2.4)$$

y_q is the average income of the poor.

Square Poverty Gap $[(PG)^2]$ measures the severity of poverty giving more weight to the poor and is depicted as:

$$(PG)^2 = \frac{1}{n}\sum_{i=1}^{n}\left[\frac{z - y_i}{z}\right]^2 \qquad (2.5)$$

The general formula for all these measures, which depend on parameters α, is given by:

$$P(\alpha) = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^{\alpha} \qquad (2.6)$$

where α takes a value of zero, for the head count index, one for the poverty gap index and two for the squared poverty gap index.

2.2.2 Food energy intake

Food poverty line is the monetary value of the food expenditure that allows households to just meet the stipulated calorie requirement (Ravallion and Sen, 1996). This method is used by Islam (2006) in his Benefit Monitoring and Evaluation Study of SSWRDSP. The Food Energy Intake (FEI) is normally derived through regression of the relationship between calorie intake and expenditure i.e., monthly expenditure (income) required for calories = food/energy requirement at 2122 kilo calories per person per day in rural areas and 2,112 kilo calories per person per day in urban areas are taken as poverty line. However, rural households are more willing to consume food that is cheaper per calorie. This could result in urban households appearing to be poorer than households even if in fact they are better off. The FEI method is huge time consuming and complexities arise in field level data collection.

2.2.3 Direct calorie intake

Direct Calorie Intake (DCI) is a calorie intake based poverty assessment method. This method is used for poverty assessment in Household Income and Expenditure Survey 2000 and 2005 (BBS, 2001 and 2006). Absolute, hardcore and ultra poor people can be identified by the intake rate less than 2122, 1805 and 1600 kilo calories, respectively, per person per day. The DCI method has the limitation of occurring differences in nutritional value, though the calorie intake rate could be high. This might happen due to the taking habits of unbalanced diet in a household. So, the result might be less accurate.

2.2.4 Cost of basic needs

The cost of basic needs (CBN) method is the standard method for estimating the incidence of poverty. In this method, two poverty lines – Lower and Upper Poverty Lines – are constructed for identifying the poor below and above poverty line respectively (BBS, 2006). Two poverty lines are constructed as follows:

Lower poverty line: Lower poverty line is often referred to as food poverty line. A basic food basket is selected based on the average food consumption habits per person per day of the locality. The quantities in the basket are scaled according to the nutrient contents of different food items according to the BBS. This will be compared with the national average of calorie intake of 2122 kilo calories per person per day. Cost of acquiring the basket is calculated. This estimated cost is taken as food poverty line. The lower poverty line measures the number of those living in "extreme poverty" (World Bank 1990).

Upper poverty line: Most international organizations define the upper poverty line as the level of income necessary for people to buy the goods necessary to their survival. For instance the "1 dollar a day" line - at 1985 purchasing power parity- has been extensively used ever since the 1990 World Development Report as the 'extreme' poverty line in studies of the extent of poverty, its socio-demographic profile and its evolution in the world and in specific countries.

2.2.5 Self-assessment method

The self-assessment (SA) method uses a more minimalist yardstick in comparison with extreme deprivation such as hunger (IMF, 2005). The popular term *'khoraki'* is used here, that is a sociological expression of a poverty yardstick understood as annual food stores for the family. Poverty is then understood in terms of perceptions on deficit in comparison with the capacity to fulfil this minimalist yardstick.While newer popular meanings of poverty are seeping in with the transformations underway in social and economic life, the traditional hunger poverty yardstick provides useful insights on changes occurring in the poverty situation at the lowest step of the scale

(IMF, 2005). The SA identifies four categories in a poverty assessment research according to people's food grain availability – always deficit, occasional deficit, break-even and surplus groups.

In the past studies, SA was used specially in terms of hunger poverty and *'monga'* prone areas in Bangladesh, where people sometimes kept on their lives without taking any meal in a day, so improvements have been much more dramatic with the proportion of the 'always deficit' category of household dropping from 24% in 1989 to 9.9% in 2001 (IMF, 2005). The SA method is simple and easily implementable, and was used in the Khulna-Jessore Drainage Rehabilitation Project by Center for Environmental and Geographic Information Services (CEGIS, 2002). It was also used by Power and Participation Research Center (PPRC, 2001, 2004) and Bangladesh Institute of Development Studies (BIDS, 2001).

2.2.6 Participatory poverty assessment (PPA) method

Participatory methods, developed in the context of Participatory Rural Appraisal (PRA), became the central tool for development agencies to embrace participation. Participatory approaches are not only contextual, but also emphasize poor people's creativity and ability to investigate and analyze their own reality (Chambers, 1994). So, they try not only to understand the reality at the local level but also they do so through local people's own analysis. Various tools are used in PRA. A classification into visualized analysis, interviewing and sampling, and group and team dynamic methods have been suggested by Cornwall et al. (1993) and Estrella and Gaventa (1998). Examples include: (1) participatory mapping and modelling; (2) time lines and trend and change analysis; (3) seasonal calendars; and (4) wealth and well-being grouping and rankings. PPA is briefly described in Section 2.3.

The head count index is an income-data based method and it can be affected with the high inflation rate. Income poverty line varies from region to region. Setting the poverty line for this method is a problematic matter. The food energy intake method has the limitation of stirring variability in nutrition value though the calorie intake rate is high. This might happen for the differences of food taking habits in community people. So the result might be less accurate. Both the food energy intake

and costs of basic needs methods are huge time consuming and complexities arise in data collection and poverty line setting.

The SA strategy is effective in extreme poverty or *'monga'* prone areas. Besides this, SA was implemented in the past by only food quantity basis which may hamper to obtain the robust results.

BIDS (2008a) used degree of starvation and number of meals taken in a day as indicators to assess the impact of 10 sub-projects of the first phase of SSWRDSP on poverty. BIDS (2008b) used food consumption and calorie intake indicators to evaluate the impact of 30 sub-projects of the second phase of SSWRDSP on poverty. Saleh and Mondal (2009) used a Modified Self-Assessment Method to assess the impact of irrigation on poverty. Runu (2009) used some water related indicators to evaluate water poverty. However, the definition and scale of poverty often depends on society. According to Ravallion (1992), poverty can be said to exist in a given society when one or more persons do not attain a level of material well-being deemed to constitute a reasonable minimum by the standards of the society. Poverty should be defined in accordance with social standards, people's level of satisfaction and the local standard of healthy living style and other issues like income and intention of expenditure of the local people and cost of standard living. Active participation of people from different communities is also very important for assessing poverty.

2.3 Participatory Assessment of Poverty

2.3.1 Definition of participatory poverty assessment

Participatory poverty assessment (PPA) can be defined as an instrument for including poor people's views in the analysis of poverty and the formulation of strategies to reduce it through public policy. The purpose of PPA is to improve the effectiveness of public actions aimed at poverty reduction. PPA are generally carried out as policy research exercises, linked to governmental policy processes, aimed at understanding poverty from the perspective of poor people and what their priorities are in terms of actions to improve their lives. PPA can strengthen poverty assessment processes

through broadening stakeholder involvement and thereby increasing general support and legitimacy for anti-poverty strategies; enriching the analysis and understanding of poverty by including the perspectives of the poor; providing a diverse range of valuable information on a cost-effective, rapid and timely basis; and creating new relationships between policy-makers, service providers and people in poor communities.

PPA may be initiated by a variety of different kinds of institutions, including NGOs, donors and research institutions. They may address different audiences – including policy-makers, politicians, advocates and activists. There is no blueprint of content or of method for PPA. The common element that unites the various exercises known under this name is the rationale. If a government or an institution is to develop a strategy for reducing poverty, it makes sense to include the views of poor people in the process of developing and implementing that strategy. This case can be made on a number of levels, encompassing both moral and technical dimensions. Essentially, there are three components to the rationale:

- Enhancing conceptualization and understanding: It has become commonly accepted in development theory and practice that poverty is best viewed as a multi-dimensional phenomenon, with a strong locally specific character. Participatory research has contributed heavily to the evolution of this understanding. It has an accepted place in the range of methods used to explore the multiple dimensions of deprivation in development policy research.

- Enhancing participation and accountability: Participatory practice aims to strengthen the degree of influence of people over decisions that affect their lives. In the case of a PPA that, however, seeks to give poor people an influence over policies and programs designed for their tangible benefit. Participation is a value in its own right, expressing aspirations for enhanced agency, empowerment and autonomy, especially for those who are excluded, voiceless and marginalized.

- Enhancing policy effectiveness: Initiatives to address problems of poverty and deprivation are more likely to be effective if they identify issues that the poor

themselves consider important, through institutional channels that they value. The effectiveness of poverty reduction policy can also be enhanced through a PPA by the inclusion of a broad range of civil society actors in its formulation [research institutes, NGOs and local governments as well as participating communities]. This offers the opportunity for strengthening the perceived legitimacy of the strategy and thereby the level of stakeholder ownership and support.

2.3.2 History and origins of PPA

Recent years have witnessed a great interest in participatory methods as instruments for poverty analysis. The insights which these participatory approaches have provided concerning the experience of poverty have contributed to the establishment of a mainstream multi-dimensional definition of poverty.

In the 1970s, "popular participation" was seen as an important component of rural development and basic needs strategies, and as such figured in the programmatic statements of many international agencies. In the 1980s, it became associated with discourses of grassroots self-reliance and self-help, with non-government organizations (NGOs) often having to fill in the void left by a retreating state as a consequence of neo-liberal reforms.

The diversity and multiple objectives which participation may serve is well illustrated within one of the most influential traditions of participatory poverty research, the participatory rural appraisal (PRA) approaches which emerged in the late 1980s and 1990s. On the one hand, PRA traces its ancestry to innovative methods developed and used by community organizers in rural areas across the world, as they sought to engage communities in reflecting on their situations in order to design strategies for change. On the other hand, it also derives from the techniques of ‘rapid rural appraisal’ (RRA), developed in the late 1970s and 1980s by researchers working as consultants in international development, who had become frustrated with expensive and unwieldy household surveys, and sought quicker and more cost effective techniques.

The core difference between RRA and PRA is not only in the extent to which local people are included in the research, but in their ultimate purpose. "A PRA is intended to enable local people to conduct their own analysis, and often to plan and take action" (Chambers, 1994). By becoming a way in which participation was enacted, the qualitative and often visual tools used in PRA acquired a new and distinctive characteristic. If the widespread adoption of participatory techniques challenged the extent to which their distinguishing features were maintained in practice, a further challenge was posed by the "scaling up" of PRA from project planning to input into policy making. The most evident form in which this scaling up has taken place has been the Participatory Poverty Assessments (PPA) performed by the World Bank, introduced as complement to Poverty Assessments in the face of criticisms of their exclusive money metric focus. These PPAs have spread rapidly. By 1998, half of the completed poverty assessments performed by the World Bank included a participatory component (Robb, 1999).

The PPAs have received particular attention over the past fifteen years following the agreement by the World Bank Group and IMF that nationally-owned Participatory Poverty Reduction Strategies (PRSPs) should provide the basis for all concessional lending and debt relief under the enhanced Heavily Indebted Poor Countries (HIPC) Initiative. Since then, PRSPs have been created in many countries as a framework for coordinating anti-poverty measures. This has merged with the need to monitor progress towards the Millennium Development Goals (MDGs) and bi-lateral donors' wish to streamline development assistance as well as improve the performance of sector ministries.

In Africa, the first PPAs were conducted during the early 1990s (Ehrhart, 2002). Together with information generated through surveys and individual interviews, their findings were meant by the World Bank to show the complex relationship between poverty profiles, public policies, expenditures and institutions.
In Tanzania, the two most commonly recognized PPAs are the 1994/5 PPA, instituted by the World Bank, and the 1997 Shinyanga PPA, conducted by the Regional Government of Shinyanga as part of a UNDP funded Human Development Report Project (Attwood, 1998; Ehrhart, 2002).

The World Bank PPA illuminated aspects of poverty and well-being important to poor people themselves. It also shows how surveys can distort understanding of poverty by papering over the unequal access to economic and non-economic resources experienced by individuals in the same household. Indeed, findings from this PPA contributed to growing recognition of poor communities and households as heterogeneous units whose members face an array of circumstances demanding a range of policy responses.

The 1997 Shinyanga PPA worked in a single region (the largest sub-national administrative unit in Tanzania). It built the capacity of local government staff to engage in participatory public planning and provided key information for a Human Development Report (Attwood, 1998).

2.3.3 PPA tools

The methodology for the PPA study included application of a wide array of tools using visual modes of analysis and communication, with information synthesis, sharing, and dissemination at all levels. There is no blueprint of content or of method for PPA. However, some PPA tools are briefly described below.

- **Preference ranking or scoring** – It involves the ranking or scoring of people's priorities, problems or preferences which often disaggregated by different criteria. For example, how do people rate different health providers according to effectiveness, cost, accessibility etc. Disaggregating of groups performing the analysis by age, gender, class, ethnic group etc. enables the comparison of experience and priorities of different groups. In policy terms a key application is often looking at priorities for action or policy change.
- **Wealth or wellbeing ranking** – It is the ranking of different individuals, households or communities according to an overall view of wellbeing. Useful for establishing the criteria by which the 'good life' is assessed by different groups, as well as the distribution within a given field. Can only be used within the limitations of the shared mutual knowledge of the group carrying out the analysis (detailed knowledge is need to establish the ranking). Performing such exercises for communities as well as households or individuals illustrates the significance of

factors and assets which affect poverty at the community or group level (e.g. road infrastructure, common property resources such as fisheries and forests).

- **Charts illustrating cyclical change (seasonality, daily activities etc.)** – These methods address the distribution of phenomena over time in more or less predictable cycles. These might include the incidence of disease through the year, the levels of food stocks or the distribution of tasks and workload over a woman's day. Useful for illustrating dynamic dimensions of wellbeing often poorly illustrated by conventional forms of poverty assessment.
- **Trend analysis** – It involves various forms of illustration of long-term trends through visual representation or matrix scoring of phenomena over time e.g. degradation of water resources.
- **Causal flow diagrams** – It illustrates the group's understanding of basic causal linkages between phenomena (e.g. the causes of hunger). Also illustrates the perceived impacts of specific events or factors (violence, conflict, economic shocks etc.)
- **Participatory mapping –** It involves representations of spatial distribution and location of resources, social groups, facilities etc. Wealth ranking can be established on a social map if the geographical distinctions between the units ranked are clear on the map.
- **Institutional diagramming** – It involves representation of different institutions, their significance, accessibility and relationships –usually as overlapping circles.
- **Drawings – pictorial representations** – It involves visualizations of different conditions (poverty, well-being, disorder etc.). Often used with children.

2.3.4 Poverty assessment in some countries through PPA

In many countries of the world, the national poverty is assessed through PPA by the aid of some national and international organizations. Action Aid used PPA to assess poverty in Lao People's Democratic Republic (Lao PDR) and Vietnam (Action Aid International, 2006). SMERU Research Institute used PPA in strengthening the poverty reduction capacity of regional government in Jakarta (Suhanyo et al., 2006). Overseas Development Institute of London uses PPA for livelihood assessment in situations of political instability in Kosovo (Westley and Mikhalev, 2002). UNDP

used PPA to assess poverty in Liberia (UNDP, 2008). Among the mentioned assessment works, Action Aid's work at Lao PDR and SMERU's work at Jakarta are briefly described here because of the direct relevant of this study.

2.3.4.1 Application of PPA in Lao PDR

Lao People's Democratic Republic (Lao PDR) is a landlocked country of 236,800 km^2 falling mostly within the catchment of the Mekong River. It is a low income food deficit country with a per capita income of US$330 in 2000. Over 36% of the population lives below the poverty line. The economy is largely natural resource based. Three-quarters of the population live in rural areas and remains almost entirely dependent on subsistence farming, fishing, wildlife and forest products. The Government is committed to alleviating poverty and promoting development. To protect the biodiversity of the Mekong river, while maintaining the natural resource base for local livelihoods, it became critically essential at every stage of the Mekong Wetlands Program's formulation to facilitate participatory poverty assessments to include the perspectives of all stakeholders with special reference to poor communities in selected sites who would be benefited from the program. Action Aid Asia decided to contribute to the Mekong River Basin Wetland Biodiversity Conservation and Sustainable Use Program by conducting the PPA in collaboration with IUCN Lao and a local multidisciplinary team. The PPA was carried out to initially assess and analyze poor people's perceptions about issues and aspects related to poverty, and the significance of wetlands in rural livelihoods in selected villages in the project demonstration sites. Conducting the PPA, Action Aid Asia aimed to ensure that the program addresses poverty reduction and sustainable livelihoods effectively, to involve stakeholders, with special reference to poor communities, in establishing the program and to build capacity for the local people and government staff to conduct research and surveys using participatory approaches for the design and planning poverty reduction projects.

The two villages selected as demonstration sites were Sen Keo and Hat Oudomxay of Sanamsay district. The two villages are typical in terms of natural resources but a majority of villagers, e.g. the Sou ethnic minority, live in poverty and local

communities experience a range of issues concerning wetland resource use and management. Significant changes to the natural resource base have taken place during the past few decades including the more frequent occurrence of flooding.

The two villages' infrastructure is poorly developed and they are only accessible by the Se Kong River. It is a five hours boat trip to the district. Transportation is particularly difficult during the rainy season. Irrigation is little practiced, as villagers cannot afford irrigation pumps. Although there are village-level classrooms, education appears to be of poor quality. There is no sign of health facilities. The market is yet to develop in the relative absence of a cash economy.

There are 60 houses with 67 Sou ethnic minority families in Hat Oudomxay village. Of these houses, 24 of them have good roofs with enough space for the families. Others are very small with poor quality roofs. All the houses are scattered without any structured roads. There are currently 8 female-headed families in the village.

The population of the Hat Oudomxay village is 379 (175 female and 204 male). There is a village school but it only goes to grade 4. Almost all the elders are illiterate, especially women. The only source of water for domestic use and drinking is the Se Khong River. As a result, villagers frequently suffer from diarrhoea, malaria and other water born diseases. Villagers use boats for daily transportation and fishing. There are 55 boats in total; only 18 of them are motorized. There is a village committee and the village head is active but his contribution to the development of the village is limited given the difficult situation. Other mass organizations, such as Lao Women's Union, Education Committee and Youth Association are not effective in taking up development issues because of poor of infrastructure, knowledge and resources; nor are they clear about their roles and responsibilities.

The total population of the Sen Keo village is 131, of which 64 are females and 67 are males. The only source of water for domestic use and drinking is the Se Khong River. As a result of using the river water, villagers frequently suffer from diarrhoea, malaria and other water borne diseases. Every household has small boats which are

used for transportation and fishing. There are only five families who own motor-boats. Natural forest covers most of the area. A large area of flat land, originally covered by forest, has been converted into agricultural land. Of the 29 households, 25 hold some lands varying from 0.7 to 4.0 ha for paddy cultivation. The head and deputy head of the village perform well. Other mass organizations are established but do not generally work well.

During the survey, individual households and groups of villagers defined their criteria for ranking households according to wealth and well being. These rankings are a good measure of how poor people define poverty and what conditions and aspects are used to qualify a family to be poor. Table 2.1 provides detailed criteria used by the villagers for their wealth and well being ranking.

Table 2.1: Indicators for different groups

Category	Sen Keo Village	Hat Oudomxay Village
Better-off	- Several buffaloes (8 - 10) - Very good house - Large paddy field (4 - 5 ha) - Motorboat for fishing - Enough food for the whole year - Good garden and other small livestock - Inheritance from parents - Good health and enough labour	
Average	- Some buffaloes (2 - 3) - Good house - Paddy field (1- 2 ha) - Boat or motorboat for fishing - Lack of food from 2 - 3 months a year - Small garden - Other small livestock (chickens) - Enough labour forces	- Paddy field (1.5 - 2.0 ha) - Children attend school - Some buffaloes - Good house - Good health, enough labour - Little food for 2 - 4 months a year - Motorboat for fishing - Selling some goods in and outside the village
Poor	- Not good house - A buffalo - Paddy field less than 1 ha - Little food for 4 - 5 months a year - With or without a boat - Poor health	- With or without a buffalo - With or without paddy field - Little food for 5 - 6 months a year - Not enough clothes and blankets - Not all children attend school - No money for medicine when ill - A boat

Table 2.1: (Continued)

Category	Sen Keo Village	Hat Oudomxay Village
Hunger	- No buffalo - No paddy field - Not good house -Little food more than 6 months per year - The elderly or young couples - Really poor health - New settlers	- No buffalo - With or without paddy field - Not good house - Little food more than 6 - 7 months per year - Not enough cloth, blankets or fishing nets - No money for children to attend school - No money for drugs when ill - The disable and women headed

A complex picture emerged about changes in poverty over the last two decades. Most people of Sen Keo perceive that overall poverty has been reduced over the last fourteen years although many people are still poor or even hungry. Table 2.2 provides the change in household poverty in Sen Keo Village. Neighboring villagers say that Hat Oudomxay's poverty level remains unchanged.

Table 2.2: Changes in poverty in Sen Keo village (No. of households)

Category	14 years ago	Present
Better-off	-	3
Average	4	9
Poor	11	10
Hungry	14	7

At Sen Keo, where overall trends in poverty reduction are positive, people said the percent of households categorized as 'hungry' was halved from 50% to about 25%. However, the number of households categorized as either 'poor' or 'hungry' still makes up more than 60%. The number of 'better-off' households has risen from almost nothing to more than 10%. Although fewer women were affected by serious diseases at Sen Keo, people reported a number of health problems from overwork and poor nutrition of women. Health services in the remote regions that could counterbalance the general poor health of the villagers do not function well. Table 2.3 provides the changes in the role of women over the last 10 years. For all of these reasons it may be concluded that among the poor, women are on average worse-off than men (Action Aid International, 2006).

Table 2.3: Changes in the role of women over a period of 10 years

Issues	Overall change	
	Group work of Sen Keo	Group work of Hat Oudomxay
Participation in decision making process	Somewhat improved	Somewhat improved
Responsibility in social Affairs	Minor improvement	Minor improvement
Educational opportunities for girls	More girls attending school	Little growth in enrolment
Household asset ownership	Minor decrease in asset ownership	Significant decrease in asset ownership
Women's health	Fewer women affected by diseases of economic importance	N/A
Workload	More or less the same	Much heavier
Domestic violence	N/A	Reduced to some extent

2.3.4.2 Application of PPA in Jakarta

The Government of Indonesia called on regional governments to utilize PPA in preparing their regional development plans and poverty reduction strategies. Since most regional governments are not familiar with PPA, the SMERU Research Institute initiated a study which is expected to help strengthen the regional governments' poverty reduction capacity through utilizing PPA. This study was conducted in Kabupaten Tapanuli Tengah, North Sumatra Province and in Kabupaten Bima, West Nusa Tenggara Province. This research is designed based on the findings and recommendations of the PPA consolidation study conducted by SMERU in 2003 with the support of the Japan Bank for International Cooperation (JBIC), as well as the experiences encountered in several programs similar to this study that had been carried out by other institutions.

This study was conducted in nine months, beginning in April 2005 and ending in December 2005. In mid-January 2006, a national workshop was organized in Jakarta as a forum to discuss and disseminate the results of this study. In principle, this study adopted an approach emphasizing on the process of participatory learning. Based on this approach, SMERU together with the Kabupaten governments and non-government institutions learned about the PPA and how to conduct it in the context

of preparing regional development plans. Through this collaborative research with the Kabupaten governments, it is expected that alternative models for integrating PPA into the process of preparing regional development programs and policies as well as models for technical assistance for regional government and other regional stakeholders can be identified.

The implementation process of this study consisted of three stages, which are the preparatory phase, the implementation phase, and the analysis and reporting phase. During the preparatory phase, the research team conducted interviews with four institutions that had carried out programs related to the strengthening of regional governments' capacity in poverty reduction. The preparation of PPA training materials and preliminary visits to the villages were carried out during this phase. During these visits, the research team discussed the collaboration framework with the Kabupaten government, interviewed several relevant sectoral offices and non-government institutions, and organized focused group discussions with stakeholders at the Kabupaten level to consult about the poverty condition in the respective districts. The second phase of this study began with the final preparation of the PPA training, which included the revision of training materials and selection of training participants. The PPA training was then organized for six days, four days in class and a two-day field trial. In Kabupaten Bima, the training included 13 participants (six from local governments and seven from non-government institutions), while 11 people participated in the training in Kabupaten Tapanuli Tengah (nine from local government and two from non-government institutions). After the training sessions, the participants and SMERU conducted PPA activities at the village level for about seven days. The PPA in Kabupaten Bima was carried out in three villages where the livelihood typology is food crops farming and cattle rising. These villages were hilly areas in the forest fringe that mostly cultivates plantation crops and coastal areas with a mix livelihood of brackish water fish pond farming, rice farming, and sea fishing. The PPA in Kabupaten Tapanuli Tengah was also carried out in three villages having the livelihood typology of semi-urban areas where some of the people still live from farming. These villages consist of farming areas where people cultivate food and plantation crops, and coastal areas where people live from sea fishing, rice as well as

coconut farming. At the end of this phase, a discussion was organized at the Kabupaten level to report and discuss the preliminary findings of the PPA at the village level. In the third stage, the research team consolidated and analyzed data and information collected during the first and second stages. The activities at the Kabupaten level ended with a workshop attended by various sectoral offices of the Kabupaten government, local legislative, and relevant non-government institutions. The objective of this workshop was to discuss the findings of this study and the recommendation for the poverty reduction strategy, as well as the potential for integrating PPA into the planning process. Table 2.4 and Table 2.5 provide the characteristic of the poor people in Kabupaten Bima and Kabupaten Tapanuli Tengah village. Table 2.6 provides Household Welfare Classification in PPA Villages in Kabupaten Tapanuli Tengah in 2000 and 2005 and Table 2.7 provides Household Welfare Classification in the PPA Villages in Kabupaten Bima in 2000 and 2005

Table 2.4: Characteristics of the poor and very poor people in the three PPA villages in Kabupaten Bima, Indonesia

Charac-teristics	Welfare Class	Desa Waworada	Desa Nunggi	Desa Doridungga
Housing Condition	Poor	Roof from grass or tile, wall from raw wood plank or bamboo, no toilet	House from raw wood (6-9 pillars)	House with 6 wooden pillars (nothing inside except wooden chairs), simple toilet
	Very Poor	Roof from grass, wall from bamboo, occupied by more than 2 household, attached to neighbor's house	Hut with 4 low quality wooden pillars enacted on other people's land	Hut with 4 low quality wooden pillars, or live in a hut in the farmland; occupied by more than one household
Education Level	Poor	Children graduated from primary school children go to senior high school	Children graduated from primary school, some go to secondary school	Children go to senior high school
	Very Poor	Children do not finish primary school, drop out from 3rd grade	Children do not finish primary school, or do not attend school	Children finish primary school or junior secondary school

Table 2.4: (Continued)

Charac-teristics	Welfare Class	Desa Waworada	Desa Nunggi	Desa Doridungga
Utilization of Health Facilities	Poor	Go to healthcare centers or traditional healers	Go to healthcare centers using health card	Go to healthcare centers or traditional healers
	Very Poor	Go to traditional healers when seeking treatment or delivering baby	Could not afford to go to healthcare centers	Only go to traditional healers or take traditional medicine
Asset Ownership	Poor	Garden 1 acre, small boat, 2 chickens.	5-10 chickens	Farm land up to 1 acre, up to 10 chickens
	Very Poor	Have no valuable assets	Have no valuable assets	No farm land, only 3 chickens or none
Clothing	Poor	Simple	Very simple	Buy new clothes once a year
	Very Poor	Sometimes given by neighbors	Secondhand, worn-out	Sometimes buy
Food Consum-ption Pattern	Poor	2 times a day	3 times with limited side dishes	2 times a day
	Very Poor	2 times a day	3 times a day with very limited nutritional value	2 times a day with a very simple menu
Occu-pation	Poor	Poor Laborer in farm or in fishing boat, small trader (women)	Farm laborer, collect wood in the forest to be sold as fire wood	Farm laborer (main job), small trader, carpenter, weaving (side job)
	Very Poor	Laborer in sea weed cultivation, farm land	Farm laborer, collector of (rice) harvest remainders	Farm laborer (main job), collect and sell firewood, weave grass to make roof
Number of Children	Poor	Less than 5	Less than 4	Less than 5
	Very Poor	Have many children (5–7)	Have 4-7 children	Have 5–8 children

Table 2.5: Characteristics of the poor people in the three PPA villages in Kabupaten Tapanuli Tengah, Indonesia

Characteristics	Desa Sipange	Desa Mombangboru	Desa Kinali
Housing Conditions	Wooden stilt house, roof made of grass; rented house; house enacted on other people's land with letter of permission from village head; no toilets – use river; no electricity; cook using fire woods	Stilt house, roof made of grass or iron sheet, walls made of plank; house enacted on other people's land; use river as toilets	Low quality wooden stilt House, roof made of grass, walls made of plank; simple house; use river as toilets
Occupation	Farmhands; landless farmers	Farmhands; landless farmers	Fishers using other people's boats, fishing in the river; landless vegetable farmer
Children's Education	Completed primary school	Completed primary school	Completed primary school
Asset Ownership	Have no farmland, or have small farmland but it is not productive; Have less than 0.25 ha rice field	Have no farmland, cattle from the government, have no jewelries	Have no furniture, only have mats; house belongs to the parents (or clan)
Health	Go to traditional healers to seek medical treatment, except for health card holders	Seek medical treatment from traditional healers	Skinny and low nutritional status
Food Consumption Pattern	Eat twice a day; only with simple vegetables and salty fish	Eat 3 times a day with a simple menu	Sometimes eat sago, sweet potato or cassava for breakfast
Social Activities, and others	Clothes obtained from charity or brought from second hand stalls	N/A	N/A

Table 2.6: Household welfare classification in the three PPA villages in Kabupaten Tapanuli Tengah, Indonesia

Village	Year	Welfare Classification		
		Wealthy	Middle Class	Poor
Desa Sipange	2005	5%	55%	40%
	2000	5%	41%	54%
Desa Mombang	2005	5%	23%	72%
	2000	-	5%	95%
Desa Kinali	2005	-	73%	27%
	2000	-	90%	12%

Table 2.7: Household welfare classification in the three PPA villages in Kabupaten Bima, Indonesia

Welfare Classification	Desa Waworada		Desa Nunggi		Desa Doridungga	
	2000	2005	2000	2005	2000	2005
Rich	15%	8%	9%	10%	43%	13%
Middle class	48%	28%	14%	25%	25%	20%
Poor	28%	47%	16%	42%	20%	24%
Poor Very	9%	17%	61%	23%	12%	43%

Finally, in mid-January 2006 a national workshop organized in cooperation with Bappenas was held in Jakarta. Besides reporting on the implementation and the findings of this study, this workshop also discussed alternative ways of integrating PPA into the regional development planning process (Suhanyo et al., 2006)

2.4 Poverty in Bangladesh

According to the World Development Report (World Bank, 2001), the poor often lack adequate food and shelter, education and health, deprivations that keep them from leading the kind of life that everyone values. They also face extreme vulnerability to ill health, economic dislocation and natural disasters. They are often exposed to ill treatment by institutions of the State and society and are powerless to influence key decisions affecting their lives. These are all dimensions of poverty.

Poverty in Bangladesh has manifold expressions, many dimensions and, indeed, many roots. For combating poverty, all routes matter recognizing the heterogeneity of the voices and the perspectives of the poor expressed in economic and non-

economic terms (Mujeri and Guha, 2006). It is one of the developing countries of the world and it has at large population about 140 millions, Most of the populations of the country are poor and live in a deprivation. It is the fact that according to the head count index 40% people of the country are staying below the poverty line, which is 28% and 43.8% for urban and rural level, respectively.

According to the Direct Calorie Intake method, the national poverty rate is 40.4% and it is 43.2% and 39.5% for urban and rural level, respectively (MoF, 2007). The economic review of the Ministry of Finance (MoF) also found that 19.5% people of the country live below the extreme poverty line. This poverty level is high enough to implement successfully any development project for the country. However, by most estimates, Bangladesh has witnessed a modest poverty reduction rate around 1% per year since the early nineteen nineties (IMF, 2005). Two alternative estimates, one by BBS (2001)/ World Bank (2002) and the other by Sen and Mujeri (2002), show that poverty has declined from 58.8% in 1991/92 to 49.8% in 2000 and from 49.7% in 1991/92 to 40.2% in 2000 (Table 2.8).

Table 2.8: Trends in poverty in the nineties (head count ratio)

Indicators	Using 1990s HIES unit record data *		Using HIES longer-term grouped distribution data **	
	1991/92	2000	1991/92	2000
National	58.8	49.8	49.7	40.2
Rural	61.2	53	52.9	43.6
Urban	44.9	36.6	33.6	26.4

Sources: * BBS (2001) and World Bank (2002): ** Sen and Mujeri (2002)

Human-poverty trends also show considerable improvement. The human poverty index which stood at 6l% in the early eighties (l98l/83) has declined to 47% in the early nineties (l993/94) dropping further to 35% in the late nineties (1998/00). The index of human poverty declined by 2.54% per year compared with 1.45% in the national head count ratio for income-poverty over the last two decades (IMF, 2005).

In terms of hunger poverty, improvements have been much more dramatic with the proportion of the ‘always deficit’ category of households dropping from 24% in 1989

to 9.9% in 200l. Though pockets of seasonal hunger – the so called ‘monga’ areas – persist, the term ‘extreme poverty’ today no longer signify going without any meal a day for significant part of the year (IMF, 2005). In a significant way, the challenge of poverty today has been transformed from that of hunger to poor diets and other basic need (Table 2.9).

In September 2000 meeting at the United Nations Millennium Summit, the world’s leaders agreed to a remarkable document, the Millennium Declaration and demanded that the world set its sights higher and aim for eight specific goals, most of which would be achieved by the year 2015. Eradication of extreme poverty and hunger is one of the goals.

Table 2.9: Self-assessment of poverty (% of rural households)

Self-Assessment	**1989**	**1995**	**2001**
Always Deficit	24.0	18.0	9.9
Occasional Deficit	50.0	32.2	26.3
Break Even	17.5	30.7	40.8
Surplus	8.5	19.1	23.0

Source: PPRC (2001)

The eight goals represent a partnership between the developed and the developing countries, as the Millennium Declaration envisages creating an environment at the national and global levels which in conducive to development and the elimination of poverty. In this point of view, the Government of Bangladesh (GoB) declared in October 2005, the Poverty Reduction Strategy Papers (PRSP) to meet the Millennium Development Goals (MDGs) with the assistance of the IMF and World Bank. The PRSP discuss some aspects of growth in agriculture technology, agricultural extension, input delivery policies, agricultural marketing, agricultural wages and agricultural credit policies. At the same time, the country Report of IMF (2005) for Bangladesh noted about the PRSP of Bangladesh: “Since three-quarters of the country’s total population and 85% of the total number of the poor live and earn their livelihood in the rural areas, the Government has identified agriculture and rural development as the topmost priority sector for rapid poverty reduction”.

This poverty reduction papers puts emphasis on the pro-poor economic growth that is clearly related with the water sector interventions, but it fails to fully recognize the importance of water resources in poverty alleviation because water in the primary input to most of the important sectors of Bangladesh. As a developing country like Bangladesh with lower poverty alleviation rate (Tables 2.8 and 2.9) needs rapid agricultural development because it is one of the main productive sectors and it has a huge contribution to the national GDP that is 21.11% (MoF, 2007). Agricultural development also helps the country to keep food supply available. Agriculture's main role in poverty reduction lies in maintaining the supply of food at least at which the demand has been growing, thereby keeping the food prices stable and within affordable limits of low-income households (Hossain, 2004).

Bangladesh Bureau of Statistics, as the national statistical organization, is mandated to monitor the progress of MDGs by conducting periodic surveys and ad-hoc surveys. Some surveys are providing data for monitoring MDGs which are: Household Income and Expenditure Survey, Poverty Monitoring Survey, Child Nutrition Survey, Multiple Indicator Cluster Survey, Vital Registration Survey, Demographic Survey, Population Census, and Labor Force Survey. As a member of United Nations, Bangladesh has taken a comprehensive approach to achieve the millennium development goals. In 31st January, 2008 government had decided about PRSP II from July 2008 – June 2011. Though the duration is three years, the duration of PRSP II is 5 years. The goals of PRSP II are macroeconomic management enhancing investment, infrastructural development for economic growth and social security and human resources development.

CHAPTER THREE
STUDY AREA AND METHODOLOGY

3.1 Introduction

Impact assessment of any development intervention is a methodological difficult and complex task. But difficulties arise not only in tracing all relevant impacts but in attributing and linking them to relevant interventions and importantly, in valuing and translating them in forms that could be used in decision making processes (Hussain, 2004). However, flood control projects have multiple effects and some of them induced impact impacts are desirable and beneficial to society and at the same time it could hasten the poverty alleviation process while other are undesired and adverse in terms of their negative impact on human and environment. Some of the impacts are significant, while the other may be insignificant. After identifying all the relevant impacts the next steps would be to quantify them in physical terms. There may be several different ways to quantify these impacts. Two commonly used approaches are before and after and with and without project comparison. Both are almost similar. One of the problems of before and after comparison approach is that it fails to account for changes in production that would occur without the project and this could led to erroneous estimates of the quantified impacts (Giittinger, 1982). Although the 'with and without' approach also suffers from similar limitation. It is commonly used in real world impact assessment. The evaluator must carefully explore the methodological options in designing the impacts study with the aim of producing the most robust results possible.

3.2 Description of the Study Area

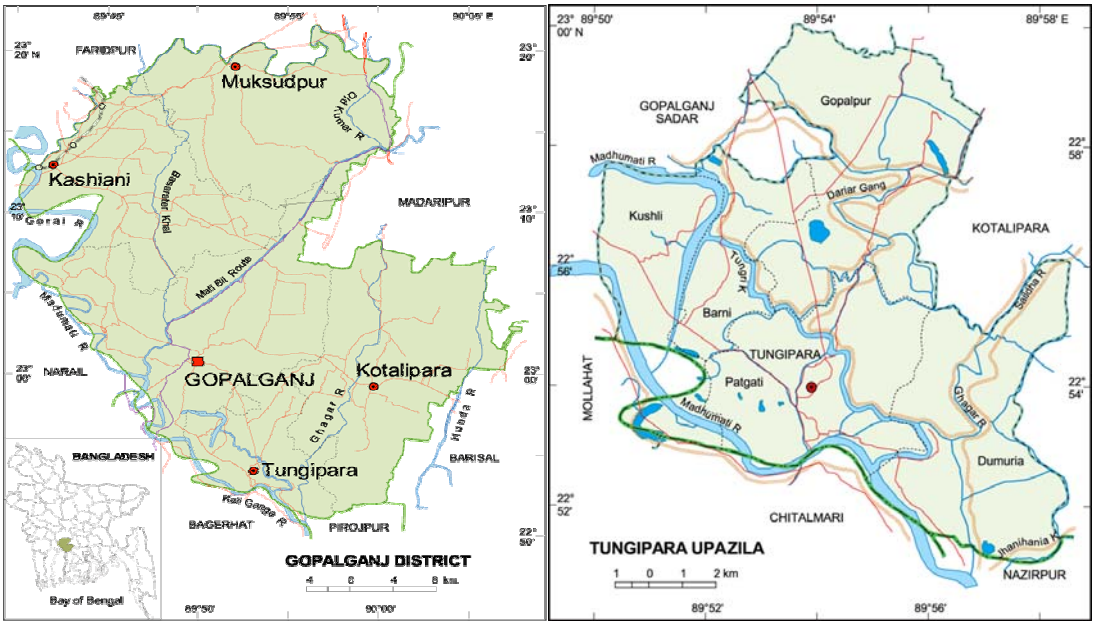
3.2.1 Location

Gopalganj district (Figure 3.1) is located in the central area of the southwest region of Bangladesh, at about 120 km south from Dhaka. The total area of the district is about 1496 sq.km. The district is bounded by Madaripur and Barisal districts in east, Narail and Bagherhat districts in west, Faridpur district in north and Bagerhat and Barisal districts in south. The district comprises of five upazilas, namely, Gopalganj sadar, Muksudpur, Kotalipara, Kashiani and Tungipara including 4 Paurasavas

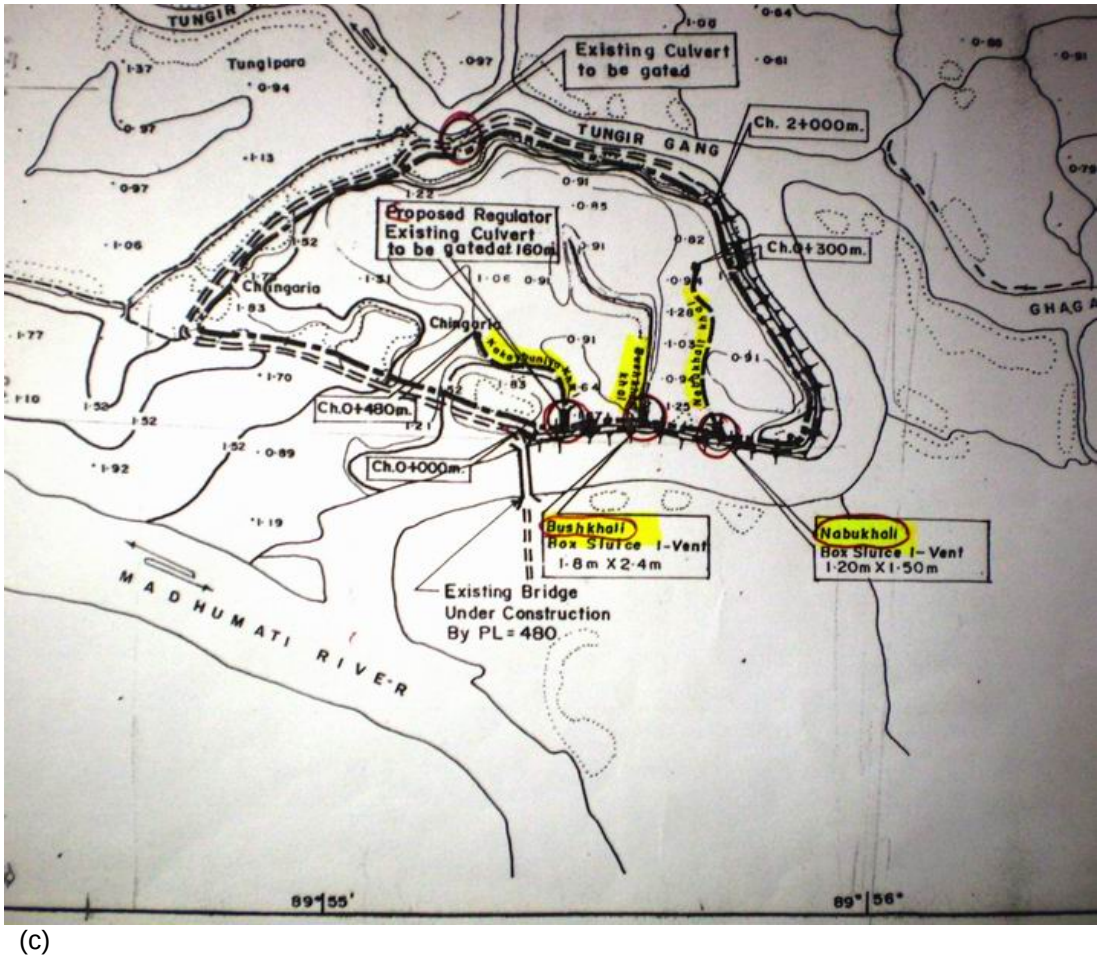
namely, Gopalganj sadar, Kotalipara, Tungipara and Muksudpur. Tungipara is located in the southern part of Gopalganj. Tungipara upazila with an area of 127.25 sq.km . The important rivers in the upazila are the Madhumati river, the Ghagar river and the Shailadaha river. The Tripalli Flood Control and Drainage (FCD) sub-project located in Tungipara upazilla of Gopalgonj district. The three villages Kakuibunia, Chinguri and Nabukhali under the sub-project area are surrounded by the Modhumoti, Ghagar Orsaildaha and Tungir Gang rivers. All these rivers are somehow connected with each other by narrow canals or directly at different locations. Besides these rivers, three canals Nabukhli, Boishkhali and Kakuibunia that enter into these villages are also connected with the Ghagar Orsaildaha river.The area of the sub-project is about 425 ha with 3.99 km embankment and 3 sluice gates in three canals (Nabukhli, Boishkhali and Kakuibunia).

3.2.2 Climate

Gopalganj district has a typical monsoon climate with hot wet summer from May to September and cooler dry winter. The monsoon is characterized by high temperature, heavy rainfall and high humidity, while winter season is experienced by cool dry weather with little or no rainfall. Mean of minimum monthly temperature ranges from 3.9°C in January to maximum 41.7°C in April-May. Mean annual rainfall is 1972 mm. The two main seasons are separated by truncation periods namely the pre-monsoon and post-monsoon period. The pre-monsoon period is again associated with local tornado and sometimes with cyclonic storms due to low depression in the Bay of Bengal. The post-monsoon period is fairly smooth with declining temperature and humidity.



(a) (b)



(c)

Figure 3.1:(a) Map of Gopalganj district; (b) map of Tungipara Upazila, (c) Tripalli Sub Project Area (Source: a and b : Banglapedia, 2003, c: LGED Office, 2009)

3.2.3 Land type and land use

According to the land classification system of Water Resources Planning Organization (WARPO), land is divided into four types (Table 3.1.) high land (F0-type with inundation depth up to 0.3m in average flood), medium highland (F1-type with inundation depth up to 0.3-0.9m in average flood), medium low land (F2-type with inundation depth 0.9-1.8m in average flood) and low land (F3-type with inundation depth >1.8m).

Table 3.1: Land types of the Gopalganj district

Land Type	Inundation Depth (m) (Average Flood)	Area (ha)	% of Net Cultivable Area
High land (F0)	0.0-0.3	8,253	6.68
Medium high land (F1)	0.3-0.9	15,177	12.28
Medium low land (F2)	0.9-1.8	42,639	34.48
Low land (F3)	>1.8	57,567	46.56
Total		1,23,636	100.00

(Source: District Agricultural Extension Office, Gopalganj: based on agricultural lands, 2009)

The district covers a gross area of 149,649 ha, of which 123,636 ha are available for cultivation (Table 3.2). Homesteads, villages and infrastructures cover an area of 25,983 hectares and remaining 8,868 hectares are the area of ponds/tanks etc.

Table 3.2: Present land use in Gopalganj district

Land use	Area in (ha)	Percent of Gross Area
Net Cultivated Area	111,450	74
Fallow Area	2,595	2
Homestead	12,186	8
Ponds and water bodies	8,868	6
Forest Area	8,436	6
Infrastructure	6,114	4

Source: District Agricultural Extension Office, Gopalganj, 2009

3.2.4 Hydrology

Gopalganj district has several important rivers (Figure 3.2) as the Madhumati river, the Madaripur Beel Route (MBR) channel, the Kumar river and the Chandana

Barasia river, the Ghagor river, the Kirtinasha–Palong river, the Chatkhali river, the Baghia river etc. Besides, there are numerous khals, beels, baor and tanks in the district rendering high potentials of water availability. In the study area lays one of the most important perennial rivers of the district- the Madhumati flowing along the west to southwest border of the district. The Ghagor River is traversed in Kotalipara and Tungipara upazilas of the district which is perennial, too. Another river flowing through Tungipara is the Chatkhali River which originates from Barni baor area in Tungipara. Not less important, the entire Baghia river, originating from the Chatkhali river, flows in Tungipara; it's meandering course in the south-west direction, meets the Madhumati river near Patgati hat.

Groundwater levels fall in the mid-October in response to evapotranspiration and with rapid drainage of surface water. The natural rate of fall is the highest in October-November. During dry season, nearly all the minor rivers of the district are sustained by the major recharge from the ground water outflow and there is a significant loss of water Table adjacent to the rivers because of the change of water levels in the rivers. Often unnecessary groundwater extraction is observed in the district despite its higher potentiality for surface water use.

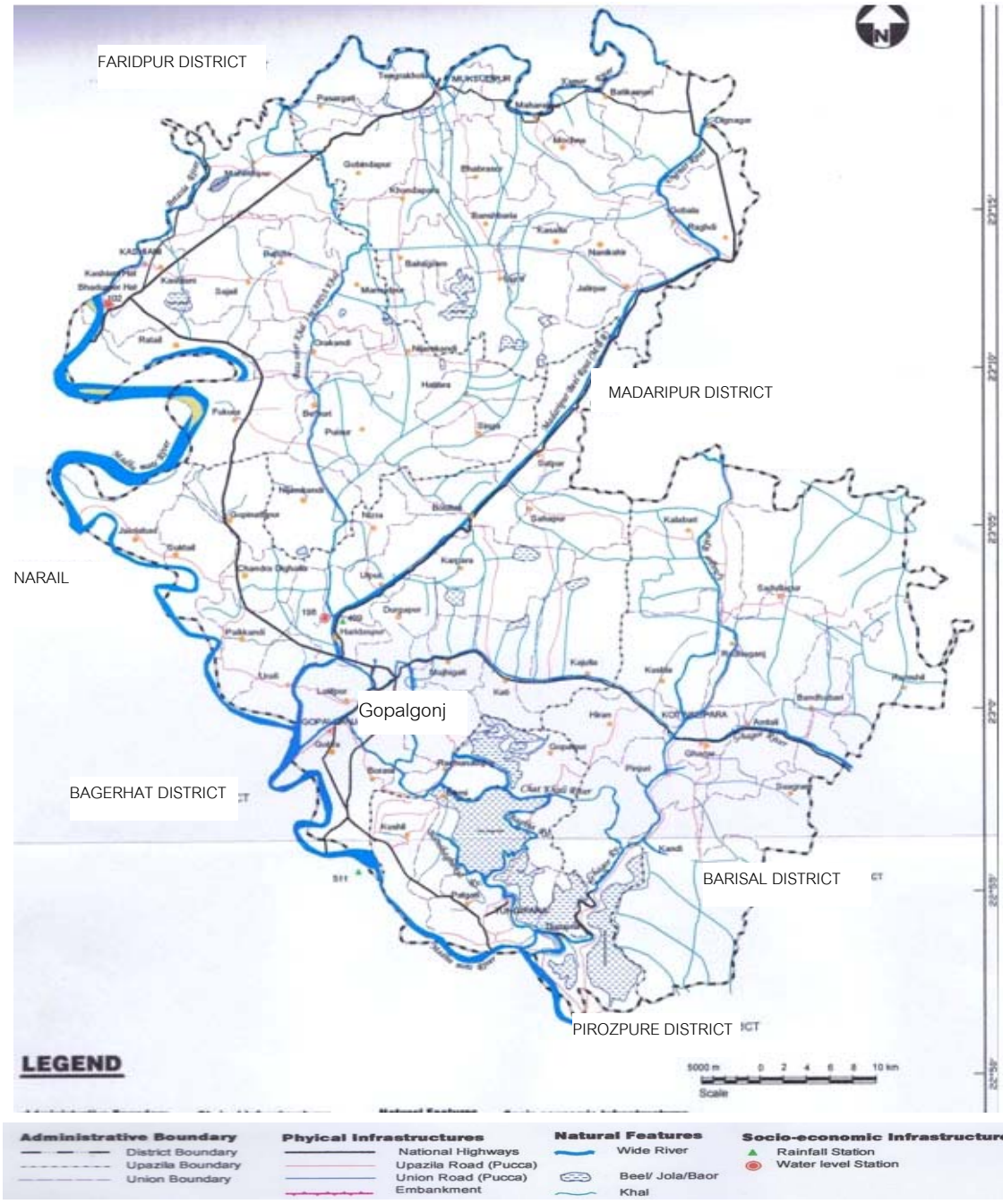


Figure 3.2: River system of Gopalganj district (Source: LGED, 2007)

3.2.5 Occupation and livelihoods

The district has a total population of about 1,165,273 comprising of 0.94% of the country's total population; 50.87% are male and 49.12% are female. According to the population census of 2001, total number of households of Gopalganj district is 221,986. Population density is around 1001 per sq km, which is 16% higher than

national average density (839/sq km). Tungipara has 18,292 households in total with a population of 99462 (male - 52,015; female - 47,447). Farming constitutes 35.51% of household occupation (Table 3.3) followed by day labor counting 26.41%, fishermen (1.67%), traders (16.12%) and others (17.52%) in Gopalganj. Economically active population in the district is 69%.

Table 3.3: Distribution of working population by occupation in Gopalganj

Profession Category	Number	%
Farmers>0.21 ha. land holder	78448	35.51
Day labor	58353	26.41
Fishermen	3751	1.69
Traders	35620	16.12
Poultry, Fisheries, Dairy	961	0.43
Transport (Rickshaw, van puller), Boatman	5052	2.28
Others (Services, remittance)	38699	17.52
Total	220884	100.00

Source: BBS, 2001 and BBS, 2006

Agriculture farming is the main occupation in Gopalganj. Most of the adult males are involved either in farming own land, sharecropping of others land or as farm wage labor. There is a significant proportion of own operated land in the hands of the marginal farmer and landless households. In this district, sharecropping is more prevalent with large and medium farmers sharing out land to small farmer, marginal farmer and landless households. It is estimated that 95% of the land is sharecropped. Large farm households are only 3.84% of total farm households in Gopalganj district while they own 21.34% of land (Table 3.4). It further shows that large farmer, medium farmer, small farmer, marginal farmer and the landless own 21.34%, 43.83%, 25.34%, 5.97% and 3.49% of the land respectively.

Table 3.4: Farm categories by land ownership and tenancy in Gopalganj district

Farm Category	Number	% of total population	Own land	% of land
Landless (0-0.02ha)	30,433	15.45	4017	3.49
Marginal farmer (0.02-0.20 ha)	77,209	39.20	6860	5.97
Small farmer (0.21-1.00ha)	51,161	25.97	2996	25.34
Medium farmer (1.01- 3.03ha)	30,554	15.51	50324	43.83
Large farmer (3.03+ha)	7,575	3.84	24511	21.34
Total	196,932	100.00	114808	100.00

Source: BBS, 2001 and BBS, 2006

3.2.6 Poverty status in the study area

Despite Gopalganj district being a food surplus district, it has a high level of poverty in terms of caloric intake method. The percentage of population with calorie intake lower than 1805 k.cal/cap/day is about 30% in Gopalgonj district (from the interpretation of the map in Figure 3.3). Gopalgonj district shows a high or very high level of food poverty in upazilla wise distribution of food poverty in Bangladesh. About 40% of the district populations live under general poverty level compared to national poverty level of 47% of population. The proportion of population below the lower poverty line is about 25% or more (Figure 3.4)

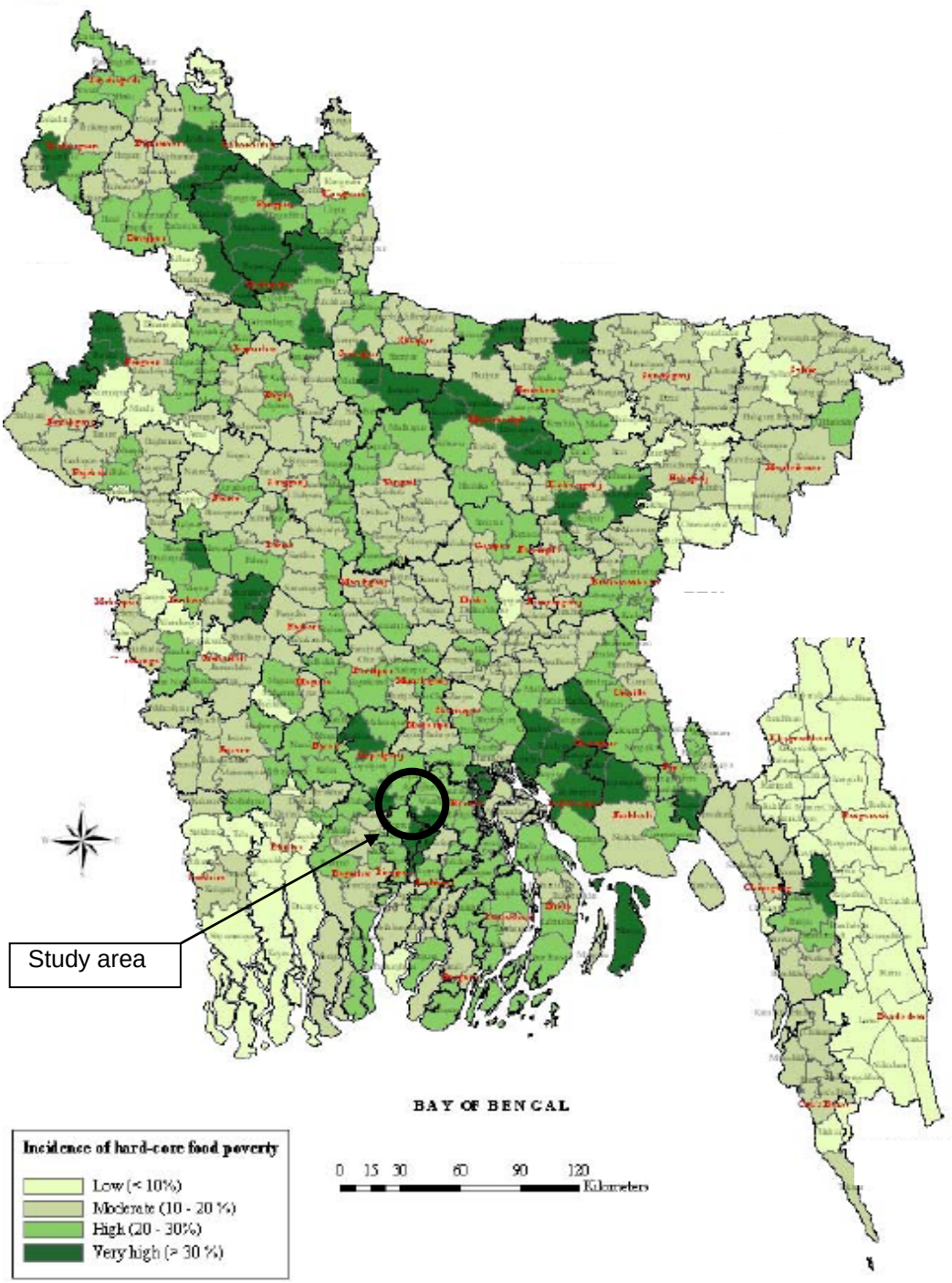


Figure 3.3: Upazilla-wise distribution of food poverty (percentage of population with calorie intake lower than 1805 kcal/cap/day) in Bangladesh (Source: BRPMP, 2004).

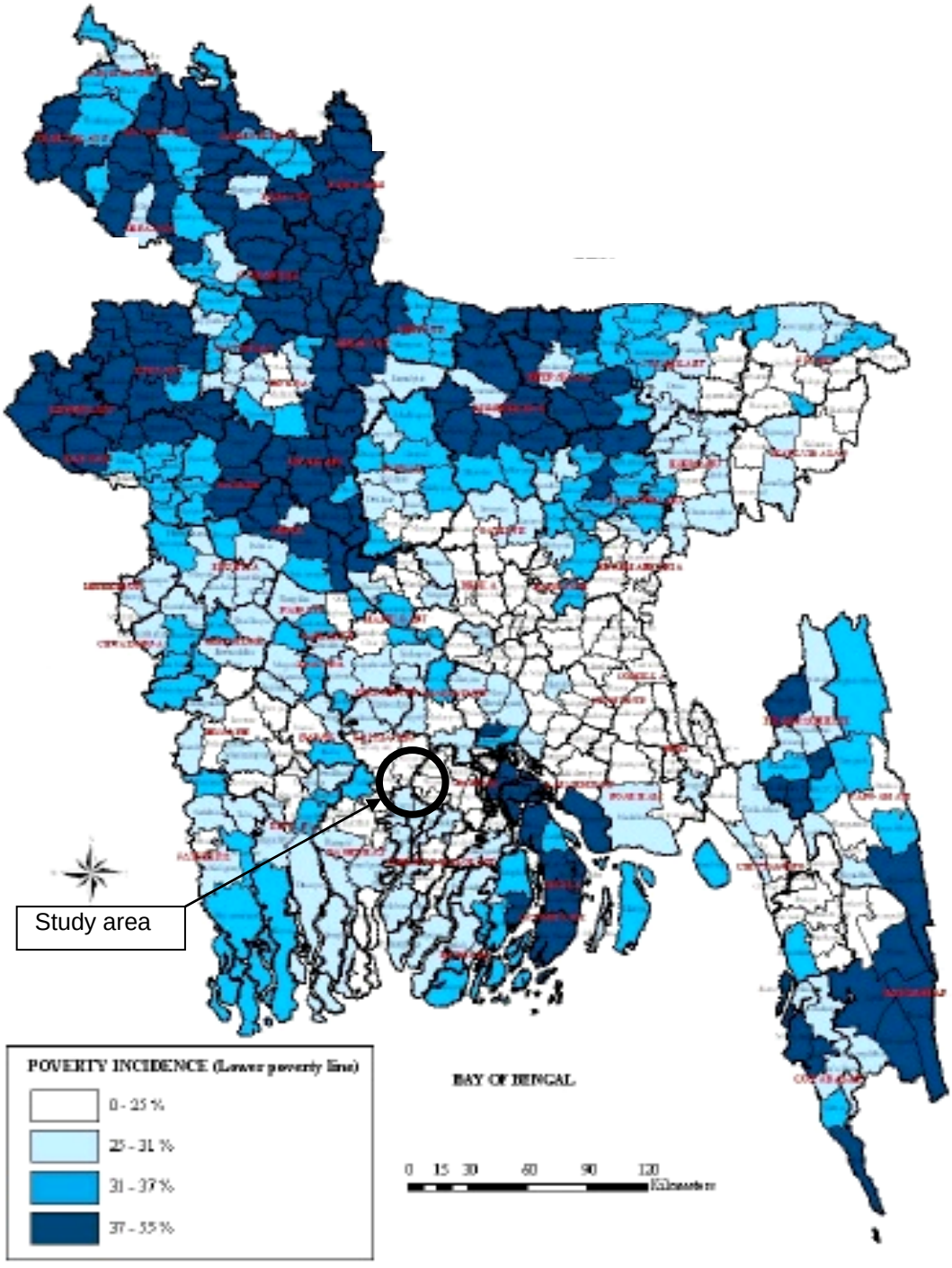


Figure 3.4: Proportion of population below the lower poverty line (Source: BRPMP, 2004)

3.3 Methodology of the Study

Based on the purpose, a research can be either exploratory or evaluation type or a combination of both. A systematic and logical study needs a methodology which reveals the entire process to achieve the ultimate goal and objective of the research in which various stages or steps of collecting data are explained and the analytical techniques are defined (Kothari, 1996). The methodology for analyzing the impact of the Tripalli sub-project on poverty was developed following the participatory poverty assessment technique and reviewing related literature. The methodology that was followed in this study consists of the following basic activities:

- Techno-social process: Identifying the background history of the sub-project and the operation and maintenance process data were collected by FGDs, KIIs and literature from LGED.

- Indicators of poverty: Selecting the appropriate indicators of poverty for the study area and scoring the indicators were done through FGDs with local people, KIIs and related literature review.

- Impact on poverty: Through structured interviews using the set of indicators.

3.3.1 Conceptual framework of the study

The steps followed in the study are shown in Figure 3.5 by a flow diagram. In this diagram, the reconnaissance survey is in the top which helped select the study area and investigate the field situation. After investigating the field situation, the objectives were formulated. In accordance to the objectives, the data were collected (primary data were collected from the field and secondary data from reports, books and webs). In this way, the next steps like conceptualization of the sub-project, selecting and scoring poverty indications and evaluating the impact of the sub-project, were completed.

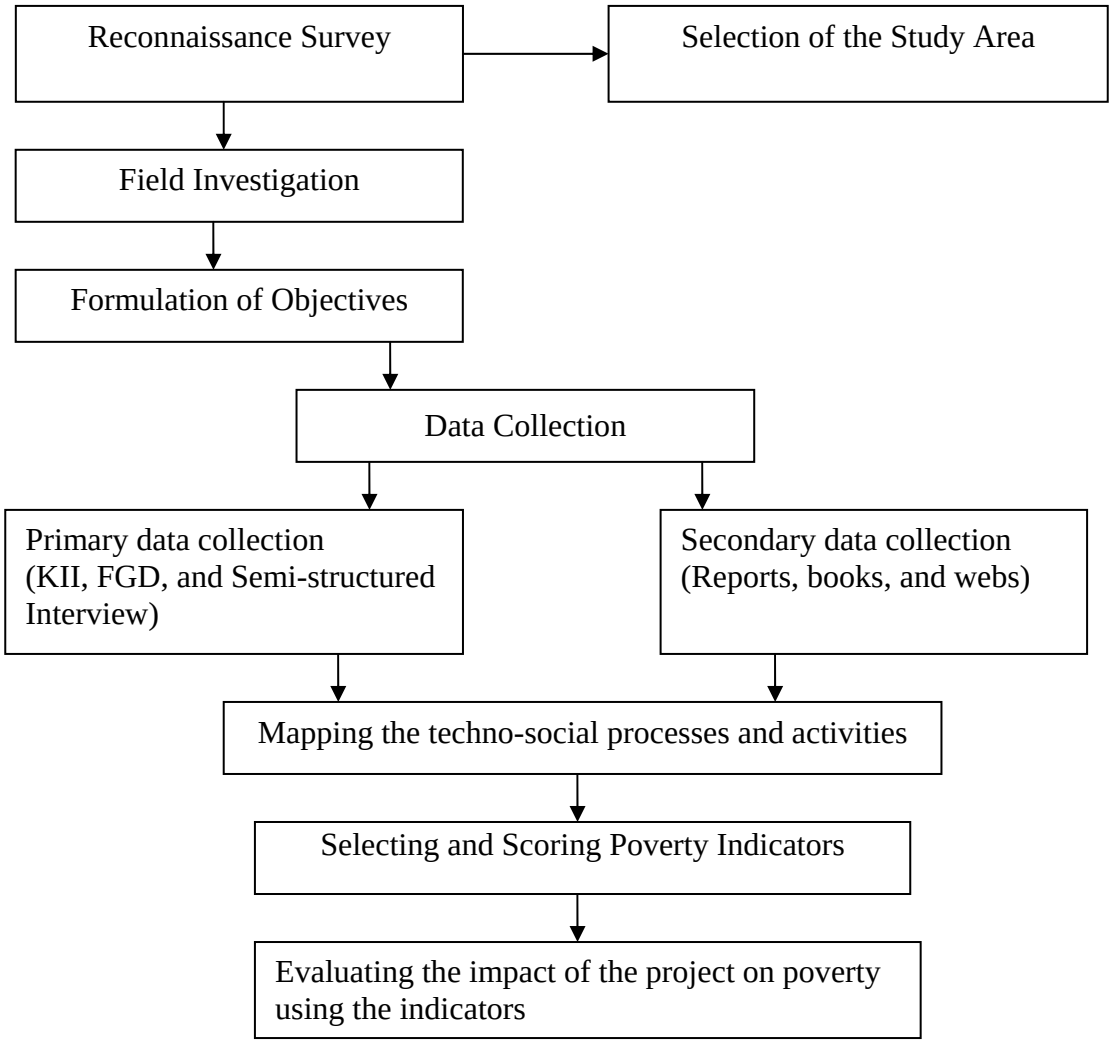


Figure 3.5: Steps followed in this study

3.3.2 Reconnaissance survey

For selecting study area, the first field visit was conducted on 25th April 2009. Several places were visited for this purpose. After several visits and discussions with the local people, the Tripalli sub-project was selected for evaluating the impact of the sub-project on poverty.

3.3.3 Field investigation

Field investigation is an important part of a research by which a careful inquiry, especially through search for a new fact in any branch of knowledge, can be done. Field investigation in this study helped understand the overall condition of the study

area and fine tune the information gathered through the reconnaissance survey. After selecting the study area, field survey was done for collecting information about the sub-project.

3.3.4 Formulation of objectives

Research objectives were formulated after understanding the sub-project fully by discussing with the local people, especially with the farmers, fishermen, women, WMCA members and LGED officials. The project shows its impact on poverty in the sub-project area. So mapping the techno-social process and evaluating the impact of the Tripalli sub-project on poverty were formulated as the research objectives.

3.3.5 Data collection

Mainly primary data were used in this study. To collect such data, four field visits were made to the study area. The first visit was made during 25-30 April 2009, the second visit was made during 8-15 June 2009, the third visit was made during 7-14 January 2010 and the last visit was made during 8-16 April 2010. Primary data were collected through field observation, KIIs, FGDs, opinion from local people and questionnaire survey. Secondary data were collected from Local Government Engineering Department (LGED, Gopalgonj and Dhaka offices), Bangladesh Bureau of Statistics (BBS, Segunbagicha and Agargaon offices) and Institute of Water and Flood Management (IWFM).

3.3.6 Primary data collection

Primary data were collected using some participatory tools, such as KIIs and FGDs, and a social investigation technique, called questionnaire survey. FGDs were conducted to gather information about the techno-social process of the sub-project and selecting the appropriate indicators for the locality and also for identifying the impacts of the project. FGDs were done within the study area with farmers, fishermen, wives of farmers and fishermen, and WMCA members. Table 3.5 shows the basic information on different FGDs conducted in the Tripalli sub-project area during the four field visits.

Table 3.5: Basic information on different FGDs conducted

Date	Location	Process	Respondent	Age Group
April, 2009	Tripalli	FGD	Fishermen	20 - 60
		FGD	Farmers	20 - 65
		FGD	Wives of farmers	20 - 60
		FGD	WMCA members	20 - 65
		FGD	Wives of fishermen	20 - 60
June, 2009	Tripalli	FGD	Local people	20 - 65
		FGD	Local people	20 - 65
		FGD	Local people	20 - 65
January, 2010	Tripalli	FGD	Local people	20 - 65
		FGD	Local people	20 - 65
April, 2010	Tripalli	FGD	Local people	20 - 65
		FGD	Local people	20 - 65

KII is an important method for collecting information on the overall aspects of the study based on observations and experiences of the key informants. KIIs were conducted to gather information about the techno-social process of the sub-project and identifying the impacts of the sub-project. KIIs with resource persons of different organizations, such as LGED and Upazila Parishad, were conducted to collect both qualitative and quantitative information on the before and after project situation of the Tripalli sub-projet area. Table 3.6 shows the different respondents and the location where the KIIs were conducted with the respondents in chronological order.

Table 3.6: Basic information on different KIIs conducted

Date	Location	Process	Respondent
April, 2009	Executive Engineer's Ofice, LGED	KII	Upazilla Engineer
	Executive Engineer's Ofice, LGED	KII	Community Organizer
	Executive Engineer's Ofice, LGED	KII	Socio-economist
	Union Parishad Complex	KII	Upazilla Nirbahi Officer
June, 2009	Tripalli	KII	School Teacher
January, 2010	Tripalli	KII	WMCA Chairman

3.3.7 Secondary data collection

Related publications (books, journals, research reports, etc.) were consulted for collection of relevant secondary data. Beyond this, secondary data have also been collected from LGED (Gopalgonj and Dhaka offices), BBS (Segunbagicha and Agargaon offices) and IWFM.

3.3.8 Mapping the techno-social processes and activities

To make comprehensive and useful analysis about the information (background history of the sub-project, situations of before and after implementation of the sub-project, operation and maintenance of the sub-project and reasons behind the success of the sub-project) of the sub-project FGD with local people, interviews with LGED engineers, socio economist, and community organizers were conducted which helps to gather information about the background history of the sub-project role of LGED and WMCA about operation and maintenance of the sub-project and schedule of gate operation.

3.3.9 Selecting and scoring of poverty indicators

After conducting FGDs and KIIs with the local people, a set of indicators to be appropriate for their locality were developed. The indicators were selected according to the local people's perception. As the local people have their own ways of judgement, they also selected the indicators in accordance with their socioeconomic characteristics. The local perception to differentiate the different socioeconomic status was mainly focused on some specific indicators. According to their views, the indicators were categorized into economical and social indicators. After that, point based weight was assigned to each indicator according to its superlative order. Point based weights were assigned so that the final survey data could produce a numerical value against each individual family. After that, considering different socioeconomic conditions, a range of scores were calculated for each individual group with specific condition, i.e. better off, poor, average or very poor.

3.3.10 Evaluating the impacts

The impact of the sub-project on poverty was evaluated structured interviews through a set of indicators. For this, the total scores of every family were calculated by the set of indicators. Every family got two types of scores - one is for before the sub-project and the other is for after the sub-project. By this way, the change in poverty situation within the sub-project area was obtained.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Mapping the Techno-social Processes and Activities

4.1.1 History of development of the sub-project

Like many areas of Bangladesh, Gopalgonj district is criss-crossed by rivers and natural canals. The three villages Kakuibunia, Chinguri and Nabukhali under the sub-project area are surrounded by the Modhumoti, Ghagar Orsaildaha and Tungir Gang rivers. All these rivers are somehow connected with each other by narrow canals or directly at different locations. Besides these rivers, three canals Nabukhli, Boishkhali and Kakuibunia that enter into these villages are also connected with the Ghagar Orsaildaha river. So if there is any rise in water level at any of these rivers, it affects the water level of adjacent rivers and canals as well. The canals which have entered inside the villages can easily carry the excess water of the rivers which often causes flooding and water logging in the study area.

Before the implementation of this sub-project, the villagers and local people used to build embankment along the Boishkhali Khal by their own effort using local materials (i.e. soil) during mid October to mid December to protect their crop lands from flooding. But this type of embankment usually did not last for more than a single season and often failed to protect lands when the water level rose significantly during the monsoon (June – October). Water level of the canal began to rise in the month of mid March to mid April and the water level rose sharply at the end of mid April and sometimes the force of increased water was so strong that the embankment failed to sustain against it and inundated the lands and crop fields. The low lands were affected at first and farmers tried to harvest their crops as soon as possible before these completely went down under flood water. They used to go to their crop field by boat to harvest the remaining crop over the flood water and they could harvest up to 25 cm above the flood water level. In this situation, much of the crops were damaged under flood water. During the mid of the monsoon the comparatively high lands and crops in those were affected too.

This flood water not only damages the crops of the field but also carries away the fishes from the gher or pond, other live stocks and damages the houses and homestead gardens. There is only one road within the three villages for communication which was seriously damaged by flood as it was too low and mud made. The transport facilities are fully damaged when this road becomes useless. Boat becomes the only means of transportation. For this, people wanted to improve their road condition.

After the devastating flood of 1988, the road was fully damaged as it goes under water for a long time. For this reason, a road was constructed replacing the existing earthen road along the river bank by local efforts.

After that the local people thought that the height of the road needs to be increased more and they also felt that there should be an embankment along the river and also three gates across the canals entering to their village.

4.1.2 Implementation process of the sub-project

The sub-project is located within the boundaries of the 21300 ha BWDB Tarail-Panchuria Project. The Project was originally financed with a World Bank loan but funding was withdrawn when the Project was about 30% complete because local people refused to give up their land for the massive embankments proposed under the project. This project did not sustain because of its “Top-down” approach. Feasibility study was not carried out in proper way before kick off the project. Local people’s active participation was not taken into consideration where as the involvement of local people in water management is considered to be an essential input for efficiency, equity and sustainability. People’s participation always creates opportunity of utilizing local knowledge and facilitates transparency. On the contrary there was a “Bottom-up” approach in case of the Tripalli sub-project. In Tripalli sub-project the initial idea was originated by the local people as they felt the necessity of having such project that could bring change to their life. The local community came up with the project proposal that was transmitted through the Executive Engineer of

LGED, Gopalgonj on 14th October 1996. The proposal was then officially placed as a FCD sub-project with gross area of 500 ha, intended to prevent flooding from Ghagar River by constructing embankments and improving drainage by re-excavating the three small canals with adding regulators. The proposed sub-project concept was reviewed and revised by the SSWRDSP team based on information supplied from the field and on the results of standard social and technical analysis. Table 4.1 provides the approaches of these two projects.

Table 4.1: Project implementation approaches

Initiated by	Started by	Completed by	Approach	Present status	Funded
BWDB	BWDB	Not completed	Top-down	Failed	World Bank
Local people	Local people	LGED	Bottom-up	Fully successful	LGED

4.1.3 Operation and maintenance of the sub-project

4.1.3.1 Formation of WMCA

In every SSWRDSP, the stakeholders form a Water Management Cooperation Associations (WMCA). It is designed in such a way that the water management and governance of the project are carried out by the beneficiaries themselves. WMCA is formed to collect 2% of the implementation costs of the project from the beneficiaries and responsible for operation and maintenance of the project. They are trained by LGED or other expert organization about the procedure of higher crop production, better seed use, crop rotation, pest management and fish culture etc. The maximum benefits on agriculture and fisheries from any sub-project largely depend on the active and proper involvement of WMCA.

In Tripalli sub-project, the WMCA was officially formed on the 5th January 1998. The WMCA is formed by the direct vote of beneficiaries and is mainly facilitated by LGED. WMCA consists of a President, Vice President, Secretary, Cashier and at least 6 to 8 members. The minimum members of WMCA must be 200. They formed some committees namely executive committee, agricultural sub committees, fisheries sub committee, ward sub committee and operation and maintenance sub committee.

Each of the committees consists of 12 members, a chairman, a vice chairman, a secretary, an accountant and 8 members – 4 men and 4 women. One third of the WMCA members shall always be women. Executive committee is formed within the members of the WMCA through election in the presence of local government administration and other committees are formed by the supervision of executive committee. Chairman of the executive committee is also the chairman of the operation and maintenance committee. There is a monthly fees system and all cash from any income and fees are deposited in a joint account of the chairman and secretary of the executive committee. The WMCA provides loan facility (Tk 500 – Tk 50000) with 10% interest among the member. Funds of deposit are used for small scale repair and maintenance work and loan purpose.

4.1.3.2 Roles of LGED and WMCA

After completion of the project, an agreement was signed between LGED and WMCA on 25th June 2002. As per the agreement, the roles of LGED and WMCA in the operation and maintenance of the sub-project are given below.

Role of LGED

- LGED will hand over the all infrastructures under the sub-project and water bodies within the project to the WMCA for use on lease basis for 20 years.
- LGED will train up the WMCA management committee and WMCA operation and maintenance sub committee about operation and maintenance of the project.
- LGED will perform emergency repair work in case of any damage occurred with the sub-project infrastructure. Emergency includes infrastructure affected by storm, flood etc.
- LGED will provide necessary technical advice and assistance regarding maintenance, operation of different tools.

Role of WMCA

- WMCA will take care of the preventive maintenance of the infrastructure and take necessary steps for post monsoon maintenance.
- WMCA will form a sub committee named operation and maintenance sub committee to carry out all kinds of maintenance work.
- On behalf of WMCA management committee, operation and maintenance sub committee will perform the planning, implementation and evaluation of the below mentioned tasks.
    - To perform post monsoon survey to assess scope for necessary repair every year.
    - To control the volume and depth of water according to different requirements for different seasons and to ensure optimum utilization and operation of the infrastructures.
    - To prepare budget for maintenance and to plan for preventive maintenance.
    - To prepare schedule for regular inspection of the infrastructures of the sub-project and to take necessary measures on the basis of the experience of the inspection.
    - To prepare a detailed plan for necessary resource accumulation from the beneficiaries of the sub-project in the form of cash money or materials or in kind of labour.
- WMCA will appoint caretakers on part time or full time basis for the project

4.1.3.3 Operation of sluice gates

Mainly the executive committee is responsible for different operational decisions of the sluice gates. The executive committee also takes the decision when any conflict arise like depth of water in the field, use of water for rice cultivation or fish production, they solve the problem by taking the local perception and investigating and analyzing the practical field condition. The final decision is executed by the operation and maintenance sub committee. The operation and maintenance sub committee is responsible for operation and small scale maintenance of sluice gate,

regulator, embankment etc. Fund is used for such type of work from deposit money of WMCA. Accountant of ward sub committee collects monthly fees and finally all money is deposited in a joint account of chairman and secretary of the executive committee that can be used for the development work of the project.

The gates are kept closed from mid January to March to retain water at khal. In April the gates are kept opened for a month for entering water inside the khal. In the month of May the salinity level of the area becomes too high, for this the gates are kept closed again. After that, the gates are opened for next two or three months. After mid August or mid September, the gates are closed again for next two or three months. Then the gates are kept opened till mid January to hold water in the canal. From this period, water is allowed to enter only. During high tide when the rise in river water level, the gates are kept opened to allow the water to enter only. The gates are closed before the start of low tide. In case of rise in water level inside the project area the gates are sometimes kept closed during low tide so that excess water can be drained out. But this draining process is possible only when the rive water level is lower than the water level inside the project area. Besides these, the gates are sometimes kept open during the low tide when it needs to wash away the waste materials in the canal water and fresh water is allowed to enter inside by keeping the gate open during high tide. Moreover, due to any unavoidable situation, the gates are kept opened or closed. Finally, the above mentioned rules regarding gate operation may be changed according to the opinion coming from majority of the local people.

4.1.4 Benefits from the project

The benefits of the project are mainly observed in four sectors – crop production (higher agri-diversity, higher productivity of land), fish production (higher production from gher and ponds), saving of homestead properties (increased number of live stock and poultry production) and impact on other sectors which are briefly discussed in sub section 4.3.1.

4.1.5 Reasons behind the success of the project

In many SSWRDSP, the community level culture fisheries business is very common. The water is retained to the canals to produce fish for two or three months. This is a common practice in many SSWRDSP. In the year of 2002, the canals of Tripalli sub-project was also used for culture fisheries activity. Income from fish production is good but the fisheries activities damages young B. Aman and also damages boro crops. It creates problem in deep water aman production because when boro harvest becomes too late, it does not allow timely establishment of the deep water aman production before the arrival of flood. Therefore, managing a deep water aman – boro rotation is become very difficult. It also causes the late harvesting of boro. This delay increases the possibility of inundation of aman seeds by early flood. Besides these the early opening of sluice gates also causes the inundation of aman seeds. When the fish is being cultured, the gates are closed to make sure about the prevention of mixing of river water with canal water. During this time hardly any water can be accessed within the canals. This limited access of water creates the rice field harder for common farmers to uproot aman stubble and makes the boro land preparation more costly. In that year the agricultural production becomes very low and fisheries production become higher compared to previous years. The benefits from this higher fish production are not equally distributed within the affected farmers. Moreover the benefits are enjoyed by outside the project people. In 2003 the local people denied to produce fish by sacrificing their crop production. After that the practice of community level fish production was stopped. All the three sluice gates and the three canals were constructed and maintained only for the betterment of agricultural production by WMCA and LGED. Stakeholders collectively stood against continuing culture fisheries in their rice field. The social and religious (mostly Hindu) homogeneity and the collective action of local people against the culture fisheries seem to be their driving force in the better management of water resource in agricultural production.

4.2 Identifying the Indicators of Poverty for Different Groups of People

4.2.1 Introduction

Participatory poverty assessment is a method where the communities define themselves who are poor and who are better off (Gibbons, 1999). "We are interested in people's own ideas about poverty. We want them to tell us what they think and to tell us who in their village are poor and who are not". The PPA begins with the community-wide meeting accomplished by field survey. After discussing the meaning and understanding poverty in the local context, the people draw a set of poverty indicators for their own locality. Four reference groups are then formed by dividing the people into better off, average, poor and very poor. The indicators are selected according to the local people's conception. As the local people have their own way of judgement, they also select indicators in accordance with the socioeconomic characteristics. The local perception to differentiate the different socioeconomic status is mainly focused on some specific indicators i.e. house ownership, housing condition, assets (mainly crop land).

According to their views the indicators are categorized into economical and social context. After that, point based weight is assigned to each indicator according to its superlative order. Point based weights were assigned so that the final survey data can produce a numerical value against each individual family. Now again with the help of local people's perception about the different socioeconomic conditions, a range of scores was calculated for each individual group of people with specific condition, i.e. better off, poor, average or very poor. The score range for a specific group was calculated by summing up all the points suitable for that group as suggested by the local people. Now the numerical score ranges for four different groups and score of each individual family are available after field survey. After that it would be an easy task to draw clear margin among different socioeconomic conditions, hence families can be sorted out into different categories to define them as poor, very poor, average or better off.

4.2.2 Selecting and scoring the indicators of poverty

4.2.2.1 Economic indicators

Economic indicators should reflect the economical conditions of the local people. To explore the economical condition of a family of the study area, all aspects of an individual family are considered. To express the economical condition, family size is considered to be an indication if a family is poor or not, as the expenditure of a large family is more which eventually makes the family's economic condition is more vulnerable than a small family with the same resource. Hence a family with more members gets a lower score and a family with less members gets a higher score. House ownership, housing condition (type of roofing materials and type of exterior walls), assets (livestocks, crop field ownership, gher or pond ownership). Sanitary systems and home appliances also indicate the economic condition of a family. To evaluate the financial condition of a family, these two factors give indications relevant to the practical economic situation of a family. Among others, the savings and loan amount are also very important indicators for evaluating a family's economic condition. The family with no credit gets a higher score and the family with more credit gets a lower score. Meal standard and clothing condition are also important indicators to assess a family's economic condition. Percentage of educated members in a family indicates the number of earning members in that family. Health care facilities and access to safe drinking water also directly or indirectly depict the economic condition of a family.

Table 4.2: Selecting and scoring the economic indicator of poverty

Indicator		Criteria	Score
Expenditure Head		1. Four persons	3
		2. Four to six persons	2
		3. More than six persons	1
House Ownership		1. Own a house	2
		2. Have no house	1
Meal Standard		1. Three meals per day with adequate supply of protein	6
		2. Three meals per day with irregular supply of protein	5
		3. Three meals per day with rare protein supply	4
		4. Two meals per day with rare protein supply	3
		5. Two meals per day with uncertainity of protein supply	2
		6. Starving	1
Housing Condition	**Type of roofing materials**	Concrete	4
		CI sheet	3
		Earthen tali	2
		Thatched	1
	Type of exterior walls	Constructed	4
		Tin	3
		Bamboo	2
		Straw	1
Clothing Condition		1. Better	4
		2. Good	3
		3. Bad	2
		4. Worse	1
Latrine Condition		1. Fully Pacca	4
		2. Partially Pacca	3
		3. Kancha	2
		4. None	1
Education level of family members		1. 50% of members attended college	6
		2. 50% of members attended high school	5
		3. 50% of members attended junior high school	4
		4. 50% of members attended primary school	3
		5. 50% of members never went to school	2
		6. Some members can write his/her name	1

Table 4.2: (Continued)

Indicator		Criteria	Score
Assets	**Livestocks**	More than two cow	4
		Only two cows	3
		Only one cow	2
		No cattle	1
	Crop Fields	Operates more than 3.5 acres of land (large farmer)	4
		Operates 1.5 to less than 3.5 acres of land (medium farmers)	3
		Operates 1.5 to less than 0.5 acres of land (small or marginal farmers)	2
		Operates less than 0.5 acres of land (landless)	1
	Ghers	1. Ownership of more than two ghers	4
		2. Ownership of two ghers	3
		3. Ownership of one gher only	2
		4. Ownership of no gher	1
Home Appliances		1. Better	4
		2. Good	3
		3. Bad	2
		4. Worse	1
Savings Status		1. Sufficient Savings	4
		2. Insufficient savings	3
		3. Nominal savings	2
		4. No savings	1
Credit / Loan		1. No credit	4
		2. Nominal credit	3
		3. Low credit	2
		4. High credit	1
Access to Safe Drinking Water		1. Possess own tube-well (more than one)	4
		2. Possess own tube-well (only one)	3
		3. Share ownership of a tube-well	2
		4. No ownership of tube-well	1
Availability of Health Care		1. Available	3
		2. Available only during emergency	2
		3. Unavailable	1

4.2.2.2 Social indicators

In addition to the economic indicators, there are some other indicators which also express the status of people in the society which are termed as social indicators. Social indicators are observed in both within and outside the family. Social indicators are given in Table 4.3. The economical condition also reflects by some other

indicators that related to family. The higher is the literacy rate of women, the higher is the participation in decision making both with in the family and in the social motivation process. Domestic violence is a very important indicator for poor families. Family needs often causes domestic violence within a family. Women's health is also an indicator of economic condition of a family. An educated family is aware of the importance of education of the children and ensures the education for the children if the family is economically solvent. For that, educational opportunity of girls is an indicator of poverty.

Table 4.3: Selecting and scoring the social indicators of poverty

Indicator	Criteria	Score
Participation of women in decision making within the family	1. Active participation	4
	2. Moderate participation	3
	3. Poor participation	2
	4. No participation	1
Women's health	1. Good	4
	2. Satisfactory	3
	3. Need attention	2
	4. Bad	1
Educational opportunities for girls	1. Enough opportunities	4
	2. Not enough opportunities	3
	3. Limited opportunities	2
	4. No opportunity	1
Domestic violence	1. No violence	4
	2. Rare	3
	3. Often	2
	4. Regular	1
Social status (prestige) in the community	1. High	4
	2. Moderate	3
	3. Low	2
	4. No status	1
Participation in decision making process of the community	1. Active participation	4
	2. Moderate participation	3
	3. Poor participation	2
	4. No participation	1
Responsibilities in social affairs	1. Active responsibilities	4
	2. Limited responsibilities	3
	3. Low responsibilities	2
	4. No responsibilities	1

In practice those people have the decision making power in the society either who have more property (that is economical condition is better) or who are the highly educated people in the society and have more prestige in the community. The people who are voiceless and powerless and who do not have enough property (that is economical condition are not good) or who are not educated have little role in decision making in the community. Poor people have no decision making power in social affair and when any social function is held they are like an audience only.

4.2.3 Upper and lower limits of the indicators for different groups of people

4.2.3.1 Better off group

Possible maximum and minimum scores against each economic indicator is shown in Table 4.3. It is seen from the table that family size has a maximum score of 4 and a minimum score of 1. This is due to the fact that though family size expresses as the scope and field of expenditure, some better off families also have large family size with members more than six. In general, each better off family possesses a well furnished home. For this, it gets the maximum score in types of roofing condition and exterior wall. The maximum value in asset is also assigned to better off group as those people have more than 3.5 acres of land with some cows and ghers and they are in comparatively better economical condition than the others. Whose economic conditions are better, their meal standards, clothing conditions and home appliances are also better. For this reason they get the maximum score. Fully pucca latrine systems, health care facilities and access to safe drinking water are also enjoyed by a better of family. Maximum saving capacity and minimum credit also indicate the better economic condition of a family. More educated family indicates more earning human resource for the family. For this it relates with economic condition. Table 4.4 reveals the upper limit or better off family is 65 and the lower limit is 57.

Table 4.4: Possible maximum and minimum scores against different economic indicators for better off group

Indicator		Maximum	Minimum
Expenditure Head		3	1
House Ownership		2	2
Meal Standard		6	5
Housing Condition	Type of roofing materials	4	4
	Type of exterior walls	4	4
Clothing Condition		4	3
Latrine System		4	4
% of Educated People in a family		6	4
Assets	Livestocks	4	4
	Crop Fields	4	4
	Ghers	4	4
Home Appliances		4	4
Savings Capability		4	4
Credit / Loan		4	4
Access to Safe Drinking Water		4	3
Health Care		3	3
Score range for better of group		64	57

Possible maximum and minimum scores against each social indicator are shown in Table 4.5. In a better off family, the women's participation in decision making within the family is active and the women's health conditions are good. Educational opportunities for girls are enough with low domestic violence. The people having high prestige and actively participating in decision making and in social affairs are in the better off group. Table 4.4 shows that the cumulative score of the social indicators has an upper limit of 28 and a lower limit of 25.

Table 4.5: Possible maximum and minimum scores against different social indicators for better off group

Indicator	Maximum	Minimum
Participation of women in decision making within the family	4	3
Women's health	4	4
Educational opportunities for girls	4	4
Domestic violence	4	4
Participation in decision making process of the community	4	3
Social status (prestige) in the community	4	4
Responsibilities in social affairs	4	3
Score range for better of group	28	25

4.2.3.2 Average group

The average group comprises the middle class or the upper middle class families having economical conditions better than the poor families but worse than the better off group. Possible maximum and minimum scores for each economic indicator for a family falling into the average economic category is shown in Table 4.6.It is seen from the table that though some families in this group consist of more family members, the average economical conditions of the families are good. Housing conditions vary for this group. Some families construct their house roofs by tin or tally and walls by tin though they can afford better construction materials. Loan and savings are nominal for this group. Literacy rate is good in this group. Home appliances, clothing condition, affordability to health care services and access to safe drinking water are good. Latrine system is fully or partially pucca. Meal conditions are more or less similar to the better off group. The upper limit of cumulative scores of economic indicators is found to be 56 and the lower limit to be 42.

Table 4.6: Possible maximum and minimum scores for economic indicators for a family under average group

Indicator		Maximum	Minimum
Expenditure Head		3	1
House Ownership		2	2
Meal Standard		5	4
Housing Condition	Type of roofing materials	4	2
	Type of exterior walls	4	2
Clothing Condition		3	3
Latrine System		4	3
% of Educated People in a family		5	3
Assets	Live stocks	4	3
	Crop Fields	3	3
	Ghers	4	2
Home Appliances		3	3
Savings Capability		3	3
Credit / Loan		3	3
Access to Safe Drinking Water		3	2
Health Care		3	3
Score range for average group		56	42

Possible maximum and minimum scores of social indicators for a family under average economic group are given in Table 4.7. People having moderate prestige in

the society and moderate participation in decision making and other social affairs are under the average group. Women's healths are satisfactory and participation in decision making within the family are moderate with rare domestic violence. The upper limit of cumulative score for this group is 24 and lower limit is 15.

Table 4.7: Possible maximum and minimum scores for social indicators for a family under average group

Indicator	Maximum	Minimum
Participation of women in decision making within the family	3	2
Women's health	3	2
Educational opportunities for girls	4	2
Domestic violence	4	2
Participation in decision making process of the community	4	2
Social status (prestige) in the community	3	3
Responsibilities in social affairs	3	2
Score range for average group	24	15

4.2.3.3 Poor group

Possible maximum and minimum scores against each economic indicator for a family under poor economic group are given in Table 4.8. A family falling under poor has limited property (crop fields, live stocks and ghers). Poor groups are mainly small and marginal farmers owning less than 1.5 acres of crop land with one cow only or not and having one or two ghers or not. They have house but the roofing materials and exterior walls are made of tin, tally or bamboo or straw. They did not get regular nutritious food. Their families are big with poor clothing standard and home appliances. Savings are not sufficient with high credit. They do not have their own safe drinking facility and available health care. Sanitary systems are partially pucca or kancha. The upper and the lower limit of cumulative score for this group is 41 and 24 respectively.

Table 4.8: **Possible maximum and minimum scores for economic indicators for a family under poor group**

Indicator		Maximum	Minimum
Expenditure Head		2	1
House Ownership		2	2
Meal Standard		4	3
Housing Condition	Type of roofing materials	3	1
	Type of exterior wall	3	1
Clothing Condition		2	2
Latrine System		3	2
% of Educated People in a family		4	3
Assets	Live stocks	2	1
	Crop Fields	2	2
	Ghers	3	1
Home Appliances		2	1
Savings Capability		3	1
Credit / Loan		3	1
Access to Safe Drinking Water		1	1
Health Care		2	1
Score range for poor group		41	24

Possible maximum and minimum scores of social indicators for a family under poor economic group are given in Table 4.9. People having low prestige in the society and low participation in decision making and other social affair are the poor group. Because they feel hesitation to give their decision in front of the rich or educated person as they are not highly educated or rich. Women's health in this group is not satisfactory and often creates violence as their families are facing regular difficulties caused by needs. The upper limit of cumulative score for this group is 14 and lower limit is 8.

Table 4.9: Possible maximum and minimum scores for social indicators for a family under poor group

Indicator	Maximum	Minimum
Participation of women in decision making within the family	2	2
Women's health	2	1
Educational opportunities for girls	2	1
Domestic violence	2	1
Participation in decision making process of the community	2	1
Social status (prestige) in the community	2	1
Responsibilities in social affairs	2	1
Score range for poor group	14	8

4.2.3.4 Very Poor group

Possible maximum and minimum scores against each economic indicator for a family under very poor economic group are given in Table 4.10. Very poor are the family with more family members but limited or no property with high credit and no savings and health care is not available when needed. The family members are illiterate, for this their earning source is absent or low. They do not get enough food due to their poor earning condition. The upper and the lower limit of cumulative score for this group is 23 and 16 respectively.

Table 4.10: Possible maximum and minimum scores for economic indicators for a family under very poor group

Indicator		Maximum	Minimum
Expenditure Head		2	1
House Ownership		2	1
Meal Standard		2	1
Housing Condition	Type of roofing materials	1	1
	Type of exterior walls	2	1
Clothing Condition		2	1
Latrine System		2	1
% of Educated People in a family		2	1
Assetes	Livestocks	1	1
	Crop Fields	1	1
	Ghers	1	1
Home Appliances		1	1
Savings Capability		1	1
Credit / Loan		1	1
Access to Safe Drinking Water		1	1
Health Care		1	1
Score range for very poor group		23	16

Possible maximum and minimum scores of social indicators for a family under very poor economic group are given in Table 4.11. As the poor people are always frustrated in their daily works their economic conditions are bad, for this the women's rights are not ensured like their health, education or decision making process. Domestic violence is regular incidents in their family. They have no prestige in the society and for this no participation in decision making process and other social affair. Both the upper and lower limit of cumulative score for this group is 7.

Table 4.11: Possible maximum and minimum scores for social indicators for a family under very poor group

Indicator	Maximum	Minimum
Participation of women in decision making within the family	1	1
Women's health	1	1
Educational opportunities for girls	1	1
Domestic violence	1	1
Participation in decision making process of the community	1	1
Social status (prestige) in the community	1	1
Responsibilities in social affairs	1	1
Score range for very poor group	7	7

4.3 Impact of the Sub-Project

4.3.1 Impacts of the project on local people

Floods were an annual natural phenomenon in Tripalli project area. The people of the area suffered a lot due to such floods and as such flood mitigation has been a very important issue. A primary objective for initiating mitigation measures against flooding in Bangladesh has been the reclamation of land for intensive agricultural use. The benefits of such projects are received usually through increased agricultural output, higher diversity of crops and higher productivity of land, increased number of live stocks and poultry and higher income and employment. These result from increased economic activities, protection of property from flooding, protection of health due to better quality of living and higher income and increased culture fisheries. However such projects have adverse impact on capture fisheries. A general description of the impacts of the project is given below under four sectors which are crop production, fish production, saving of homestead property and impact on other sectors.

4.3.1.1 Crop production

Agricultural sector is the main focus for the protection of flood in an area. Though many other sectors are more or less benefited by the project but agricultural benefits are more. The Tripalli sub-project area has two categories of lands - the high land

which is 1/3 of the total project area and the low land which is 2/3 of the total project area.

Before the project, the low land area were more vulnerable to flood water because only 3-4 feet increase in water level in the rivers caused 1½ feet flooding at low lying area. Only boro could be cultivated in the low land before the project implementation. After the implementation of the project, two crops (aus/ aman and boro) can be cultivated in the low land. Previously in the high land cereals/ vegetables and boro could be cultivated but after the project cereals/ vegetables, jute /aus and aman can be harvested from the same land. The extra crop is aus /jute. The cropping patterns in the study area before and after the Tripalli sub-project are given in Table 4.12.

Table 4.12: Cropping pattern in the study area

Land Type	Before Project	After Project
Low	Fallow - Boro	Aus/ Aman - Boro
High	Cereals/ Vegetables - Fallow - Boro	Cereals/ Vegetables - Jute/ Aus- Boro

Production of any land depends upon two variables which are investment and damage. When the investment is high and damage is low then the production is high which can be expressed by this equations:

Crop Production = Investment – Damage ---------- (4.1)

$\text{Crop Production}_{max} = \text{Investment}_{max} - \text{Damage}_{min}$ ---------- (4.2)

Before the project the investment was very low as the damage was high.This is in contrast to the above equations which show that the crop production is the maximum only when the investment is the maximum and the damage is the minimum. After the project, the farmers feel more secured as the damage is in their control and they can use water as per their requirement. For this they invest more in selecting crop seeds, fertilizers, and pesticides and also invest more in labour .As a result, the production level in this project area has increased. The change in productivities of land is shown

in Table 4.13.The table shows that the productivities of land has increased significantly in “with project” situation compared with “without project” situation

Table 4.13 : Change in productivity of land

Land	Type of Crop	Before (ton / ha)	After (ton / ha)
Low	Boro	2.0 – 2.8	5.2 – 5.6
	Aus	-	1.5 – 1.6
	Aman	-	1.9 – 2.1
High	Aus	-	1.3 – 1.5
	Aman	0.8 – 1.0	1.8 – 1.9
	Vegetable	2.8 – 3.0	4.8 – 5.0
	Jute	-	1.6 – 1.8
	Pulses	0.4 – 0.5	0.7 – 0.8

4.3.1.2 Fish production

As two-thirds of the area of the sub-project is low land area, the flood water remains long time over there which is the main source of many natural fishes. But after implementation of the sub-project, it prohibits the migration of fishes. Moreover, sweet water fishes release their eggs in the river. Transportation of these eggs from rivers to adjacent beels or water bodies is barred after the implementation of the sub-project that results in reduction of the stock of natural fishes in the adjacent beels and water bodies. The capture fisheries activities in the sub-project area are adversely affected by the sub-project. On the other hand the ghers / ponds are negatively affected by the sudden intrusion of the flood water as the water washed away all types of fishes from the ghers or ponds which gives adverse impact to the gher or pond owners or the people who take lease of that ghers/ ponds. But after the sub-project, the water intrusion is totally in the control of the local people. They can control the excess water which washes away the fishes. By this way, the sub-project is positively affecting the gher or pond operators.

Though the sub-project has positive impact on culture fisheries, the benefits from this sector are not uniformly distributed among the affected groups and others. The fisher families depend on the culture fisheries are mainly the affected groups who catch fishes from the rivers, beels, or water bodies, had to switch to culture fisheries or

other professions due to the decrease of fishes in the natural habitat. Though the decrease in river fish stock is not entirely due to the sub-project, the sub-project caused a decrease in fish stock in other sources like beels and water bodies. While culture fishing activities became an attracting source of income, the income is mostly gone to the non fisher families (Figure 4.1). Before the sub-project, among the beneficiary groups (benefited from fishing activities) 80% were fisher families and rest were non fisher families but after the sub-project implementation 90% became non fisher families where as only 10% remained fisher families. It is therefore evident that, non fisher families, who had land properties (ponds, ghers or low lying crop lands) benefited due to the sub-project, while the fisher families who have little tie with land (except home stead) are the net losers from the sub-project. It clearly shows that as the fishing activities within the area switch from capture to culture, the net gainers are mostly the non fisher households and the net benefits from culture fisheries are very high while the net benefits from capture fisheries are very low due to the flood control sub-project.

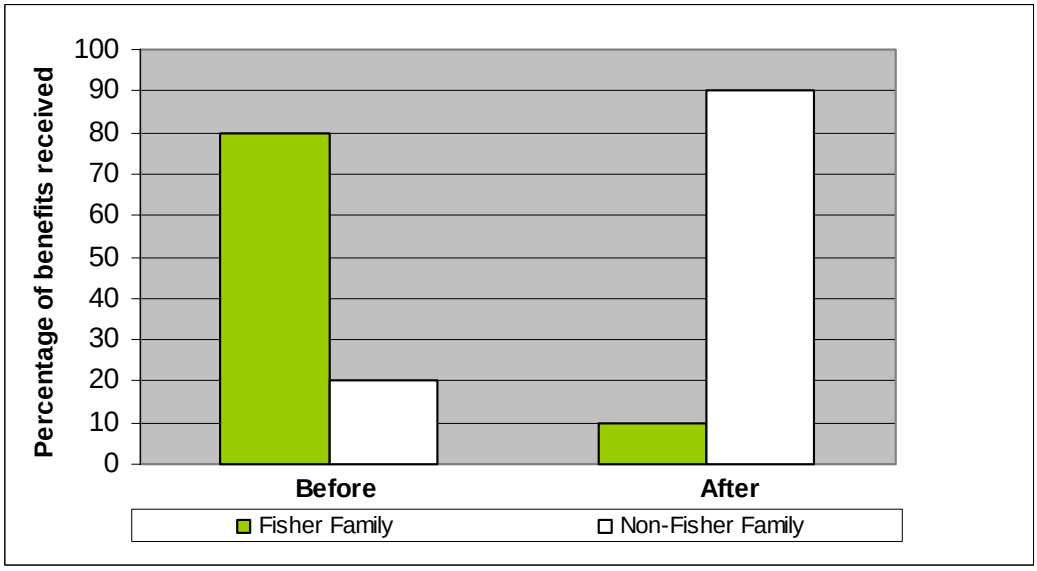


Figure 4.1: Distribution of benefits from fisheries among the fisher and non fisher families before and after the Tripalli sub-project

4.3.1.3 Saving of homestead property

Flooding affected livestock and poultry production negatively before the implementation of the project. Livestock and poultry production has increased due to the project. Now they feel secured as their livestock and poultry production will not

be affected by sudden flood. Moreover, they have enough money so that they can invest more for the betterment of this production which was not possible before the project. Before the project they could earn Tk. 10-30 per day which has now increased to Tk. 120 – 170 per day.

Flooding also reduced the production of fruit trees before the implementation of the project. Now every house has some fruit trees which increase their food value and also there income. Before the project, the income from fruit trees per season per household was Tk. 200 – 300 which is now Tk. 1000 – 1500.

As the people suffered from flooding before the project, their household conditions were not so good. They made up their houses by soil, bamboo and straw which were negatively affected by floods. But after the project, their houses are comparatively better and less affected by floods. For this, maintenance cost becomes low compared to the pre project condition.

4.3.1.4 Impact on other sectors

Transportation facilities were totally damaged due to floods. School going children cannot go to school. Moreover, parents were also not interested to send them to school as their economic conditions were hampered by the floods. But now the project helps the people by protecting both the transportation infrastructures as well as their economic conditions. All the people of this area feel that their children have to go to school as other people do so and their economic conditions also help them to think so. As a result, the literacy rate is now more than 55% which was only 28%-30% before implementation of the sub-project.

Project has facilitated protection of health due to better quality of living and better income. As the effect of flooding has reduced in the study area, cholera, typhoid, dysentery and other water borne diseases have also reduced. Local people pay more attention to their health as their economic conditions are better now than before the project. For this, the cost of health-care is now lower compared to before the project.

In the project area, a large ratio of the working population is engaged in agriculture specially the farmers with small land size whose amount of production from their

own lands are not enough to feed their families. Peasants with no land are totally dependant on the income from agricultural employment. Floods decrease not only agricultural production but also labour requirements for planting and harvesting of agricultural products. As a result, the job opportunity of farmers and agricultural workers were low before the project. It is found that the people other than those involved in agricultural activities lost their work because of the damaged transportation network and the obstacles in economic activities created by the floods. Now the scope of jobs is more. The sectors where new jobs have been created due to the project are given below:

- Crop production related jobs (Production, Processing, harvesting etc.)
- Agricultural product related jobs (Seed business, pesticide business, fertilizer business etc.)
- Fish production related jobs (Production, harvesting, marketing and fish food related business)
- Livestock and poultry related jobs (Production, marketing, maintenance, poultry and livestock food business etc)
- Transportation related jobs (Van, tractors etc.)
- Canal excavation related jobs
- Road cleaning related jobs (Temporal cleaners and permanent cleaners)

4.3.2 Change in poverty situation

When the poverty of local people in the sub-project area is measured with the economic and social indicators mentioned earlier, some indicators show greater change in poverty situation between before and after the project, i.e., in between 1996 and 2010. These change is visible mostly in percentage of educated people in the family, housing conditions (types of roofing conditions, types of exterior walls), latrine systems, access of safe drinking water, health care facilities, credit / loan and saving status. Because now almost every child in the area goes to school, it is like competition within the village people, which has created a change and eventually contributed to bring change in the poverty situation of the sub-project area. A huge

change is also found in housing condition between before and after the sub-project. Constructed walls with concrete or CI sheet roof have increased compared to before the sub-project. Thatched roofs with straw or bamboo made walls have decreased compared to before the sub-project. A change is also visualized in latrine system. Now everyone has either fully or partially pacca latrine. All the people now can drink safe water either from their own or from their neighbours' tube wells. Healthcare facilities can also be ensured because of better economic condition. Before implementation of the sub-project, there existed traditional credit business operated by some greedy landlords. The poor farmers took loans when the flood water washed away their crops or damaged their houses and homestead gardens or livestocks. Fishermen also took loan when flood water damaged their houses and homestead gardens, washed away boats, nets and fishes from their ghers and ponds. This cycle of interest of loan became their burden in the long run. But now there exists a little or no credit business. Almost every person is more or less solvent, and if they need any loan they can take it from WMCA fund with nominal interest.

Project ensures these facilities by improving their situations. All of the local people of the project area have some work to earn all over the year. Farmers work in the field in crop season. Besides this, they produce fishes in their ghers or ponds and get fruits and vegetables from the pond embankments which meet up their needs of protein and vitamins. Moreover, they can sale these in the village market that provides them extra income round the year.

4.3.2.1 Poverty score before and after project

According to the different poverty indicators, both economic and social, each family within different groups obtained corresponding economic and social scores. There ware changes with the scores of each family after the project implementation, which indicate the change with poverty situation of a particular family. Some families could take the opportunity from the project to make their situation better, hence their scores increased and some remained in the same group with a nominal change with their economic and social scores. On the contrary, few families lost scores that indicates the declining trends with their poverty situation. A common set of indicators were

used for all four groups, but the score ranges are different for specific group. Although each household obtained two score, one from economic indicators and another for social indicators, finally the cumulative value of both economical and social scores was used as the benchmark of poverty measurement for that family. In the Figure: 4.2 – Figure: 4.5, the scores (economic, social and cumulative of economic and social scores) for different groups (better off, average, poor and very poor) in pre-project and post project situation are described and analyzed.

Figure 4.2 (a) represents the scores of households in better off group obtained against the economic indicators. Individual household's score is shown by two different coloured dots, green dot represents the score obtained before the project and blue dot represents the score obtained after the project. After project scores were sorted in descending order before plotting into the graph hence some dots are seen declining at the right most position in the graph. Declining trend indicates falling into lower range of economic score where as rising trend indicates up gradation to the upper range. The range of economic indicators for better off group is from 57 to 64.

The graph in Figure 4.2 (b) shows the scores of better off group for social indicators. The score range for social indicators for better off group is from 25 to 28. Two different coloured dots are used in this graph also to distinguish the score before and after the project.

Figure 4.2 (c) represents the cumulative scores obtained from both economic and social indicators. The range for cumulative score of better off group is from 82 to 92. The cumulative scores are used to measure the poverty situation and here 10 blue dots are seen declining from better off range, hence total 10 families dropped out from the better off group after the project as their total poverty scores fall below 82. Among these 10 families, scores of 8 families fall within the range of average group and scores of other 2 families fall within the range of poor group. Rest 55 families persist in better off group after the project.

It needs to be mentioned that the change in poverty situation in better off group observed from the cumulative score in Figure 4.2 (c) is similar as observed in the

economic score in Figure 4.2 (a). Again, from Figure 4.2 (b) it is observed that there are changes with the social scores of 10 families but the changes are not identical either with Figure 4.2 (a) or Figure 4.2 (c). According to scores obtained from social indicators, 8 families lost scores and fell into average group. The contrasts are that, this falling number is 10 with respect to economic indicators and no one's social score falls further into poor although there are 2 families whose economic scores fall within poor group as shown in Figure 4.2 (a). This happens because usually people's social status takes time to change hence the social indicators also take longer time to be affected. On the other hand, people's economic indicators change as soon as there is change with the economic activities. Moreover, people's economic condition dominates over their social status and condition. But again, people's social status and their social influence can not be ignored in measuring their poverty status as in the long run the factors mentioned as social indicators affect economic progress. Whatever, to avoid conflict between economic and social scores and to maintain the integrity and consistency in the result, the cumulative score is used as final benchmark to measure poverty status of individual household.

In the Figure 4.2 (a), Figure 4.2 (b) and Figure 4.2 (c), only the scores of those households who were better off before the project are shown. So the newly joined households into better off group are not shown here. In Figure 4.3 (c), Figure 4.4 (c) and Figure 4.5 (c), it is shown that how many households from average group and from poor group upgraded their poverty situation into upper groups.

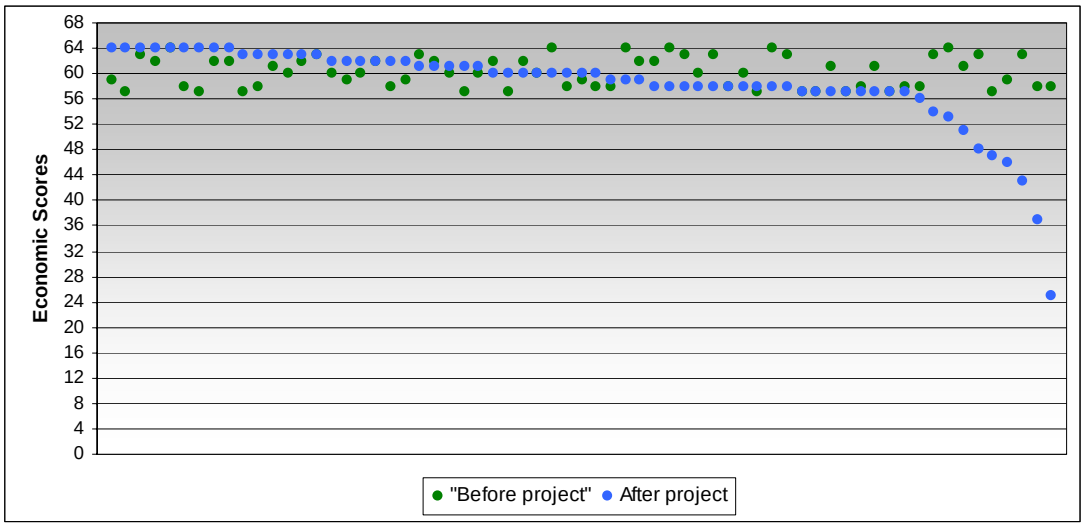


Figure 4.2 (a): Score of economic indicators for better off group before and after the project

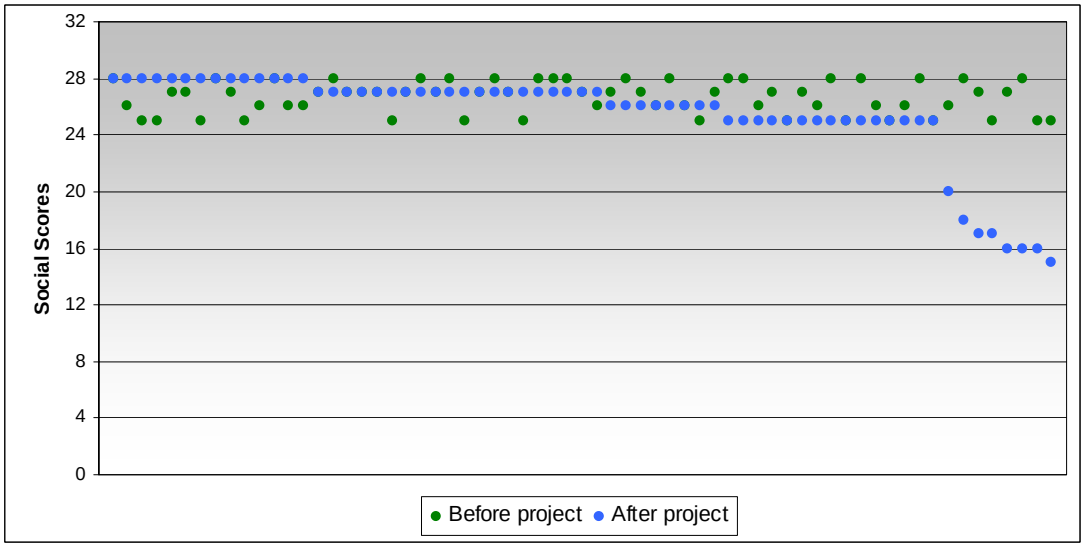


Figure 4.2 (b): Score of social indicators for better off group before and after the project

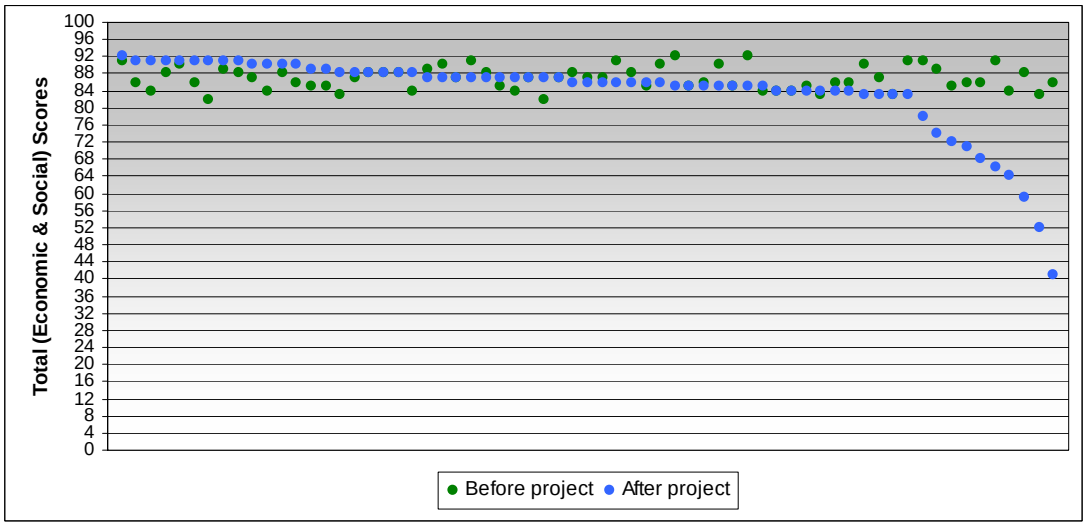


Figure 4.2 (c): Poverty score of better off group for before and after the project

Like previous three graphs, the next three graphs in Figure 4.3 (a), Figure 4.3 (b) and Figure 4.3 (c) represent the similar analysis for change in poverty situation before and after the project for average group. Figure 4.3 (a) shows dots corresponding to the scores obtained from economic indicators for average group, Figure 4.3 (b) shows dots against scores obtained from social indicators for average group and Figure 4.3 (c) shows dots representing resultant scores before and after the project for each family who were in the average group before the project. For average group, the score range of economic indicators is from 42 to 56 and the score range of social indicators is from 15 to 24, hence the cumulative range is from 57 to 80.

It is seen that, the total number of families in average group is 103 before the project. After project situation, total 82 families out of 103 families persist within the same range of average group. Poverty scores of 17 families exceeded the upper limit of poverty score of average group that is 80, hence up graded into better off group. On the other hand, total 4 families were dropped out from the average group, as their total poverty scores fell below 57 that is the minimum required score for average group. It is to be noted that the number of households who promoted themselves to the upper group or fell into lower poverty group is identical in both Figure 4.3 (a) and Figure 4.3 (b)

Newly joined households from other groups into this group are not shown in the figures below. It is described in the next section.

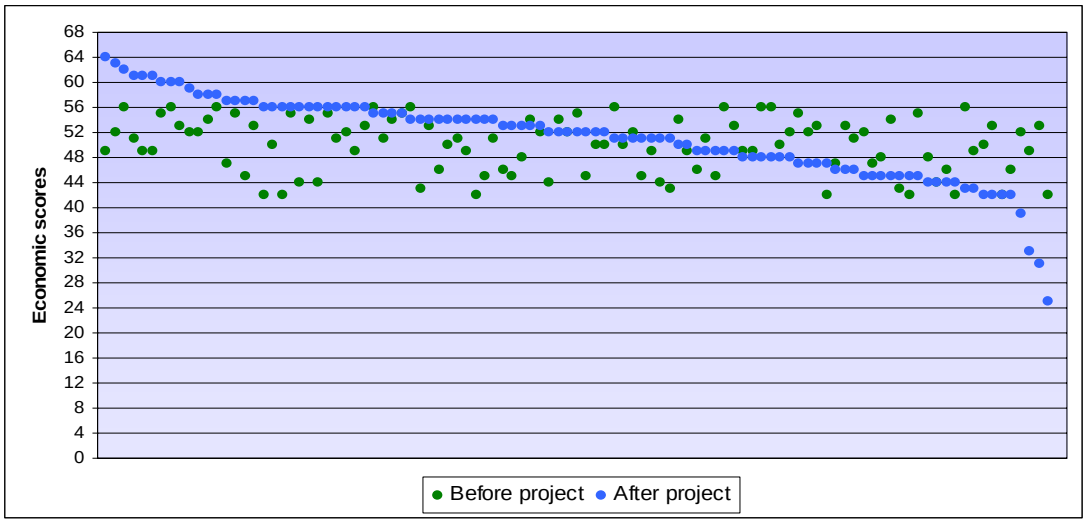


Figure 4.3 (a): Score of economic indicators for average group before and after the project

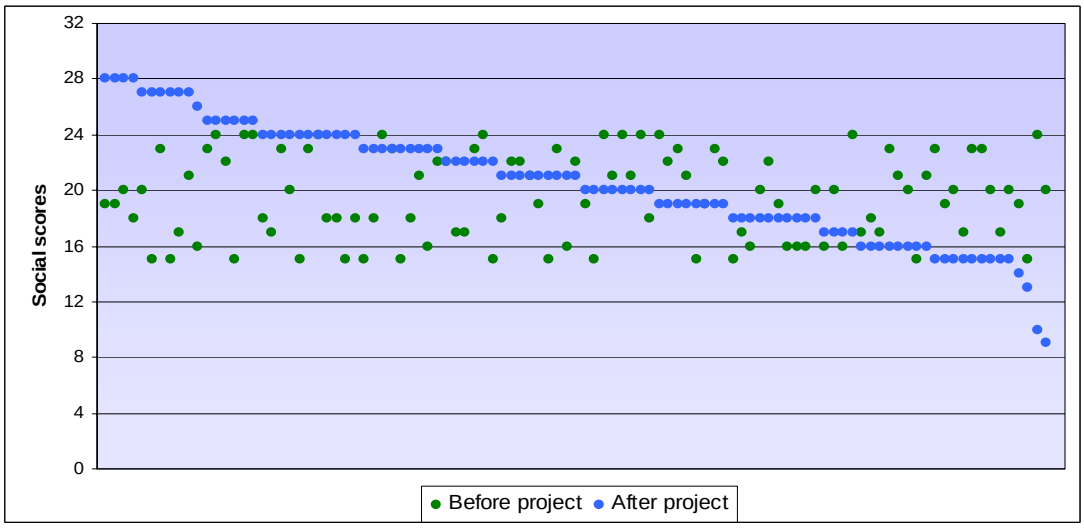


Figure 4.3 (b): Score of social indicators for average group before and after the project

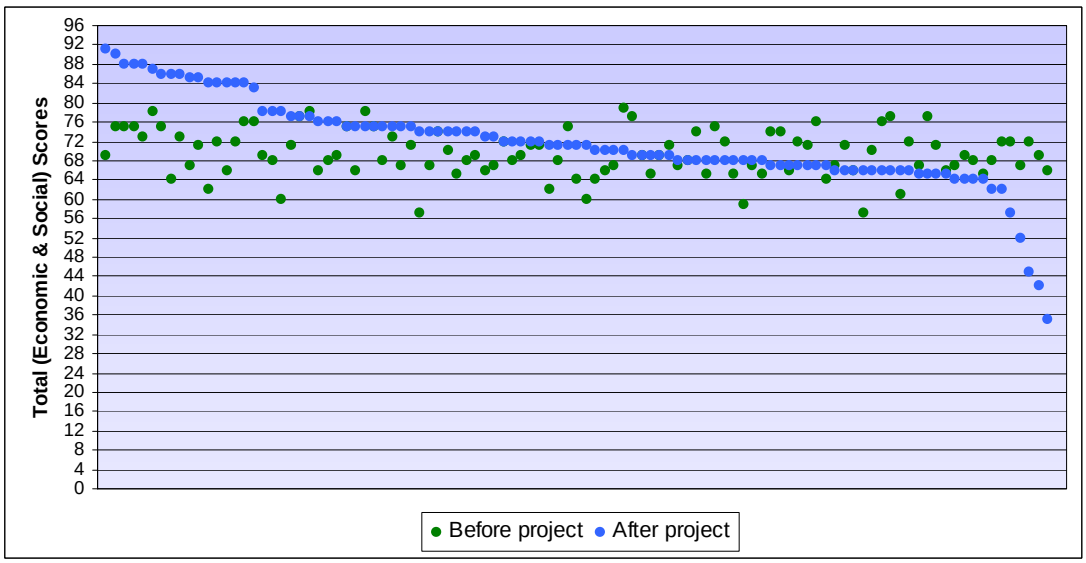


Figure 4.3 (c): Poverty score of average group for before and after the project

Figure 4.4 (a) shows dots corresponding to the scores obtained from social indicators for poor group and Figure 4.4 (b) shows dots for scores obtained from social indicators for poor group. For poor group, the score range of economic indicators is from 24 to 41 and the score range of social indicators is from 8 to 14, hence the cumulative range is from 32 to 55.

Figure 4.4 (c) shows dots representing resultant scores before and after the project for each family who were in poor group before the project. It is seen that, the total number of families in the poor group is 68 before the project. After project situation, total 30 families out of 68 families remained within the same range (32 to 55) of poor group. Poverty scores of 32 families exceeded the upper limit of poverty score of poor group that is 55. Out of these 32 families, 29 families upgraded into the average group and other 3 families up graded further into the better off group. 6 families were dropped out from the poor group, as their total poverty scores fall below 32.

The changes are similar also in the Figure 4.4 (a). But in Figure 4.4 (b) it is observed that all the 32 families who exceeded the upper limit of poverty score of poor group could change their social score up to the range of the average group only, although 3 out of those 32 families up graded their economic scores to the better off group.

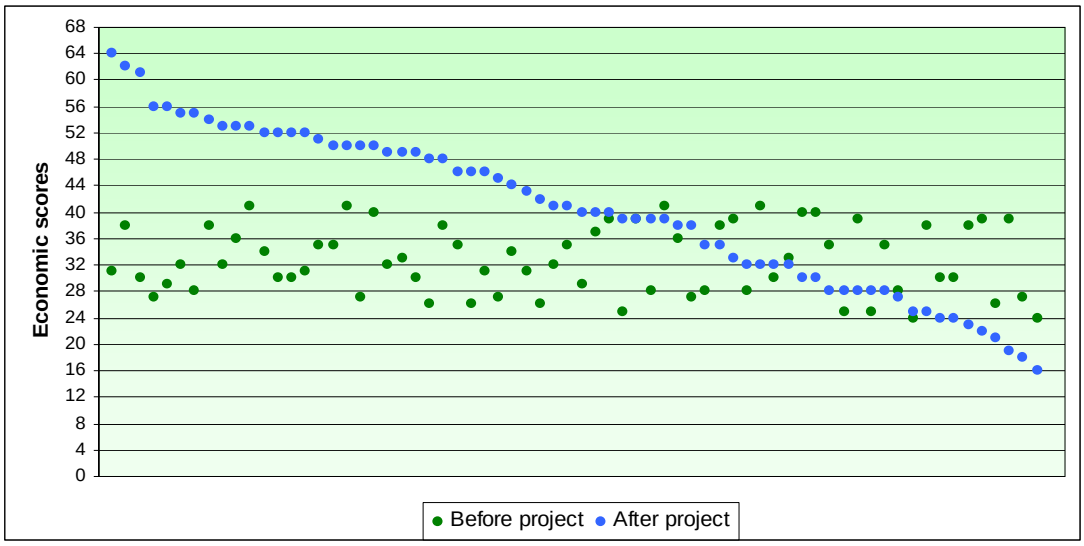


Figure 4.4 (a): Score of economic indicators for poor group before and after the project

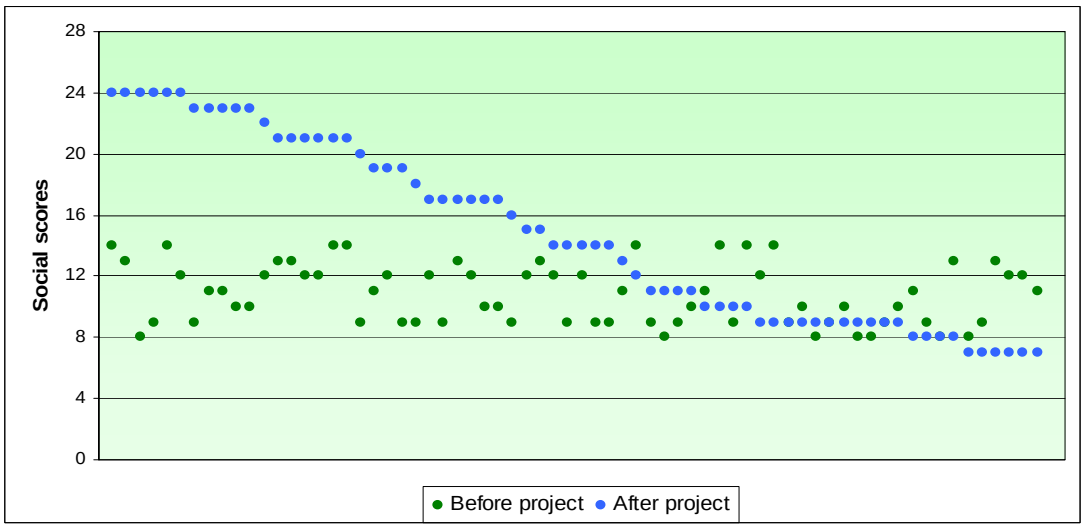


Figure 4.4 (b): Score of social indicators for poor group before and after the project

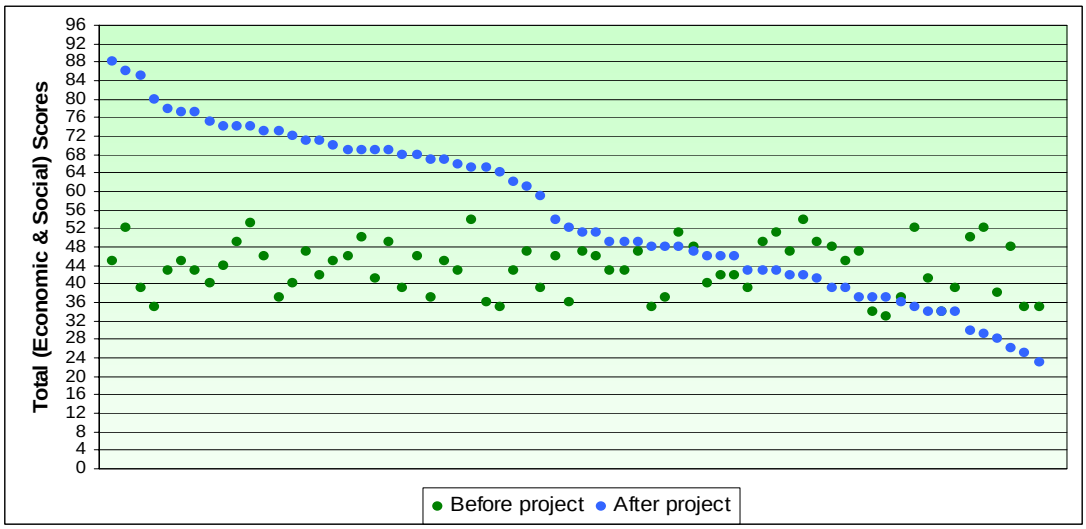


Figure 4.4 (c): Poverty score of poor group for before and after the project

Figure 4.5 (a) shows dots corresponding to the scores obtained from economic indicators for very poor group and Figure 4.5 (b) shows dots against scores obtained from social indicators for very poor group. For very poor group, the score range of economic indicators is from 16 to 23 and the score range of social indicators is from 7 to 7, hence the cumulative range is from 23 to 30.

Figure 4.5 (c) shows dots representing resultant scores before and after the project for each family who were in very poor group before the project. It is seen that, the total number of families in poor group is 78 before the project. After project situation, only 4 families out of 78 families remain within the same range (23 to 30) of very poor group. Poverty scores of 74 families exceeded the upper limit of poverty score (30) of very poor group. Out of these 74 very poor families, 53 families entered into the poor group on the basis of their changed cumulative poverty score although the scores obtained from social indicators for 15 families still remain within very poor group's range, as shown in Figure 4.5 (b). 21 families up graded further into the cumulative score range of average group including 7 families with social scores of poor group. Therefore, a significant positive change with poverty situation of the very poor group after the project is observed here.

It is observed from all the graphs in Figure 4.2 to Figure 4.5 that, out of total 314 families inside the project area, 171 families of different groups persist in their previous position and there are changes in poverty situation with the rest 143 families. The changes happen mostly in positive manner that means, out of these 143 families 123 families upgraded to the upper group. Only 20 families fall from their previous poverty situation which is only 6% of total families in the project area. Among these 20 families, only 6 families fall from poor to very poor that is only around 2% of 314 families. Moreover, most of the downward poverty changes happen due to personal reason like large loan or other irreparable loss occurred by accidents or diseases. On the other hand, 123 families could change their lives positively after the project implementation and all of them were benefited by the project in general. Among the 123 families, 74 are from very poor group which is 95% of total very poor families. So the marginal people (poor and very poor group) were benefited most and they could come out of poverty.

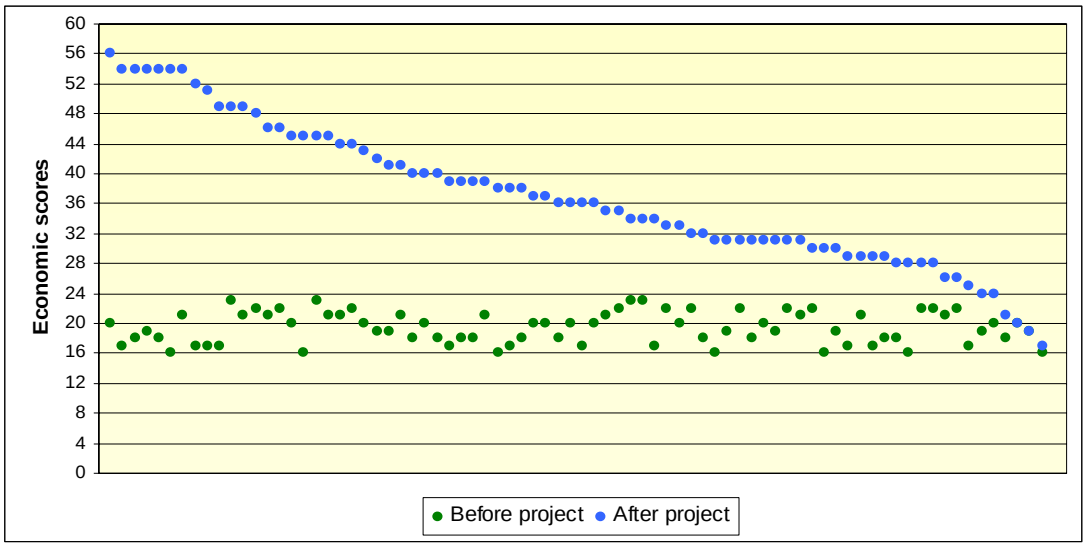


Figure 4.5 (a): Score of economic indicators for very poor group before & after the project

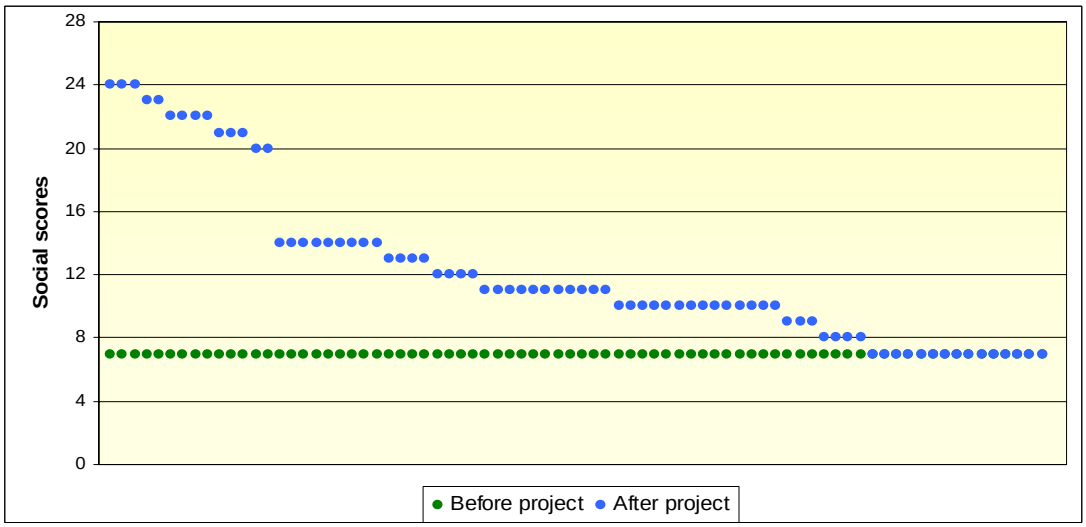


Figure 4.5 (b): Score of social indicators for very poor group before and after the project

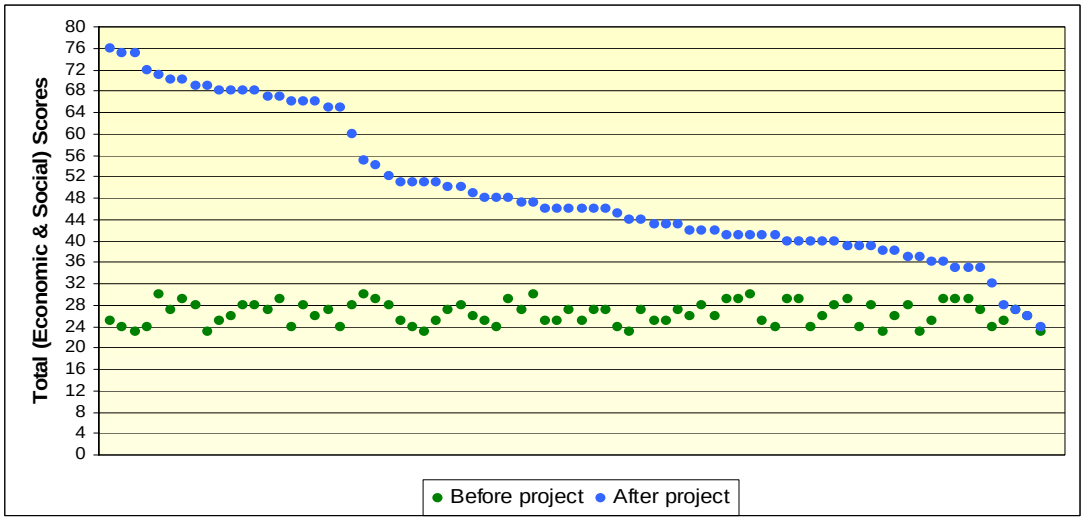


Figure 4.5 (c): Poverty score of very poor group for before and after the project

4.3.2.2 Pattern of group formation after the project

The range of combined score for better off group is 57 to 64 for economical indicators and 25 to 28 for social indicators. A family falling within these scores is categorized as better off group. Before the project, the number of better off families was 65. After the project, 20 new families joined in the better off group. Of these 20 newly joined families, 3 families joined from the poor group and 17 families joined from the average group (Figure 4.6). However, 10 families were dropped from the better off group to a lower economic group. Among these 10 families, 8 families later fell into average group and other 2 fell into poor group. It thus appears that the number of better off families has increased by 10 and the total number of better off families is now 75. Of these 75 better off families, 55 families were from previous better off group.

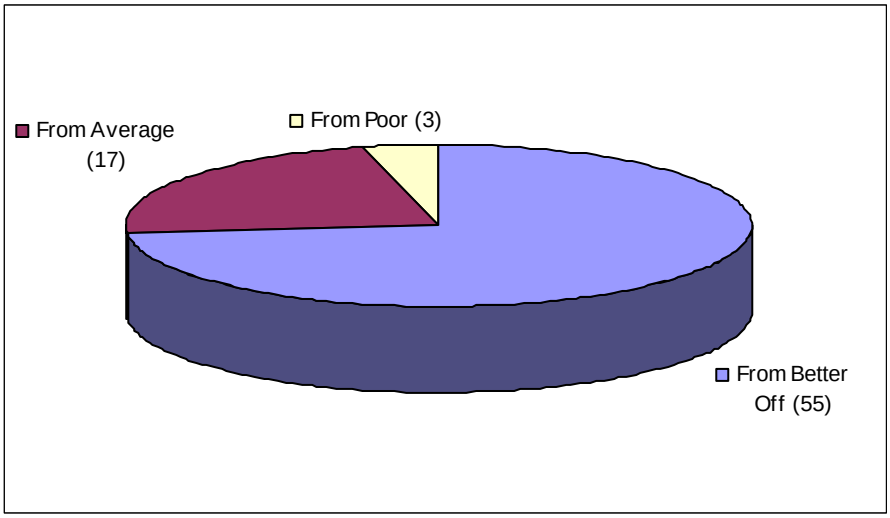


Figure 4.6: Re-formation of better off group after implementation of the project

The range of combined score for average group is 42 to 56 for economic indicators and 15 to 24 for social indicators. A family falling within these scores is categorized as average group. Before the project, the number of families within average group was 103 which are now 140. Among them 37 of families are promoted in this group. In this newly formed average group 8 families joined from better group, 29 joined from poor group and 21 joined from very poor group (Figure 4.7).

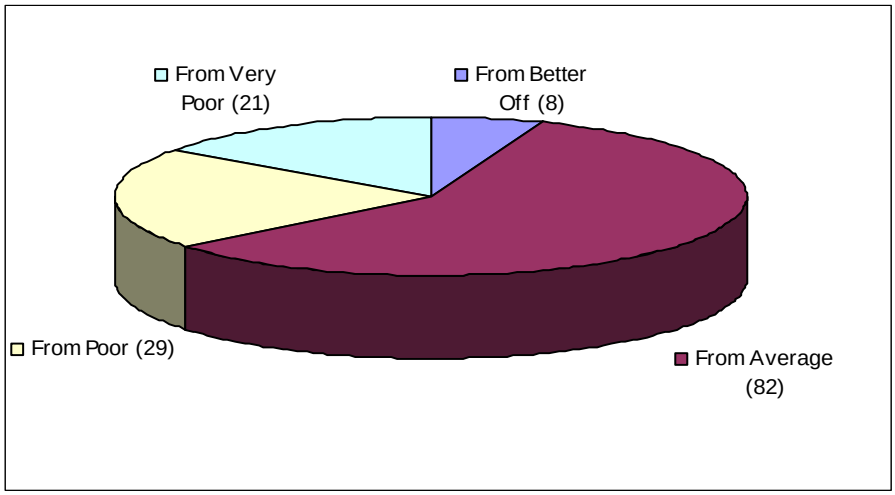


Figure 4.7: Re-formation of average group after implementation of the project

The score range for poor group is 41 to 24 for economic indicators and 14 to 8 for social indicators. . A family falling within these marks is categorized as poor. Before the project the number of families of poor groups was 68 which is now 89. Among them 21 of families have been added with this group. In this newly formed group 2 families joined from better off, 4 families joined from average and 53 families came from very poor group (Figure 4.8).

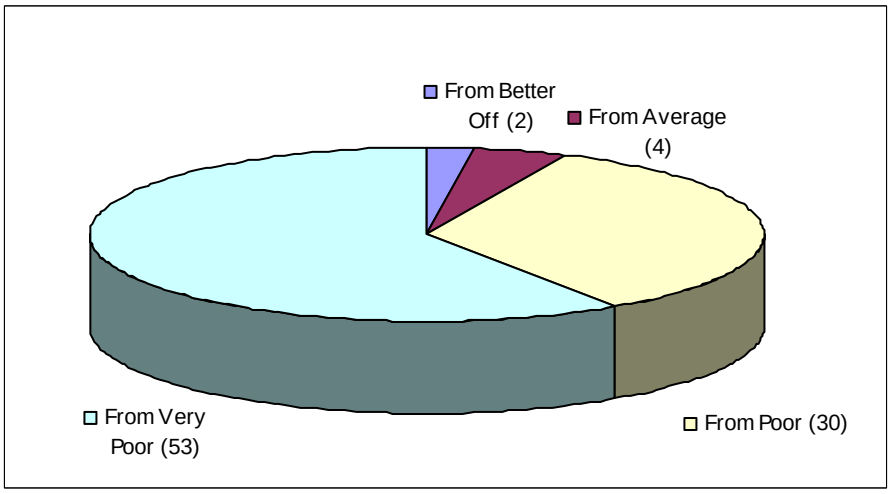


Figure 4.8: Re-formation of poor group after implementation of the project

The score for very poor group range from 23 to 16 for economic indicators and 7 for social indicators. After the sub-project implementation, there are 10 families in the very poor group of which 4 families are from existing very poor families and 6 families have been from poor families (Figure 4.9).

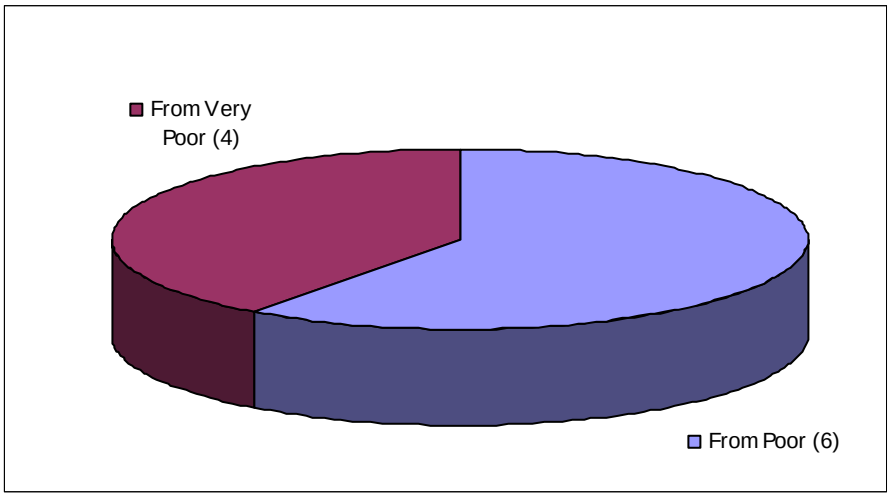


Figure 4.9: Re-formation of very poor group after implementation of the project

4.3.2.3 Summary of change in number of families in different groups

After the sub-project implementation, the changes in number of families within the groups are summarized shown in Figure 4.10. The number of families in better off, average and poor groups has increased and the number of families in the very poor group has decreased. The rate of change in percentage for each group is shown in Table 4.14. Though the number of poor families has increased, the number of very poor families been decreased significantly. The main objective of any FCD project is to improve the condition of very poor group. In that aspect, this is a successful project because it could change the poverty situation of 87% of the families under very poor group.

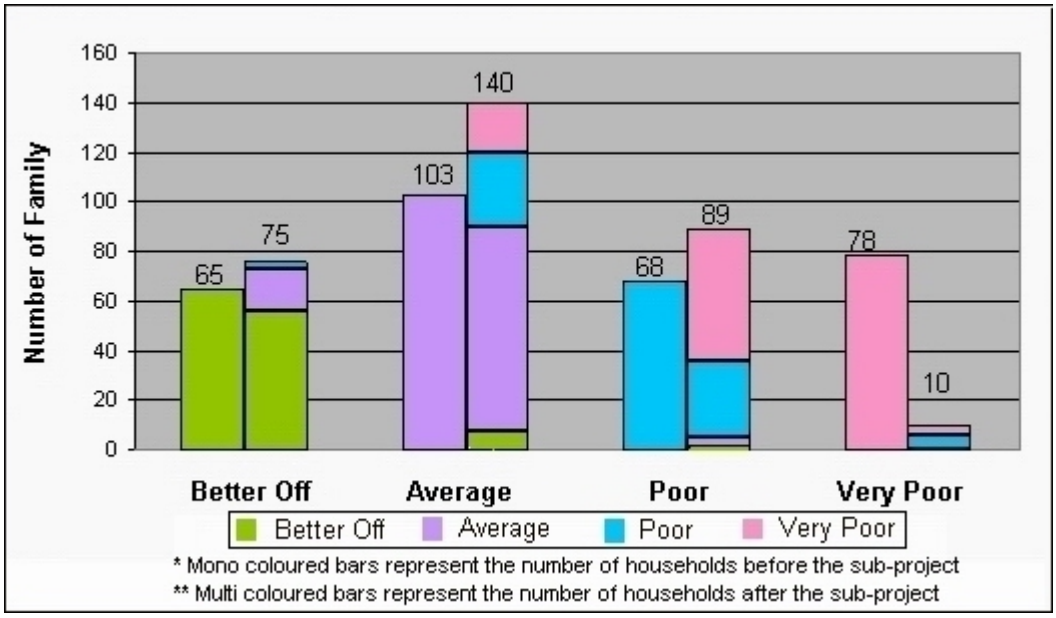


Figure 4.10: Change in number within the groups

Table 4.14: Change of population within the groups

Groups	Time		Change in percentage
	Before (1996)	After (2010)	
Better Off	65	75	15.38
Average	103	140	35.92
Poor	68	89	30.88
Very Poor	78	10	-87.18

4.3.3 Contribution of the project in reducing poverty

In Tripalli sub-project, the poverty level (poor + very poor) has decreased. In 1996, the poverty level (poor + very poor) of the sub-project area was 46.5% and in 2010 it is 31.53%. The decrease in poverty level is above 14.97% from 1996 to 2010 thus the rate of poverty reduction in the sub-project area is 1.07% per year (Table 4.15). It is to be mentioned that, the Gopalgonj district is within the administrative boundary of the Dhaka division and it is the southern most district of this division. Gopalgonj is situated across the great Padma river and at the junction of three administrative divisions, Dhaka, Khulna and Barisal. Moreover, the people's way of life and their socio-economical conditions are more similar with the people of Khulna Division. So, relative comparison of poverty related data between the study area and Khulna division or other similar project in or around Gopalgonj district would be more justified.

Table 4.15: **Incidence of poverty in Tripalli project area by Participatory Poverty Assessment method**

Year	Poverty level (%)	Decrease in poverty (%)	Rate (%/year)
1996	46.50	14.97	1.07
2010	31.53		

The poverty level of the selected thirty sub-projects of the second phase of SSWRDSP is 47.5% in 2007 (BIDS, 2008b). Balajtala-Kalmadanga is among the mentioned thirty sub-projects that is also located in the Tungipara upazila under Gopalgonj district and nearest to the Tripalli sub-project. The poverty level of Balajtala-Kalmadanga sub-project area was 42.5% in 2007 (BIDS, 2008c) whereas the poverty level at Tripalli sub-project area in 2010 is 31.53%. So the poverty level of Tripalli sub-project area is at an advantageous position assuming that the poverty level of Tripalli sub-project area in 2007 would not be more than 39% with an average annual poverty reduction rate of 1.07% since 1996. Here the above mentioned poverty assessments were done by using different methods. Daily Calorie Intake (DCI) was used as the poverty assessment method for SSWRDSP by the BIDS and Participatory Poverty Assessment (PPA) was used as the poverty assessment method for the Tripalli sub-project in this study. Still the above comparison makes sense as the PPA reflects more accuracy in poverty assessment for its multidimensional approaches.

Another study by the Bangladesh Bureau of Statistics (BBS) shows that, in Khulna division the poverty level has not decreased, rather it has increased by 0.12% per year (Table 4.16) whereas from this study it has been found that, since 1996 poverty in the project area has been decreasing at an average yearly rate of 1.07%. In comparison with Khulna division the number of poor people in the sub-project has decreased significantly. Literary, the project contribution in poverty reduction in the project area is 1.07 – (- 0.12) = 1.19% per year.

Table 4.16: Incidence of poverty (Head Count Rate) by Cost of Basic Needs method using upper poverty line (2122 K Cal/day/person) – Khulna division

Year	Poverty level (%)	Decrease in poverty (%)	Rate (%/year)
2000	45.1	- 0.60	- 0.12
2005	45.7		

Source: BBS

So, in comparison with the entire Khulna division and with other similar projects, it can be said that there is a clear distinction in poverty situation change inside the project area and obviously it is due to the impact of the project implementation. Moreover, the social and religious homogeneity, uniform land distribution and the bottom-up approach in implementing the Tripalli sub-project helped keep the poverty level lower in the sub-project area. It is to be noted that such comparison can not be made with Gopalgonj district poverty situation, as there is no published poverty data of Gopalgonj.

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on the findings of this study, the following conclusions are drawn.

(i) The concept of the Tripalli sub-project was originated by the local people which was transmitted through the executive engineer of LGED, Gopalgonj. So it is a “Bottom-up” approach project. The local knowledge is utilized here. Moreover, the water resource in the Tripalli sub-project area is managed in such a way that the benefits could be maximized and the benefits were not limited within few people only but for the general people also. For this, the sub-project was not used to serve the culture fisheries activities in the canal water by sacrificing the agricultural production. Social and religious homogeneity and the collective opinion against the culture fisheries create better management of the water resources.

(ii) After implementation of the Tripalli Flood Control and Drainage (FCD) sub-project, the damage caused by floods has reduced. The average income of the villagers from crop fields has increased. Now from low land two crops can be harvested, where as only one can be harvested before implementation of the sub-project. Yield performance of both high land and low land have increased as the farmers feel more secured against the damage caused by sudden floods.

(iii) The income from culture fisheries, livestock and poultry, fruit trees and homestead gardens has increased and the expenditure from homestead damage, education related damage and health damage have decreased as the flood cause no more damage to the villagers. The employment opportunity has increased after the sub-project implementation as scopes for new jobs have been created after the sub-project which ensures the people’s income round the year.

(iv) Poverty is a multidimensional concept and this multidimensional characteristic of poverty should be reflected while choosing its indicators. For this reason a set of poverty indicators have been developed considering the socio economic conditions of the Tripalli sub-project. The families are categorized in four groups (better off group, average group, poor group and very poor group). Point based score is assigned to each poverty indicator according to its superlative order. For economic indicators, the lower and upper limit for better off, average, poor and very poor groups are 57 - 64, 42 - 56, 24 - 41 and 16 - 23 respectively. For social indicator the lower limit and upper limit for better off is 25 to 28, average is 15 to 24, poor is 8 to 14, and very poor is 7.

(v) A remarkable change is observed in the poverty situation within the sub-project area. Before the sub-project 78 families were in the very poor group, where as only 10 families are now in very poor group. 68 families of very poor group could improve their condition after the sub-project. Number of poor families increased from 68 to 89, but this does not indicate that the poverty situation has worsened. This is because more families from very poor group have move into the poor group by developing their socioeconomic conditions. For other two groups, better off and average, number of families in both groups have increased after the sub-project implementation. Number of families increased from 65 to 75 and from 103 to 140 for better off and average groups respectively.

(vi) The rate of poverty reduction is 1.07% per year within the project area during 1996 - 2010 whereas the poverty level has increased by 0.12% per year in Khulna Division during 2000 - 2005. Literary, the project contribution to poverty reduction is 1.07% – (-0.12%) = 1.19% per year

This study shows that the Tripalli FCD sub-project has positive impact on agricultural performance on the study area. The yield performance, net benefit per unit area, income from other sectors have increased and damage related expenditure has decreased and also the job opportunity has increased compared to the pre-sub-

project situation. The poverty situation is also better now after the sub-project implementation. Therefore, it can be concluded that the Tripalli FCD sub-project has positively contributed to the reduction in poverty.

5.2 Recommendations for Further Study

The following recommendations are made based on the experiences of this study:

(i) The set of poverty indicators have chosen considering the economical and social conditions of the Tripalli sub-project area. There is a great opportunity to conduct similar research in a control area to compare the poverty situation that can reflect the project condition better.

(ii) The present study has evaluated the impact of the Tripalli sub-project on poverty by using a set of poverty indicators. There is a scope to evaluate the impact of the Tripalli sub-project on livelihood and gender considering inequality by selecting corresponding set of indicators.

(iii) The set of poverty indicators have selected especially for the Tripalli sub-project area. There are more opportunities to conduct research in other similar project area to compare the poverty indicators used for the Tripalli sub-project.

References

Action Aid International, 2006. Participatory Poverty Assessment (PPA), A joint UNDP – IUCN – MRC - GEF Funded Programme, Lao PDR.

Action Aid International, 2006. Participatory Poverty Assessment (PPA), A joint UNDP – IUCN – MRC - GEF Funded Programme, Vietnam.

Attwood, H. 1998. Participatory Poverty Assessment: Shinyanga Region, Tanzania. Shinyanga Regional Government.

BBS, 2001. Preliminary Report of Household Income and Expenditure Survey 2000, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.

BBS, 2003. Household Income and Expenditure Survey 2000. Dhaka: Ministry of Finance.

BBS, 2006. Preliminary Report of Household Income and Expenditure Survey 2005, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.

BIDS, 2001. Analysis of Poverty Trends Project, Bangladesh Institute of Development Studies, Dhaka.

BIDS, 2008a. Benefit Monitoring &Evaluation Study, Impact Evaluation Study Report, Selected 10 Subprojects, SSWRDP-1, LGED.

BIDS, 2008b. Benefit Monitoring &Evaluation Study, Synthesis Report, Selected 30 Subprojects, SSWRDP-2, LGED.

BIDS, 2008c. Benefit Monitoring &Evaluation Study, Benchmark Report, Balajtala-Kalmadanga Subproject, Tungipara, Gopalgonj, LGED.

BRPMP, 2004. Geographical concentration of Rural Poverty in Bangladesh. PR Number 24660. Report for the Food and Agriculture organisation of the United Nations (FAO) and the Consortium for Spatial Information (CSI).

CEGIS, 2002. Monitoring and Integration of the Environmental and Socio-economic Impacts of Implementing the Tidal River Management Option to Solve the Problem of Drainage Congestion in KJDRP area, Khulna-Jesssore Drainage Rehabilitation Project, Final Report, Part A: Monitoring.

Chambers, R. 1994. The Origins and Practice of PRA, World Development, Vol. 22., No.7.

Chetwynd, E., Chetwynd, F. and Spector, B. 2003. Corruption and Poverty: A Review of Recent Literature, Final Report, Management Systems International, 600, Water Street, SW, Washington, DC., 20024, USA.

Cornwall, A., Gujit, I. and Welbourne, A. 1993. Acknowledging Processes: Challenges for Agricultural Research and Extension Methodology. IDS Discussion Paper, No. 333.

Ehrhart, C. 2002. Combining Methodologies to Improve Pro-poor Public Policies in Tanzania. A Paper Presented During the Conference on Combining Qualitative and Quantitative Methods in Developing Research held on 1st – 2nd July 2002 at the University of Wales, Swansea.

Estrella, M. and Gaventa, J. 1998. Who Counts Reality? Participatory Monitoring and Evaluation: A Literature Review, IDS Working Paper, No. 70.

Gittinger, J.P. 1982. Economic Analysis of Agricultural Projects, EDI series on Economic Development, Washington DC., The World Bank, United States of America.

Hossain, G.M. A. and Islam, M. N. 2001. Small Scale Water Resource Development Sector Project in Rural Bangladesh: Perspective of People's Participation, LGED, Dhaka.

Hossain, M. 2004. Poverty Alleviation through Agriculture and Rural Development in Bangladesh, Centre for Policy Dialogue (CPD), No. 39, Dhaka.

Hussain, I. 2004. Pro-poor Intervention Strategies in Irrigated Agriculture in Asia-Poverty in Irrigated Agriculture: Realities, Issues, Option with Guidelines, Draft Final Report, International Water Management Institute (IWMI), Colombo, Srilanka.

Hussain, M., Hussain, Z. and Ashfaq, M. 2006. Impact of Small Scale Irrigation Schemes on Poverty Alleviation in Marginal Areas of Punjab, Pakistan, International Research Journal of Finance and Economics, 6, 193-200.

IMF, 2005. Country Report No. 05/410., International Monetary Fund, Dhaka Residence Mission, Dhaka.

Islam, K.M.N. 2006. Benefit Monitoring and Evaluation (BME) Study, Second Small Scale Water Resources Development Sector Project, Revised Inception Report.

Kothari, C.R. 1996. Research Methodology, Methods and Techniques, Wishwa Prakashan, New Delhi, India.

LGED, 2004. Guidelines for Conducting Participatory Rural Appraisal, Second Small Scale Water Resources Development Sector Project (SSWRDSP-2), LGED, Dhaka.

LGED, 2007. District Water Resources Assessment-Gopalganj. Second Small scale Water Resources Development Sector Project. Government of the People's Republic of Bangladesh. LGED, IWRM Unit.

MoF, 2007. Bangladesh Economic Review 2007, Ministry of Finance, Government of the People's Republic of Bangladesh, Dhaka.

Mujeri, M.K. and Guna, R.K. 2006. Local Level Poverty Monitoring System in Bangladesh: Some Lessons from the Pilot Survey, MIMAP-Bangladesh, Bangladesh Institute of Development Studies (BIDS).

Norton, A., Bird, B., Brock, K., Kakande, M., and Turk, C. 2001. A Rough Guide to PPAs – An Introduction to Theory and Practice, Overseas Development Institute, UK.

NWMP, 2004. National Water Management Plan, Ministry of Water Resources, Government of the People's Republic of Bangladesh.

PPRC, 2001. 62 Village Survey and Resurveys: 1989, 1985, Power and Participation Research Centre, Dhaka.

PPRC, 2004. State of the Poor Project, Power and Participation Research Centre, Dhaka.

Rahman, H.Z. 2002. Re-thinking Local Governance: Towards a Livelihoods Focus, In Hands not land: How Livelihoods are Changing in Rural Bangladesh, edited by Kazi Ali Toufique and Kate Turton. Dhaka (BIDS).

Rahman, R. 2004. Formulation of a Pro-poor Water Sector Strategy, Institute of Water and Flood Management, Bangladesh University of Engineering and Technology, Final Report, Dhaka.

Ravallion, M. 1992. Poverty Comparisons: A Guide to Concepts and Methods, Living Standard Measurement Study, Working Paper No. 88, The World Bank, Washington DC.

Ravallion, M. and Sen, B. 1996. When Method Matters: Monitoring Poverty in Bangladesh, Economic Development and Cultural Change, Vol. 44., No.4., pp. 761-792.

Robb, C. 1999. Can the Poor Influence Policy? Participatory Poverty Assessments in the Developing World. Washington, DC: World Bank.

Runu, S. 2009. Water Poverty Status in Selected Small-Scale Water Resources Projects in Bangladesh, IWFM, BUET.

Saleh, A.J.M. and Mondal, M.S. 2009. Irrigation Intervention as a Tool of Socio-Economic Advancement: A Case Study of Kawradi River Rubber Dam Project, Gazipur, Bangladesh, Proceedings of the Second International Conference on Water and Flood Management, 641-650, Dhaka.

Sen, B. and Mujeri, M. 2002. Poverty in Bangladesh: Trends, Profiles and Determinants, Background Paper for IPRSP, Using HIES grouped Distribution Data for Comparability with Poverty Trends in the Eighties and Using 1983-84 Non-Food Poverty Line as the Base Year Non-Food Poverty Line, Dhaka.

Suhanyo, W.I., Sulaksono, B., Widjanarkao, H., Toyamah, N., Fillaili, R., Usman, S., and Heryanwan, W. 2006. Strengthening the Poverty Reduction Capacity of Regional Governments through Participatory Poverty Assessment (PPA), SMREU Research Institute, Jakarta, Indonesia.

UNDP, 2000. Human Development Report 2000, United Nations Development Programme.

UNDP, 2008. Liberia Participatory Poverty Assessment, Liberia Institute of Statistics and Geo-Information Service.

UNICEF, 2000. Poverty Reduction Begins with Children, United Nations Children's Fund, New York, United States of America.

Westley, K., and Mikhalev, V. 2002. The Use of Participatory Methods for Livelihood Assessment in Situations of Political Instability; A Case Study from Kosovo, Overseas Development Institute, 111 Westminster Bridge Road, London.

World Bank, 1990. World Development Report: Poverty. Oxford University Press, New York, United States of America.

World Bank, 2001. World Development Report 2000/2001: Attacking Poverty, New York: Oxford University Press.

World Bank, 2002. Poverty in Bangladesh: Building on Progress, Report No. 24299-BD, World Bank, Washington DC., United States of America.

Yoshitani, J., Takemoto, N., and Merabtene, T., 2007. Factor Analysis of Water Related Disaster in Bangladesh. Technical Note of PWRI No. 4068.

APPENDIX-A

Checklist for Key Informant Interviews

evsjv‡`k c‡KŠkj wekwe`¨vjq
cwb I eb¨v e¨e¯vcbv Bbw÷wUDU

Poverty assessment by PPA

cKí ce Ae¯v t

1| cKí ev¯Íevq‡bi c‡e GjvKvi eb¨vq wK wK A_‰bwZK ¶wZ n‡Zv ?

2| eb¨vi ¶wZ Kgv‡bvi j‡¶¨ wK ‡Kvb e¨e¯v †bqv n‡qwQj ?

3| eb¨vq GjvKvi RbM‡bi Rvb I gv‡ji ‡h ¶wZ n‡Zv Zvi †Kvb mvgwRK cfve wQj wK ?

4| Kwl †¶‡Î wK wK cfve co ?

5| grm¨ Drcv`‡b wK wK cfve coZ ?

6| hvZvqvZ e¨e¯vi Dci wK wK cfve coZ ?

7| wk¶vi Dci †Kvb cfve coZ wK ?

8| emZ evoxi wK wK ¶wZ nZ ?

9| GjvKvevmxi ‡ckv wK wQj ?

10| DP Rwg‡Z wK wK ai‡bi dmj djZ ?

11| bxP Rwg‡Z wK wK ai‡bi dmj djZ ?

cKí cieZx Ae¯v t

12| cKí ev¯Íevq‡bi c‡i GjvKvi eb¨v cwiw¯i wK cwieZb n‡q‡Q?

13| cKíwU ev¯Íevq‡bi c‡i Kvhµg wK RbM‡bi AbK‡j?

14| Kwl †¶‡Î wK wK cfve c‡o‡Q ?

15| grm¨ Drcv`‡b wK wK cfve c‡o‡Q ?

16| hvZvqvZi e¨e¯vq wK cfve c‡o‡Q ?

17| wk¶vi Dci wK †Kvb cfve c‡o‡Q|

18| eZgv‡b GB GjvKvq emevmKvixiv wK wK †ckvi mv‡_ RwoZ ?

19| DP Rwg‡Z wK wK ai‡bi dmj n‡”Q ?

20| bxP Rwg‡Z wK wK ai‡bi dmj n‡”Q ?

`wi`Zv m¤úwKZ t

21| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii m`m¨‡`i wK wK wel‡q cwZdwjZ nq ?

22| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii emZevoxi wK wK wel‡q cwZdwjZ nq ?

23| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii ˆelwqK wK wK wel‡q cwZdwjZ nq ?

24| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii mvgwRK wK wK AvPvi AvPi‡Y cKvk cvq ?

25| GKwU cwiev‡ii Aw_K Ae¯v Ab¨ Avi wK wK wel‡q cKvk ‡c‡Z cv‡i ?

26| Aw_K I mvgwRK Ae¯vi wfwË‡Z GjvKvi cwievi mgn‡K wKfv‡e fvM Kiv †h‡Z cv‡i ?

APPENDIX-B

Checklist for Focus Group Discussions

evsjv‡`k c‡KŠkj wekwe`¨vjq
cwb I eb¨v e¨e¯vcbv Bbw÷wUDU

Poverty assessment by PPA

`wi`Zv m¤úwKZ t

1| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii m`m¨‡`i wK wK wel‡q cwZdwjZ nq ?

2| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii emZevoxi wK wK wel‡q cwZdwjZ nq ?

3| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii ˆelwqK wK wK wel‡q cwZdwjZ nq ?

4| GKwU cwiev‡ii Aw_K Ae¯v H cwiev‡ii mvgwRK wK wK AvPvi AvPi‡Y cKvk cvq ?

5| GKwU cwiev‡ii Aw_K Ae¯v Ab¨ Avi wK wK wel‡q cKvk ‡c‡Z cv‡i ?

6| Aw_K I mvgwRK Ae¯vi wfwË‡Z GjvKvi cwievi mgn‡K wKfv‡e fvM Kiv †h‡Z cv‡i ?

APPENDIX-C

Survey Questionnaire

evsjv‡`k c‡KŠkj wekwe`¨vjq
cwb l eb¨v e¨e¯vcbv Bbw÷wUDU

Poverty assessment by PPA

mv¶vr`vZvi cwiwPwZ t

mv¶vrKv‡ii ZwiL t

mv¶vrKv‡ii ¯vb t

mv¶vrKv‡ii mgq t

mv¶vrKvi `vZvi bvg t

mv¶vrKvi `vZvi wbR †Rjv t

1| mv¶vrKvi `vZvi wj½ ?

(K) ciæl (L) gwnjv

2| mv¶vrKvi `vZvi eqm ?

(K) 18-30 eQi (L) 30-50 eQi

(M) 50-65 eQi (N) 65 ev Zvi D‡aŸ|

3| mv¶vrKvi `vZvi wk¶vMZ †hvM¨Zv

(K) wbi¶i (L) cv_wgK wk¶v

(M) gva¨wgK (N) D”P gva¨wgK

(O) mwZK / D‡aŸ|

A_‰bwZK mPK msµvšÍ ckvejx t

1) Avcbvi cwiev‡ii m`m¨ msL¨v KZ ?

cKí c‡e t K) 4 Rb L) 4 ‡_‡K 6 Rb M) 6 Gi D‡×

cKí cieZx t K) 4 Rb L) 4 ‡_‡K 6 Rb M) 6 Gi D‡×

2) Avcbvi wbR¯ evox Av‡Q wK ?

cKí c‡e t K) evox Av‡Q 1 wU L) evox bvB

cKí cieZx t K) evox Av‡Q 1 wU L) evox bvB

3) Avcbvi cwiev‡ii Lv‡`¨i gvb †Kgb ?

cKí c‡e t K) chvß †cwUb (gvQ ev gvsm) mn w`‡b 3 evi L) w`‡b 3 evi, Achvß †cwUb
M) gv‡S g‡a¨ †cwUb mn w`‡b 3 evi N) gv‡S g‡a¨ †cwUb mn w`‡b 2 evi
O) w`‡b 2 evi, †cwUb Awbw‡ðZ N) ¶avZ

cKí cieZx t K) chvß †cwUb (gvQ ev gvsm) mn w`‡b 3 evi L) w`‡b 3 evi, Achvß †cwUb
M) gv‡S g‡a¨ †cwUb mn w`‡b 3 evi N) gv‡S g‡a¨ †cwUb mn w`‡b 2 evi
O) w`‡b 2 evi, †cwUb Awbw‡ðZ N) ¶avZ

4) Avcbvi evoxi Qv` wK Øviv wbwgZ ?

cKí c‡e t K) cvKv L) wUb M) Uwj N) Pvj

cKí cieZx t K) cvKv L) wUb M) Uwj N) Pvj

5) Avcbvi evoxi Pvicv‡ki †`qvj wK Øviv wbwgZ ?

cKí c‡e t K) cvKv L) wUb M) evk N) Lo

cKí cieZx t K) cvKv L) wUb M) evk N) Lo

6) Avcbvi cwiev‡ii m`m¨‡`i cwi‡aq e‡¯i gvb †Kgb ?

cKí c‡e t K) fv‡jv L) ‡gvUvgwU M) Lvivc N) Le Lvivc

cKí cieZx t K) fv‡jv L) ‡gvUvgwU M) Lvivc N) Le Lvivc

7) Avcbvi evoxi ‰kvPvMv‡ii Ae¯v †Kgb ?

cKí c‡e t K) m¤úY cvKv L) Avav cvKv M) KvPv N) bvB

cKí cieZx t K) m¤úY cvKv L) Avav cvKv M) KvPv N) bvB

8) Avcbvi cwiev‡ii m`m¨‡`i wk¶vi nvi †Kgb ?

cKí c‡e t K) A‡aK m`m¨ K‡jR cvk L) A‡aK m`m¨ D”P gva¨wgK cvk
M) A‡aK m`m¨ wb¤ gva¨wgK cvk N) A‡aK m`m¨ cv_wgK cvk
O) A‡aK m`m¨ KL‡bvB ¯‹j hvq bvB P) ‡KD †KD bvg wjL‡Z cv‡i

cKí cieZx t K) A‡aK m`m¨ K‡jR cvk L) A‡aK m`m¨ D”P gva¨wgK cvk
M) A‡aK m`m¨ wb¤ gva¨wgK cvk N) A‡aK m`m¨ cv_wgK cvk
O) A‡aK m`m¨ KL‡bvB ¯‹j hvq bvB P) ‡KD †KD bvg wjL‡Z cv‡i

9) Avcbvi cwiev‡ii Mew` cïi msL¨v KZ ?

cKí c‡e t K) `B‡qi AwaK Miæ L) `wU Miæ M) GKwU Miæ N) Miæ bvB

cKí cieZx t K) `B‡qi AwaK Miæ L) `wU Miæ M) GKwU Miæ N) Miæ bvB

10) Avcbvi cwiev‡ii dmjx Rwgi cwigvb KZ ?

cKí c‡e t K) 3.5 GK‡ii †ekx L) 1.5 †_‡K 3.5 GKi

M) 0.5 †_‡K 3.5 GKi N) 0.5 GK‡ii Kg

cKí cieZx t K) 3.5 GK‡ii †ekx L) 1.5 †_‡K 3.5 GKi

M) 0.5 †_‡K 3.5 GKi N) 0.5 GK‡ii Kg

11) Avcbvi cwiev‡ii ‡N‡ii msL¨v KZ ?

cKí c‡e t K) `B‡qi AwaK ‡Ni L) `wU ‡Ni M) GKwU ‡Ni N) †Kvb ‡Ni bvB

cKí cieZx t K) `B‡qi AwaK ‡Ni L) `wU ‡Ni M) GKwU ‡Ni N) †Kvb ‡Ni bvB

12) Avcbvi cwiev‡ii Avmevecxî †Kgb ?

cKí c‡e t K) fv‡jv L) ‡gvUvgwU M) Lvivc N) Le Lvivc

cKí cieZx t K) fv‡jv L) ‡gvUvgwU M) Lvivc N) Le Lvivc

13) Avcbvi cwiev‡ii mÂ‡qi cwigvY †Kgb ?

cKí c‡e t K) chvß L) Achvß M) bvggvî N) bvB

cKí cieZx t K) chvß L) Achvß M) bvggvî N) bvB

14) Avcbvi cwiev‡ii ‡`bvi cwigvY †Kgb ?

cKí c‡e t K) bvB L) bvggvî M) Kg N) A‡bK

cKí cieZx t K) bvB L) bvggvî M) Kg N) A‡bK

15) Avcbvi cwiev‡ii Lvevi cwbi Drm wK ?

cKí c‡e t K) GKwaK bjKc L) GKwU bjKc M) mgevq bjKc N) bjKc bvB

cKí cieZx t K) GKwaK bjKc L) GKwU bjKc M) mgevq bjKc N) bjKc bvB

16) Avcbvi cwiev‡ii wPwKrmv mweav †Kgb ?

cKí c‡e t K) mnRcvc¨ L) Riæix mg‡q cvc¨ M) `¯cvc¨

cKí cieZx t K) mnRcvc¨ L) Riæix mg‡q cvc¨ M) `¯cvc¨

mvgwRK mPK msµvšÍ ckvejx t

1) Avcbvi cwiev‡i cwiewiK wm×všÍ Mn‡b gwnjv‡`i AskMnb Av‡Q wK ? _vK‡j ‡Kgb ?

cKí c‡e t K) mwµq L) ‡gvUvgwU mwµq M) Kg N) bvB

cKí cieZx t K) mwµq L) ‡gvUvgwU mwµq M) Kg N) bvB

2) Avcbvi cwiev‡i gwnjv‡`i ¯v¯¨ †Kgb ?

cKí c‡e t K) fv‡jv L) ‡gvUvgwU M) Lvivc N) Le Lvivc

cKí cieZx t K) fv‡jv L) ‡gvUvgwU M) Lvivc N) Le Lvivc

3) Avcbvi cwiev‡i ‡g‡q‡`i wk¶vi m‡hvM †Kgb ?

cKí c‡e t K) h‡_ó L) h‡_ó bv M) Kg N) bvB

cKí cieZx t K) h‡_ó L) h‡_ó bv M) Kg N) bvB

4) Avcbvi cwiev‡i cwiewiK Kjn ev mwnsmZv Av‡Q wK ?

cKí c‡e t K) bvB L) Kg M) K`wPr N) wbqwgZ

cKí cieZx t K) bvB L) Kg M) K`wPr N) wbqwgZ

5) Avcbvi cwiev‡ii mvgwRK gh`v †Kgb ?

cKí c‡e t K) fv‡jv L) ‡gvUvgwU M) Kg N) bvB

cKí cieZx t K) fv‡jv L) ‡gvUvgwU M) Kg N) bvB

6) Avcbvi cwiev‡i mvgwRK wm×všÍ Mn‡b gwnjv‡`i AskMnb Av‡Q wK ? _vK‡j ‡Kgb ?

cKí c‡e t K) mwµq L) ‡gvUvgwU mwµq M) Kg N) bvB

cKí cieZx t K) mwµq L) ‡gvUvgwU mwµq M) Kg N) bvB

7) Avcbvi cwiev‡i mvgwRK Abôvbw`‡Z AskMnY Av‡Q wK ? _vK‡j †Kgb ?

cKí c‡e t K) mwµq L) ‡gvUvgwU mwµq M) Kg N) bvB

cKí cieZx t K) mwµq L) ‡gvUvgwU mwµq M) Kg N) bvB