FLOOD PROOFING PROJECT AT CHAR AND HAOR: IMPACT ON HOUSEHOLD FOOD SECURITY AND CONSUMPTION

A Dissertation for the Degree of Master in Disaster Management

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ABSTRACT

Household food insecurity continues to threaten large proportions of vulnerable population in rural Bangladesh. Food is such a high priority for poor households that many may be tenuously "secure", but at great sacrifice - for example spending almost all their money or time on securing food. Food insecurity, as a household-level issue, can be addressed by a wide range of program intervention in vulnerable areas. In order to address household food security in flood prone areas CARE/Bangladesh implemented Flood Proofing Project (FPP) in selected haor and char areas from October 1999 to September 2004 to address household food security in flood prone areas. The interventions designed and implemented under the FPP project was aim to demonstrate that how flood proofing measures can impact on household food security conditions of vulnerable population in the project areas. Household food security can be measured through household food consumption.

The primary objective of this study is to oversee the impact of household food security in the FPP areas. There are several food security indicators to measure household food security. This study selected a performance indicator " percentage of households consuming the minimum daily food requirement" . This is a direct measure of impact of all the activities for any food security and disaster management project. The overall objective of this study is to assess that at least eighty percent of household able to meet minimum standard daily food consumptions (1,800 Kcal per person per day) and higher percentage of households in the program areas were able to meet minimum daily food consumptions compared to non program areas over a period of time (three years period). To conduct this study, data were taken from a secondary source. The data source was "Comprehensive Food Security Data Collection Activity (DCA) project conducted by The Asia Foundation. The DCA project conducted a total number of six rounds surveys (two surveys in a year) for a period of three years between June 2003 and May 2006 in selected Flood Proofing Project areas.

It is seen that food security was achieved by more than 87 percent of the FPP population in program areas. The food security situation was observed to be more or less stable in program areas during the three years. The effect on food security depends of course how consumption of different food items was affected. With the fall in income in Year Two, consumption of nearly all food items fell in rural program

areas, but the decrease was less than 5% for the staples-rice, other cereals, and potato-and much higher for pulses, meat, fish, vegetables, fruits, and milk and dairy products.

Recommendations are suggested for designing and implementation of potential FPP interventions in accordance with the objective of the study. FFP intervention need to give more attention on some areas such as creating Income Generating opportunities, developing more public actions combined with long-term sectoral growth with consumption smoothing initiatives at household level. It is recommended that FPP interventions also need to emphasis awareness on importance of balance diet and consumption and community mobilization and training for maintenance of the assets created where environmental crisis are dominant forces in governing daily life. It is also recommended that targeted interventions should interact across poverty, food consumption and nutrition. Finally, food security as a holistic approach identifies potential interventions at char and haor areas .

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Table of **Contents**

Glossary

Definition of Key Terms

The study referred different terminology and concept in this study as relevant to different section. Following are definition of some key terms that are being referred in different section of this study.

Hazards

Natural hazards are natural events that have the potential to cause loss of lives and properties of human values.

Food Security

Food security is the condition in which all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. Food security is dependent upon agricultural production, food imports and food aid, employment opportunities and income earnings, intra-household decision making and resource allocation, incidence of disaster and risk analysis and health and nutrition care utilization and caring practices. **It is a multi-dimensional** development topic that requires cross-sectoral integrated interventions.

Household food security

Household food security can be defined as the ability of all individuals to access an adequate supply of food, on a stable basis, and in a sustainable way. A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity, safety and culturally acceptable), and when it is not at undue risk of losing such access.

Vulnerability

Vulnerability means that food security can be lost as well as gained. Vulnerability also can be thought of as the inability to manage risk. When countries, communities and households are unable to cope effectively with shocks or hazards, in fact or potentially, they are vulnerable and potential candidates for assistance. Reducing exposure to risks, such as shocks that affect the many (e.g., droughts or floods) or shocks that affect the individual (e.g., death of the head of a household) can help reduce vulnerability. Increasing the ability to manage risks also reduces vulnerability.

Flood Environment

Flood proofing requirements will depend on the flood environment at a particular location. The flood is a function of the characteristics of the floods that occur. The characteristics of floods vary throughout Bangladesh depending on inter alia the source of flood water, positions of water bodies, the rate of rise of flood water, the duration of floods, local topography and construction to drainage.

Char areas

Char is a Bangla term for a mid channel island that periodically emerges from the riverbed as a results of acceleration. Chars are located within active flood plains of the major rivers. Active flood plains are characterized by more frequent, deep and sever flood.

Haor areas

A haor is a tectonic depression in the northeastern region of Bangladesh which serves as a water basin that during the monsoon season receives rain water run-off from the Meghalaya and Assam regions of India. The haors remain under water for about six to eight months of the year.

Flood proofing

Over the last two decades a new approach has emerged to mitigating the impact of flood on Bangladesh, which is one of the major factors causing the vulnerability of the poor in the country. Flood protection means efforts to reduce flood losses rather than flood prevention. Conceptually, flood protection is outside the dike, not inside it. Therefore, it is especially the focus in char and haor lands in Bangladesh. The chars and haors contain some of Bangladesh's poorest, most marginal, and most vulnerable people. Located outside the protective dikes that protect many river and lake shores they are forced to take to the high ground during the rainy season. FPP was targeted at some of Bangladesh's *char* and *haor* areas. Both of these are **areas** that are flooded during the rainy season but cultivated during the dry season. The residents are subject to high disaster risk and very cramped living conditions during the rainy season.

Structural measures

The FPP contains physical infrastructure and non-infrastructure elements. The infrastructure elements are especially flood protection construction **such as anti**-erosion walls, plinth raising etc. but also submersible roads, latrines, and tube wells for drinking water. Some boats were also provided community **organizations.**

Non-structural measures

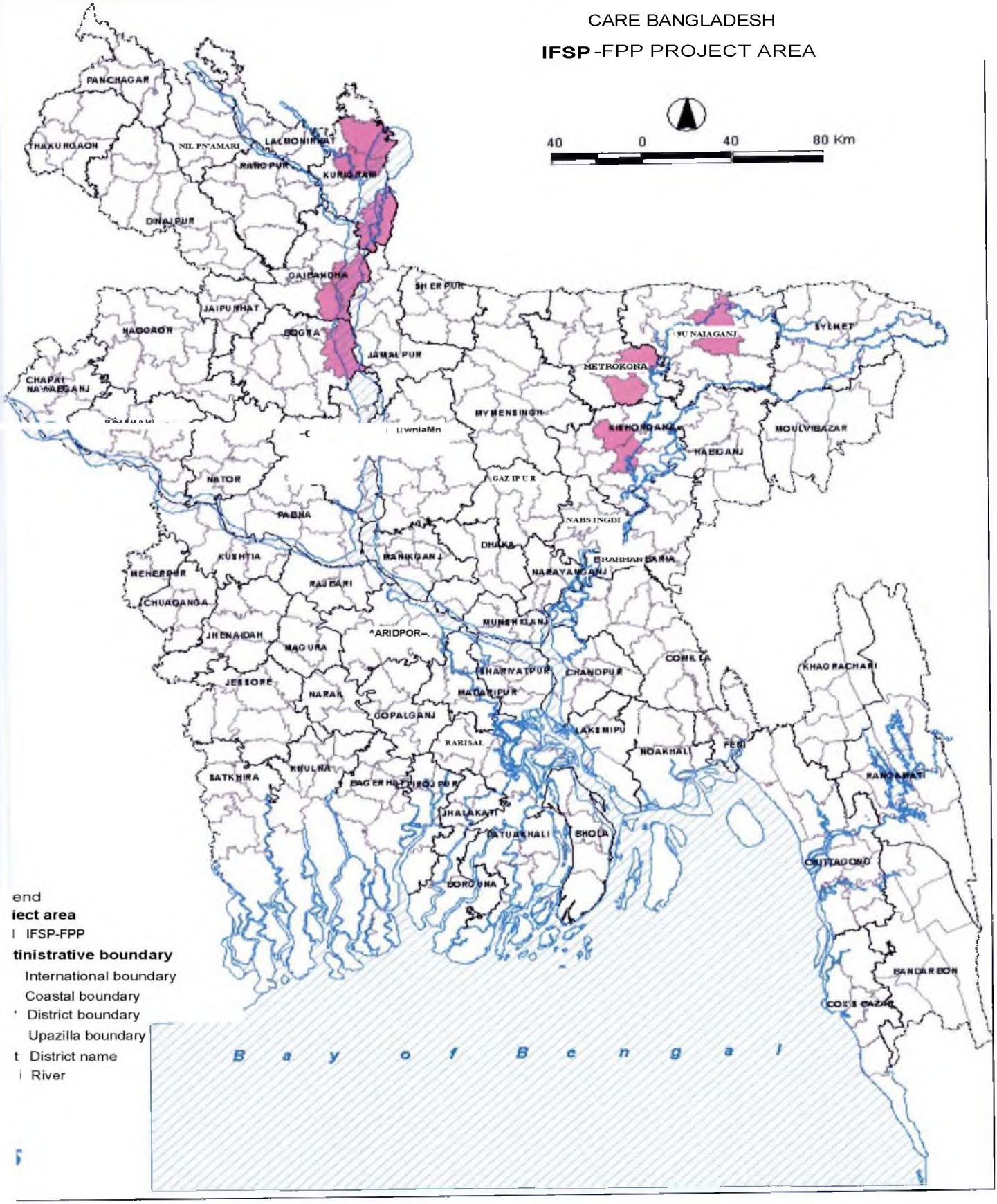
The non-infrastructure elements include considerable work with groups of women in the targeted areas on health and nutrition - supporting household gardening and some other IGA (Income Generating Activities).

Poverty line

Poverty in the context of Bangladesh is usually defined as the inability to attain a minimal standard of living. For **measuring** the incidence of poverty, the poverty line estimated by using food-energy-intake (FEI) method. The FEI method considers the functional relation between monthly per capita expenditure and per capita per day calorie intake. The poverty line is determined as monthly per capita expenditure which the functional relation estimates at predetermined 2112 K cal per day food energy requirement.

CARE BANGLADESH

IFSP-FPP PROJECT AREA



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iect area

I IFSP-FPP

tinistrative boundary

International boundary

Coastal boundary

' District boundary

Upazilla boundary

t District name

i River

Chapter 1 Introduction

1.1 Background:

Bangladesh is a country of 140 million populations with a per capita income of $440. Poverty alleviation is a core challenge for Bangladesh. Because of poverty, malnutrition is a fundamental problem. To reduce poverty in Bangladesh, it is crucial to develop and improve the capacities of its most vulnerable populations and regions. For this, Bangladesh needs to accelerate the growth and productivity of its agriculture and non-farm sectors, improve the quality of social services, ensure proper functioning of its community and rural institutions and expand the rural support infrastructures.

Over the last three decades food grain production in Bangladesh has more than doubled - rice and wheat production has increased from around 10 million metric tons in the early 1970s to 25 million metric tons by the early 2000s. However, nearly half of the population still cannot afford an adequate diet. Also, as much of the countryside lies in disaster-prone, largely flood plain areas, annual flooding, together with periodic other natural disasters, often cause crop damage and food shortages for the vulnerable population.

The major food security problem is that around half of the Bangladeshis remain below the established food based poverty line and as many as one third are in extreme poverty and severely undernourished despite the impressive increases in food grain availability. Success in making staple foods available coexists with very high prevalence of undernourishment (insufficient caloric intake) and malnutrition. According to the Bangladesh Bureau of Statistics in 2000 the malnutrition problem was desperately serious for the poorest 14% of the rural population who were consuming fewer than 1600 kcal per day. Another 10% consumed between 1600 and 1800 kcal per day and around 23% consumed between 1800 and 2122 kcal, the minimum caloric requirement to be food secure, 45% of women had low (<18.5) body mass indices and 52% of children were underweight.

Lack of agricultural lands, employment opportunities, social services, access and knowledge of nutritional diet and healthcare, sanitation and palatable drinking water coupled with sustained poverty leave a significant portion of the Bangladesh population hungry and malnourished.

1.2. Introduction:

Although Bangladesh appears to be approaching aggregate national cereals self-sufficiency, an estimated 30 million plus people cannot afford a daily intake of more than 1800 kilocalories. Due to the frequency of disasters, primarily annual flooding and occasional cyclones typically accompanied by high tidal surges, people in many rural areas remain ultra poor and are trapped by their poverty. Related contributing factors include the lack of reliable and regular income sources, with the majority of the rural population landless and reliant upon income from unpredictable employment. Insignificant economic activity in most areas further contributes to poverty and thereby affects community livelihoods and food security. The domain of vulnerability in this group encompasses exposure to risk, hazards, shocks and stress, difficulty in coping with contingencies, and access to assets.

1.3 Estimates of poverty

Estimates of poverty are based on the food-energy intake method of setting poverty lines. It is estimated that in 1991-92, 47.5 per cent of the population lived below the absolute poverty line, set at a direct calorie intake of 2,122 calories per day. Based on population data for 1995, this equates to around 57 million people. The incidence of poverty was broadly similar in rural (47.6 per cent) and urban (46.7 per cent) areas. Poverty was only slightly lower than in the 1988-89 survey (47.8 per cent), but well below the level recorded in 1983-84 (62.6 per cent). The 1991-92 survey also included estimates of the hard-core poor (28.0 per cent), based on a poverty line equivalent to a direct calorie intake of 1,805 calories per day, and the ultra-poor (17.8 per cent), and based on a poverty line equivalent to a direct calorie intake of 1,600 calories per day.

An important such study by Ravallion and Sen (1996) estimated that in 1991-92, 49.7 per cent of the population were below the poverty line, comprising 52.9 per cent of the rural population and 33.6 per cent of the urban population. Unlike the official estimates, Ravallion and Sen found that the proportion of people living in poverty was much higher in rural than in urban areas. Moreover, they found little evidence that poverty had fallen in the 1980s. While poverty had fallen from 52.3 per cent in 1983-84 to 43.9 per cent in 1985-86, it had risen consistently since that time. Indeed, the World Bank (1996) has argued that poverty has got worse in the last decade, primarily due to the rapid increase in the working age population, increasing landlessness, and slow growth in non-farm employment. Moreover, the burden of poverty falls disproportionately on women, with the incomes of female-headed households 40 per cent lower than for male-headed households.

Hence, while there is debate as to precise estimates, it is clear that widespread absolute poverty remains a major and intractable problem in Bangladesh. It is evident that a major policy focus on poverty will be necessary if poverty is to be reduced and eradicated.

1.4 Addressing Household Food Security

Household food insecurity continues to threaten large proportions of vulnerable population in rural Bangladesh. Food is such a high priority for poor households that many may be tenuously "secure", but at great sacrifice - for example spending almost all their money or time on securing food. Thus not only must current food security itself be tackled, but also both the vulnerability and the disadvantages from enforced concentration on acquiring food, to the detriment of other needs like education or housing. Food insecurity, as a household-level issue, can be addressed by a wide range of program intervention in vulnerable areas. In order to address household food security in flood prone areas CARE/Bangladesh implemented Flood Proofing Project (FPP) in selected haor and char areas from October 1999 to September 2004.

1.5 Flood Proofing Project (FPP)

The goal of the FPP was to increase household food security. The FPP aim was to provide long-term structural and non-structural measures that can be taken by individuals, families, or communities to mitigate the effects of floods. FFP operated in the selected villages in the highly vulnerable *char and haor* areas where annual flooding patterns make local livelihoods highly precarious (see map 1 for FPP locations) . The river islands in the char regions are particularly unstable and may become totally submerged depending on annual flood levels. In the haor regions, households are concentrated in mounds within tectonic depressions that, during the flood season, can create highly damaging waves that erode scarce land and flood household settlements. Inspired by a comprehensive livelihood approach, the FFP addresses the infrastructural vulnerability of households as well as the nutritional, income, and educational needs of the population. The specific objectives of the FFP were:

- To reduce the disruption of normal social and economic activities during floods as well as post-flood period;
- To conserve community as well as household assets and resources during as well as post-flood period;
- To improve household hygiene, sanitation and dietary practices in the pre and post flood period;

The Flood Proofing Project (FPP) provides "long-term structural and non-structural measures that can be taken by individuals, families, or communities to mitigate the effects of floods." FFP operates in the highly vulnerable *char and haor* areas where annual flooding patterns make local livelihoods highly precarious. The river islands in the char regions are particularly unstable and may become totally submerged depending on annual flood levels. In the haor regions, households are concentrated in mounds within tectonic depressions that, during the flood season, can create highly damaging waves that erode scarce land and flood household settlements.

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- To conserve community as well as household assets and resources during as well as post-flood period;
- To improve household hygiene, sanitation and dietary practices in the pre and post flood period; and
- To enhance the capacity of CARE- partners, including UP, GOB, PNGOs and communities in planning, implementing and maintaining flood proofing activities through participatory learning.

1.6 Objective of the Study

The interventions designed and implemented under the FPP project was aim to demonstrate that how flood proofing measures can impact on household food security conditions of vulnerable population in the project areas. Household food security status is basic elements in overseeing the impact of the food security and disaster mitigation activities. Food is a basic need for any individual and household food security is an important phenomenon for any individual household. Household food security can be measured through household food consumption. The key assumptions for the success of the FPP is that as these interventions protect household's assets during flooding, as a results targeted households were able to spent their income for their food consumption.

The primary objective of this study is to oversee the impact of household food security in the FPP areas. There are several food security indicators to measure household food security. This study selected a performance indicator " percentage of households consuming the minimum daily food requirement". This is a direct measure of impact of all the activities for any food security and disaster management project.

The overall objective of this study is to assess that at least eighty percent of household able to meet minimum standard daily food consumptions (1,800 Kcal per person per day) and higher percentage of households in the program areas were able to meet minimum daily food consumptions compared to non program areas over a period of time (three years period).

1.7 Focus of the Present Study

The primary focus of this study will be to assess impact of flood proofing interventions at household levels. Household food security is an important area to oversee the impact of that intervention. Therefore, this study will particularly concentrate on data collected from both program and non program areas. The term program areas will refers FPP sites and control areas will refers as non-project sites in this study. The study will collate and compile six rounds surveys in a yearly basis

1.8 Rational for selection of the study topic

At the household level, a simple and common method of assessing food security is determining whether a household actually consumes 1,800 kcal per person per day. While this number may be low for many adults, it is more than small children require, and thus represents a simple and straightforward threshold to be used at the household level. The level of food security at a higher level of aggregation can then be calculated as the percentage of households consuming the minimum daily food requirement. This indicator is also useful for measuring the impact of programs, as successful program activities could reasonably be expected to raise the proportion of the population in program areas that have attained food security.

1.9 **Limitation** of the Study

The following **limitations** have been identified during the study-

- There was limited published study and reports were available on FPP projects
- Vision for this study was to oversee impact of food consumption in the project areas. FPP interventions may not have direct impact on overall household food consumption. There may be some incredulity to get an overall perception.
- Major source of data used for the study were based on data collected by secondary source. There may be some assumption adopted for analysis that may not be perfect

Chapter 2 Methodology and Approach of the Study

2.1 Methodology and Approach

The Methodology for this study described as follows:

- The background, introduction, scope and objectives of the study is presented in the chapter 1.
- The study described the concept of food security and flood proofing in the chapter 3. This will allow the study to make a linkage between objective and findings of the study for having a better sense how this project contributed.
- The study will review the interventions and implementation mechanism of the FPP in chapter 4. This will allow having a better sense how this project contributed to achieve household food security in the target areas.
- The study will provide a detail description of the methodology of the secondary source i.e. DCA project including sampling, data collection, methods, tools, data analysis techniques in chapter 5. This will be helpful for conducting data analysis for this study and compile findings.
- The study will collate FPP control and program areas data and accumulate findings in accordance with the objective of the study in chapter 6.
- Based on findings recommendations of the study will be presented in chapter 7.
- Glossary of key terms that used in this study is described at the beginning of the study.
- Maps of the FPP project areas and study areas were presented in the relevant sections.
- Questionnaire that used for the secondary data survey is given in the appendices 1.

2.2 Use of Secondary data

The study will make use of data that are being colleted by the project "Comprehensive Food Security Data Collection Activity (DCA)". This **particular** study will **synthesizes the findings of a series of surveys of program activities on an aggregated** yearly **basis and make analysis as per the objective of the study.**

DCA was the secondary source for this study. Below is the brief description of the DCA project - the secondary data source for this study.

2.3 Brief description of the secondary data source

The Asia Foundation (TAF) and its partner organization, Data International Ltd. (DI) undertook a project "Comprehensive Food Security Data Collection Activity (DCA)". This activity served as an independent monitor from May 2003 to June 2006. The overall goal of the DCA was to monitor the impact of USAID funded two food security and disaster management programs. These programs were CARE implemented Integrated Food Security Program Enhancement Initiative Program. Both these programs were implemented between the period 1999 and 2005. Flood Proofing Project was on the sub-project of IFSP. Primary activities include collection and analysis of data and reporting on household food security and nutrition, with the aim of measuring the impact of food security and disaster management interventions that contribute to improvements in the food security of vulnerable groups.

During this period DCA conducted a total number of six rounds survey between June 2003 and May 2006. The survey was conducted two rounds in each year for a period of three years in selected IFSP and FSEI program areas. In order to address seasonal variation the data collection time frame were post harvest season i.e. February/March and pre harvest and lean season i.e. August/September of each year. This would allow capturing time series analysis of household's calorie intake over three year's period (between 2003 and 2006) in a consistent manner.

2.4 Types of the study

The study aims to look at calorie intake and consumptions pattern in the FPP program areas over a period of time. One/two time measurement of household's food consumption is not an effective way of observing improved household food security. In order to understand the household food security status, it is important to look at consumption pattern over a period of time. The focus of this study would be to find out the household food consumption over a period of three years within the life-time of the FPP. As per literature definition of s a cross-sectional time series study are as

particular point of time. **In cross-sectional** studies variables of interest in a sample of subjects are assayed once and the relationships between them are determined. A time **series**, one or more measurements are taken on all subjects before and after a treatment. Time series suffer from a major problem: any change you see could be due to something other than the treatment. For example, subjects might do better on the second test because of their experience of the first test, or they might change their diet between tests because of a change in weather, and diet could affect their performance of the test. Another label for this kind of study is **longitudinal. In a longitudinal** study successive measures are taken at different point of time from the same respondent.

The FPP interventions provided a holistic and integrated food security and disaster management approach for the entire community/villages in the targeted areas. In order to get effective results a cross-sectional and time series analysis is considered more viable option.

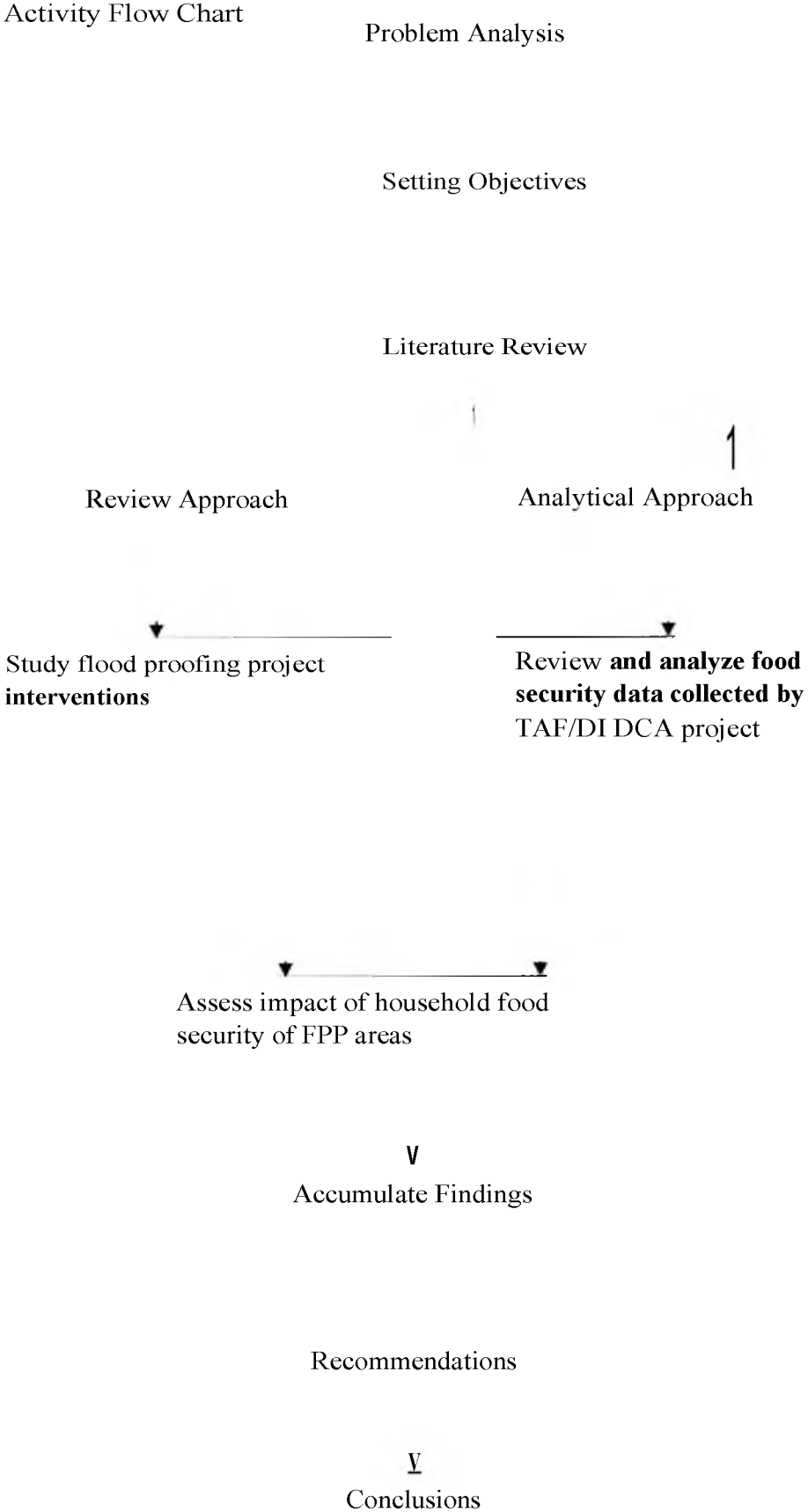
2.5 Literature Review

The literature review was done for background study and conceptual developments. Books papers, research work and report related to disaster management, flood proofing and food security were extensively reviewed

2.6 Formulation of Objective

To work on the impact of household food consumptions in the FPP areas different project reports and studies were reviewed. A precise goal and objective were formulated which are considered the guidelines of this study.

2.7 Activity Flow Chart



Chapter 3 Conceptual Framework

3.1 Concept of Food Security

Food security, as an issue, became prominent in the 1970s and has been a topic of considerable attention since then; thirty definitions of it have been identified by Maxwell and Frankenberger (1992). Originally, there was a tendency to understand the issue of food security only from a supply point of view. In 1979 the World Food Programme Report conceptualized food security, equating it with an "assurance of supplies and a balanced supply-demand situation of stable foods in the international market." The report also emphasized that increasing food production in the developing countries would be the basis on which to build their food security.

The concept of food security would have more meaning if it were understood in line with the legal commitments of the United Nations: the Universal Declaration of Human Rights (1948), which accepts the "right to adequate standard of living," including food; the International Covenant on Economic, Social, and Cultural Rights (1966), which ensures "an equitable distribution of world food supplies in relation to need"; and the Universal Declaration on the Eradication of Hunger and Malnutrition (1974), which declares that "every man, woman, and child has an inalienable right to be free from hunger and malnutrition." Each of these tenets (as quoted by Maxwell and Frankenberger, 1992) suggests implicitly or explicitly the distribution of world food to the needy.

Had these United Nations declarations been adhered to by all nations, the availability of food at the global level would have been one basis for food security in the proper sense of the concept, as defined by the World Bank in 1986. Although member countries accepted these declarations, responding to food needs of other countries is left to the discretion of individual surplus-producing countries. The UN has no power to enforce such declarations. Therefore, a global concept of food security does not guarantee food security at either the household or the national level.

Food security at the household level has been defined by Eide (quoted in Maxwell and Frankenberger, 1992) as "access to adequate food by households over time." This

access to food. The assumption here is that household members' strong family ties would ensure that food is shared equally by each. The basis for early warning of food insecurity (famine and hunger) would then rest on the identification of the inadequacy of food supplies at the household level. It would focus on monitoring the food stock of the households.

Although food availability at the household level is a key issue, there are intra-household factors that may affect equitable and adequate access to food by all members. Maxwell and Frankenberger (1992) have said that "it is misleading to assume that household members share common preferences with regard to (a) the allocation of resources for income generation and food acquisition or (b) the distribution of income and food with the household."

The head of the household may have more power in determining the use of food resources and may misappropriate it. Moreover, household members' nutritional requirements may vary, for example, if some exert more energy in work than others. Cultural factors can also deprive members of the household (i.e., women and children) from getting an equitable share. Thus, the concept of household-level food security, in general, does not fit into the accepted definition of food security.

One of the most influential definitions of food security is that of the World Bank in 1986. The Bank defined it as the "access by all people at all times to enough food for an active and healthy life." This definition encompasses many issues. It deals with production in relation to food availability; it addresses distribution in that the produce should be accessed by all; it covers consumption in the sense that individual food needs are met in order for that individual to be active and healthy. The availability and accessibility of food to meet individual food needs should also be sustainable. This implies that early warning systems of food insecurity should monitor indicators related to food production, distribution, and consumption. The performance of these indicators, therefore, will detect whether a certain area or population is food secure or insecure in relation to the spirit of the above definition. This is now a conventional concept of food security.

The definition of food security that USAID issued in a 1992 policy paper: "Food security exists when all people at all times have both physical and economic access to

sufficient food to meet their dietary needs for a productive and healthy life." (USAID Policy Determination Number 19, April 1992)

The dimension of risk is implicit in USAID**'s definition of food security. That is, the inclusion of the phrase "at all times" in the definition suggests that food security can only be achieved when the risk of falling below adequate levels of availability, access and utilization is very low. This emphasizes to pay more attention to addressing food insecurity through a focus on reducing vulnerability and risk.**

Natural disasters cause immense suffering and loss of life every year, and can have a devastating long-term impact on food production. Agriculture is the most important and possibly the oldest industry in the world. It employs about half of the world's workers and utilizes about one third of the world's land area. However, in the aftermath of disasters, repairing damaged infrastructure, compensating for personal loss, and rehabilitating the landscape consumes resources that could otherwise be devoted to improving nutrition levels and food security

3.2 Concept of Flood **proofing measures**

Two approaches may be used to protect a property from flood damage: structural and nonstructural. Structural methods are intended to prevent flooding by altering the flow of floodwater; these include constructing levees or dams, or modifying a waterway's channel. Nonstructural methods are intended to reduce damage from encroaching floodwater by altering the property; these include acquiring and/or relocating a building, preparing emergency measures, such as sandbagging, and flood proofing structures.

Flood proofing is defined as "any combination of changes or adjustments incorporated in the design, construction, or alteration of individual buildings or properties that will reduce flood damages." Unlike a structural approach, the building site remains subject to flooding; it is the building or the area adjacent to it that is modified to prevent or minimize flood damage.

Some approaches to flood proofing rely on human intervention. "Human intervention" is the need for one or more people to be present to take the right steps to make a flood proofing system work. For example, if a floodwall will provide protection only if

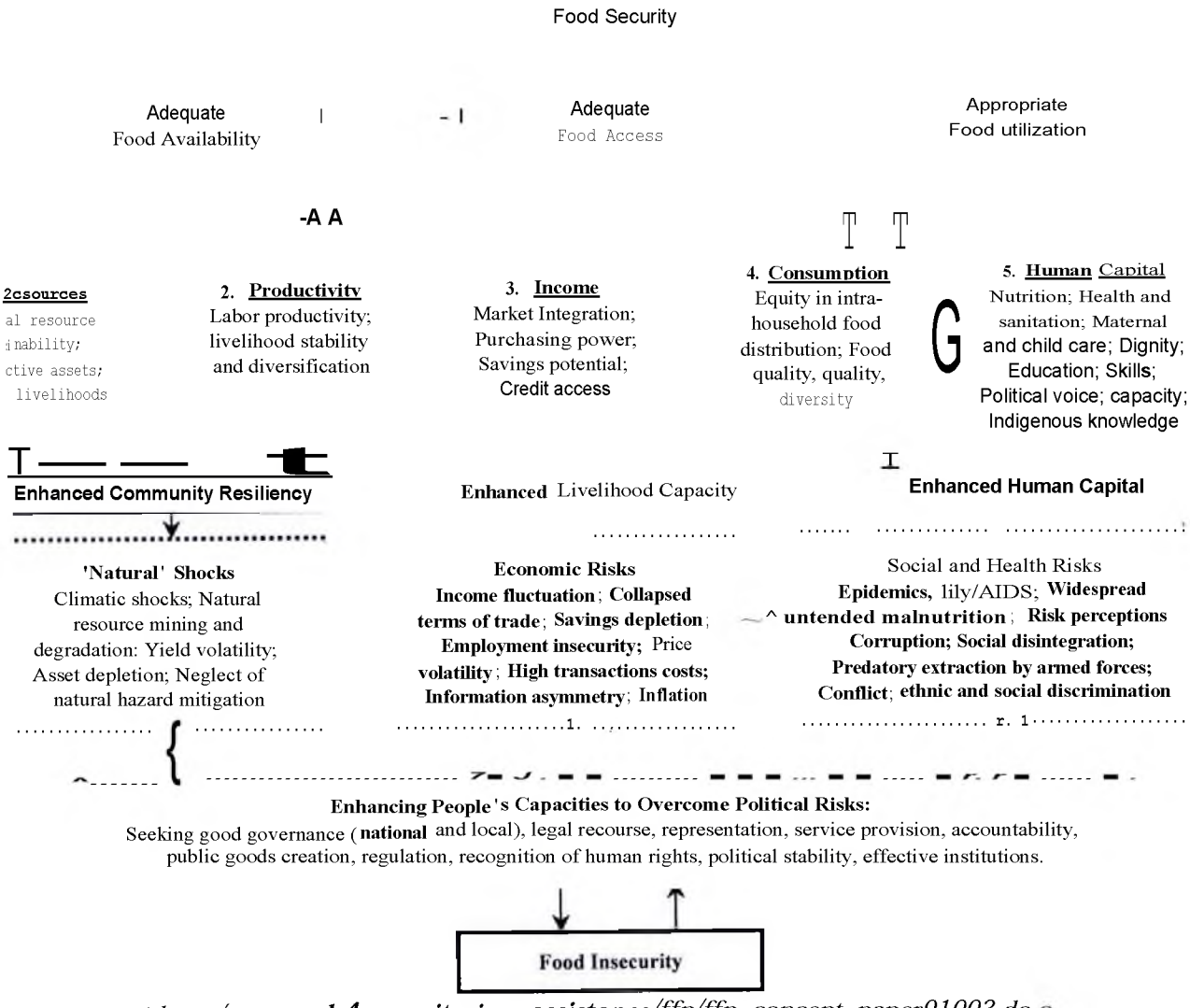
someone installs a closure or activates a pump, it is considered to need human intervention. Measures that need human intervention are considered less dependable, especially if little warning of flood conditions can be expected, since failure to perform human intervention tasks can result in flood damage.

The basic food security framework is presented in the upper part of the diagram with the desired food security outcomes leading to the goal of improved food security. And, the major risks that must be tackled to achieve food security and their links to the desired program and food security outcomes are identified in the bottom of the framework. As this expanded conceptual framework demonstrates, understanding risk is essential to understanding the concept of food security - it underlies everything. Unmanaged risk leads to food insecurity, while managing risks can protect and enhance food security. Risks, as the expanded framework makes clear, come from many sources. Food supply can be affected by climatic fluctuations, for example, depletion of soil fertility, or the loss of a household's productive assets. Food access can be negatively affected by physical insecurity , for example, loss of livelihood or coping options (such as seasonal job migration) or the collapse of safety-net institutions that once protected people with low incomes. Factors that can impair food utilization include epidemic diseases, lack of appropriate nutrition knowledge or socio-cultural practices that affect access to nutritious foods according to age or gender. Political risks, including the lack of good governance, can exacerbate natural, economic, social and health risks.

The expanded conceptual framework encourages a stronger emphasis on livelihoods and assets, and the need to support consumption indicators and invest in nutrition, education and skills development, roads and other public works, and social capital. It also encourages a greater focus on prevention, including prevention of damage to physical assets and livelihoods. The focus on prevention also has a generational dimension, encouraging early investment in infant nutrition to prevent undernutrition.

Figure: 3.1

An Expanded Conceptual Framework for Understanding Food Security



www. *usaid.gov/our_work/humanitarian_assistance/ffp/ffp_concept_paper91003.do,c*

Chapter 4 **Description** of Flood Proofing Project

4.1 Flood Proofing Project

FPP was a five-year program, under the Integrated Food Security Program that commenced in October 1999 and completed in September 2004. Flood Proofing (FP) in 810 villages of 73 selected *char* and *haor* unions of 17 upazilas;

4.2 Implementation Strategies of FPP Component

The implementation strategies of FPP are outlined in the following table.

	(a) Structural	(b) Non-structural
Flood preparedness	1. Construct multi-purpose flood shelters 2. Raise plinth levels of homesteads and community places 3. Extend village mounds and protect walls 4. Construct small retaining structures for social and religious institutions 5. Develop and protect village markets 6. Construct small embankments, village roads, and culverts 7. Provide community evacuation boats, school boats	1. Mobilize community participation in FPP activities through the establishment and training of LPS 2. Provide access to flood information and develop flood proofing and preparedness plans 3. Provide flood preparedness education
Erosion Protection	1. Tree plantation on road sides, institution grounds, and flood shelters 2. Plant-based erosion protection for village mounds 3. Establishment of tree nurseries 4. Construction of protection structures on mound walls	

Nutritional Security	1. Install flood-proofed tube wells (arsenic-free) 2. Construct low-cost flood-proofed latrines 3. Introduce alternative IGA opportunities	1. Form mothers' clubs for health, hygiene and nutrition education 2. Provide necessary training and inputs for home gardening

4.3 Interventions implemented under the FPP

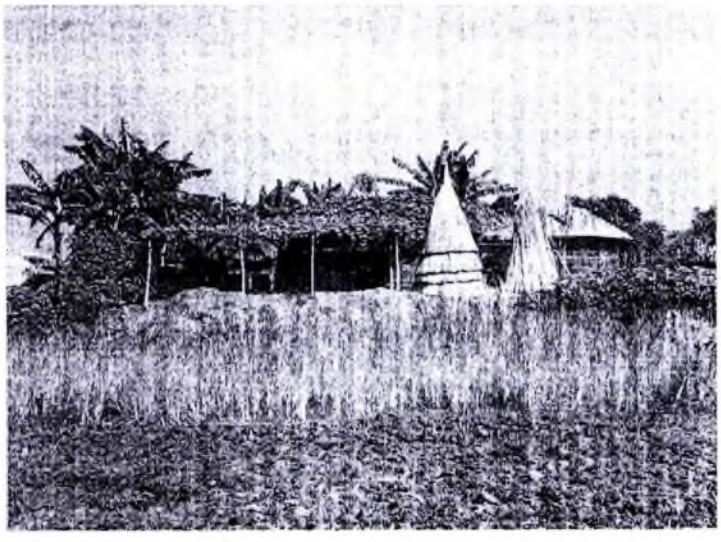
Some activities implemented under FPP

Flood preparedness

Homestead Rising

The houses in the low lying areas and chars are inundated by flood water, since the homestead grounds are low. The household suffer greatly during flooding and their houses are damaged partially or completely. In most cases, poor households have no ability to raise their homestead. In FPP implemented villages, through negotiation and community consultation a number of plinth activities were implemented. Homestead was raised by filling earth in a height normal flooding cannot inundate the raised homestead. Homestead vegetation was planted to protect erosion.

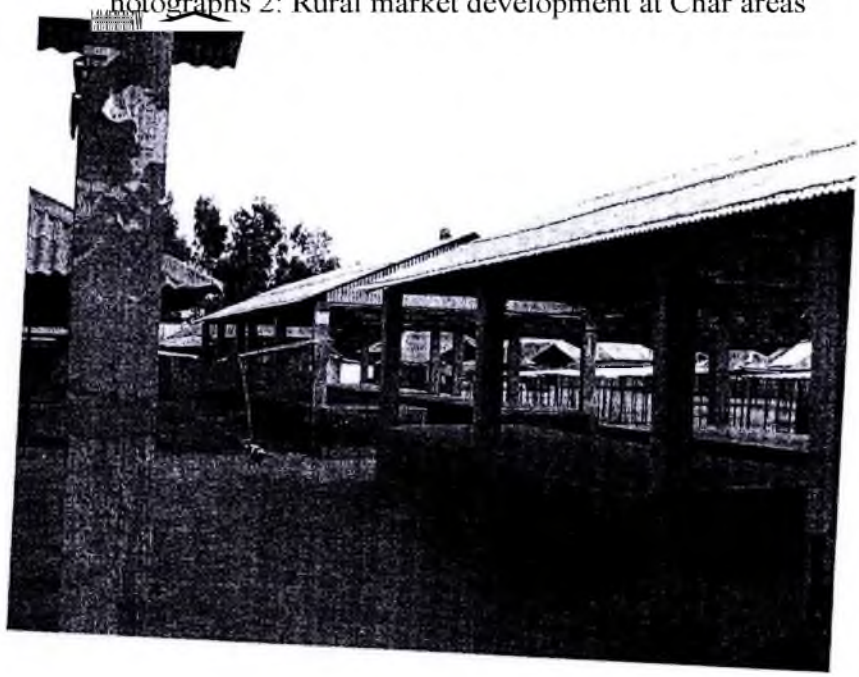
Photograph 1: Homestead raising at char areas



Improvement of community places

Community places such as schools, mosque/madrasa, bazaar, health centres, graveyards, grazing field etc were improved in FPP areas. In these area community activities are seriously disrupted during flooding since these places since these places are inundated during flooding. Also many of the community places are used as refugee areas, but because of its own vulnerability, flood effected people are unable to take shelter in these places or they suffer because of lack of facilities in the communal places. The project supported to developing the ground levels of these places above High Flood Level as well repairing existing structures. These improvements helped comity to use the places during flooding and to take shelter as required. On a need basis latrines and tube-wells were installed in the community places.

Photographs 2: Rural market development at Char areas

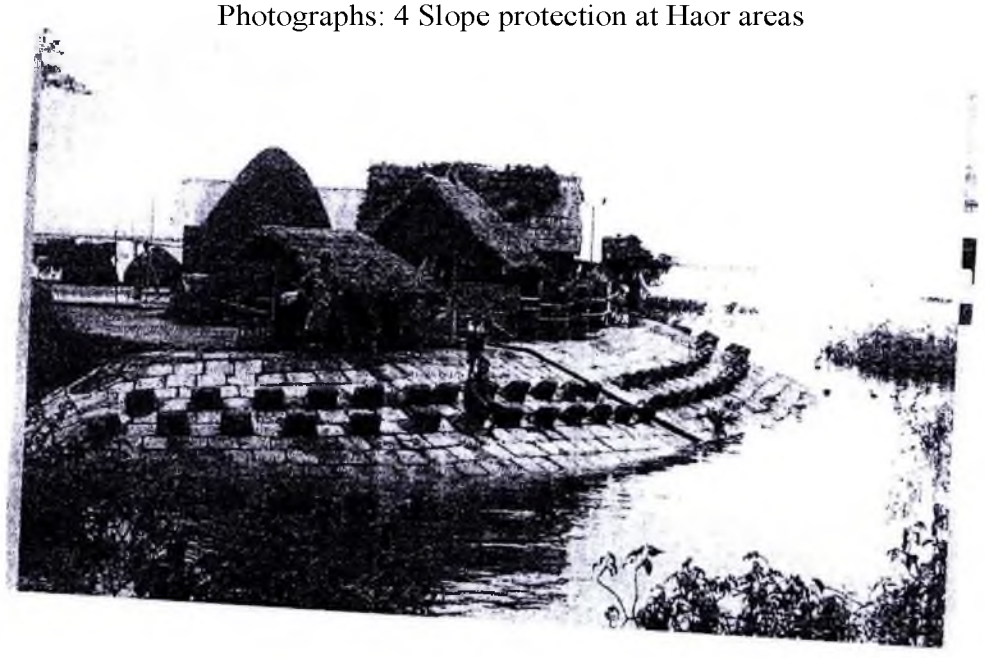


Photographs 3: Embankment

Restoring the area of village mounds

In haor areas, the mounds are becoming smaller year by year due to wave erveion and the families living in the mounds have very limited space for th Extension of the mounds provided the families more spaces or help to eta livld hood. settlements, p established new

Photographs: 4 Slope protection at Haor areas



Slope protection Methods

Slope protection methods involve placing harder, more durable materials such as bricks, stones or rocks to from a vertical or inclined barrier to absorb or dissipate the energy of the waves.

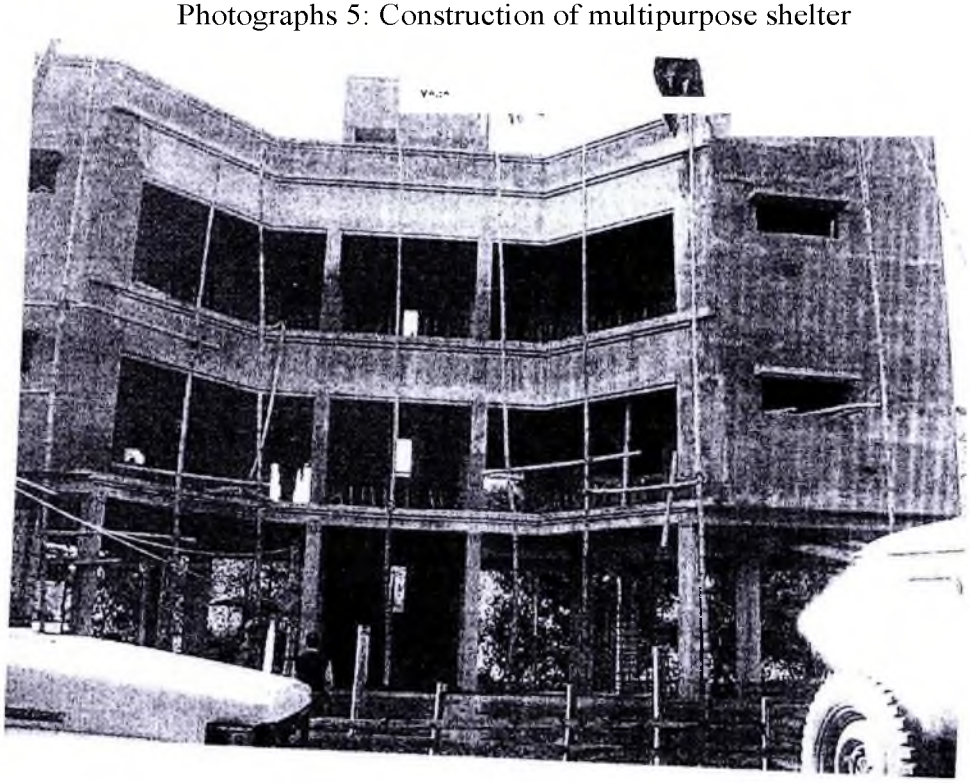
Retaining wall

Retaining walls were constructed to protect communal places in haor area such as hat, bazaar, school, mosque etc. This was completely made of RCC with mix ratio of concrete 1:2:4. The height of retaining wall varied on site conditions.

Multi-purpose flood shelter

The muliti-purpose flood shelters were constructed in some of the FSEI sites as determined by the size of the population and the settlement pattern. The height of the shelter were determined and designed on the basis of hundred years of flooding return period. Community were involved n planning and site selection considering some factors such as access to shelter during flooding, length of time a shelter may be occupied, distance of the shelter etc.

Photographs 5: Construction of multipurpose shelter

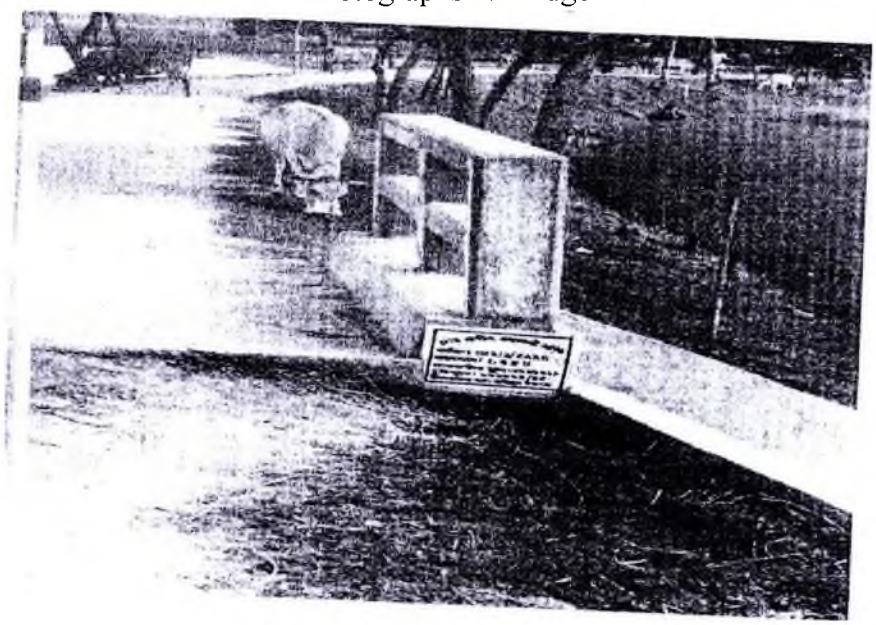


Improvements of Village **Roads and construction of Appurtenant Bridge**

A few existing roads to communal places were improved the roads provided internal communication facilities for communities and used as refugee areas when it was required.

Appurtenant bridge/culvert was constructed in those improved road.

Photographs 6: Bridge



Nutrition Security

Construction of latrines

There were different types of latrine constructed as appropriate latrines were constructed. Communal latrine installed in community places such as flood shelter, service places etc. Group latrine installed in a cluster of households mainly in the haor areas. Low cost latrines were installed at household levels. All these latrines were constructed as per UNICHEF/DPHE standard in order to maintained hygiene standard and above normal flood level. Health education and proper hygiene behavior demonstration were also provided at household level participants.

Construction of Tube-wells

To ensure safe drinking water during flooding, FPP installed new tube wells and or improved existing tube wells in selected sites. These tube-well were installed nr

Photographs 7: Tube wells

Photographs 9: Mother's Club

Photographs 10: Home-gardening

4.4 Management of the FPP

Management System

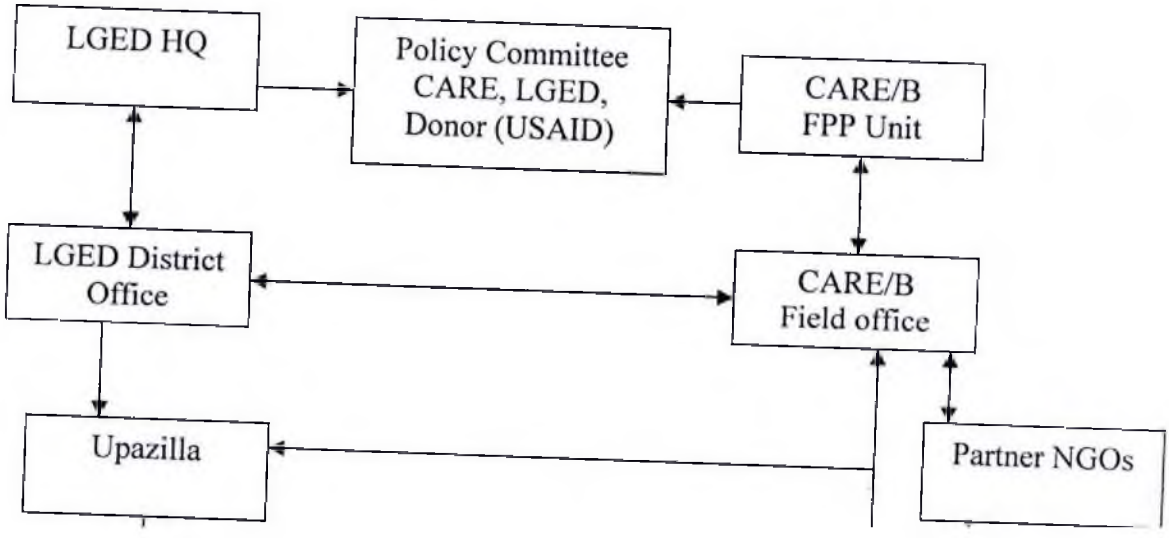
The FPP coordination unit of CARE Bangladesh at the HQ coordinated the management of the project. The coordination unit was mainly responsible for the overall management of the project. The overall management included planning, implementation, coordinate field office operations, Monitoring and Evaluation, Partnering with Local government Engineering Department and NGOs, liaison with donor and GOB, reporting and documentation etc. Each of the operational sites the FPP maintained a Field Office with required staff. Reporting to the coordination unit individual Field Office was responsible for operations of all interventions in their respective areas. LGED HQ provided necessary guidance to their respective district and upazila offices on planning and implementation.

Policy Committee

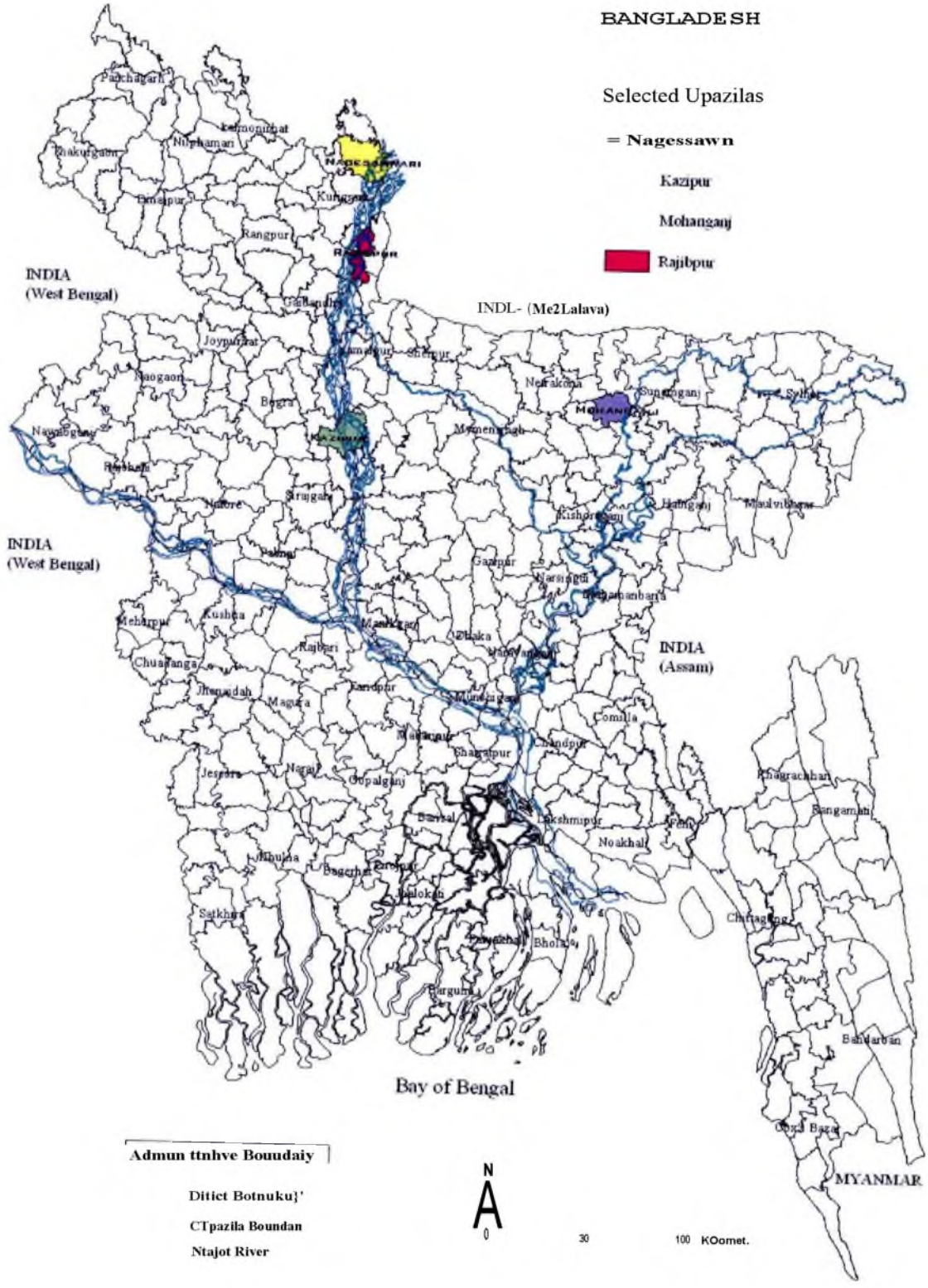
At the central level a policy committee was formed consisting of CARE, LGED and Donor i.e. USAID. The policy committee was responsible for providing guidance on policy related issues at the central level and reviews the progress of the project

interventions. The policy committee also reviewed and approved the design of structural interventions.

Figure 4.1 Institutional set-up for implementation of FPP



FPP Project **sites and interventions**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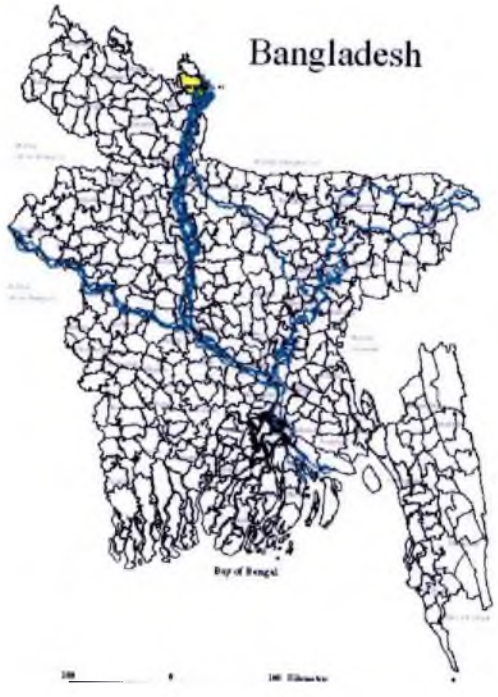

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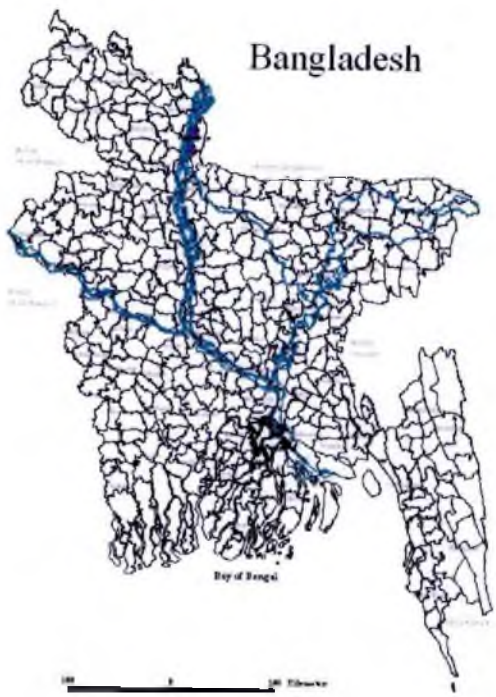

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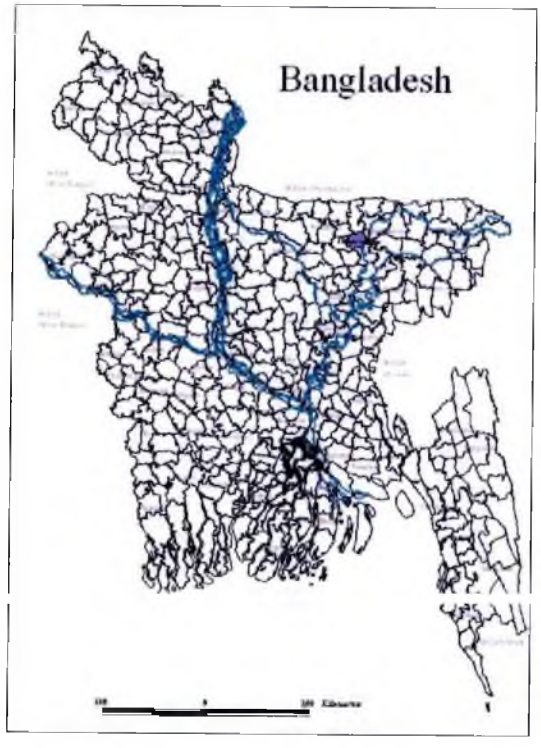


Chapter 5 Secondary Data from Previous Study

5.1 Methodology

Three districts-Kurigram, Sirajganj and Netrokona-in which flood-proofing activities were conducted by CARE under its IFSP program were first selected. Four upazilas were then selected, two in Kurigram - Nagesswari and Rajibpur, and one each in Sirajganj - Kazipur and Netrokona.- Mohon ganj (see map 2,3,4 and 5 for locations). The sample includes one union in each of the four upazilas. The four program unions selected are Noonkhawa and Kodailkati in Kurigram, Tekani in Sirajganj, and Gaglajore in Netrokona (Table5.1).

Having selected the four unions, all the FP villages in each union were listed. One village from each union was then selected purposively from each union. In selecting the villages, the study team consulted with CARE regarding the extensiveness of flood proofing activities in terms of household coverage and the presence of other NGOs. This selection process yielded four villages in the four unions as program area sampling sites. About 225 households were then randomly sampled in each village.

For the control village, the study team chose one non-FP village in the same union, adjacent union, or adjacent upazila, taking care that socio-economic characteristics are similar and that there is not a large amount of other NGO activity in the control village.

For each of the program areas-Nageshwari and Rajibpur upazilas in Kurigram District, Mohanganj upazila in Netrokona District and Kazipur upazila in Sirajganj District-controls were chosen on a one-to-one basis. As control, the team chose a non-program village, close to the program village (but not necessarily in the same union or even in the same upazila) so that roughly the same socio-economic characteristics would be obtained. The indicators that were used to identify the control area were:

- Age of the char. We wanted to compare chars that were roughly equally old.
- General livelihood patterns. We made sure that general livelihood patterns-farming, homestead vegetable gardening, fishing, livestock and poultry rearing, non-farm activities-were roughly the same. Choosing

villages in nearby areas of the same char or in different chars ensured similarity of livelihood patterns; however, an effort was made to avoid adjacent villages as they may have benefited indirectly from CARE's homestead gardening activities and their health and hygiene programs.

- Level of elevation of the village. The control village we selected is as flood-prone as the program village.
- The general characteristics of the villages-type of house *(pukka* or *kutcha);* existence of roads; existence of schools and cyclone shelters; existence of safe water and sanitation facilities; knowledge of good health and hygiene practices; basic knowledge of nutrition outcomes of different foods; and availability of medical help and medicines at low prices;

CARE's Flood Proofing (FP) sites are mostly in *char* and *haor* areas. These areas have unique characteristics that set them apart from the mainland and even from each other. Some chars are old and stable; others are newly formed. The stable chars display distinct agricultural patterns which have emerged over time. Cropping, livestock rearing and fishing comprise the mainstay of the people. In the Mohanganj chars, there is very little land for cultivation and fishing is the principal occupation. In newly formed chars, cropping depends on what the land will yield best for the first few years, and then there is a shift to more stable agricultural patterns. Because of these features, choosing proximate villages as controls offered the best fit in terms of socio-economic characteristics.

Table **5.1: Sampling:**

	Upazi la	Union	# of **Sample Unions** (SA)	# of households in sample	# of households per union
FPP Areas	17	74	4	889	222

5.2 Sampling

The following steps were applied for selecting households from the designated villages:

- For each selected village, a starting point (i.e. the first household to be interviewed) was identified;
- From a central location of a village, a direction was selected randomly;
- Moving in a straight line in the chosen direction, all houses were counted until the edge of the selected place was reached;
- A household was selected randomly as the starting point for the selected direction. Subsequently respondents were interviewed after every `k` households, where

$$k \quad \frac{\textit{Total Number of HHs}}{\textit{HHs to be Interviewed}}$$

- If the interview remained incomplete in one direction, the surveyor returned to the central location and repeated the process choosing another direction.

5.3 Questionnaires and Supplementary Data Collection

Development of Questionnaires: The general questionnaire includes three sections that incorporated (i) socio-demographic and socio-economic information, (ii) weekly food consumption, and (iii) food security scale. The questionnaire was designed to capture information that is primarily required to analyze household food security of program area households.

The primary survey instrument was a seven-day list recall of household consumption patterns, which generated information on quantities consumed and the value of food items (including consumption of home-produced goods). The survey also included a significantly abridged one-month recall list to elicit more information on household expenditure on non-food items. In addition, the survey elicited information on socio-economic background of the households, natural disasters, unanticipated

expenditures, and coping strategies, and involvement in NGO activities. An additional set of questions relating to the regularity of meals and the frequency of skipped meals and inadequate foods was incorporated.

The survey was conducted with the member of the household (presumably female) who has primary responsibility for food preparation or its supervision. Each round of data collection took approximately five weeks to complete. The questionnaire was field-tested and final adjustments were made on the basis of the field-testing, following which the questionnaire was translated into Bangla and subsequently reproduced in quantities sufficient to meet the total sample target.

Supplementary Intra-household Data Collection: From the initial survey of households, the Foundation-DI team returned to all households with children under five to complete an additional module that samples the health and nutrition status of women and children using isopomorphic (body measurement) methods, among others. These data was then linked to the consumption expenditure data.

The broader survey provided a distribution of household expenditures, and identified the line at which households on average consume 1,800 kcal per person, or the minimum family food security line. It is generally understood, however, that intra-household allocation decisions do not actually generate equal consumption among all household members. As a result, it is expected that there is another income line (or total of consumption expenditures) at which everyone in the household actually consumes enough. It will be possible to identify this line (presumably above the 1,800 per person line) at which everyone actually consumes at least 1,800 (that is, the line at which women and children achieve acceptable nutritional status). This line represents the total family food security line. Thus, rather than recording daily household consumption patterns over a lengthy period for each person in the household, a process that is time consuming and requires great attention from all concerned, this approach judges food security by looking at the actual outcomes-that is, the nutritional status of the most vulnerable members of the household. Once the relationship between household consumption patterns and actual nutritional outcomes

among the most vulnerable is documented, this information can be used to take a closer look at the overall survey information from the 940 households.

To this end, the study team designed a supplementary questionnaire on health and nutrition to get anthropomorphic data on mothers and children under 5 from a sub-sample (10 percent) of the overall sample in both rural and urban areas. In developing this questionnaire, discussions were held with several medical doctors and nutrition specialists.

5.4 Data Management, Entry, and Cleaning

Data Enumeration: Data International (DI) contracted the services of 14 local NGO partners to conduct the data enumeration in most of the program and control sites. Having selected the NGOs, the next step was to ensure that the enumerators hired by those NGOs had the requisite qualifications to carry out the work. These included considerations of age, educational background, and previous experience in the field, particularly in data collection. DI helped the NGOs in the screening process.

To ensure quality control, adequate support to NGO partners, and timely completion of work in the critical phase of data collection, the Foundation-DI team made the following administrative arrangements:

The selected NGO enumerators (including the DI enumerators and field supervisors) were then trained by senior DI staff at Dhaka prior to the beginning of every round. The enumerators underwent two days of intensive training, followed by field level pre-testing of the questionnaire. During the actual field surveys all the enumerators in each field met every evening to discuss answers to the various questions and to take stock of any problems encountered. The DI-appointed enumerator in each field then took the lead in guiding the other NGO enumerators. If the problem had not been previously encountered, and no immediate solution was found, the DI enumerator referred the matter to the field supervisor, who provided immediate guidance. If the field supervisor found it necessary, he contacted the DI Dhaka office for clarification on the issue. The enumerators were then instructed accordingly.

A significant percent of the data was checked and edited by senior DI personnel at the field level to ensure quality. The supervisors worked closely with the NGO teams in offering advice and assistance as necessary, monitoring the pace and quality of work, undertaking random spot checks of questionnaires and data entry, and reporting back to DI's Dhaka office on a regular basis. They also made random visits to individual households that had already been interviewed to confirm the integrity of the data collected.

The Foundation-DI team reviewed the quality control measures following the completion of each round of data collection and determined whether similar arrangements would be necessary-and in which cases-in future rounds.

Data Customized data entry software was developed for data entry, using Visual Basic programming. The following principles were considered in developing the program:

- User-friendly
- Prevent implausible data entry
- Restrict access to database
- Easy translation of data for analysis

User Friendly: While entering the data, each of the questions asked appeared on the screen adjacent to the cell(s) data was to be entered. Before going to the next page of data entry, the data entry operators had an opportunity to correct the data if they made any mistake. This enhanced the correctness of the data entered by the operators.

Preventing Implausible Data Entry: The software has built-in instructions whereby implausible data cannot be entered. The data entry module had the following features to ensure quality and integrity of the data entry:

- Validation check of each entry, which enhanced the accuracy of the information stored.
- Logical error check. Based on logical verification, the database rejects irrelevant information.

- Detecting entry of illogical numbers.
- Auto-backup after every entry.

For instance, for respondent's gender, the computer would reject any entry other than the two possible categorical answers-1 and 2.

Restricted Access to Database: The NGO **'s responsibility was limited to timely and reliable data entry. They were not expected to clean or analyze the data. The software developed precluded the data entry operator to review or to copy the database. Such restrictions were aimed at avoiding possible tampering of the data set.**

Easy Translation of Data for Analysis: **For analysis purpose the whole dataset or part of it could be extracted into Microsoft Access as per users ' requirement. For instance, district- or division-level information or data for female-headed households can be extracted from the master database. Data was stored in dbf format. Consequently, statistical packages like SPSS and** STATA can **be used to perform the data analysis.**

In addition to these regular attributes, a Logical Error checking function that compared answers from multiple sections was introduced for a few key questions. In the first two versions of the data entry software, logical functions were used to restrict entering any implausible answer to a question. In Round 3, the use of this function was further extended up to a level where the software could check logical errors in data entry by comparing the answers entered from multiple corresponding questions. For example, if the number of household members was entered as five under variable v003 and details of age of those five members were not entered properly in the next section, then the software would not allow the user to finish the data entry until the correct information was entered. To guide the entry operator, a message box appears on the screen with detailed guidelines in conformity with it user-friendly features.

In a similar way, per capita monthly household expenditure on non-food items was checked. The entry operator was alerted if the per capita monthly household expenditure was found not within the acceptable range. A logical error checking function was also used in Food Security Scale questions in Part C of the questionnaire. In the first two rounds of the survey, all these Logical Error checks

were conducted using statistical packages. Modifications made in the software from the third round minimized errors at entry level.

NGO-DI Collaboration: In most cases, local partner NGOs conducted the data entry. The data entry operators were trained in DI's Dhaka office for two days prior to the beginning of every round of data collection and were made thoroughly familiar with the software. At the field level, DI field supervisors and enumerators monitored the data entry process and provided guidance to ensure quality of the data entry. A significant percent of the data was checked and edited by senior DI personnel at the field level and at DI's Dhaka office to ensure quality. To ensure correctness of data entry, local NGO partners were given ample time for data entry.

Data Cleaning: After the data was entered and transmitted from the fields to DI's Dhaka office, senior DI personnel in Dhaka carried out the data cleaning using standard procedures. As part of data entry integrity checking, DI physically checked 5 percent of the questionnaires, variable by variable. The selection of this 5 percent was done randomly. Subsequently some general statistical analysis such as frequency distribution, mean, median, mode, etc. was applied in identifying outliers in the questionnaire. Outliers in responses were investigated by reviewing the entire questionnaire of such respondents.

Ensuring and Assessing Data Quality: The data was re-checked as the tables required for data analysis were prepared. If the tables revealed any anomalies (e.g., the per capita daily food intake in a particular union was found much higher than in others), the data entry was again checked (if necessary, by going back to the original questionnaires) to confirm that the data was properly entered and that the anomaly, in fact, existed. The analysis then proceeded to understand the anomaly.

Chapter 6 **Findings**

Findings

At the household level, a simple and common method of assessing food security is determining whether a household actually consumes 1,800 KCal per person per day. While this number may be low for many adults, it is more than small children require, and thus represents a simple and straightforward threshold to be used at the household level. The level of food security at a higher level of aggregation can then be calculated as the percentage of households consuming the minimum daily food requirement. This indicator is also useful for measuring the impact of programs, as successful program activities could reasonably be expected to raise the proportion of the population in program areas that have attained food security.

Food Consumption Data

The questionnaire elicited information on weekly food consumption of each household. The household was defined as all extended family members taking food from a common cooking location. The food consumption section included 15 sub-sections, and more than 300 food types were itemized.[1] Information on the amount of each food type consumed (in grams) and the associated expenditure was taken.

Reported food quantities were converted into caloric equivalents using standard conversion factors.[2] The caloric intake figures were tallied for each household, and these sums were then used to ascertain the proportion of households consuming more than the minimum daily food requirement of 1,800 KCal per person per day.

The survey was conducted in four program areas and four matched control areas, and food security estimates were calculated for each of these eight sample populations.

[1] Any food type not explicitly itemized was included under an "other" sub-category for each broad food category.

[2] "Tables of Nutrient Composition of Bangladesh Foods." Darnton-Hill (HKI), N. Hassan and R. Karim (Institute of Food and Nutrition, University of Dhaka), and M.R. Duthie (World Food Program), 1988. Published by Helen Keller International, Bangladesh. Other information was obtained from the Institute of Food and Nutrition, Dhaka University.

For each union sampled, the percent of households consuming the minimum per capita daily intake was calculated. The weighted aggregate figure for the entire FP program was then obtained using the proportion of total population (or households) in the respective unions sampled in the total population (or households) of all the unions sampled under the particular program.3

Food Security Estimates

The purpose of having two rounds of surveys a year was to capture seasonalities and other adverse natural conditions, and attending rising and falling incomes ad expenditures. Before the onset of the Green Revolution, Bangladesh typically had four poor months in terms of agricultural output-these were the winter months. With the widespread use of irrigation, fertilizers and quality seeds, seasonalities in rice production have largely disappeared, though seasonalities exist for potatoes and vegetables. However, adverse conditions do come up every year in one form or another. An exceptional flood may destroy aman seedlings and reduce the extent of aman rice planting, which in turn reduces employment and income. Drought in Northwest Bangladesh may reduce agricultural output and force a reduction in food intake through large price increases. Given such uncertainties, averaging the results from the two rounds of survey in each fiscal year (July to June) would seem to provide a better representation of yearly performance than a single point survey. In this synthesis of findings, a simple average of the results of the two rounds of survey in each year was taken to give a more balanced yearly representation of results.

The estimates of food security status for each program and control area were obtained in terms of the percentage of households having per capita daily calorie intake of 1,800 kilocalories (KCaI) or more. The results for program and control areas for the three years are shown in Table 6. 1.

The sample for each program and control area produces an unbiased estimate of food security for each area; however, aggregating the statistics at the local area to estimate food security in the population covered by each nrnoram A.....o..... : l-

Table 6.1: Estimates of Food Security in FPP Areas

	FPP-Program Areas	FPP-Control Areas
Year 1 (2003-04)	87.4	74.6
Year 2 (2004-05)	87.5	83.3
Year 3 (2005-06)	87.5	82.8

It is seen that food security was achieved by more than 87 percent of the FPP population in program areas. A statistical test found food security to be significantly higher in program areas compared to control areas at 5 percent confidence level in each of the three years under study. The food security situation was observed to be more or less stable in program areas during the three years.

The programs provide a number of poverty-reducing interventions in.a limited area (i.e., particular villages in FPP). There are very few spread effects for villages (in nearby *chars)* that are not covered by the programs. Consequently, the sampling for program areas was limited to the same slums or villages where the programs were undertaken. Under FPP, villages close to the program village and situated in adjacent *chars* were excluded from the program on the grounds of greater erosion possibilities that would undermine any investments in development. These villages were left out by other NGOs on the same basis. With the program working intensively and well in specifically defined areas, a significant difference between program and control areas was observed. In FPP villages, increased production of winter vegetables in each homestead (facilitated under the program through provision of better seeds and technical know-how) provided valuable dietary supplements in a season when fish and meat were largely inaccessible to the residents. In addition, reduction of illnesses increased work-time and productivity of earning members. Also, women with better knowledge of nutritious foods could allocate their limited household income for the purchase of foods that provide a more balanced diet.

Determinants of Calorie Intake:

Food security as defined depends on:

- **the ability of households to access foods, largely dependent on their income;**
- **general food availability, determining prices given the demand; and**
- **the composition of the food consumption bundle, with greater preference for calorie-intensive foods providing higher calorie intake.**

It is in these terms that the analysis proceeds.

Income: A stable or slightly worsening food security situation can be attributed to lower incomes. A lower per capita daily income level is observed in Year Two compared to Year I, and in Year Three compared to Year 2, though the declines are not statistically significant . In control areas likewise, the differences in per capita expenditure levels are not statistically significant. Using expenditure as a proxy for income, it appears that both per capita income levels and food security were roughly stable in program areas during the period under consideration. In control areas, food security increased significantly in Year 2, but declined somewhat in Year Three, though the decline was not statistically significant.

Table: 6.2

	Monthly Expenditure per Sample Household			Per Capita Daily Expenditure			of Per Capita Daily Total Expenditure		
	Food Expenditure	Non-food Expenditure	Total Expenditure	Food Expenditure	Non-food Expenditure	Total Expenditure	Food Expenditure	Non-food Expenditure	Total Expenditure
PROGRAM									
AREA									
Year I	2,512	947	3,459	16.74	6.39	23.13	72.37	27.63	100.00
Year 2	2,231	728	2,959	15.51	5.09	20.60	75.28	24.72	100.00
Year 3	2,195	658	2,853	15.67	4.73	20.40	76.79	23.21	100.00
Year 2 over Year	(1 1.19)	(23.14)	(14.47)	(7.36)	(20.31)	(10.94)			
Year 3 over Year 2	(1.57)	(9.63)	(3.56)	1.04	(7.02)	(0.96)			
CONTROL AREA									
Year 1	2,071	875	2,947	13.83	5.92	19.75	70.03	29.97	100.00
Year 2	1,975	572	2,547	13.59	3.96	17.55	77.44	22.56	100.00
Year 3	2,094	590	2,684	14.74	4.19	18.93	77.89	22.11	100.00
Year 2 over Year	(4.63)	(34.65)	(13.55)	(1.76)	(33.12)	(11.16)			
Year 3 over Year 2	6.03	3.07	5.37	8.48	5.71	7.85			

Declining expenditure was accompanied by reduced food and non-food expenditure (as measured on a per capita daily basis) in rural program and control areas, but the declines are not statistically significant. Non-food expenditure fell by a greater percentage than food expenditure, as is to be expected with people striving, in the face of lower income levels, to preserve their meager food intake levels through a greater cut-off in non-food expenditure.

Consumption: The effect on food security depends of course how consumption of different food items was affected.

With the fall in income in Year Two, consumption of nearly all food items fell in rural program areas, but the decrease was less than 5% for the staples-rice, other cereals, and potato-and much higher for pulses, meat, fish, vegetables, fruits, and milk and dairy products (Table 5). Rice prices were 17.3 percent higher in Year Two compared to Year One but rice consumption fell by only 3.9 percent. In Year Three, incomes fell further, but rice prices increased further by another 4.2 percent, with a resulting fall of 4.8 percent in rice consumption. In both the years, the fall in rice consumption was lower than the fall in consumption of other foods in the consumer's diet, namely pulses, fish, meat, milk and dairy products and fruits (Chart 1).4

Table 6.3 Percentage Decline in the Quantities Consumed of Different Foods in the Face of Declining Incomes (FPP Program Areas)

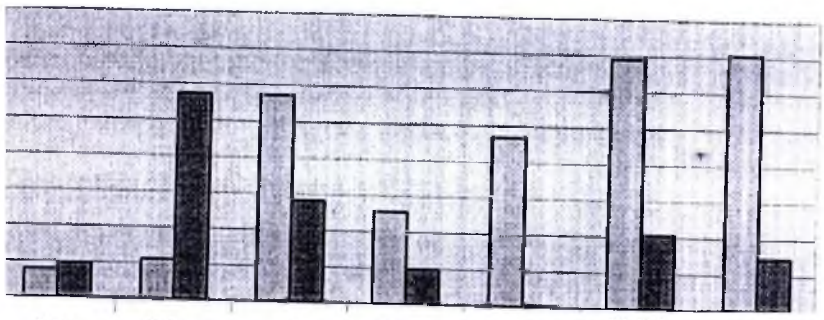
	0-5%	5-10%	10-20%	20-30%	30-40%	Increase
F	Rice, potatoes, cereals other than rice	Pulses, oils and fats, spices	Meat	Fish, eggs, vegetables, sugar/molasses	Milk & dairy, fruits	
Year 2						
Year 3	Rice, meat, vegetables, spices	Cereals other than rice, fruits	Fish, milk & dairy products	Pulses, sugar/molasses	Sweets	Potatoes (0.95%), oils & fats (1.6%)

The conclusion is that people try to hold on to their rice consumption even in the face of declining income and higher prices. In Year Two, the smaller *aman* crop resulting from the floods greatly increased rice prices but the fall in rice consumption was small. In Year Three, rice consumption fell in rural program areas in response to the income fall and a further rise in prices.

With the exception of vegetables in Year Three.

Chart 6.1

Fall in Per Capita Daily Consumption (**in grams**) of Some **Foods Important in the** Consumer's Diet



	Rice	Pulses	Fish	Meat	Vegetables I	Milk & dairy	Fruits
Yr 2 over Yr I	3.94	6 .69	28 .69	12.81	23.38	34.63	35.26
M Yr 3 over Yr 2	4.81	28 .63	14 .11	4.91	L 0.14	10.29	7.29

The Importance of Rice in the Consumers' Diet: We have seen that rice consumption is relatively sticky in the face of income and price changes. What is the implication of this in terms of overall caloric intake of the households?

Rice is the major element in the typical consumer's diet. Rice provides a relatively large amount of calories per gram and, given its price, is about the cheapest source of calories amongst different foods consumed in Bangladesh (Table 6). This, together with dietary habits that make rice the major component of a normal diet, contributes to the large share of rice in total food expenditure and total caloric intake of the average household.

Table 6.4 Prrice per Calorie Obtained From Different Foods (FPP Areas, Feb-Mar 2006)

	Calories per 100 grams	Price per 100 grams	Price per 100 calorie
Rice	349	1.66	0.47
Potato	97	0.83	0.85
Pulses	344	3.76	1.09
Fish	118	5.95	5.05
Meat	115	10.06	8.75
Vegetables	64	0.49	0.77

Share of Rice in Caloric Intake: As seen in Table 7 below, rice accounted for 75 percent or more of per capita caloric intake in FPP program areas during the three years under consideration. Notice that over the three years, as incomes declined, the share of rice in per capita caloric intake increased. In other words, even though rice consumption decreased due to income and price reasons, consumption of other foods declined to the extent that the share of rice in total caloric intake actually increased.

Table 6.5: Percentage Share of Rice in Per Capita Daily Caloric Intake of the Average Household in FPP Areas

	% share of rice
Year 1	74.77
Year 2	78.01
Year 3	79.17

Share of Rice in Food Expenditure: Per capita daily expenditure on rice accounted for 43 to 52 percent of per capita daily food expenditure in FPP program areas in the three years (Table 8). It is notable that as incomes fell over the three years, per capita

daily food expenditure on rice increased while that on most other food types was stable or declining.

Table6.6 : Percentage Share of Rice in Per Capita Daily Food Expenditure of the Average Household in FPP Areas

	% share of rice
Year 1	42.89
Year 2	51.75
Year 3	50.85

Summing Up: Rice constitutes a major proportion of the average consumer's diet, and comprises a major share of per capita calorie intake. Rice consumption is also quite invariant to income and price changes. Given a decline in income, the fall in calorie intake from a decrease in rice consumption is low compared to the fall in caloric intake from other food types. Consequently, food security is preserved even in the face of income declines if rice prices remain relatively stable. Stable rice prices are crucial for food security.

Percentage of Households Consuming 2,122 KCal **or More Per Person Per Day**

One problem with using an extremely low threshold (i.e., 1,800 KCal per capita daily) is that it may miss program impacts among households that are above that line and yet still vulnerable to an unexpected loss of income. The survey data reveal that about 75 percent or more of the per capita daily calorie intake comes from cereals (mainly rice) alone. If rice prices are relatively low and stable, as currently observed, it can be expected that the extremely poor would very quickly reach the 1,800 KCal threshold. Once above this threshold, it is impossible to distinguish improvements in household consumption levels.

To determine if program activities have had any impact on households above the lowest food security line, Table 9 examines differences in the proportion of

households achieving a higher caloric intake threshold-2,122 Kcal-that serves as a standard benchmark for measuring absolute poverty. If these programs have had some positive contribution, then the difference between program and control areas should become more striking with respect to this higher benchmark.

Table 6.7 : Percentage of Households in FPP Areas Consuming 2,122 KCal Or More Per Person Per Day

	Year 1	Year 2	Year 3
FPP Areas: **Program**	**75.14**	**69.28**	**61.50**
FPP Areas: **Control**	**58.98**	60.45	56.27

At this higher threshold, the difference between FPP program and control areas in terms of the percentage of the population having adequate caloric intake is again significant at the 5 percent level. For FPP areas, the interpretation of these results is that program activities do appear to be having a beneficial impact on food security-not strictly in the case of the very poorest households, but also in the case of those that are positioned just above the lowest food security threshold.

Total Consumption (Extreme Poverty) Estimates: A focus on actual food consumption levels may count some households as food insecure even if they had the ability to consume adequate food levels but chose not to do so. Similarly, households may be considered food secure even if they are barely able to consume enough food by restricting non-food purchases to levels below socially accepted norms. To consider a broader conceptualization of food security, the research team constructed a taka-based line for extreme poverty. This line includes a taka amount that reflects the ability to purchase a local food basket that would represent 1,800 KCal per capita daily, as well as a non-food basket of essential items as defined by those households consuming roughly 1,800 calories per capita daily.[5] Accordingly, households in extreme poverty are those with expenditure less than the above-derived poverty line. It could be argued that households living in extreme poverty are food insecure,

[5] The food basket was calculated by averaging the total amount spent on food by households consuming between 1,700 and 1,900 calories. The non-food basket was calculated as the average amount of expenditures for this same cohort. Thus, the taka-based poverty line represents food security in the sense that households above this line *could* consume the 1,800 calories even if they choose not to do so.

regardless of actual food consumption levels, as the low total consumption levels make these households vulnerable to sudden shortfalls in household income, even if they are consuming enough calories today.6

While the threshold of 1,800 KCa1 per capita daily has been reached by over 87 percent of the population (see Table 3, page 5), the proportion of households judged vulnerable to income shortfalls (i.e., not meeting this higher standard of food security) using these estimates of extreme poverty is considerably higher.

Table 6.8: Percent of Households in Extreme Poverty (FPP program areas)

	Year 1	Year 2	Year 3
FPP Program Areas	25.98	31.62	23.25

Assessing the Programs in Terms of Food Security Attainments

Given adverse exogenous circumstances that affected program performance-the disastrous floods of 2004 and the consequent drop in *aman* rice production, the losses incurred in homestead vegetable and livestock production activities, employment losses from shut-down of many small industrial activities, the poor potato harvest in the north-west districts in 2006-adverse income movements did occur that were beyond the scope of the programs to reverse. One can speculate that the situation would have been better in the absence of these adverse influencing circumstances. However, overall caloric intake depends on a number of variables-types of foods consumed, calorie content of different foods, and income and price elasticities of consumption. The reality is that different households have different consumption priorities and preferences, and the use of an externally determined standard of caloric sufficiency does not allow for the incorporation of many of these household-level differences.

Another way of measuring food security is to simply ask households about the adequacy of their consumption patterns. Rather than asking for specific details of past

G Also, to the extent that the figures for extreme poverty calculated in Chart 3 can be read as the proportion of households that are food insecure, the levels of food security in any given population can be easily calculated by subtracting poverty estimates from 100.

consumption, qualitative questions can be posed that elicit subjective judgments of food consumption. The data collected on these questions should not be seen as an alternative data set to the consumption recall survey, but rather as a complementary set of information about levels and characteristics of food security in program and control areas. In addition to the recall survey, the research questionnaire included a module that posed a series of questions about certain consumption patterns that may reflect varying degrees of food insecurity in each household.

The first question asked directly whether any member in the household experienced hunger during the past month, but that there was not sufficient income to purchase more food. The data suggest that hunger has been much less prevalent in the FPP program areas than in the control areas. The data reflect higher levels of food security for the FPP program areas .

Table 6.9: Percentage of Households in which one or More Members were Hungry, but the Household Did Not Have Enough Money to Buy More

	Experienced hunger	Experienced hunger frequently
Year 2-FPP Program	37.91	14.74
Year 2-FPP Control	54.99	20.36
Year 3-FPP Program	29.06	4.87
Year 3-FPP Control	49.85	10.22

The second question approaches the issue of food adequacy slightly differently, focusing on the ability of households to consume their daily needs of rice and lentils. In Bangladesh, a household that is unable to provide adequate *dal-bhat* might very well be considered food insecure. The notion that this is a higher standard than the direct question of hunger posed in the first question is reflected in the responses, with a slightly higher percentage experiencing shortage of *dal-bhat* than acknowledging

hunger. As with the responses to the first question, the responses here display a remarkable consistency in the contrast between program and control areas, with less food insecurity in all program areas than in control areas .

Table 6.10: Percentage of Households That Did Not Have Enough *Dal-bhat* to Meet Their Daily Needs but Did Not Have Enough Money to Buy More

	Inadequate dal-bhat intake	Frequent dal-bhat inadequacy
Year 2-FPP Program	41.01	10.98
Year 2-FPP Control	55.28	15.45
Year 3-FPP Program	31.79	5.71
Year 3-FPP Control	51.24	11.81

The third question poses yet a higher food security standard by describing a more nutritious diet that includes meat, fish, or vegetables in addition to *dal-bhat*. The percentage of households who are unable to attain this more nutritious diet is lower in program areas than in control areas .

Table 6.11: Percent of Households Which Could Not Afford to Eat Other Nutritious Foods Along with *Dal-bhat* (e.g., fish, **meat, vegetables, etc.**

	Inadequate diet
Year 2-FPP Program	53.70
Year 2-FPP Control	68.84
Year 3-FPP Program	57.86
Year 3-FPP Control	73.10

Nutritional Outcomes

A subset of program area households yielded some insight into the nutritional status of under-five children in these households. Weight-for-age (w/a) is taken as an indicator of undernourishment. The Z-scores were calculated using standard procedures. Values between two and three standard deviations were counted as measures of moderate malnutrition, while values less than three standard deviations were counted as measures of severe malnutrition. Moderate malnutrition among children under five increased in FPP program areas over the three years judged by the weight for age criterion, but remained lower than the level in control areas in each year. Severe malnutrition was higher in program areas compared to control areas in Year 1, but the incidence was lower than control areas in subsequent areas (Table 14).

Table 6.12: Extent of Moderate and Severe **Malnutrition** Among Children Under Five In FPP Program and Control Areas

	Year I	Year 2	Year 3
Moderate Malnutrition			
Program	30.22	33.90	34.27
Control	34.11	38.73	36.48
Severe Malnutrition			
Program	21.56	23.89	21.75
Control	20.60	25.47	23.29

Prevalence of malnutrition among mothers of under-five children

The subset of households subject to the nutrition survey also included mothers of the children under five included in the sample. Given the mothers' height and weight, the body mass index (BMI) was used to determine the percentage of mothers who are moderately or severely underweight. The results are shown in Table 15.

Table 6.13: Percentage of Mothers Who Are Moderately Underweight (**using the** BMI criterion) in FPP Areas

	Year 2	**Year 3**
Program Areas	32.10	33.32
Control Areas	31.08	36.60

The results show that the incidence of moderate malnutrition among mothers was higher in program areas compared to control areas in Year Two. However, the difference is not statistically significant at the 5 percent confidence level. In Year Three, moderate malnutrition among mothers increased in both program and control areas. The extent of malnutrition in Year Three is, however, significantly lower in program areas compared to control areas. What is interesting is the prevalence of a high percentage of moderately underweight mothers in the program areas. Given the decline in food expenditure in program areas in Year Two and the further small decline in Year Three, intra-household disparities in food consumption could accounted for an uneven distribution of foods leading to a temporary increase in malnutrition for the mothers in Year Three.

Chapter 7 Conclusion and Recommendations

7.1 Recommendations

Household food security status is basic elements in overseeing the impact of the food and disaster mitigation activities. Food is a basic need for any individual and household. Food security is an important phenomenon for any individual household. The interventions designed and implemented under the flood proofing project was aim to demonstrate that flood proofing measures can impact on household food security conditions of vulnerable population in the project areas. The key assumption for the success of the flood proofing project is that as these interventions protect household assets during flooding, as a result targeted households were able to spend their income to improve food consumptions.

Following recommendations are suggested for designing and implementation of potential FPP interventions in accordance with the objective of the study.

- Increasing food availability can contribute to reduce food security and malnutrition. Income growth helps improve food availability, consumption demand and nutritional outcome. Creating opportunities of different Income Generating Activities (IGA) at household and community levels are important in the flood proofing areas at char and haor. IGA will help household for their increase income which will lead to increase food consumption. It is observed that FPP intervention could not give sufficient attention for creating opportunities for IGAs. Systematic attention in the FPP areas is needed to the economic prospects of various potential IGA, and methodology for marketing products and securing livelihood of communities and households.

- Smoothing consumption as a means of stabling the dynamics of household food insecurity. FPP interventions in char and haor areas need more public action which should be combined with long-term sectoral growth with consumption smoothing initiatives at household level.

- Community mobilization and training should include environmental and scientific materials so that communities can understand and take some responsibility for the environmental soundness and maintenance of the assets created in the char and haor areas where environmental crisis are dominant forces in governing daily life. This will be helpful for the FPP areas household to protect their livelihood and assets, eventually their expenditure pattern would be more focused on household food consumption.

- It is crucial for the household at FPP areas to understand the importance of household food security for their healthy life. FPP project intervention should give more attention at community and household level for better understanding of dietary pattern and food consumption habit in order to survive for a healthy and peaceful life. This will be useful for enhancing their coping mechanism during a disaster period.

- In the FPP programmatic actions such as structural and non-structural interventions need to be reframed and integrated such a way vulnerability of food insecure households and communities in char and haor areas should be addressed directly. Targeted interventions should interact across poverty, food consumption and nutrition.

7.1 Conclusion

There is an important spatial dimension to poverty, vulnerability to shock and food insecurity in Bangladesh. These events have a disproportionate effect on people in marginal, risk and flood prone areas. Although half of the population live below the upper poverty line (2,122 Kcal/day) and a third below the lower poverty line (1,805 kcal/day). Although food consumption among the poor is increasing, under nutrition indicators remain alarmingly high, and the rich-poor gap is growing.

The study focused on the impact of household food security and consumption in the flood proofing project areas The findings revealed that in terms of consumption most

of household were able to meet daily calorie requirements, however, quality of diet and balance diet remain an issue.

Finally, food security as a holistic approach identifies potential interventions at char and haor areas such as enhancing people's resilience to shock (protecting lives), building people's capacity to grow durable and diverse livelihood base (such as assets, resources, infrastructure etc.) and enhance the capacity of individuals to make better use of available and potential resources by increasing their human capital.

REFERENCES

Anderson, P. Pinstrup and R Pandya-Lorech (eds) (2001) *Degradation,* International Food Policy Research Institute, Washington, D.C.

CARE Bangladesh (1999), *Planning and Implementation Guideline, Flood Proofing Project,* CARE Bangladesh, Dhaka.

CARE Bangladesh (2000), *Baseline Report FY 2000, Socio-Economic and Anthropometry Survey, Flood Proofing Project,* CARE Bangladesh, Dhaka.

CARE Bangladesh (2003), *Baseline Survey of vulnerable households in Char and Haor areas of Serajganj and Sunamganj Districts, Integrated Food Security Program,* CARE Bangladesh, Dhaka.

CARE Bangladesh (2003), *Seasonal Survey of Flood Proofing Project, Integrated Food Security Program,* CARE Bangladesh, Dhaka.

CARE Bangladesh (2004), *Integrated Food Security Project, Final Evaluation Report,* CARE Bangladesh, Dhaka.

CARE Bangladesh *(n.d.) Participatory Monitoring and Evaluation in Flood Proofing Pilot Project,* PLA Notes CD ROM 1988-2001, CARE Bangladesh, Dhaka.

Darnton-Hill, N. Hassan, R. Karim and M.R. Duthie (1988), *Tables of Nutrient Composition of Bangladesh Foods,* Helen Keller International, Bangladesh.

Food and Agriculture Organization of the United Nations (2001), *The State of Food Insecurity in the World, Third edition,* FAO, Rome.

Garrett, J. (n.d.) *"Achieving Urban Food and Nutrition Security in the Developing World" The Unfinished Agenda: Perspectives on Overcoming Hunger, Poverty and Environment.*

International Fund for Agricultural Development (2002), *Risk of Increasing Marginization of Rural Poor in Least Development Countries,* IFAD, Rome.

Kreimer, A., and M. Arnold (eds), *Managing Disaster Risk in Emerging Economics,* World Bank, Washington, D.C.

McCulloch, N and C. Revoredo (2001), *Prospects for Global Food Security,* International Food Policy Research Institute, Washington, D.C.

Sposato, S. (2002), *Food Aid Needs and Burden Sharing,* USAID Internal Memorandum.

United States Agency for International Development (1995), *Food Aid and Food Security Policy Paper,* Bureau for Program and Policy Coordination, USAID, Washington D.C. URL: http://www.usaid.gov/bd/food sec html, accessed in September, 2006.

United States Agency for International Development (2005), *Strategic Plan for 2006 - 2010,* URL: http://www.usaid.gov/bd/food sec.html, accessed in September, 2006.

Comprehensive Food Security Data Collection Activity
DI-TAF Bangladesh

Round # 0 2

Household #

Date of interview

Day Month Year

Area	Code	Name
Division		
District		
Upazila/City		
Union/Ward		
Village/Slum		
Enumerator's Ndo		
Program/Control		

Conducted by The ***Asia Foundation and Data International Ltd.***
Dhaka, Bangladesh

Part A: ***Demographic and Socio-economic*** *Information*

Section 1: Background Information

v001	Name of the respondent:	code	
	Code: [II = Male; [21=Female		
v002	Name of the head of household:	Code	
	Code: [1] = Male; [2] = Female		
V003	If the household head is female, which one of the following is applicable?	Code	
	Code: [1] =Married and living with husband; [2]=Widowed; [3] = Divorced; [4] Abandoned		
	by husband; [5] Husband is disabled; [6] Other		
	(Specify)		
v004	What is the relationship between respondent and head of household?	Code	
	Code: [1] = Household head; [2] = Spouse of household head; [31=Son/daughter;		
	[4] = Other family member (Specify)		
v005	Number of household members (number of people eating from the same	Number	
	cooking pot?		

v006: What **are the ages and sex of people in your household?**

	Age		
SI#	Year	**Month**	**[1] = Male [2] = Female**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

	Age		
SI#	Year	Month	[1] = Male [2] = Female
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

	Age		
SI#	Year	**Month**	**[1]=Male [2] =Female**
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

(Infants under 30 days old should be considered as I month old)

v007	What is **the main and secondary source of your household income?**	**Code**		
	Code: [1] Agriculture: farming on own or rented-in land; [2] Agriculture: wage labor; [3] Agriculture: fishing; [4] Agriculture: poultry and livestock rearing; [5] Non-agricultural wage labor; [6] Business owner/employer; [7] Self employed in business; [8] Regular wage employment in some fixed business establishment; [9] Rickshaw puller; [101 Working as servant/maid in others' houses; [111 Salaried service; [12] Other (Specify)			c E
v008	**How much land does your household own (excluding homestead)?**	**Decimals**		
V009	**How much land is rented-in?**	**Decimals**		

v010	How much land is rented-out?	Decimals
v011	What is the area of land that you cultivate or use for any other income-earning or other purpose, but which you do not own or have not rented in?	Decimals
v012	What is the land area of your homestead?	Decimals

Section 2: Housing

v013	What is the main construction material of the walls of your main house? Code: [1] = Brick; [2] = C.I. Sheet / wood; [3] = Mud wall; [4] = Bamboo; [5] = Straw/jute stick/leaves; [6] = Thatched/polythene; [7] = Other (specify)	Code
v014	What is the main construction material of the roof of your main house? Code: [1] = Concrete; [2] = C.I. Sheet / wood; [3] = Mud wall; [4] = Bamboo; [5] = Straw/jute stick/leaves; [6] = Thatched/polythene; [7] = Other (specify)	Code
v015	What type of latrine does the household use? Code: [1] = Pucca latrine (Pit); [2] = Kutcha latrine (pit with pan); [3] = Kutcha latrine (Temporary); [4] = Open field; [5] = Other (specify)	Code
v016	**Does your household have an electricity connection?** Code: [1] = Yes; [2] = No	Code

Section 3: Monthly Household Expenditure

How much money did the household spend on -theollowng items in the last month?

v017	**Fuel (including kerosene, charcoal and wood for cooking; candles and any other non-electric source of light; but excluding expenditures on agricultural and other business inputs)**	Taka
v018	Electricity, **water and other utilities**	Taka
V019	House rent (rented/imputed)	Taka
v020	Regular housing-related maintenance and repair [One-time large expenditures on house improvement (e.g., replacing a straw roof with tin or tiles, or making the house semi-pukka or pukka) are not to be listed.]	Taka
v021	Clothing	Taka
v022	Household items (bathing and washing soap; cosmetics; hair oil; combs; shoes/sandals; plates, cups, pots and pans, cutlery, etc.)	Taka
v023	**Medical expenses (doctor/quack fees; hospital/clinic charges; medicines; pathological tests/X-Ray etc.)**	Taka
v024	Educational expenses (school fees; teacher and tutor fees; books and stationery, and school uniform)	Taka
v025	Paan, jarda, cigarette, biri,, etc.	Taka
v026	Games, cinema, jatra and other entertainment	Taka
v027	Transport expenditure (rickshaw, rickshaw van, auto rickshaw, boat, bus and train fares)	Taka
v028	Voluntary contributions for religious and other charitable purposes [One-time large contributions are not to be listed.]	Taka
v029	**Gifts for social occasions [One-time large gifts to any family member or relatives are not to be listed.]**	Taka

Section 4: Disaster. Other Shocks & Co ing Strategies

v030	eexpeenses household experienced a natural disaster in the last one year? Yes; [2] = No	Code	
v031	at kind of disaster?		
	Flood; [2] Cyclone; [31 River erosion; [4] Tornado; [5] Drought, [61 (e.g. land slides, excessive rain fall, embankment failure, etc.)	Code	
v032	household experienced any major unexpected problems or in the last one yea ?	Code	
	es; [2] = No		
7033	If yes, what kind of problem?		
	Code: [11 = Loss of land; [2] = Loss of job; [3] = Unexpected loan repayment obligation; [4]		
	Wedding/funeral/other ceremony; [5] = Major illness; [61 = Death of any household income earner; [7] = Threat of eviction; [8] = ThefVrobbery/physical assault & harassment; [9] Other (Specify)	Code	
v034	If yes, how did you cope with the crisis?		
	Code: [1] = Gift/contribution from family/relatives/neighbor; [2] = Borrowed money from family/relatives/neighbor; [31 = Borrowed money from moneylender/institutional source [4] = Savings; [5] = Government assistance; [6] = NGO assistance; [7] = Sale of livestock; [8] = Sale of vehicle; [9] = Sale/mortgage of land; [101 = Sale of house; [I I] = Sale/mortgage of jewellery; [12] = Sale of utensils/appliances; [13] = Household member moved away; [14] _ Did not take any assistance; [151 Other (Specify)	COde	

Section 5: Involvement in Various Activities Im plemented by NGOs and Other A encies

7035	Were you or any member of your household involved in any development activities implemented by CARE/WV-B/NGO/LGED/Union Parishad/local contractor during the last three ears?	ode	
	Code: [11= Yes; [2] = No		
v036	If yes, what is the name of the agency?		
		NanMe	
v037	If yes, what is the type of involvement?		
	Code: [1] = NGO savings; [2] = Micro credit for small business; [3] = Fisheries program; [4] = Homestead gardening; [5] = Poultry/livestock program; [61 = Poultry vaccination, [7] = Water sources and sanitary latrine construction, [8] = Road construction, [91 = Tree plantation, [101 = School/shelter construction, [I I] = Homestead raising, [12] = Wave erosion protection, [13] = Nursery, [14] = Market construction, [151 = UP Building construction, [161 = Demonstration farming, [17] = Pond excavation [181 = Land leveling /raising, [191 = Other (Specify)	Code	
7038	If yes, is that NGO or other agency a local partner of CARE/WV-B? * Code: [I] = Yes; [2] = No; [3] = Do not know	Code	
7039	Did you or any member of your household work for the NGO in any wage-earning activity?	Code	
	Code: [I] = Yes; [2] = No		

v040 If yes, did you (or other household member) receive payment in cash or kind? Code

Code: [1] = Payment in cash; [2] = Payment in kind

v041 if yes, how many days did you (or other household member) work on the activity during the last three years? Number of days

v042 If yes, how much were you (or other household member) paid for that work per da ? (if -paid in kind, report value in Taka) [Report daily payment received during the last time you or other household member worked for the NGO or other agency.] Taka/day

V043 Did you or any other member of your household receive any health and nutrition-related education from any NGO or other institution?

Code: [1] = Yes; 12] = No

[* In each of 21 field sites, the field supervisors will document the activities with help from CARE/WY-B and their local *partners. If the answer* **to v038** *is [3], the field* **enumerator** *will subsequently check if the NGO* **is an** *implementing NGO (Y' CARE/WV-B, and* **then** *incorporate* **the answer** *in v038]*

Part B**: Weekly **Food Consumption

[1f, in any section, any type offood other than those listed herein is mentioned, please list it in Part-EJ

Section 1: Food Grains

Food item	Code	Quantity **(gm)**	**Value in** Taka
Rice - Fine	1001		
Rice - Medium	1002		
Rice - Coarse	1003		
Beaten rice	1004		
Pop rice	1005		
Puffed rice	f006		
tt	f007		
Flour	f008		
nicelli	f009		
Suji	f010		
Bread/ Bonroti	1011		
Biscuits	1012		
	1013		
Other	1014		

Section 2: **Pulses**

Food item	Code	Quantity (gm)	Value in Taka
Musur	f015		
Chickling-Vetch (moog)	f016		
Green gram (boot)	f017		
Pea gram (kheshari)	f018		
Mashkalai	f019		
Other	f020		

Section 3: Fish

Food item	Code	Quantity **(gm)**	Value in Taka
Hilsa	f021		
Ruhi	1022		
Katla	1023		
Mrigel			
Kali baush	1025		
Silver carp	1026		
Grass carp	1027		
Mirror carp	1028		
Pangash	1029		

Food item	Code	Quantity **(gm)**	Value in Taka
Aayir	f030		
Boal	f031		
Magur	f032		
Shinghi	f033		
Kai	f034		
Shoal	f035		
Gajar	f036		
Taki	f037		
Puti	f038		
Telapia/ Nylotica	f039		
Mala-kachi	f040		
Chapila	f041		
Shrimp	f042		
Crab	f043		
Eel	f044		
Bails	f045		
Tapashi	f046		
Khalisha	f047		
	f048		
Tangra	f049		
Vetki/koral	f050		
Pomphret (Rupchanda)	f051		
Sea fish	f052		
Dried fish	f053		
Other	f054		

Section 4: Es

Food item	Code	Quantity (No.)	**Value in** Taka
Hen egg	1055		
Duck eee	1056		
Other	1057		

Section 5: Meat

Food item	Code	Quantity (gm)	Value in Taka
Beef	f058		
Buffalo	f059		
Mutton	f060		
Lamb	f061		
Chicken	f062		
Duck	f063		

Liver	1064		
Pigeon	1065		
Other	f066		

Section 6: Vegetables

Food item	Code	Quantity (gm)	Value in Taka
Potato	f067		
Brinjal	f068		
Pata I	1069		
Tomato	f070		
Ladies' finger	1071		
Turnip	1072		
Kakrol	1073		
Cauliflower	1074		
Cabbage	1075		
Beans	f076		
Borboti	1077		
Green banana	1078		
Green papaya	f079		
Arum/Kochur lati	1080		
Ol-kachu	f081		
Kochur-mukhi	1082		
Snake gourd (Chichinga)	f083		
Ribbed gourd (thin a)	f084		
Radish	1085		
Carrot	1086		
Bitter gourd (Korolla)	f087		
Chal Kumra	1088		
Pumpkin	f089		
Water gourd (Lau)	1090		
Spinach	1091		
Lal shak	1092		
Pui shak	1093		
Kalmi shak	f094		
Lau shak	1095		
Jute shak	f096		
Data shak	f097		
Other shak	1098		
Data	1099		
Peas	fl 00		
Cucumber/khira	1101		
Saj nay	f102		
Other	f103		

Section 7: Milk & Dairy

Food item		Code	Quantity	Value in Taka
Liquid milk	(ml)	1104		
Powder milk	(gm)	f105		
Curd	(gm)	f106		
Cheese	(gm)	1107		
Butter	(gm)	fl08		
Milk drinks (lassi)	(ml)	f109		
Ice cream	(No.)	fl 10		
Other		fl] I		

Section 8: Sweetmeat

Food item	Code	Quantity (gm)	Value in Taka
Raso olla	fl 12		
Charncham	fl 13		
Shandesh	fl 14		
Jilapi	fl 15		
Bundia	fl 16		
Amriti	fl 17		
Halua	fl 18		
Batasha	fl 19		
Kadma	f120		
Other	fl21		

Section 9: Oil & Fats

Food item		Code	Quantity (gm)	Value in Taka
Mustard oil	(ml)	fl 22		
Soybean oil	(ml)	f123		
Dalda/Vanas ati	(gm)	f124		
Ghee	(gm)	f125		
Other		fl 26		

Section 10: Fruits

Food item	Code	Quantity (gm)	Value in Taka
Ripe banana	1127		
Mango	f128		
Water melon	1129		
Ban i	f130		

Food item	Code	Quantity (gm)	Value in Taka
Jack fruit	f131		
Litchies	fl 32		
Ripe papaya	f133		
Guava	fl 34		
Pineapple	f135		
Safeda	1136		
Palm (Taal)	fl37		
Bedana	f138		
Apple	f139		
Orange	fl 40		
Grape	f141		
Blackberry	1142		
Emblic (Boroi)	f143		
Amra	f144		
Kaniranga	1145		
Date	*f146*		
Lemon	1147		
Coconut	fl 48		
Jambura	1149		
Bel	f150		
Kodbel	fl51		
Sharifa/Ata	fl 52		
Amlaki	fl53		
Other	1154		

Section 11 : Drinks

Food item	Code	Quantity	Value in Taka
Soft drinks (ml)	fl 55		
Sarbat (ml)	fl 56		
Maltova/ Horlicks (gm)	f157		
Coffee (m	1158		
Tea leaf (gm)	fl59		
Sugarcane juice (ml)	fl60		
Datejuice (ml)	fl61		
Bel juice (ml)	fl62		
Fruit juice (packets, etc.) (ml)	f163		
Green coconut (no)	f164		
Other	f165		

Section 12 : Sugar & molasses

Food item	Code	Quantity	Value in Taka
Sugar (gm)	fl66		
Misri (gm)	1167		
Molasses (Sugarcane) (gm)	f168		
Molasses (Date) (m)	fl 69		
Molasses (Palm) (m)	1170		
Khaja (gm)	fl 71		
Chocolate (No.)	1172		
Kotkoti (gm)	f173		
Other	1174		

Section 13 : Miscellaneous Food

Food item	Code	Quantity (gm)	Value in Taka
Pickles	A75		
Jelly/ Jam	fl 76		
Amshatta	fl 77		
Pitha	fl 78		
Sauce	f179		
Nuts	fl 80		
Other	fl 81		

Section 14: Spices

Food item	Code	Quantity (gm)	Value in Taka
Dried chili	fl82		
Green chili	fl 83		
Onion	fl 84		
Garlic	fl 85		
Turmeric	fl 86		
Salt	f187		
Ginger	f188		
Cumin	fl 89		
Coriander-seed	fl 90		
Cinnamon/cardamom	fl91		
Clove	fl 92		
Black pepper	f193		
Bay leaf	fl94		
Other	f195		

Section 15: Dining out

Food item		Code	Quantity	Value in Taka
Tea	(Cu)	fl 96		
Snacks	(No.)	f197		
Soft drinks	(**Ml**)	**f198**		
Prepared betel leaf	(No.)	fl 99		
Sweetmeat	(No.)	f200		
Other		1201		

Section 16: Meals taken outside

Household member	Code	Quantity (No.)	Value in Taka
Men	**f202**		
Women	f203		
Children (below 15 yrs.)	f204		

Part C. Food Security Scale

These next **questions are about** the food eaten in your household **in the last** month and whether you were able to *afford the food you need.*

s00]	During the last month did it happen that your household did not have	Code	
	enough dal-bhat to meet your daily needs and that your household did not		
	have enough money to buy more.		
	Code: 1] = Almost eve da ; [2] = Occasional) ; 3 = Once or twice; [4] = Never		
s002	Could your household afford to eat other nutritious food along with dal-	Code	
	bhat (e.g., fish, meat, vegetables, etc.)?		
	Code: [1] = Almost every day; 2 =Occasionally; 3 = Once or twice; [4] =Never		
s003	In the last month, did it happen that any of the adults in your household	Code	
	reduced the normal size of daily meals because there wasn't enough		
	money for food?		
	Code 1 = Almost every day; 2 =Occasionally; [3] = Once or twice 4 = Never		
s004	In the last month, did it happen that your household had to cut the normal	Code	
	size of daily meals eaten by the children because there wasn't enough		
	money for food?		
	Code: [11 Almost ever da ; [2] =Occasionally; [3] = Once or twice; [4) =Never		
5005	In the last month, did you or any of the adults skip meals because there		
	wasn't enough money for food?		
	Code: 1 Almost every day; 2 = Occasional[y; [3] = Once or twice; [4] =Never		
s006	In the last month, did any of the children ever skip meals because there	Code	
	wasn't enough money for food?		
	Code: [1] Almost every day; [2] =Occasional[y; [3] = Once or twice; 4] = Never		
S007	In the last month, did it happen that any of the adults did not eat for the		
	whole day because there wasn't enough money for food?		
	Code: [11 Almost every da ; [2] =Occasional[y; 3 = Once or twice; [4]=Never		
s008	In the last month, did it happen that any of the children did not eat for the	Code	
	whole day because there wasn't enough money for food?		
	Code: 1 Almost eve day; 2 =Occasional[y; 3 = Once or twice; [4] =Never		

Adult = 15 years & above, Children = Less than 15

Interviewer Fi Supervisor