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MIDTERM ASSESSMENT

of

INTEGRATED FOOD FOR DEVELOPMENT (IFFD) PROJECT

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ACRONYMS

BIDS	Bangladesh Institute for Development Studies
CARE	Cooperation and Relief Everywhere
CIDA	Canadian International Development Agency
CNRS	Center for Natural Resource Studies
DAP	Development Activity Proposal
DGPS	Differential Global Positioning System
EU	European Union
EIA	Environmental Impact Assessment
EIV	Environmental Impact Value
EMU	Environmental Management Unit
FFW	Food For Work
FPP	Flood Proofing Pilot
GCCR	Growth Center Connecting Road
GIS	Geographic Information System
GOB	Government of Bangladesh
HKI	Helen Keller International
IFADEP	Integrated Food Assisted Development Project
IFFD	Integrated Food For Development
IFPRI	International Food Policy Research Institute
IRR	Internal Rates of Return
ISPAN	Irrigation Support Project for Asia and the Near East
LGED	Local Government Engineering Department
M&E	Monitoring and Evaluation Unit (CARE)
MIS	Management Information System
MYOP	Multi Year Operational Plan
NGO	Nongovernmental Organization
PAA	Previously Approved Activity
PACT	Private Agencies Collaborating Together
PRIP	Private Rural Initiative Project
PWS	Pre-Work Survey
RCTP	Road Construction Trial Project
RMP	Rural Maintenance Program
RRN	Rural Road Network
RSTP	Road Surfacing Trial Project
SIC	Scheme Implementation Committee
SSA	Soil Sand Aggregate
TDCC	Thana Development Coordinating Committee
TEO	Thana Executive Officer
TFS	Transport and Freight Survey
USAID	United States Agency for International Development
WFP	World Food Program

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EXECUTIVE SUMMARY

This 5-year Integrated Food For Development (IFFD) project was initiated in Fiscal Year (FY) 1994 with two components:

1. **Rural Roads Network**—to upgrade and make environmentally sound about one third of the earthen R-1 roads in 315 thanas; and,

2. **Disaster Preparedness**—to finance

   - **disaster preparedness and response planning**; and

   - **flood proofing pilot activities** to support earth-raising and platform activities in beels/haors (swampy areas characterized by tectonic depression and subject to regular river flooding) and chars (islands within a river channel).

The project is funded by a development assistance grant of $10.4 million to Cooperation and Relief Everywhere (CARE), the cooperating sponsor of the project; 80,000 tons annually of Public Law-480, Title II wheat, which is largely monetized and is used for program costs; and, a government of Bangladesh (GOB) contribution of $13.7 million equivalent in taka, of which $4.1 million would be used to cover a share of CARE's operating costs.

An additional 40,000 metric tons of wheat was authorized in FY 1997 to finance planting 400,000 trees along 400 kilometers of roads; slope stabilization measures on 100 kilometers of roads; and, improving road surfacing techniques on over 140 kilometers of rural roads which are not passable throughout the year due to their poor road surface and soil conditions.

SCOPE OF WORK AND METHODOLOGY FOR THE ASSESSMENT

This midterm assessment is concerned with the rural roads network component and the flood proofing pilot activities subcomponent. The scope of work is contained in annex A of this report.

Field visits were conducted to both completed and planned road interventions in the areas served by all six IFFD suboffices. Meetings and discussions were held with officials of the Local Government Engineering Department (LGED) (the implementing agency), beneficiaries along the completed alignments and on the haors and chars, IFFD personnel in the suboffices, appropriate GOB officials in Dhaka, CARE and USAID personnel, and selected other donors. Individuals contacted are listed in annex B and documents reviewed are presented in annex C.

RESULTS TO DATE

The project target for rehabilitated roads was changed from over 13,040 kilometers to 11,000, permitting greater effort to be applied to ensuring that already completed roads remain passable. About 8,000 kilometers have been accomplished to date in over 1,400 roads. CARE and USAID have revised the current target to approximately 12,500 kilometers.

Sample rural roads in all six IFFD suboffices were visited/observed and IFFD personnel were interviewed in the process of conducting initial environmental examinations (IEEs). In all instances environmental problems were identified and appropriate intervention measures were recommended to mitigate any existing or potential environmental problems. The level of understanding of CARE and LGED staffs of the major environmental issues associated with the rural road network is impressive. This reflects the quality of training that has been provided by CARE and its partners for their staffs. Individuals interviewed in the areas were appreciative of the improvements.

On average, the results of road improvements have been positive—overall passenger volume on the sample roads increased 35 percent and freight volume increased 71 percent. This positive information from the transport and freight surveys is tempered by a deeper analysis of the data which shows declines in post-intervention traffic on a significant number of the IFFD roads—16 percent show declines in passenger traffic and 23 percent show declines in freight traffic. Some of the factors involved are discussed in section III.

The passability surveys on FY 1996 roads (based on a sample of 180 roads) show very significant, even dramatic in many cases, improvements over the pre-intervention situation. This good news is tempered by the level of the post-intervention data and the subsequent decline in road passability experienced in 1997. As shown in table III-2, 69 percent of surveyed roads were passable by trucks and 88 percent were passable by rickshaws/vans. Both of these figures are below target (75 percent for trucks, 100 percent for rickshaws/vans). The averages mask positive results in some areas (for example, increases in overall rickshaw traffic in four suboffices) and discouraging results in others (for example, reduced overall truck traffic in all suboffices, even though some alignments are showing healthy increases). Jessore's situation deteriorated for both rickshaws and trucks.

During the field visits, an attempt was made to obtain anecdotal information that would bear on the basic thesis that the road improvements would lead to greater fertilizer use (and thus increased production) and greater employment opportunities (both on- and off-farm). On a number of alignments, there were new shops along the alignments or in pre-existing markets (hats and bazars). New stores were selling fertilizer on at least two alignments and there was an expansion of (and a new tin roof on) a third. Individuals interviewed cited less expensive fertilizer as a benefit of the road. Also cited were shifts from one to three crops per year.

To determine whether the Small Farmer group (lowest economic category in the socioeconomic studies and usually functionally landless) was also benefiting, a special session was held with a small group of Helen Keller International (HKI) interviewers gathering socioeconomic information on the project to obtain the interviewers' perspectives and to find out how the Small Farmer overcomes his/her situation. The HKI interviewers confirmed that the Small Farmer group is benefiting. Frequently, individuals are able to set up a small shop along the alignment. Others rent or buy a rickshaw/van and enter the transport business. This pattern was subsequently confirmed in a focus group on another alignment. A tempo (small vehicle used as a taxi) driver on another HKI alignment reported that even after reducing his prices, he earns more than double what he was earning before because the road is passable and he can make more trips in a day than he could in the past.

Although HKI impact data are not yet available, HKI's baseline studies of the sample households coupled with some of their effects data and personal observations and discussions in the field have shown the positive outcome of the IFFD roads—when well selected, constructed, and maintained—in general and on food security specifically (food access and food availability).

Flood proofing pilot activities were initiated in FY 1996; some field studies were conducted in early 1996, and staff hiring began in mid-1996. Village-wide planning started in August 1996. The physical work began in March 1997 in the chars in Ulipur thana. A total of 501 homestead ground raisings were planned in 11 villages, and 431 were completed. One flood shelter was completed, which will also serve as a school and a community meeting place.

The activity took longer to initiate than planned, but the extra time has helped mobilize the local populace very effectively. Additional activities that are being undertaken in this pilot include provision of clean drinking water (by raising tubewells), latrines, evacuation boats, road rehabilitation, tree plantations, home gardening, flood preparedness, health education, erosion and mound protection, and village planning.

Flood proofing pilot activities will be undertaken in 54 villages in FY 1998: 34 in char areas and 20 in the haor. In FY 1999, activity is planned for another 50 villages, bringing the total covered in three years to 115 villages.

FUTURE DIRECTIONS

In sections II, III, IV, and VII of this report, the IFFD program is supported but there is some concern that the potential impact of the program is not being realized. The following are seen as detracting from the impact of this highly useful program:

- the road selection process—insufficient use of economic and food security criteria in selecting the thanas in which to operate and the specific roads chosen within a thana; and,

- a significant percentage of the IFFD roads do not remain passable after rehabilitation, reflecting

  - the types of soil and the levels of rainfall in some areas;

  - the quality of construction of some of the roads, particularly earthwork compaction, slope protection, and structure approaches;

  - the lack of a repair and maintenance budget in the project.

For the remaining two years (FY 1998 and FY 1999), a high priority should be accorded to improving on the foregoing. Some remedial actions have already been initiated, for example, the expansion of the soil sand aggregate (SSA) pilot road surfacing activity.

In section III, some changes in data collection and use are recommended. The taking of land without compensation and the delay in paying contractors after they have finished their work are issues to be addressed. USAID needs to work with the stakeholders to develop better solutions.

The IFFD project is implementing a plan for the production of maps generated by the differential global positioning system for 150 thanas. The output of the current geographic information system (GIS) will be of great benefit for planners of infrastructure interventions. The additional cost of using the CARE GIS unit to continue the job and expand it to the bulk of the country would appear quite small in terms of the IFFD budget and especially small in relation to the benefits to the country. The present GIS activity should be expanded to include the entire land area of Bangladesh as well as hydrologic and flood plain data.

Another priority is the creation of a sustainable system of road maintenance for the earthen road network. The rural maintenance program (RMP) has pointed out that its teams should not be expected to do other than routine maintenance, that is, no repair work. Yet the latter will be needed until a higher standard of road is built. Given the foregoing, it is essential that an increased level of attention be given to this problem. The IFFD project should start the design process now of a local-level maintenance program that could be a part of a follow-on program (see sections IV and VIII for additional recommendations).

A continuation of a rural infrastructure program, including a significant road component, can make a strong contribution to the economic development of Bangladesh and a significant contribution to the food security of rural Bangladeshis. It would be appropriate for USAID to authorize a follow-on Title II program for such a program.

Through FY 1997, the IFFD program has upgraded about 25 percent of the R-1 roads in the 315 thanas in which it is operational—23 percent by number of roads, 22 percent by percent of kilometers. A follow-on program should be designed to incorporate economic and food security factors in the selection process and to have a geographic focus, rather than limiting program activity to R-1 roads. In some cases, upgrading of an R-2 road could make good economic sense, particularly if there were environmental factors that needed mitigating. In addition, the follow-on program should encompass other rural infrastructure with clear socioeconomic payoff for the food insecure, for example, markets, ghats (ferry landings), and dikes. (See section VIII for a full discussion.)

It will take some time to make the transition to a restructured and expanded program. The ongoing program, with improvements made based on the assessment's findings, is too important to be allowed to lapse for a year as happened during the transition from IFFW to IFFD. USAID should be prepared to seek authorization from USAID/Washington to extend the present program for one or two years, if necessary, to avoid any lapse of operations.

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I. INTRODUCTION

SYNOPSIS OF PROJECT

The Integrated Food For Development (IFFD) project was initiated in Fiscal Year (FY) 1994 to contribute to the goal of increasing the proportion of Bangladeshis above the poverty line. The project purpose is to provide the poor with improved, year-round access to markets and basic human development services.

According to the Multi Year Operational Plan (MYOP) FYs 1994-99, dated December 1993, this 5-year project was to achieve this purpose by undertaking the following two components:

1. **Rural Roads Network**—resources would be provided to create an economically viable road network of 34,000 miles in 315 thanas, opening up areas of significant developmental potential. The Local Government Engineering Department (LGED) of the government of Bangladesh (GOB) would be the implementing agency. Some 13,600 miles of this network would be environmentally sound and continuously passable all year by 4-wheel drive vehicles; and,

2. **Disaster Preparedness**—the project would finance

    - **Disaster preparedness and response planning**—the cooperating sponsor, Cooperation and Relief Everywhere (CARE), would enhance its own disaster preparedness and response capabilities, enlarge its outreach by working with nongovernmental organizations (NGOs) operating at local levels, and assist the Bangladesh government to strengthen its disaster response and preparedness; and,

    - **Flood proofing pilot activities**—the activity would focus on environmentally benign earth-raising and platform activities in two different types of areas: a beel/haor (a swampy area characterized by tectonic depression and subject to regular river flooding) and a char (an island within a river channel).

To fund these MYOP-approved activities, the U.S. Agency for International Development (USAID) authorized on September 13, 1993, a development assistance project, No. 388-0081. The project envisioned a grant of $10.4 million to CARE plus 600,000 tons of Public Law (PL)-480, Title II commodities valued at $92.2 million. GOB was to contribute the equivalent of $13.7 million, of which $4.1 million would be a grant to CARE to cover a portion of its operational expenses. The USAID development assistance project also was to fund a nutritional surveillance system to provide information on the nutritional status of the country.

Because the annual utilization level of activity in prior years under the Food for Work (FFW) project required about 80,000 tons of wheat, USAID/Washington approved a level of 80,000 tons for the new IFFD project—in contrast to the planning figure of 120,000. In response, CARE submitted an update to the original MYOP in May 1994, with revised anticipated project achievements. The FY 1998 Development Activity Proposal (DAP) Supplement of May 29, 1997, contained a request for an additional 40,000 metric tons of wheat to finance

- planting 400,000 trees along 400 km of roads,
- implementation of slope stabilization measures on 100 km of roads, and
- improving road surfacing techniques on over 140 km of rural roads which are not passable throughout the year due to their poor road surface and soil conditions.

SCOPE OF WORK AND METHODOLOGY

This assessment is concerned only with the rural roads network and the flood proofing pilot (FPP) project activities. The scope of work and the general methodology used for this assessment are provided in annex A.

Because the recruitment of three Bangladeshis was not feasible (only one of the Bangladesh firms contacted responded and its response was negative), the situation was offset by obtaining the advice of Bangladesh's pioneer in soil mechanics (M. Serajuddin); contracting with Helen Keller International (HKI) for some special analyses of the information generated by their field interviewers on the socioeconomic impact of the IFFD roads; using CARE Bangladesh personnel (occasionally personnel of LGED) as interpreters when this was necessary in the field; obtaining assistance from some of IFFD's staff offices in making special analyses and data runs; and, obtaining special reports from CARE field offices to enquiries generated by the special analyses or team observations in the field. (Both USAID and CARE agreed with these alternate arrangements.)

During the field visits, discussions were held with CARE officers, district and thana engineers of the LGED, thana executive officers (TEOs), union parishad chairmen (or secretaries), beneficiaries of the project (occasionally individually, but usually in impromptu small groups along an IFFD road), officials of NGOs participating in some aspect of the program (for example, flood proofing and tree plantations), enumerators employed to work on the freight and transport surveys, and HKI's field interviewers employed for the socioeconomic impact assessment of the IFFD alignments.

In most of the IFFD suboffices, discussions were held with all available staff. Similar discussions with LGED engineers were also arranged by one district engineer. These

discussions were used to obtain an understanding of the special problems encountered by the IFFD implementers in general and in their areas specifically, to obtain ideas on how to resolve these problems and/or improve the program, and, after field visits to three of the suboffice areas, to obtain field reaction and evaluation of some of the ideas that had been generated by earlier field conversations or internally within the assessment team.

In Dhaka, the workings of CARE IFFD headquarters (and LGED to a lesser extent) were reviewed, analyses were performed of the large quantities of data available, and answers/reactions were sought from CARE, USAID, and LGED (in joint or separate meetings) to questions and ideas resulting from the field visits or subsequent analyses. Meetings were also held with the following ministries: Local Government, Rural Development and Cooperatives; Food; and, Environment and Forestry. Contact was also made with local representatives of the World Food Program (WFP) and Integrated Food Assisted Development Project (IFADEP). Meetings were held with HKI to learn about its work for the IFFD project, to request special analyses, and to obtain briefings on those analyses.

PROJECT SETTING AND BACKGROUND

Country Setting

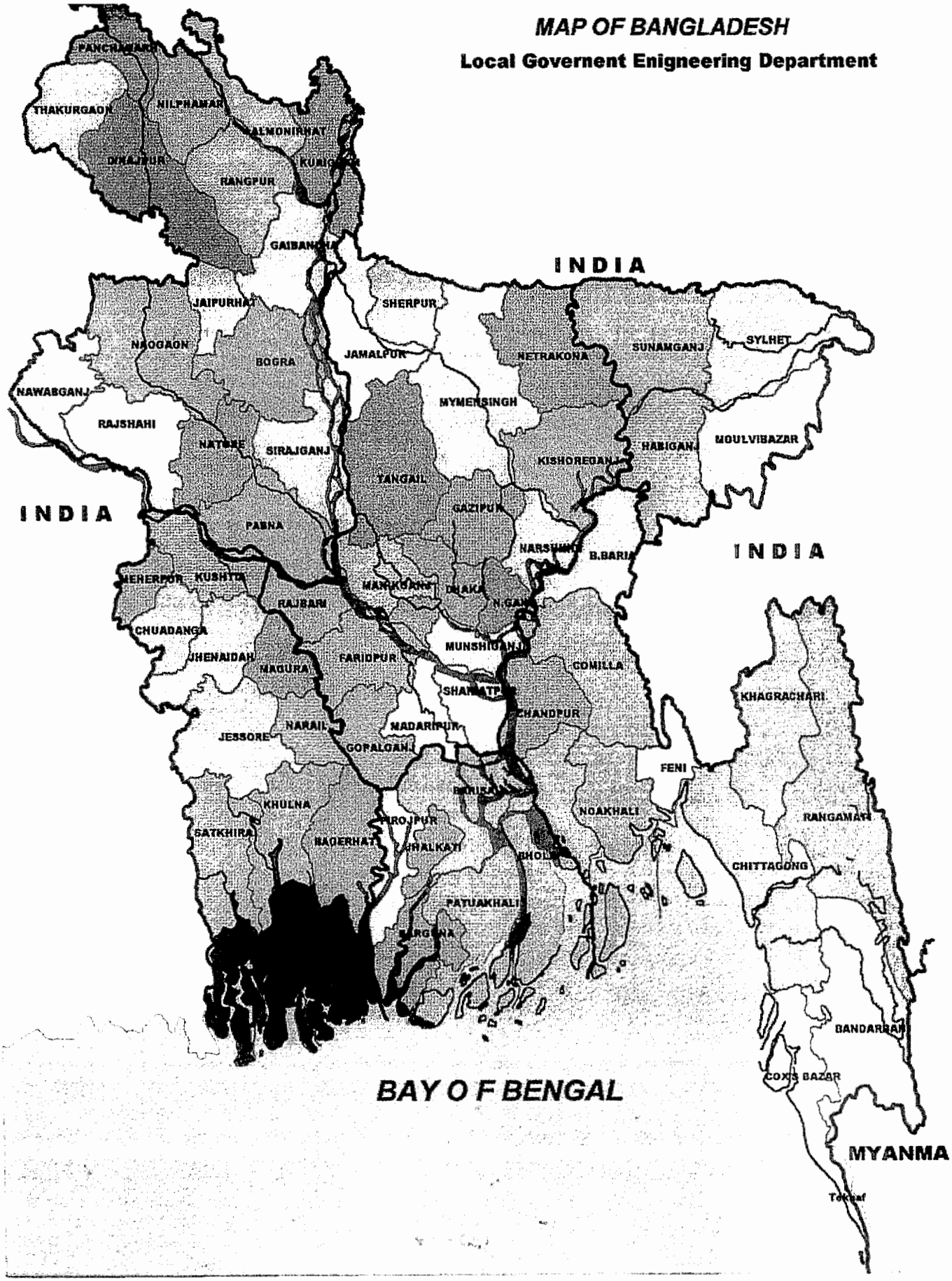
Bangladesh, a nation of 115 million people, has an area of 55,598 square miles, the amount above water varying from season to season and from year to year. It is the most densely populated country in the world, excluding nonrural city-states—three times that of India—and its rate of population growth is still high (2.3 percent). Its population inhabits an area roughly the size of Wisconsin.

At the start of this project, Bangladesh depended heavily on food imports, about 70 percent of which was donated by bilateral and international donors—even in years that were relatively disaster free. This reflected the increasing landlessness and fragmentation of land holdings that occurred all through the 1980's. National production of food grains was increasing, but the demand was rising faster. Rural poverty was estimated in 1992 at 38 percent, one of the highest in the world; it reached 63 percent in flood-prone areas. Average rural households had neither the means to grow, nor sufficient resources to purchase, the ingredients of an adequate diet. Daily per person food intake declined steadily between the 1960's and 1990.

Bangladesh is situated due south of the Himalayan mountain range, being bordered by India on the west, north, and northeast. Myanmar borders on the southeast; the Bay of Bengal is to the south. Eighty-eight percent of the land area is less than 30 feet above sea level, consisting of the fertile alluvial flood plains and deltas of the Padma (Ganges in India) and Jamuna (Brahmaputra in India) rivers and their tributaries. (See map on following page.)

MAP OF BANGLADESH

Local Governent Enigneering Department



LEGEND

ADMINISTRATIVE BOUNDARY

- International Boundaries
- Division Boundaries
- District boundaries
- Coastal Area

- River Network
- Sundarban Area
- Bay of Bengal

N

30 0 30 60 Kilometers

GIS UNIT, LGED

Bangladesh has three seasons: March to June, when the moderate rainfall occurs mostly in thunderstorms and the weather is hot and increasingly humid; June to October, the monsoon period when 80 percent of the mean annual rainfall occurs; and, October to March, when it is relatively cool and dry. Most of the IFFD earthwork takes place between January and May and the structure work between March and July.

Because of Bangladesh's low elevation, between 30 and 70 percent (depending on the region) of the land area is inundated for part of the monsoon season. Annual rainfall varies from 55 inches in the west to 228 inches in the northeast. In addition to often destructive routine flooding annually, extremely serious flooding is not uncommon; four major floods have occurred since independence in 1971. The most recent of these (in 1988) killed 2,379 people, affected another 50 million people, and caused over $2 billion in damages. This disaster-prone country also suffers from cyclones (averaging 1.3 per year), tornadoes (in the Manikganj district in 1989 and Tangail in 1996), and major earthquakes (the most recent in 1950).

Bangladesh contains the following administrative levels: 6 divisions; 64 districts (similar but geographically smaller than U.S. states); 460 thanas of about 120 square miles with approximately 250,000 people (similar to counties); 4,400 unions of about 25,000 people; and, about 60,000 villages or grams. For this project, the most important are the union and the thana.

A union, which has about 10-15 villages and 30-50 paras (socially homogeneous hamlets), is the only elected level of rural local government. It is charged with administrative, regulatory, developmental, and welfare activities. Among its specific duties are construction and maintenance of local roads and drainage structures and implementation of food-for-work and rural works programs at the union level. It has minimal financial resources, although the government is working on procedures to give it some additional revenues.

The thana is the lowest level at which representatives of government ministries are posted. The thana executive officer (TEO) is the chief administrative officer and coordinator of the various central government activities in the thana. Both the TEO and the thana engineer (the representative of the LGED) are involved in the implementation of the IFFD program. The thana development coordination committee (TDCC), which is composed of the TEO, the chairmen of all constituent union governments, representatives of ministries, and others, also plays a role in the implementation of IFFD activities.

Project Background

The USAID Title II Food for Work (FFW) program, which began in 1975, had three projects: FFW I, from 1975 to 1980; FFW II, from 1979 to 1986; and, IFFW, from 1985 to 1994. Other than programming wheat for distribution, USAID also provided development

assistance funds to finance the management-cum-monitoring activities of the cooperating sponsor, CARE. The major undertaking has been earthen road rehabilitation and other earth-moving rural infrastructure activities.

Beginning in 1983, bridges less than 40 feet and culverts were constructed on rural earthen roads; these structures were financed primarily through monetized Title II, Sections 202/206, and Title III local currency.

The work was completed in approximately 500,000 person days of labor. It was assumed the laborers would be otherwise unemployed during the relatively dry season from December to April, which, before the expansion of irrigated crops, had been one of the agricultural slack seasons with a reduced need for unskilled labor. These laborers were compensated in wheat for digging borrow pits in fields adjacent to the roads and moving the extracted earth to the road top and sides to make the roads wider, higher, and thus suitable for light vehicle traffic.

Each year about 6,000 miles of dirt roads benefited from FFW; 99 percent of this mileage was on well-established byways which had eroded after several monsoon seasons and needed reconstruction. The remaining 1 percent was new and undertaken mainly to connect previously discontinuous segments. No surfacing or resurfacing was completed with brick, water-bound macadam, gravel, or bituminous carpeting.

At its inception, FFW was seen almost exclusively as a relief endeavor. The widely accepted premises of FFW were that providing wheat to poor people and upgrading rural infrastructure were good, without qualification. However, studies of the program, especially beginning in the 1980's, and a 1981 audit, began criticizing FFW for falling short of realizing its growth potential and development impact.

The earliest noted developmental deficiency of FFW roads was that there were often holes or gaps which made the reconstructed road impassable, even on foot. These gaps arose primarily from two causes: monsoon erosion; and, farmers slashing roads to drain their fields because roads were acting as embankments, preventing the natural drainage of fields after heavy rains.

In response to this deficiency, USAID provided monetized Title II, Sections 202/206, and Title III proceeds to finance small bridges and culverts. However, this construction initially was not systematically coordinated with road rehabilitation, thereby providing discontinuous IFFD roads. Sometimes, inadequate attention was provided to approaches to the structures.

The traditional system of providing wheat allocations to local governments for FFW schemes for the relief-oriented program and allowing the local governments unguided

discretion in selecting which roads to rehabilitate resulted in too much road rehabilitation. The consequences were as follows:

- too many roads in absolute numbers—Bangladesh has one of the highest density road networks in relation to land area among Asian countries;
- roads which zigzagged across the land rather than following a direct line as a result of the voluntary donation of land to develop roads during the mid-1970's under FFW;
- roads without any socioeconomic merit which did not connect important points—a 1989 study estimated that only 40 percent of a season's wheat was used for roads which were needed from a socioeconomic viewpoint;
- a plethora of developmentally important roads merited rehabilitation but had not been chosen for FFW attention; and,
- rehabilitation of whole roads rather than just those portions needing it so that the allowed number of schemes would not be exceeded.

Rudimentary technical standards and practices (for example, no compaction and a general absence of routine maintenance) resulted in significant erosion. A 1987-88 washout study found that 26.45 percent of a road's incremental volume and 44 percent of the additional earth resulting from FFW rehabilitation could be expected to wash away with the first monsoon (36 and 53.5 percent, respectively, within three years). The continuous need for rehabilitation has been one of the reasons for the longevity of the FFW program in Bangladesh.

FFW roads were also found to pose an environmental threat. Their sheer number crisscrossing the countryside, coupled with the fact that they often did not have culverts and bridges, prevented drainage. This posed an enormous problem. Further, trees sometimes were cut to permit road widening, adjacent fields were deprived of fertile topsoil to increase road height and width, and fish production appears to have been adversely affected.

Beginning in 1990, USAID and CARE introduced the following remedial modifications:

- formulating and field testing developmental impact site selection criteria for both roads and appurtenant structures;
- formulating and field testing environmental soundness site selection criteria;
- training CARE field staff and local government officials in developmental impact and environmental soundness analysis;

- piloting hand compaction and exploring other means of compacting FFW roads; and,

- keeping records of local governments' FFW performance over time and suspending the FFW participation of those which performed in the lowest 30 percent for three consecutive years.

The IFFD project was designed to overcome the foregoing problems and to ensure that the rural infrastructure activities being undertaken would result in sustained poverty reduction. That the provision of rural transport infrastructure can alleviate poverty was shown in a study carried out between 1987-88 and 1989-90 by the Bangladesh Institute for Development Studies (BIDS). The findings of the BIDS study were the following:

- throughout the period, overall poverty was consistently lower where there were well-developed transport facilities;

- between the beginning and the end of the period, overall poverty decreased 8 percent more where there were developed transport facilities and extreme poverty decreased 6.2 percent; and,

- extreme poverty increased 5 percent where transport facilities were less developed.

The poverty alleviation effect of rural infrastructure in general (including transport facilities) was found to be especially beneficial in helping nonfarm households emerge from poverty because it facilitates expansion of rural nonfarm sectors (for example, trades and services). Access to nonagricultural employment was found to provide opportunities for upward income mobility for land-poor households; it was deemed the most important factor in reducing income discrepancies in rural areas.

II. OVERALL STATUS OF PROJECT IN RELATION TO TARGETS

PROJECT PLANS

The goal of the Integrated Food For Development (IFFD) project authorized in 1993 was to increase the proportion of Bangladeshis above the poverty level. The purpose of IFFD was to provide the poor with improved, year-round access to markets and basic human development services and effect improved food management.

The IFFD project supports the goal and purpose by undertaking two components: the rural road network (RRN) project and the disaster preparedness component. RRN would provide resources to create an economically viable rural road network of 34,000 miles in 315 thanas, opening up areas of significant developmental potential. Some 13,600 miles of this network were originally envisaged to be environmentally sound and continuously passable all year by 4-wheel drive vehicles.

The disaster preparedness component includes the expansion and creation of disaster preparedness and response measures by undertaking a flood proofing pilot project (FPP). The objective of the FPP is to reduce the economic and social vulnerability of poor and marginal households in flood-prone areas. The project implements measures that are designed to save lives, reduce asset loss, preserve income, protect household livelihoods, and safeguard community infrastructure and public services from flooding. In the FPP, 200-300 villages were targeted in 2 geographic areas of the country: the haors (areas in the northeast that are tectonic depressions where flood waters usually cover the area for 4-6 months), and the chars (active flood plains in the major river basins of the Tista and Brahmaputra.)

End-of-project status indicators were set forth for achieving the program goal and the project purpose. Regarding the program goal, income of rural project areas was expected to increase and daily caloric intake to increase beyond 2,112. The project purpose indicators established were increased pedestrian, oxen carts, bicycle, rickshaw, 4-wheel drive vehicle, and truck traffic at all seasons on the improved roads; increased number of traders and commercial enterprises conducting business in the locality; increased school enrollment and attendance; and, increased use of health and family planning facilities.

CARE/Bangladesh submitted a Multi Year Operational Plan (MYOP) for FYs 1994-99 for 120,000 metric tons of Title II wheat to be monetized annually in support of the IFFD project. However, this was modified because the Bureau for Humanitarian Response/Food for Peace Office, USAID/Washington, only agreed to a level of 80,000 tons of wheat annually. CARE updated the MYOP before the project started, establishing a new set of targets and modus operandi:

- 75,000 poor earthwork laborers and their 375,000 dependents would receive wheat as in-kind wages for earthmoving and revegetation each year for five years;

- 12,500 laborers and their 62,500 dependents would receive cash wages for structure construction work each year for five years;

- 1,630 miles of rural roads would be rehabilitated annually for five years (total of 8,150 compared to the original target of 13,600 miles), making the roads passable by motorized transport during the dry season (all year in the original plan) and by nonmotorized transport all year;

- CARE would advance 75 percent of the scheme's contribution to the building of approved structures (no advances were originally anticipated); and,

- A cost-benefit ratio would be used to select and rank order prospective roads rather than an internal rate of return (IRR), as originally planned.

On May 20, 1997, CARE sent to USAID a Previously Approved Activity (PAA) Submission for FY 1998, justifying its annual request for 80,000 tons of wheat (of which 67,400 was to be monetized). The detailed implementation plan which was enclosed provided for focusing on consolidating efforts in road improvement and passability and expanding pilot projects (under the development activity proposal [DAP] supplement discussed below) in tree plantation, slope protection, and alternative road surfacing technologies. The project considered passability and sustainability of roads and systems to be the primary goal for FY 1998. The project would work closely with its local counterpart to improve regional planning and road inventory and selection procedures. At the local level, the project would increase public awareness of road building and maintenance objectives and requirements. Specific activities which would be included are discussed in the following six paragraphs.

Training of counterparts would be provided in environmental management, public participation, and regional planning, and a public awareness campaign would be undertaken, aimed at local road users to explain the benefits of improved roads and the role local communities play in long-term maintenance.

Existing pilot programs would be expanded in improved road surfacing and slope stabilization options in an effort to increase the percentage of roads which remain passable throughout the year.

Through use of the geographic information system (GIS), the existing road inventory would be enhanced in order to improve planning, selection, and resource utilization.

The first year's impact data from the monitoring and evaluation system would be completed.

Disaster management training and capacity building with local NGOs would be carried out, along with village-based flood-proofing activities and a new initiative, Union Parishads Working to Achieve Real Development (UPWARD), aimed at increasing accountability, public participation, and revenue generation at the local level.

About 5,000 kilometers of rural earthen roads need to be rehabilitated in FYs 1998-99 to achieve the overall project target of 13,000 kilometers. The project proposes that the target be reduced in order to ensure that the IFFD roads have environmental and structural integrity, that local communities and the local counterpart are selecting and maintaining roads in a sustainable and participatory fashion, and that the target roads are considered priorities in terms of their costs and benefits (that is, that the roads are well planned, designed, and maintained). Further, the targets should be revised due to cost issues (for example, pilot activities with the goal of increasing sustainability or funding bridges over 12.5 meters in span). A more realistic target would be 11,000 kilometers of roads; the additional 2,000 would be lower priority for the GOB and the project due to their relatively high cost and low benefits.

The FPP proposed revising its targets from 200-300 villages to receive flood proofing measures over a 5-year period to 115 villages in three years. A detailed impact monitoring and evaluation methodology was being developed using beneficiary input.

On May 29, 1997, CARE submitted a DAP supplement to USAID requesting a special allocation of 40,000 metric tons of wheat to increase sustainability and strengthen project efforts to ensure year-round passability of selected roads by implementing the following three activities:

1. roadside tree plantation efforts by planting 400,000 trees on over 400 kilometers of roads, with 90 percent of the trees surviving after one year and 200 unions to benefit from the program;

2. slope stabilization measures on 100 kilometers of roads; and,

3. improved road surfacing techniques on over 140 kilometers of rural roads which are not passable throughout the year due to their poor road surface and soil conditions. Performance indicators and targets are as follows:

    - 140 kilometers of roads surfaced with passability at 100 percent;

    - 25 percent increase in volume of freight and passenger traffic over non-soil sand aggregate (SSA) roads; and,

    - 125,000 person days of work generated for laborers.

PROJECT ACHIEVEMENTS

Rural Road Network

Given the system that evolved for the selection of roads and the relatively short construction period, the achievements presented in table II-1 below are reasonable. Technical comments on the quality of the roads constructed are found in section IV below. The IFFD project area is shown on the map following table II-1.

Table II-1
REHABILITATED ROADS, FYs 1995-97 IN 315 THANAS

Fiscal Year 1995		
Item	No. of alignments	Length in km
Planned	659	3,609
Completed	654	3,591
Canceled	5	18
Fiscal Year 1996		
Planned	436	2,336
Completed	430	2,306
Canceled	2	15
Ongoing	4	15
Fiscal Year 1997		
Planned	426	2,269
Completed	334	1,775
Canceled	1	4
Ongoing	91	490
Total Planned	**1,521**	**8,214**
Total Completed	**1,418**	**7,673**
Total Canceled	**8**	**36**
Total Ongoing FYs 1996-97	**95**	**505**

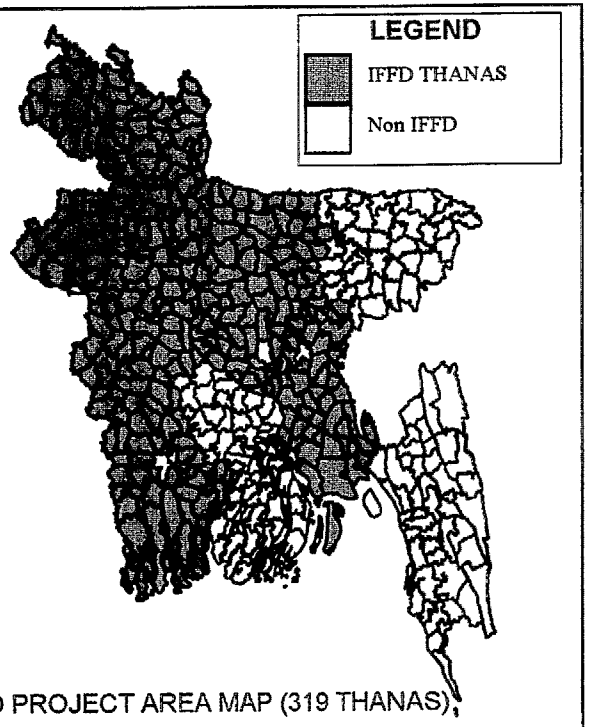
NOTE: FY 1997 data are preliminary; final figures were not available.

IFFD PROJECT AREA MAP

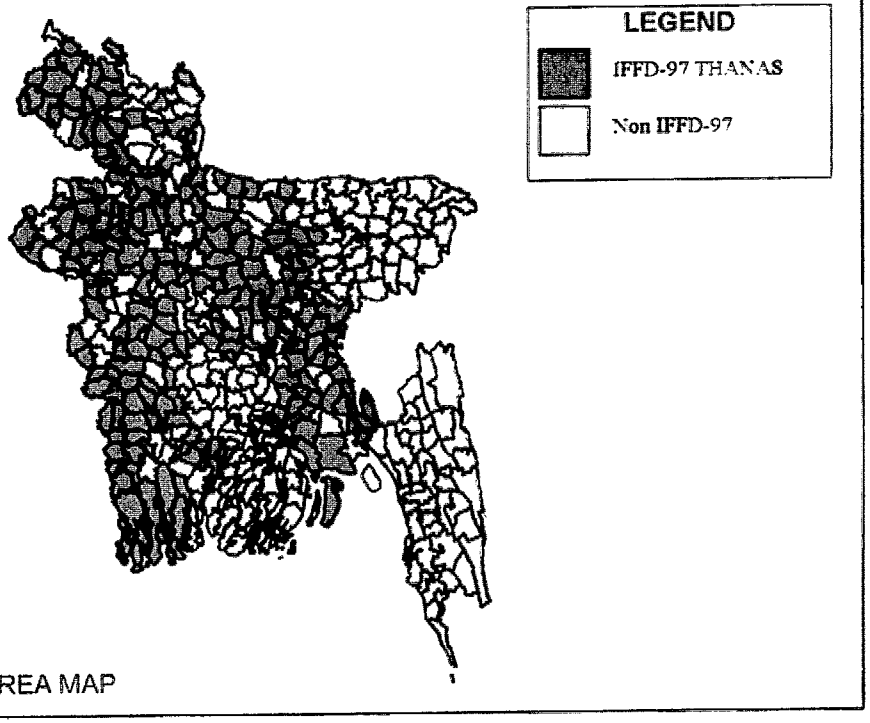
N

Km

0 50 100



IFFD PROJECT AREA MAP (319 THANAS)



IFFD - 97 PROJECT AREA MAP

IFFD ' 97 THANA

ABHOYNAGAR
ADAMDIGHI
AKHAURA
AKKELPUR
ARAIHAZAR
ASSASUNI
ATGHORIA
ATRAI
ATWARI
B.BARIA-S
BADALGACHI
BADARGANJ
BAGATIPARA
BAGERHAT-S
BAGHA
BAGHERPARA
BAGMARA
BAJITPUR
BAKSHIGANJ
BALIADANGI
BALIAKANDI
BANCHARAMPUR
BANDAR
BASAIL
BELABO
BELKUCHI
BHAIRAB
BHALUKA
BHOLAHAT
BHURUNGAMARI
BIRAMPUR
BIRGANJ
BOCHAGANJ
BODA
BOGRA-S
BRAHMANPARA
BURICHONG
CHANDPUR-S
CHARGHAT
CHATMOHAR
CHHAGALNIYA
CHILMARI
CHIRIRBANDAR
CHITALMARI
CHOUDDAGRAM
CHOWGACHA
COMILLA-S
DACOPE
DAGANBHUIYAN
DAMURHUDA
DAUDKANDI
DAULATPUR
DAULATPUR
DAULATPUR
DEBHATA
DEBIDWAR
DEWANGANJ
DHAMOIRHAT
DHUNOT
DHUPCHANCIA
DIMLA
DINAJPUR-S
DOHAR
DOMAR
DUMURIA
DURGAPUR
DURGAPUR
FAKIRHAT
FARIDGANJ
FENI-S
FULBARI
FULBARIA
GABTALI
GAIBANDHA-S
GAZARIA
GAZIPUR-S
GHATAIL
GHORAGHAT
GOALUNDA
GOBINDAGANJ
GOPALPUR
GOURIPUR
GURUDASPUR
HAIMCHAR
HAKIMPUR
HALUAGHAT
HARINAKUNDA
HARIPUR
HARIRAMPUR
HATIYA
HAZIGANJ
HOMNA
HOSSAINPUR
ISHWARGANJ
ISLAMPUR
JALDHAKA
JAMALPUR-S
JESSORE-S
JHENAIDAH-S
JHENAIGATI
JHIKARGACHA
JIBANNAGAR
KACHUA
KACHUA
KAHALOO
KAHAROL
KALAI
KALAROA
KALIA
KALIAKOIR
KALIGANJ(JHE)
KALIGANJ(SAT)
KALIGANJ(GAZI)
KALIHATI
KAMARKHAND
KAPASIA
KARIMGANJ
KASBA
KATIADI
KAUKHALI
KENDUA
KERANIGANJ
KESHABPUR
KHANSHAMA
KHOKSHA
KISHOREGANJ
KISHOREGANJ-S
KOIRA
KOTCHANDPUR
KUMARKHALI
KUSHTIA-S
LAKSHAM
LALMONIRHAT-S
LALPUR
LAUHAJONG
LAXMIPUR-S
LOHAGARA
MADAN
MADHUPUR
MANDA
MANIKGANJ-S
MATLAB
MEHERPUR-S
MELENDAH
MIRZAPUR
MOHADEVPUR
MOHAMMADPUR
MOHANPUR
MOHESHPUR
MOLLAHAT
MONGLA
MONIRAMPUR
MUKTAGACHA
MURADNAGAR
NABINAGAR
NAKLA
NALITABARI
NANDAIL
NANDIGRAM
NANGALKOT
NAOGAON-S
NARAIL-S
NARAYANGANJ-S
NATORE-S
NAWABGANJ
NAWABGANJ
NAWABGANJ-S
NAZIRPUR
NIAMATPUR
NILPHAMARI-S
NOAKHALI-S
PABA
PABNA-S
PAKUNDIA
PALASH
PALASHBARI
PANCHAGARH-S
PANCHBIBI
PANGSHA
PARBATIPUR
PATGRAM
PATNITALA
PEROJPUR-S
PHULTALA
PIRGACHA
PIRGANJ
PORSHA
PORSHURAM
PURBADHALA
RAIGANJ
RAIPUR
RAIPURA
RAJBARI-S
RAJIBPUR
RAMGANJ
RAMGATI
RANGPUR-S
RANINAGAR
RANISANKAIL
RUPGANJ
RUPSA
SALIKHA
SANTHIA
SARIAKANDI
SARISHABARI
SARSHA
SATKHIRA
SATKHIRA-S
SATURIA
SAVAR
SAYEDPUR
SERAJGANJ-S
SHAHRASTI
SHAHZADPUR
SHAILKUPA
SHAKHIPUR
SHIBGANJ
SHIBGANJ
SHIVALAYA
SHYAMNAGAR
SINGAIR
SINGRA
SIRAJDIKHAN
SONAGAZI
SONATALA
SREENAGAR
SREEPUR(MAG)
SREEPUR(GAZI)
SUJANAGAR
SWARUPKHATI
TALA
TANGAIL-S
TANORE
TARAIL
TARASH
THAKURGAON-S
TONGIBARI
TRISHAL
UJIPUR
ULLAPARA

Flood Proofing Pilot (FPP) Project

In the char areas, project implementation began in March 1997 with local NGO partners: SOLIDARITY, Mohideve Jobo Samaj Kallan Samiity, and the LGED. This project is located in Ulipur thana in the river channel of the Jamuna and Tista rivers. The FPP sites are noted on the map on the following page.

For the first two years, a total of 45 villages with a population of 48,765 people are targeted under FPP. In FY 1997, a total of 501 homestead ground raisings were planned in 11 villages, and 431 were completed; it was planned and work has been completed; it will also be used as a school and community meeting place. In the current fiscal year, the project will work in an additional 34 villages. In FY 1999, another 34 villages will be added, bringing the total number of villages to 79 at the end of the pilot project.

The provision of clean drinking water by raising tubewells, latrines, evacuation boats, road rehabilitation, tree plantations, home gardening, flood preparedness, health education, erosion and mound protection, and village planning are additional activities that are being undertaken in this pilot.

In the haor (depression areas), IFFD has established a field office. The first reconnaissance surveys have been conducted in 31 villages and the participatory learning and action activity is being carried out in 20 villages. FPP intervention will be implemented in these 20 villages this fiscal year. For FY 1999, FPP plans interventions in an additional 16 villages.

In summary, current plans call for interventions during the 3-year period (FYs 1997-99) in 36 villages in the haor area and 79 villages in the chars.

The FPP addresses an identifiable, immediate need and provides for a direct and readily recognizable benefit to the benefactors of the intervention. The present living conditions on the haors visited are unacceptable. The proposed intervention will dramatically improve these living standards.

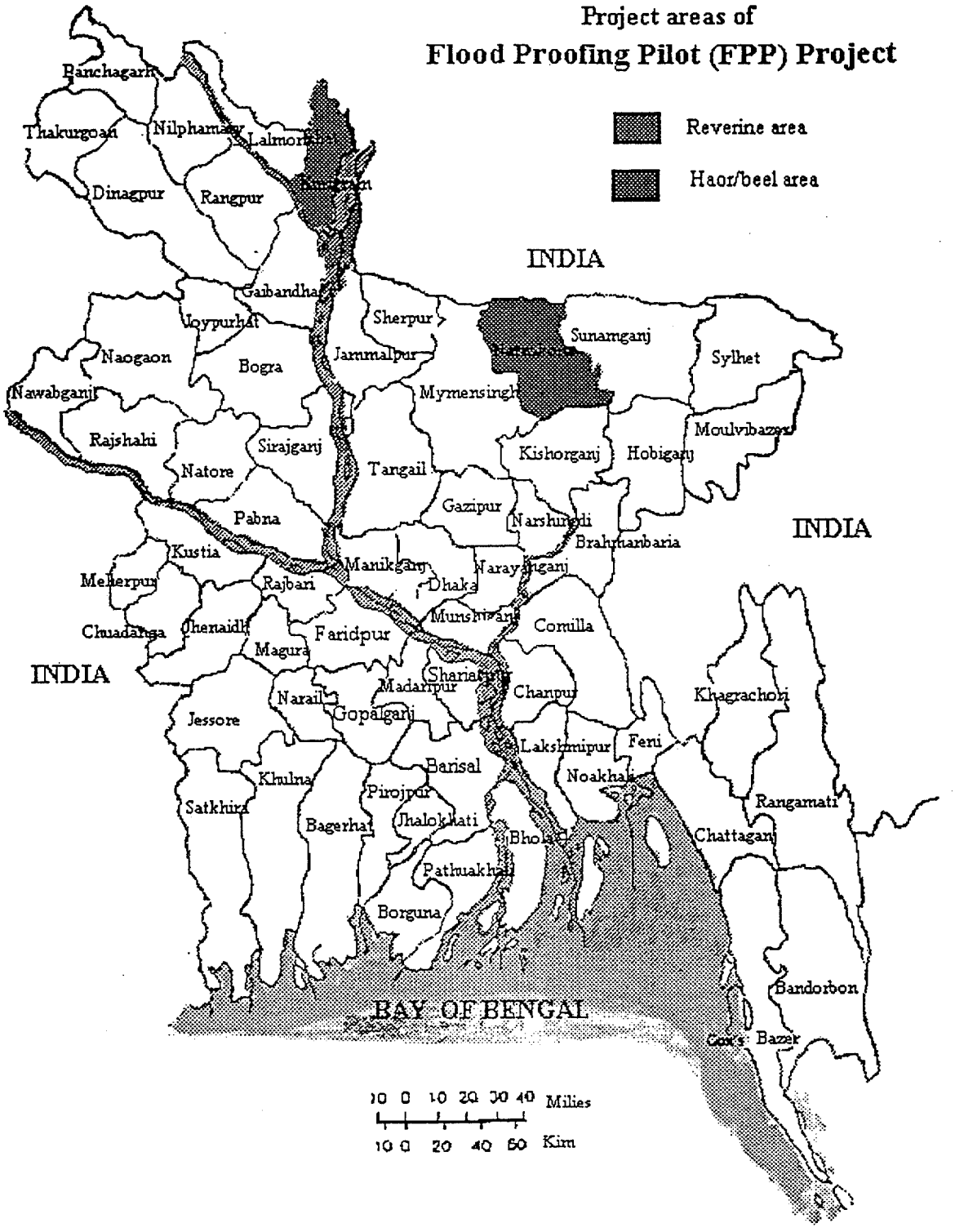
There is a sense of satisfaction with being a part of a project with these characteristics that is universal, and the FPP staff is not immune to this condition. The staff's pursuit of the objectives and commitment to the pilot is evident. The successes being achieved are a reflection of the positive attitude of the staff members and their dedication and ability.

The history of the inception of the pilot is a microcosm of the experience of the USAID/ CARE transition from purely relief-oriented activities to relief/development activities. It is the history of the positive transition of a program originally perceived to address simply the

CARE-International Bangladesh

Project areas of

Flood Proofing Pilot (FPP) Project



physical need of protecting the benefactors from inundation during flooding to addressing a whole range of socioeconomic issues that need to be controlled if the benefactors are going to experience significant, sustainable benefit from the program.

Very early in the program it was perceived that the original scope of the intervention was insufficient. To the credit of the managers of the program, the physical interventions planned were delayed until additional planning and design of the pilot were accomplished.

The orderly implementation of the pilot allowed for extensive community involvement during the planning stage of the implementation, and the consequence has been active community acceptance of the project. Institutional strengthening has been accomplished in that the original implementation planning committees in the island char village of Jalangerkuthi and the unprotected land village of Beparipara have remained active after the completion of the interventions. The Jalangerkuthi committee is now considering a plan for community assistance for families whose homesteads were not flood proofed by the pilot. The Beparipara committee is planning the establishment of a high school in the flood shelter provided by the project.

There is a potential problem that needs consideration if the scope of the flood proofing project is to be expanded to address even a small portion of the estimated 2.7 million persons now living in these flood zones. Despite the efforts of the program, the people living in these flood zones still remain vulnerable to major floods. There is reason to believe that the improvement in living standards in these areas will attract people now living outside of them to relocate to these locations, exposing them to this hazard. The island char village of Jalangerkuthi has already experienced an influx of 9 new families, increasing the original household number of 57 by 15 percent.

If new families are attracted by the success of the interventions, it is the responsibility of the project to provide adequate disaster preparedness apparatus to assure the protection of life and limb of the population in times of extreme flood.

GEOGRAPHIC INFORMATION SYSTEM (GIS)

CARE identified the need for a GIS in its May 1994 grant proposal to USAID. The first annual work plan called for the Irrigation Support Project for Asia and the Near East (ISPAN) to complete prototype GIS applications in November 1994 and a follow-on needs assessment to be undertaken, if necessary. The January-March 1995 Project Performance Report anticipated that the needs assessment would be completed by the project's environmental management unit coordinator in the fourth quarter of FY 1995. The fourth quarter report project shifted the completion date to the second quarter of FY 1996. The needs assessment is dated July 1996.

The assessment recommended the use of GIS in the roads program in environmental assessment and infrastructure planning and monitoring. In addition, the assessment identified four types of GIS applications in disaster management: preventive, disaster preparedness, emergency response, and rehabilitation.

The assessment recommended that CARE set up its own GIS laboratory, but asserted that it should work closely with and provide relevant support to the LGED GIS unit. In response, the CARE GIS unit was established in November 1996, with the following objectives:

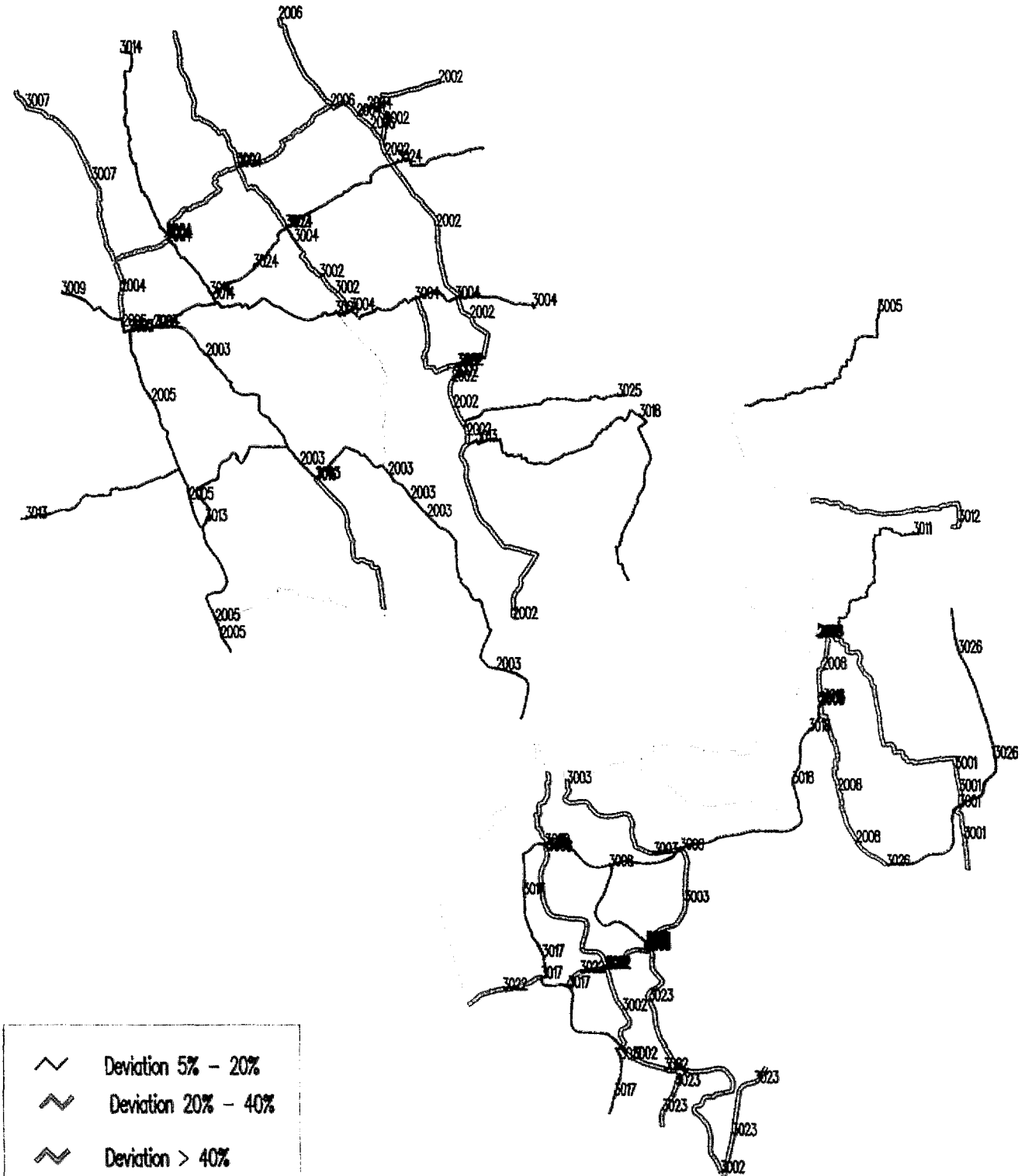
- Work with LGED in updating the R1 and higher roads for their integration in thana maps;
- Improve the thana database through incorporation of spatial features, in particular environmental, to improve R1 road selection processes;
- Integrate CARE data in its management information system (MIS) with the GIS data;
- Develop GIS applications for use in CARE projects, such as the disaster management and flood proofing activities; and,
- Support the needs of other CARE projects for thematic maps and tables, derived through using GIS techniques, such as overlays and simulation.

At the time of the assessment team's visit, the two GIS units (LGED and CARE) had just completed mapping the R1 and higher roads in a pilot area of seven thanas in Comilla and Chandpur districts using the differential global positioning system (DGPS). The results have been analyzed, and a table and map prepared showing the deviations of the DGPS data from the LGED data. An example is provided on the following page.

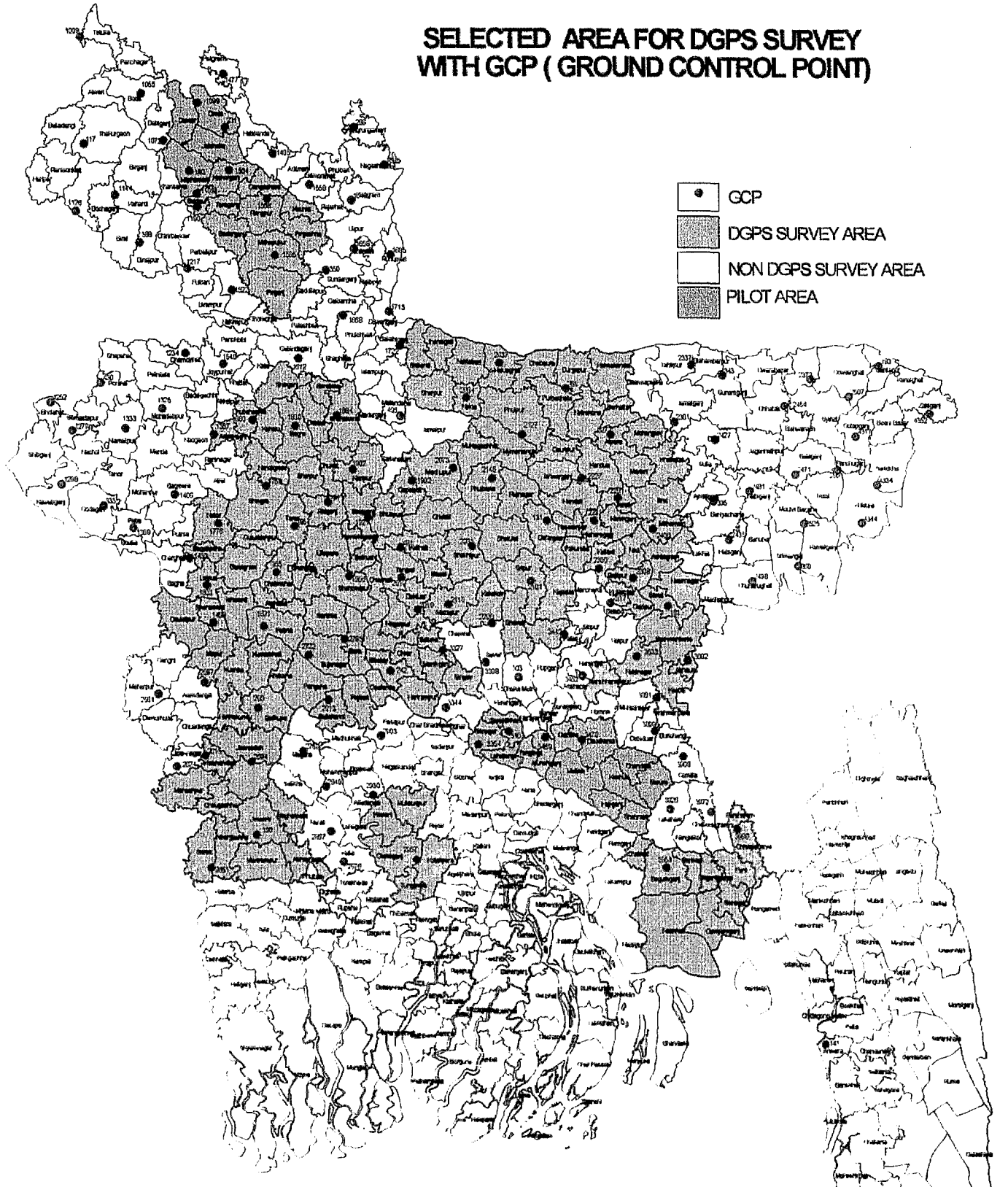
Based on the pilot experience, plans have been prepared for the two GIS units to undertake a more comprehensive survey in 150 thanas. The latter activity, scheduled to start about December 1, 1997, will also integrate satellite imagery in raster format with vector spatial data. The map on page 19 shows the area to be included in the forthcoming survey.

The output of the GIS pilot is valuable for planners of infrastructure interventions. LGED recognized this value and consequently produced detailed thana maps with the best secondary information available as expeditiously as possible. LGED addressed the immediate need for detailed maps by providing the best information available. These maps are the starting point for the present DGPS survey, and without them the prosecution of the survey would be much more difficult.

THANA : MATLAB
Deviations of DGPS Roads from LGED



SELECTED AREA FOR DGPS SURVEY WITH GCP (GROUND CONTROL POINT)



GIS

It is unfortunate that the accurate information that will be available when the data collected in the GIS pilot are compiled was not available at the inception of IFFD. More efficient use of IFFD resources would have been realized if this planning tool had been available prior to the implementation of the IFFD program thereby facilitating the preparation of a master plan of the R1 road system with priority components of the system identified.

OTHER ACTIVITIES

The status of other activities projected in the MYOP to support the implementation of the IFFD project is presented in table II-2 below. In addition to those set forth in the table, it should be noted that CARE has established other operational units, such as the environmental unit, monitoring and evaluation unit (M&E), training unit, and an MIS. (The work of the environmental unit is discussed in section V below and the M&E unit is discussed in section III. A summary of training unit activity is included in section VII, along with a comment on the work of the MIS.) CARE also established a technical support unit and an operations unit to provide assistance to the six suboffices established in various parts of Bangladesh to support and monitor IFFD.

Table II-2
PROJECT OUTPUT AND ACHIEVEMENT STATUS

Proposed Activities	Current Status and Achievements
A GIS is to be established at CARE.	Completed. See preceding discussion.
At least 3,115 initial environmental examinations (IEEs) will be carried out for the IFFD-financed rural road network component construction and rehabilitation activities.	Completed and ongoing. Detail is given in section V.
Systems to strengthen local governments' and communities' capacities to plan and implement routine rehabilitation of rural road network (for example, incentive system, union, thana, and district-level publicity, reimbursement system, action research) will be field tested.	An incentive system has been established. (See section IV.) The awareness campaign, which has recently been designed, also responds to this output target.
Evaluative environmental reviews are to be implemented.	Completed. See section V.
Preliminary environmental reviews are to be carried out for all IFFD-financed rural road network component construction and rehabilitation activities.	Completed. See section V.

Table II-2
PROJECT OUTPUT AND ACHIEVEMENT STATUS
(continued)

Road contractor pilot project is to be implemented.	Eight roads were piloted in 1997; issues addressed in section IV.
Monetization pilot project is to be implemented.	Completed.
CARE is to provide staff training in new approach and procedures for approval of annual thana road proposals.	The system has been somewhat modified over time; CARE staff has been adequately trained.
CARE staff is to be trained in incentive, constructive monetization, and reimbursement systems operations.	Completed.
CARE staff is to be trained in road environmental reviews.	Valuable environmental training was provided. See section V.
CARE staff is to be trained in Training of Trainers curriculum in road approval, environmental review, and new IFFD management system.	Completed and ongoing.
Regional planning needs are to be assessed.	This was carried out as a basis for the planned rural infrastructure planning training.
A model is to be developed for the regional planning workshop series.	See foregoing.
Thirty-six 5-day regional planning workshops a year are to be conducted during the last three years of the project, each for 20 thana officials.	TDCC training is ongoing.
Action research study is to be conducted.	UPWARD was designed in 1996, has been approved, and is moving into implementation.

III. PROJECT IMPACT AND ITS MEASUREMENT

Positive results of the IFFD road rehabilitation and flood proofing activities can be seen. However, the road component is not achieving its full potential. This section will present some of the impact indicators, both positive and negative, and discuss some of the factors contributing to the results. Technical factors affecting the quality of the roads, and hence their effect, are discussed in section IV.

The type of impact that could be anticipated from improved transport infrastructure is discussed in studies conducted between 1987-88 and 1989-90 by the International Food Policy Research Institute (IFPRI) and the Bangladesh Institute for Developmental Studies (BIDS)[1]. The study reported that a well-developed rural infrastructure (of which road infrastructure is a crucial component) increases the availability of agricultural inputs on site, decreases marketing costs, positively affects off-farm employment opportunities, and increases household income. Well-developed infrastructure, as defined in the study, is broad; it is based on access to transport, markets, agricultural inputs, electricity, and social services.

Using this definition, the study findings indicated that in areas where well-developed infrastructure existed, fertilizer prices at village level were 14 percent lower, fertilizer use by farmers was 92 percent higher, farm land under irrigation was 105 percent higher, and 71 percent of the agricultural land was used for high yield variety rice, compared with areas with a lack of improved infrastructure. The income per unit of area of field crop was 20 percent higher, household income increased by 8 percent, and wage rates were 12 percent higher than areas where rural infrastructure was not well developed.

The study also indicated that the wages of landless labor were 36 percent higher and the proportion of female laborers was 135 percent higher in areas or villages where there is a well-developed rural infrastructure compared with nondeveloped infrastructure areas.

The IFFD project has established two monitoring activities designed to give some indication of impact: the transport and freight survey (TFS) managed by CARE; and, the socioeconomic impact surveys carried out by the contractor, Helen Keller International (HKI). The flood proofing unit is in the process of re-establishing a monitoring system for that component of the project. An element of that system will be designed to obtain outcome information. (Since the design is not complete, it will not be discussed in this report.) The passability surveys are not designed to provide impact data, but they help explain the results of surveys designed for that purpose as well as provide an indication of expected program results.

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[1]Ahmed and M. Hossin, *Development Impact of Rural Infrastructure, Bangladesh*. International Food Policy Research Institute and Bangladesh Institute for Developmental Studies, 1990.

TRANSPORT AND FREIGHT SURVEYS/PASSABILITY REPORTS

To assess both the economic and social impact of the IFFD interventions, the TFS reports provide data on passenger volume, freight volume, and freight carried by trucks on FY 1996 IFFD roads—roads completed for the most part in the spring of 1996. These data provide a proxy or advance indicator of the socioeconomic effect.

To ensure that 80 roads would be available for the TFS, 90 roads were selected on a stratified random sampling basis, drawn from the universe of FY 1996 IFFD roads. The alignments were further stratified by the level of development (high, medium, and low) of the owner thana. Data collection is planned to last two years. Data are generated in three different surveys: **a reconnaissance survey**, which produces a sketch of the road showing road entry/exit points, major traffic directions, market places, schools, colleges, and health centers; **a traffic census**, in which a 7-day a week, full-day traffic and freight movement count will be undertaken for 1 week a month for 24 months; and, **a survey of transport operators** to produce estimates of passengers and freight cost and value added as a result of increased movement of agricultural inputs and outputs and other goods due to reduced transport costs. Key informants are to be used twice in the rainy season and twice in the dry season, before and after project intervention.

Data collection is being conducted by two enumerators hired by the project for each road to be surveyed under the general supervision of monitoring and evaluation technical officers and assistant field engineers in each of the six IFFD suboffices.

Survey Results

On average, the results of road improvements have been positive (see table III-1 on the following page). Overall passenger volume on the sample roads increased 35 percent and freight volume increased 71 percent. As might be anticipated, the percent increases are greatest during the rainy season, even though the overall levels are lower than during the dry season. The data in table III-1 reflect preliminary figures for 1997 (the second collection of post-intervention data).

What leads to the conclusion that the road component of the project is not obtaining the results that one would expect is that the TFS surveys show declines in post-intervention traffic on a significant number of the IFFD roads—16 percent show declines in passenger traffic and 23 percent show declines in freight traffic. Furthermore, 35 percent of the roads show no truck traffic at all. Some roads were not passable by trucks. (Other explanations are discussed in the next section of this report.)

Table III-1
MEAN VOLUME OF TRAFFIC PER ROAD PER MONTH BY SEASON

TRAFFIC VOLUME	DRY SEASON	RAINY SEASON	ALL SEASON
Passenger Traffic (person-km)			
Pre-Intervention	50,889	37,581	44,235
Post-Intervention	65,917	53,587	59,752
Volume Change	**15,028**	**16,006**	**15,517**
Percent Change	**30%**	**43%**	**35%**
Freight Traffic (maund-km)			
Pre-Intervention	13,450	7,796	10,623
Post-Intervention	22,400	13,852	18,126
Volume Change	**8,950**	**6,056**	**7,503**
Percent Change	**67%**	**78%**	**71%**

SOURCE: Special report prepared by the CARE Monitoring and Evaluation Unit.

The passability surveys on FY 1996 roads (based on a sample of 180 roads) were made in September, during the rainy season. As can be seen from table III-2 below, the passability rates post-intervention show very significant (even dramatic, in many cases) improvements over the pre-intervention situation. This positive result is tempered by the level of the post-intervention data and the subsequent decline in road passability experienced in 1997.

According to the preliminary FY 1997 follow-up passability report of FY 1996 roads (table III-2), 69 percent of the surveyed roads were passable by trucks and 88 percent were passable by rickshaws/vans. Both of these figures are below target (75 percent for trucks, 100 percent for rickshaws/vans). The averages mask positive results in some areas, for example, rickshaw traffic in four suboffices and some discouraging results in others (truck traffic in all suboffices). Jessore records a deteriorating situation for both rickshaws and trucks.

Table III-2
PASSABILITY OF FY 1996 ROADS ONE YEAR AFTER INTERVENTION

Percent of Roads Passable	RANGPUR	BOGRA	JESSORE	DHAKA	MYMEN SINGH	COMILLA	TOTAL
Pre-Passability							
Truck	20%	24%	19%	18%	11%	23%	**20%**
Rickshaw	83%	56%	57%	46%	71%	79%	**66%**
Post-Passability							
Truck	92%	68%	57%	76%	86%	92%	**75%**
Rickshaw	96%	79%	79%	100%	100%	100%	**88%**
Passability After One Year							
Truck	88%	64%	42%	67%	78%	83%	**69%**
Rickshaw	100%	82%	64%	100%	100%	93%	**88%**

Source: *Preliminary Follow-Up Passability Report on FY 1996 Roads*, provided by the CARE Monitoring and Evaluation Unit.

The *Preliminary Post-Passability Report on FY 1997 Roads* (not presented here) shows comparable results: 69 percent of roads were passable by trucks, 87 percent by rickshaw. These results are below IFFD targets and below the post-passability (September 1996) results on FY 1996 roads—slightly for rickshaws (88 percent versus 87 percent), significantly for trucks (75 percent versus 69 percent). Again, Jessore and Bogra (especially Jessore) show the most discouraging results (46 and 41 percent, respectively, passable by trucks; 62 and 81 percent, respectively, by rickshaw).

Survey Process and Use of the Data

The passability reports and the TFS reports were analyzed, including cross-analysis of the data from the two reports. This resulted in a number of questions about apparent anomalies. That, plus observations in the field, led to questions being submitted to suboffices regarding a number of the roads. Information gleaned from this process included the following:

- Zero truck traffic may mean:
  - there are no trucks in the area because of its isolation, for example, surrounded by rivers and not serviced by a vehicle ferry;

- a road has become rough and trucks have looked for and found alternate routes;
- the road has been cut or is otherwise not passable;
- the IFFD alignment was relatively unimportant; or,
- other road construction was concurrent with the IFFD upgrade which minimized the importance of the IFFD alignment.

- The standards used for grading the passability of FY 1995 roads, which are surveyed in January (dry season), seem less stringent than those used for FY 1996 and FY 1997 roads, which are surveyed in September (rainy season).
- Sections of the TFS alignments have been given a hard surface, paved or herringbone brick, up to or beyond the location of the enumerators in a number of cases.
- Because of the nature of the IFFD road (for example, no markets along the alignment) or the improvement of other access roads, trucks are using only a portion of the IFFD alignment and that is beyond a point where the information would be captured by the enumerators.

Conclusions

- The TFS reports need to be modified to provide appropriate explanatory material by alignment so that the reader can properly interpret the data in the report and not draw inappropriate conclusions.
- The data should not be summarized and presented as an indicator of the overall effect of the IFFD.
- Inadequate use is being made of the data by headquarters and field managers.
- Even allowing for the data problems cited, the TFS data, supplemented by field input, are valuable tools, permitting the analyst and/or manager to:
  - verify the validity of the assumptions cited at the beginning of this section about the anticipated effect of improving road infrastructure;
  - perform additional analyses, for example, changes in traffic from upgrading from earth to herringbone brick or pucca, and test certain theses regarding the relative importance of trucks in rural areas and/or low development

areas, the impact on the use of rickshaws/vans when trucks enter an area, and so forth; and,

- describe at least some of the characteristics of a successful IFFD intervention.

Based on the limited analysis conducted during the assessment, the most significant characteristics of successful IFFD interventions appear to be as follows:

- The alignment is at least 4 km in length and usually longer. Of the top 17 performers (a cutoff based on freight volume increase of over 10,000), 8 were 4.0 to 7.9 km, 8 were 8.0 to 11.9 km, and 1 was 17.3 km.

- There are markets along the alignment, not just at the endpoints, and/or several R-2 and R-3 roads feed into the alignment. (This was seen on some alignment profiles or observations provided by the field offices or on the assessment team's field visits, but additional research would be helpful.)

- The alignment is located in a thana that is included in the low development category. The distribution of the top 17 performers is as follows: 3 in the high development category, 4 in medium development, and 10 in low development.

- There are no alternate good roads available that connect to the market/bazaar at the endpoint of the alignment. This was cited 13 times in the field responses to the questions on apparent poor performance.

- Trucks have access to the route. There are, however, some alignments which show substantial increases in freight traffic even when no trucks are available or where the truck contribution is relatively small. Of the top 17 performers in truck-carried traffic, 14 would fall within the top 17 top performers for freight overall. In other words, in only 3 of the top 17 overall freight performers was the contribution of truck volume relatively insignificant.

Recommendations

1. **The passability and TFS reports should be redesigned to make them more useful for management than they are currently and distributed more widely, including to each thana engineer and the heads of CARE field teams.**

Specific suggestions for redesign include the following:

- The passability report should become a road use and status report in which the surveyor of the road would not just indicate whether the road was passable but would record the amount of time it takes to drive the alignment; record where repairs are needed immediately or will be needed before the next rainy season; and, classify the road for commercial usability, not just passability.

- The TFS report should include as an annex the data on changes in passenger volume, freight traffic, and freight by truck for each alignment, thereby permitting field personnel to compare their alignments with others and review apparent shortcomings or other anomalies.

- The proposed TFS annex would also provide for comments by the enumerators or the M&E technical officer (based on information from LGED and CARE personnel) regarding changes affecting the use and passability of the alignment.

2. **CARE should have its field M&E technical officers visit all of the TFS alignments once and report on the status of the roads, including change in surface, and on the positioning of the enumerators in relation to established traffic patterns.**

This would provide the data for the comments section of the annex proposed as part of a revised TFS report. The information gathered might suggest some additional modifications to the reporting or some refinement of the foregoing proposals.

3. **CARE and LGED should instruct their field personnel to report to CARE M&E technical officers in the field or the assistant coordinator of the M&E in CARE headquarters of any developments which could affect the traffic patterns or levels of the TFS roads. Similarly, the TFS enumerators should be instructed to report any developments on or along the alignment.**

This is to ensure that the comments section of the annex proposed as part of the revised TFS report would be kept current.

4. **LGED and CARE management should encourage their personnel to make use of these reports in assessing their implementation practices and in selecting alignments for improvement (including soil sand aggregate [SSA]) under IFFD.**

While this may need to be reflected in the planning and implementation guidelines, management could also arrange for a headquarters review of the reports and ask the field

about apparent poor performance or anomalies in the data. This would ensure that field personnel at least start looking at the report to anticipate headquarters' queries.

5. **CARE and USAID should station enumerators immediately on a selected number of FY 1998 roads that will be given an SSA surface so some pre-intervention TFS data can be collected.**

This would provide valuable data for use in performing internal rates of return (IRR) calculations on the SSA-surfaced roads. It might also provide an indication of whether the effect from subsequent years' roads is comparable to that obtained at a prior time.

6. **The proposed new road use and status report should be carried out at least once annually on all IFFD roads, not just on a sample group, preferably in the rainy season—at harvest time, where feasible.**

This is to ensure that the IFFD-supported roads fulfill the reason for their upgrading: to improve the lives of those living along the roads. If they are not passable, the investment was in vain, and necessary remedial action should be taken immediately. As proposed in section IV, a repair and maintenance fund should be established to ensure passability/ usability during and (it is hoped) beyond the life of the project.

SOCIOECONOMIC IMPACT ASSESSMENT SURVEY

This activity is for evaluating the effect of the improvement of IFFD roads on households along selected alignments in which the household uses the road as its primary land communication service. The sample includes 1,437 households living on 8 alignments located in 7 thanas in the jurisdiction of 5 of the 6 IFFD suboffices (excluding Bogra).

In order to isolate, insofar as possible, the effect of marginal road improvements upon the beneficiaries, particularly at the income and welfare levels, control groups were identified—families affected by the same socioeconomic environment as those families living adjacent to the rural roads, but whose lives were not expected to be affected by the road improvements. Data are collected on this group at the same time and in the same manner as the data are collected for the beneficiary group. This was to enable the analysis to account for factors outside the project which may negatively or positively affect households who directly benefit from the road improvements.

Four survey instruments are used: household inventory survey (annually), periodic survey (monthly), land use calendar (quarterly), and child and mother health and nutrition form (bimonthly).

The household inventory survey obtains information on

- household demographics—information on all members of the household, including their employment status, and
- household assets—information on the general level of household livelihood security.

The periodic survey seeks information on the following:

- agriculture—production, sales, purchase of inputs, labor hire;
- other income-generating activities,
- market purchases—information on household's regular visits to the market;
- food consumption—dietary diversity, sources of major foods, food distribution within the household;
- purchases and sales of assets and borrowing—information used to monitor coping strategies of households;
- access to social services; and,
- sanitation and water—information used to assist analysis of health and nutritional status of household.

The land use calendar tracks changes in agricultural production and land use through

- the form of access/type of ownership of land,
- area of the parcel of land,
- type of crop grown, and
- changes to the land base.

The child and mother health and nutrition form collects data on the following:

- nutritional status of children in the household: age, height, weight, midupper arm circumference; night blindness; vitamin A coverage; breastfeeding status; diarrhea; and frequency of food intake—rice, wheat, vegetables, and dal; and,
- mother's general nutritional status—age, weight, height—used to calculate body mass index, and frequency of food intake.

For analytical purposes, the indicators were categorized into effect indicators and impact indicators. Effect indicators relate to cost of transport, both in terms of time and money, and the frequency of travel and volume of goods transported per household. Effect indicators are reported for transport of agricultural inputs and outputs; visits to markets, schools, and health facilities; and, visits to the households by extension agents.

Impact indicators measure several dimensions of household welfare and livelihood security status which are expected to be related to transportation cost, including agricultural production and productivity, and food consumption patterns.

The survey is being conducted in two phases or cycles. The first survey cycle, from December 1995 through January 1997, was conducted before the project had undertaken road improvements on the alignments and was designed to provide baseline data. The post-intervention cycle is ongoing; the fieldwork will be completed in January 1998. Helen Keller International (HKI) was awarded a contract to manage the data collection; outside experts assisted in the design of the survey and in the analysis of the data collected to date.

Survey Results

The baseline report (by Mark Langworthy) was published in June 1997. With regard to effect indicators, significant differences were found between households in the control and beneficiary areas as follows:

- The quantities of agricultural inputs and outputs transported by beneficiary household was 17 percent less than control households;
- The unit cost of freight was 10 percent higher for beneficiary households than for control households;
- Beneficiary households sell rice and purchase fertilizer at the tail end or the middle of the alignment rather than at the head of the alignment where larger markets are located;
- Beneficiary households use higher cost modes to transport rice and fertilizer than do control households;
- Beneficiary households go to markets to make household purchases less frequently than do control households;
- Beneficiary households visit health centers somewhat less frequently than do control households;

- No significant differences exist between the two groups in school attendance rates; and,

- Extension agents visit beneficiary households less frequently than they visit control households.

The analysis of the impact indicators revealed that transport costs and isolation from markets have statistically significant relationships with several of the project indicators, in particular:

- Freight transport costs are significantly related to the quantities of fertilizer used by farmers; fertilizer use, in turn, affects rice production;

- Food consumption patterns are related to transport costs, for example, the beneficiary households were found to consume proportionately more rice than potatoes, wheat, and dal; and,

- Per capita consumption of the staple foods and the total calories derived from the four staples are highly positively rated with income; hence, lower transport costs would likely lead to increased per capita food consumption.

The first post-intervention quarterly report (February-April 1997) reported 8 findings related to the beneficiary group: (1) 6 of 8 alignments showed a significant decline in the number of trips to the market; (2) 4 of 8 alignments showed a decline in the time needed to reach the market; (3) there was a trend to use a lower cost mode of transport for returning from the market in 4 alignments, to higher cost in 3; (4) 6 of 8 alignments reported lower costs to reach a medical facility; (5) school attendance rates fell (although they were still at a high level); this also was true for control households; (6) 4 of the alignments reported a decline in visits by a health extensionist while 3 reported an increase; (7) homestead purchase of fertilizer increased in 4 alignments; purchase at midalignment increased in 2 and there was a decrease in purchases from off-alignment and from the tail end of the alignment; and, (8) all 8 alignments showed a trend to a lower cost mode of transport for travel to purchase fertilizer than previously.

As stated in the above-mentioned report, these effect-level indicators "show the onset of behavior change of households due to alignment improvement and these changes need to be sustained for a period of time to have any measurable effects on the impact indicators. The impact indicators, however, are difficult to interpret using quarterly data and can be meaningfully measured with completion of post-intervention data. These indicators will be reported in the impact assessment reports and not in the quarterly reports."

The *Report on Household Characteristics and Patterns of Seasonal Variation*, by Leonardo Costa, July 1997, provides a quantitative review of the most important

socioeconomic characteristics of the beneficiary households on the alignments and of patterns of seasonal variation in household incomes, consumption, nutritional status, visits to medical facilities, and frequency of visits to market.

From the analysis, four types of households with very distinct socioeconomic characteristics were identified and labeled as Small Farmers (including the landless), Mid Farmers A, Mid Farmers B (who usually also pursue significant nonagricultural economic activities), and Large Farmers. The Small Farmers have the lowest living standards of the four groups and the mothers and children of the group are in the poorest condition in terms of their nutritional status. The analysis suggests that all types of households can be affected by road improvements, including Small Farmers.

Some characteristics of the Small Farmers, in relation to the other categories, include the lowest levels of formal education; predominant occupation for the household head is day labor; high rates of household male integration in the labor market; high presence of short-term/casual labor; a majority live in thatched roof houses, while a high percentage live in low-cost houses; lowest holdings of cattle; own much less land; net revenues from agriculture and livestock are very low; least access to electricity; live closest to the main road; visit medical facilities more frequently; rely most on high-cost means of transport; cultivate less land and have the lowest percentage of irrigated land; rank second in use of high yield variety rice; are the main producers and sellers of potatoes; are the main producers of wheat and account for the most wheat sales; grow fewer vegetables; use fertilizer more intensively; eat slightly more wheat (and less rice); consume fresh fish, vegetables, and eggs less frequently; main source of rice is the market; wheat as food aid is especially important; have the highest rates of mothers below normal with body mass index categories; and, have the smallest children (height for age).

In the preliminary report for the IFFD evaluation team, November 5, 1997, HKI addressed the following questions: (1) Does variation in passability conditions and the general use of the alignment by beneficiary households affect project indicators? and (2) Is the impact of road improvements uniform across all households? For the purpose of this analysis, monthly data were aggregated into pre- and post-intervention semi-annual figures (February-July, 1996 and 1997).

To address the first question, alignments were grouped into high, intermediate, and low categories using qualitative field reports on passability conditions and use of the alignment as compiled by HKI teams residing on the alignments. No significant differences were found in the effect-level indicators from pre- to post-intervention by alignment group. The low category, however, has been affected by outside interventions—a pucca road has been built at the beneficiary end of Gopalpur-II, which leads directly to thana headquarters.

No significant differences were found in the changes in the effect-level indicators from pre- to post-intervention by household type. For instance, the Small Farmer household type

showed declines in holdings of livestock assets, but so do all other beneficiary categories. Similarly, all categories showed an increase in cash holdings—perhaps the two are related, perhaps it is a seasonal phenomenon. Seasonal variations cannot be established without a full year's data.

During the assessment team's visits, which included visits to various alignments (including some TFS and HKI alignments), an attempt was made to obtain anecdotal information that would bear on the basic impact thesis that the road improvements would lead to an increase in fertilizer use (and thus increased production) and additional employment opportunities (both on- and off-farm). On a number of alignments, there were new shops along the alignments or in pre-existing markets (hats and bazars). New stores were selling fertilizer on at least two alignments and there was an expansion of (and a new tin roof on) a third. Individuals interviewed cited less expensive fertilizer as a benefit of the road. Also cited was the shift from one to three rice crops per year.

To ensure that the Small Farmer group was also benefiting, a special session was held with a small group of HKI interviewers to obtain the interviewers' perspectives and to find out how the Small Farmer overcomes his/her situation. The HKI interviewers confirmed that the Small Farmers are benefiting. Frequently, Small Farmers are able to set up a small shop along the alignment. Others rent or buy a rickshaw/van and go into the transport business. This pattern was subsequently confirmed in a focus group on another alignment. A tempo (small vehicle used as a taxi) driver on another HKI alignment reported that even after reducing his prices, he is earning more than double what he had been earning previously because the road is good and he can make more trips in a day.

Conclusion

- Although HKI impact data are not yet available, HKI's baseline studies of the sample households coupled with some of their effects data and personal observations and discussions in the field have shown the positive result of the IFFD roads, when well selected, constructed, and maintained, in general and on food security specifically (food access and food availability).

Survey Process

The work with HKI began as a research activity to identify indicators that could be used to measure the impact of the IFFD program. Along the way, the effort has become the impact measurement activity it was intended to help design.

Conclusions

- As a research activity for gaining insight into the situation of target beneficiary households and identifying potential indicators, the HKI activity has been successful.

It should not, however, be expected to provide at its completion in February 1998, conclusive results about the impact of the IFFD program.

The factors which lead to this conclusion are the following:

- The comparisons between the control group and the beneficiary group will have less relevance than expected because the control group tends to benefit also from the road rehabilitation. This has emerged from the data collection and was confirmed during the field visits.[2]

- Because of the effort to obtain control groups that would be minimally affected by the road intervention, the eight alignments chosen appear not to be representative. On the one hand, the roads chosen are generally fairly long (average 6.9 kilometers). On the other hand, four or five of the eight have no trucks using them, a higher percentage than the IFFD program in general.[2]

- The causal relationship between the road improvement and many of the indicators being surveyed is very tenuous and/or it is clear that other factors will generally have a more important impact upon the indicator, for example, visits to health facilities, visits by health and agricultural extension agents, nutritional habits, sanitation facilities, and anthropometric and dietary information of mothers and children. These factors can be positively affected by the road, but other supporting actions are likely to be needed to see the full benefit of the road.

- The real world has encroached on the effort to have a clean experiment in the following ways:

  - one of the roads became passable before the baseline data were collected;

  - it has not always been possible to keep the roads passable after the intervention;

  - an alternate pucca road has been built to the starting point of the Gopalpur-I road; and,

[2]These concerns were discussed in the briefing presentations with the IFFD partners and it was acknowledged that they could be addressed in the statistical analysis process in terms of extraneous intrusion as well as sample representativeness.

- two roads are very slippery when wet and are not used during the rainy season by rickshaws.

► Using the data generated by HKI and a more detailed analysis of the data from the TFS and passability surveys, it should be possible to design follow-on survey activity that will provide, in a shorter timeframe, some useful answers related to ensuring maximum impact from the IFFD program, even though the survey process may not be as rigorously scientific as the current HKI socioeconomic activity.

The studies cited at the beginning of this section have established the linkage between developed rural infrastructure and rural prosperity. The principal effort that would seem to be needed now within IFFD is to determine what happens to a sampling of Small Farmers and Farmers A (as identified in the HKI studies): who is gaining/losing and why? This could help identify supporting activities needed to go with road improvements; conversely, it could suggest choosing roads with certain existing conditions to ensure a high level of benefit for the target group.

The proposed reworking of the TFS and passability surveys could be complemented by continuing the socioeconomic impact assessment surveys in most of the HKI alignments, but with a reduced set of indicators after the current activity is finished; and, designing some additional surveys, as discussed above, and carrying them out on a sampling of FY 1997 and FY 1998 IFFD roads.

An HKI activity on FY 1997 and FY 1998 roads is not being proposed. Nor are any pre-intervention studies being suggested. Rather, sample surveys targeted on specific groups for very specific reasons are being proposed.

Conclusion

► Short-term targeted purposive surveys is what is needed now, not additional long-term research activity.

It has been noted by the IFFD partners that the importance of truck traffic on the IFFD roads should not be overemphasized because Small Farmers or the landless use rickshaws/ vans rather than trucks. Although the farmers may use rickshaws/vans to take produce to market, trucks will supply the markets if the markets are large enough and if the road is usable economically.

If the trucks (low-priced transporters) come to the markets, better prices for both the farmers' inputs and produce would be ensured. Therefore, from an economic point of view, truck traffic to markets along the alignments should be facilitated. In general, in all newly developing areas where trucks enter, development accelerates. From the limited data available for this analysis, it appears that the pattern holds for Bangladesh as well.

Additional analysis is needed of the available TFS data regarding the importance of truck traffic. In the personnel subsection of section VII of this report, it is suggested that CARE establish an economic analysis unit to conduct needed studies on these types of processes.

IV. TECHNICAL ANALYSIS OF RURAL ROAD IMPROVEMENT

This section of the report addresses specific technical issues that are related to the R1 rural roads component of the program only. For the purpose of organizing this technical discussion, the IFFD rural roads will be considered to consist of three components: structures, embankments, and roadway surfaces. As used in the text of this discussion, structures are defined as the masonry and reinforced concrete structures constructed as designed and implemented under IFFD, embankments are the compacted earth embankments constructed as earthworks under IFFD, and roadway surfaces are the travel surfaces of the IFFD roads on the embankment crests.

STRUCTURES

The structures incorporated into IFFD roads are small, reinforced concrete or masonry abutments, bridges, culverts, and U-drains. The designs of these structures are selected jointly by CARE and LGED field engineering staff. Recently, procedures were changed so that the selection of the design of small structures spanning up to 2 meters will be the responsibility of the LGED thana technical staff. The methodology of the designers is to make selections of structures from a library of prepared, detailed structural designs.

In 1987, LGED adopted the *Road Structures Manual, Part A: Standard Designs,* and *Part B: Guidelines and Design Criteria,* to use as the standard for the design and construction of small road structures, including various small culverts, bridges, and bridge abutments. The manuals consisted of design standards and a series of detailed standard designs that were prepared by the Department of Civil Engineering, Bangladesh University of Engineering and Technology, in conjunction with Engineering Science Limited, consulting engineers and architects. Designers chose prepared designs from the *Road Structures Manual, Part A,* which is a library of prepared designs.

IFFD developed a training manual from these materials entitled, *The Survey, Design, and Construction of Small-Scale Rural Infrastructure.* These materials were used for the design and construction of the structures first introduced into the USAID/CARE rural roads program as Integrated Food For Work (IFFW), which evolved into IFFD.

In the early 1990's, LGED, in conjunction with Development Design Consultants, Ltd., and with the assistance of a grant provided by USAID, developed a new package of design materials: *Road Structures Manual, Part A: Design Criteria, Guidelines, and Selection of Structures,* and *Part B: Standard Designs, Volumes I, II, and III.* Included with this package of design materials is computer software that is easy to use and assists in the selection of an appropriate design and the calculation of material quantities and cost estimates.

The methodology in the new manual remains the same. The designer is not required to perform a rigorous engineering design. The requirement is to enter into the computer

various parameters dictated by specific site requirements so that the computer can search the library of prepared designs to select a design suited to the conditions described.

The present IFFD practice in the use of these design materials is for the assistant field engineer or field engineer responsible for collection of the site data, in conjunction with the LGED thana technical staff, to enter the data into the computer and select the appropriate structure. In two places, the present IFFD Planning Guidelines provide for review of the selection and design of significant structures:

- Section 6.1 of the Planning Guidelines requires that, at the initial environmental examination (IEE) and pre-work survey (PWS) phase of the planning, an alignment requiring a bridge with a span equal or greater than 9 meters must be jointly pre-work surveyed by the thana engineer and a CARE assistant project engineer or project engineer; and,

- Section 4.4.3, Structure Design Guidelines, of the Planning Guidelines, requires that, if the height of an abutment is greater than 6 meters, the selection of the design will be made jointly by the thana engineer and CARE technical staff. The transition point for the type of foundations available in the design materials is that for structures requiring abutments greater than 6 meters, the foundations will be piling. In some cases, piling may be required for an abutment less than 6 meters; such designs are available in the library.

The implementation of the use of the new design materials is in process. Schemes constructed in FYs 1996-97 were designed with the new materials. The software is presently installed and in use by CARE staff at the suboffice level. As is expected in the initial use of a software package of this magnitude, the implementation has had some problems.S Specifically, the software has required revision to correct the calculation of pile lengths and the selection of structures skewed to the axis of a crossing. The former problem contributed to the failure of test piles at 6 of the 18 cast-in-place bridge foundations built in FYs 1996-97. According to CARE technical staff, these problems have been identified and resolved, and the revised software has been distributed, including copies to LGED for use at the district level.

Section 6.1.2 of the IFFD Implementation Guidelines, Determination of Pile Capacity, is in line with the *Road Structures Manual, Part A* guidelines in that there is a requirement for the load-bearing capacity of cast-in-place piles to be confirmed by a static pile load test. There is no requirement for static load testing of driven piles to confirm the results of the application of empirical equations dependent on dynamic resistance to pile penetration during installation in either the *Road Structures Manual, Part A* guidelines or in the IFFD Implementation Guidelines.

Recommendations

1. **The guideline for static pile load testing should be reviewed and static load testing should be required to confirm the load-carrying capacity of driven precast piling that are designed for loads of 30 tons or more.**

Recent experience with the static load-test failures for cast-in-place piling highlights the need for static load testing of piles to confirm calculated capacities. Recording dynamic energy input during the driving of precast piling is valuable as an indicator of pile performance. However, the dynamic equations used in the calculation are empirical. The measurement of the dynamic energy is not direct, but calculated from measurements of the theoretical output of the pile-driving equipment used. The pile-driving equipment in use on IFFD work consists of drop hammers. The energy output of this equipment is variable and directly related to the operation of the equipment.

2. **Cast-in-place piling should be avoided, where possible, and precast piling should be substituted in prepared designs incorporating cast-in-place piling.**

Cast-in-place piling require close supervision and inspection monitoring to assure load-carrying capacity. The foregoing recommendation is made taking into consideration the remoteness of many IFFD scheme sites and the lack of adequate numbers of supervisory and/or inspection personnel from LGED or CARE to provide the inspection and supervision required to assure the load-carrying capacity of cast-in-place piles. In order to assure proper quality control of cast-in-place piling, continuous full-time inspection by a qualified individual with direct cast-in-place piling experience is required.[1]

3. **Provision should be made in the IFFD Planning Guidelines for the review of the selected design by an experienced structural design engineer of all structures requiring abutment heights in excess of 6 meters.**

The recommended structural review is not to be confined to the foundation of the structure under consideration. The size, complexity, and consequent cost of these structures is such that a complete review of the appropriateness of the structure selected, with full consideration of the cost as well as the structural capacity of the structure, should be made. The reviewing engineer should have a 4-year degree and a minimum of five years relevant and verifiable experience.

A workload of some 40 structures for review per year should be within the capability of 1 experienced individual. If such an individual is not available for recruitment from

[1]The IFFD partners have decided to avoid cast-in-site piles in the design of FY 1998 structure schemes.

existing CARE staff or readily available from outside present CARE staff, the part-time services of an appropriate local consultant should be considered.

The procedures in the *Implementation Guidelines, Annex 10: Material Testing Procedures*, are appropriate. However, a problem has been identified as to the timeliness of the concrete testing being conducted by the LGED district materials laboratories. It has been reported that the 28-day concrete tests are not conducted on a timely basis and that some of these tests are conducted up to 60 days after casting of the test cylinders.

4. **A requirement for timely testing and reporting of test results should be included in the Implementation Guidelines.**

5. **LGED should review staffing and equipment requirements in its materials laboratories and address the issue of testing laboratory capacity.**

The validity of the test results (that concrete gains 90 percent of its strength by 28 days and the remaining 10 percent during its entire life, thereby showing no significant difference in test results after 28 or 60 days) is not the issue of concern, but the delay. The delay in the processing of concrete tests can result in delayed implementation where subsequent steps should await the test results. Further, if the test suggests a need for corrective action, the month's delay may make it virtually impossible to rectify the situation without re-doing a structure or it may mean that corrective action cannot be taken until the following construction season. Furthermore, the delays result in delayed payments to contractors.

The structures are designed to sustain H-15 highway loading, using accepted engineering design principles. This capacity is appropriate for the intended maximum service of the roadways and sufficient to protect the structures from damage caused by the types of vehicles observed in use in rural Bangladesh.

Observations of the IFFD structures in place confirm the validity of the design parameters and the acceptable level of the quality of the implementation of the designs. No structural failures were observed in the field. To date, IFFD has constructed 4,113 structures. According to the latest passability survey results, only six structures are a cause for nonpassability of an alignment.

Conclusions

- With the completion of the software corrections and adoption of the recommendations made herein, the design materials, planning guidelines, and implementation guidelines are adequate.

- The structures being incorporated into the IFFD interventions are appropriate.

EMBANKMENTS

Embankments of the type incorporated in the IFFD interventions are subject to four types of failures:

1. Failure of the foundation soils supporting the embankment to sustain the weight of the embankment;

2. Subsidence of the embankment surface caused by consolidation of poorly compacted soils within the embankment;

3. Failure of the shear capacity of the embankment soils to sustain the weight of the portion of the embankment located outside the angle of repose of the soil in the embankment, resulting in a sliding failure of the embankment soil mass; and,

4. Erosion of the embankment resulting in deep rain cuts into the embankment and/or complete washouts of sections of an embankment.

There has been no evidence of failure of the foundations of embankments, consequently this issue will not be addressed. Embankment consolidation, sliding failures, and erosion of embankments were observed in the field and incidence of washouts of embankment sections during severe weather conditions are reported to be not extraordinary.

There is a reporting category on the passability survey for nonpassability causes—described as a nature-made gap, such as is formed by flood water or erosion. This category is directly attributable to embankment failure, and is the second most frequently reported cause of nonpassability. It accounts for 34 percent of the nonpassability of the IFFD interventions. In addition, subsidence of road surfaces results in the loss of roadway crest geometry and the formation of depressions that impede proper drainage. Lack of proper road surface drainage is the primary factor contributing to the most prevalent cause of nonpassability—poor condition of the road surface.

The durability of IFFD embankments is a product of the materials incorporated into them and the care with which they are placed. IFFD embankments are constructed of materials from adjacent agricultural fields or borrow pits. Fill materials are scarce and there is no attempt to grade or to select the materials included in the embankments. The cost of importing selected fill materials to an earthwork site is prohibitive and beyond the scope of the labor-intensive methods employed to accomplish IFFD earthwork.

Often a layer of topsoil is removed from an adjacent agricultural field as a source of fill material. This material is then compacted using hand tampers, or durmus, to consolidate the soil mass. The result is that the fill materials used are not always suited for compaction into

an embankment, the compaction of these materials is not always optimum and, over time, there is settlement of the road surface and loss of the crest camber required for proper drainage. Poor soils, inadequate compaction, and poor geometric configuration of embankments are contributing factors to embankment failures and high maintenance costs.

These causes and their effects can be alleviated, if not eliminated, by selection of the best materials reasonably available, application of the maximum compaction effort available from the methods employed, and maintenance of proper embankment geometry. All of these mitigating factors have a cost attached to them, and the degree to which they are applied is a judgment—balancing increased initial cost against the ongoing savings accrued from reduced maintenance costs and the increased benefit of increased passability.

Consolidation, sliding failures, and erosion can all be mitigated by the use of the best materials available for the embankment compacted to their optimum density. Soil type, moisture content, and content of organic material in the soil used will affect a soil's performance in an embankment.

Borrow pits excavated adjacent to an embankment as a source of soil create a problem in that the depth of the pit increases the effective height of the embankment, thereby reducing the embankment's stability. The seasonal presence of surface water in Bangladesh means that the soils extracted from even shallow pits may be saturated and not desirable for use as fill material for embankment construction. Also, top soil excavated from agricultural fields generally contains organic materials which are not desirable for use as fill material for embankment construction.

Recommendations

6. **If existing fish ponds are dredged and/or drained and deepened for embankment material, soils claimed from these ponds should be dried to the optimum moisture content for compaction prior to placement in an embankment. Also, any additional excavation should be above a line extending from the edge of the crest width of the embankment down at a slope of 2 horizontal to 1 vertical.**

7. **In instances where the most suitable source of soil is from the top layer of adjacent agricultural fields, a shallow test pit should be dug to a maximum depth of 18 inches. Where soil conditions improve in this 18-inch zone by the uncovering of soil that has less organic content, or if an improved soil type is discovered, the topsoil should be set aside, the subsoil removed for placement in the embankment, and the topsoil replaced in the field.**

By adoption of these recommendations, two identified problems would be addressed. First, the soil in the embankment would be suited to its purpose as a fill material. At the worst, it will have less organic content; in the best case, it will be a better soil type for

compaction than the topsoil. Second, the nutrient-rich topsoil remains in the field where it is of benefit to the farmer, reducing production losses and mitigating the consequent negative impacts on poverty alleviation and food security caused by acquiring fill materials from agricultural fields adjacent to IFFD interventions.

It is envisaged that the process for claiming fill soil from below topsoil in an agricultural field would be as follows. A shallow trench, approximately 1 m wide, would be excavated through the topsoil to the top of the fill material. The depth of the trench would be to the bottom of the concentration of organic material in the topsoil, a depth estimated at 15-25 cm. The soil from this trench would be placed on the field surface immediately to the side of the trench. The fill material would be removed to the depth required for the calculated earthwork. Depth of excavation for fill material would be limited to an additional 30 cm, approximately.

Upon completion of removal of fill material from the initial trench, the process would be repeated in a trench tangential to the first. Topsoil from the second trench would be deposited directly into the first trench and graded. This process of trenching and grading would continue over the surface of the field. At the end of the process, the topsoil from the first trench would be used to backfill and grade the last trench.[2]

Compaction

Proper compaction is important to the durability of an embankment. Consolidation is mitigated and shear strength of the soil mass increased by achieving the maximum compaction reasonably attainable for the soils incorporated into the embankment. The result is a reduction of the settlement of the embankment and the distortion of the roadway surface.

The monsoon rains of Bangladesh increase the importance of proper drainage of road surfaces. Limiting settlement tempers the formation of depressions in the embankment surface, facilitating drainage and avoidance of waterlogging and consequent softening of saturated areas. Limiting settlement accommodates maintenance of the camber of the crest of embankments, which provides for evenly dispersed runoff from embankment surfaces. Mitigation of runoff concentrations, which cause surface erosion, results in the lessening of rain cuts in embankment surfaces.

IFFD is dedicated to the use of hand compaction methods to accomplish earthworks. This policy is dictated by the cost and nonavailability of mechanical compaction equipment, as well as by the advantage of the employment opportunities created by reliance on hand earthwork methods. The provision of the maximum number of employment opportunities for the poorest and most vulnerable individuals by the efficient use of hand labor, when

[2]USAID has expressed a willingness to pilot this technique on a limited scale.

appropriate, is an important component of IFFD for attaining the poverty alleviation goal of the project.

In order to assure that maximum reasonable compaction levels are attained, the guidelines for acceptable levels of compaction need to be modified to reflect absolute minimum standards.

Recommendations

8. **The minimum acceptable compaction for materials in embankments should be 90 percent when tested in accordance with section 6.2.5.1 of the Implementation Guidelines, Measurement of Compaction.**

9. **Compaction levels below this limit should not be accepted and the decreasing rate structure, described in section 6.2.5.2, should be removed from the guidelines.**

10. **To achieve these high levels of compaction, the maximum loose thickness of soil layers recommended in section 6.2.5, Compaction, of the Implementation Guidelines should be reduced from 30 cm to 15 cm, and the maximum size of earth clods should be reduced from 40 mm to 20 mm.**

It is very difficult to obtain consistently 95 percent compaction in the top 30 cm of an embankment using hand compaction methods. It is usual, however, to require 98 percent compaction in this upper area when an accommodation for hand compaction is not a consideration. In order to ensure maximum durability of the IFFD interventions, 90 percent compaction should be considered as a minimum requirement with the expectation that under favorable conditions of soil type and condition it will be exceeded—not as an optimum goal that may or may not be achieved. (A gradual increase in the compaction rate will be attempted by the IFFD partners. This year, they will try 50 percent payment for 85 percent compaction and 100 percent payment for 90 percent compaction or better. However, IFFD will be continuing with the old system, which is part of the problem, and its administration is unfair to the earthworks laborers, who should be paid their full daily wage if they complete a day's work. They should not be penalized for inadequate supervision by the sardars and SIC chairmen and/or the inadequate monitoring by LGED and CARE. The problem comes from paying sardars by the amount of earth moved. Their incentive is to move the earth quickly, and applying the appropriate compaction standards would cause the work to take longer without any increase in benefit to the sardar. Furthermore, the IFFD incentive system encourages all involved [SIC chairmen, sardars, and LGED thana engineers] to finish the scheme as quickly as possible—which encourages ignoring the compaction rules).

As discussed further in the following sections, IFFD needs to resolve the supervision issue to address the compaction issue. If the compaction issue were resolved, an increase

in the level of contracting for earthworks would not need to be considered. Further, it is quite possible that requirements for SSA surfacing would be reduced considerably.

The frequency of compaction testing specified in section 6.2.5.1, Measurement of Compaction, of the Implementation Guidelines, is certainly adequate. Observations of field test records and interviews with CARE field staff indicate, however, that this density of testing is not being conducted and it does not seem probable, given the resources available, that it can be accomplished.

Recommendations

11. **New guidelines regarding the frequency of the tests specified should be developed which are realistic in relation to the resources available to provide the quantity of testing specified.**

12. **Compaction testing guidelines should include provisions for testing each 15 cm layer of fill within 30 m of each side of a structure.**

13. **A local soils expert should be contacted to assist in the development of reasonable in-place soil testing procedures and standards.**

Differential settlement between the relatively fixed elevation of structures and the settling surfaces of embankments presents a problem universally recognized by road builders. Assurance of the compaction effort in these sensitive approach areas will mitigate differential settlements, thereby improving the road surface and reducing maintenance.

Sliding failures occur in an embankment when the shear strength of the soil mass is not sufficient to resist the gravitational forces the weight of the soil mass imposes on itself. The consequence is the development of a failure plain in the soil mass and the consequent movement, or sliding, of the soil mass above the failure plain.

Physical evidence of a sliding failure is the presence of a crack parallel to the axis of the embankment and subsidence of the embankment surface outboard of this crack. Severe failure will result in the disruption of the roadway surface and possible collapse of the embankment.

Embankments can be protected from sliding failures by reducing the sliding forces imposed on the embankment, increasing the capacity of the embankment to resist sliding forces, or by the installation of retaining walls external to the embankment.

Relative land values and the costs associated with the installation of external retaining walls or the internal structural reinforcement of embankments are the primary considerations for the adoption of structural reinforcement to accomplish stabilization. Structural methods

are expensive. They are not appropriate when stability can be achieved by upgrading embankment materials, increasing embankment strength through compaction, and decreasing embankment gravitational forces causing sliding failures by flattening embankment side slopes.

The maximum acceptable earth slopes specified in section 6.2.1, Minimum Construction Quality Standards (Earthwork Schemes), are reasonable if they are applied as absolute maximums and not as targets that can be exceeded if it is not convenient to accommodate the specified side slope. Side slopes exceeding specified maximums were observed in the field and sliding failures were observed that could have been prevented if adequate side slopes had been provided.

In addition to the selection and compaction of the materials incorporated in embankments, there are two forces at work that affect the adequacy of side slopes. The first is that the embankments are altered after construction by the public. Ditches were observed to have been excavated directly at the toe of embankment slopes, increasing the effective height of the embankment and undermining the support of the embankment. Ditches have been dug directly across rights of way to facilitate drainage of a field or fish pond and have been improperly backfilled, causing subsidence of the roadway surface.

The toe of slopes have been removed by farmers in attempts to reclaim agricultural land lost to production because of the presence of the side slope. Turfing grasses have been damaged by overgrazing of livestock or by removal for use as livestock fodder. Irrigation pumps have been set on top of embankments and their discharge allowed to drain across the road surface and down side slopes, causing erosion and instability of embankments and roadway surfaces.

The occurrence of the public improperly cutting and backfilling road surfaces and the negative consequences to the road system are prevalent enough to earn a classification slot for these activities on the passability survey. The latest update includes a frequency of this cause of nonpassability of 8 percent.

Recommendations

14. **A community awareness program should be initiated to make the community sensitive to the problems created by these activities and to obtain suggestions for activities that can be undertaken to improve the condition of embankments and their side slopes, thereby reducing required maintenance and increasing the passability and usefulness of the roadway.**

15. To protect against citizens improperly cutting and backfilling the road surface, provision should be made during the construction of the embankments for installation of small pipes under the road for transfer of water from side to side of embankments, as required by individual farmers.

Given the importance of keeping the roads open, the project should provide an inexpensive means for facilitating the transfer of water (for example, a 4-inch or 5-inch plastic or metal pipe below the road surface). Regarding the problem of purchases of tubewells subsequent to the rehabilitation of the road, this problem should be resolved, in part, through the community awareness program and a procedure should be developed to help maintain the integrity of the road. Such a procedure could involve, under LGED auspices and/or coordination, the provision of a pipe for facilitating water transfer (as previously described) for a minimal fee to the property owner requesting it. If the owner were to take action independently, LGED could arrange to restore the road properly and bill the owner for the cost—a cost in excess of the minimal fee that would have been charged had the owner made a request for a pipe.

Side slope erosion is mitigated by geometric design and slope protection. Adequately flat-side slopes are presently specified in the Implementation Guidelines. For all normal situations, the turfing specified in section 6.2.6 of the guidelines is appropriate.

Recommendation

16. The IFFD partners should take the necessary steps to improve the supervision of the earthworks activities of the IFFD project.

Earthwork schemes are presently implemented through the use of SIC chairmen and sardars providing day labor to accomplish the work. A key element that is missing from the earthwork component of IFFD implementation is competent, full-time supervision.

The pilot program in Comilla comparing outputs of SIC-implemented earthworks versus contractor-implemented earthworks highlights the increase in quality that can be obtained by the use of properly supervised, experienced earthwork crews. Considering the simple nature of the tasks involved, it is concluded that it is the supervisory component of the contractor's effort that accounts for the improvement in output. In order to attain the higher compaction outputs recommended, it is essential to adhere to good construction practices, which is not going to occur without adequate supervision.

The simplest way to obtain improved supervision is to contract out the earthwork, as is done for the structures, and require the contractor to provide adequate, full-time supervision to accomplish the work in accordance with the implementation guidelines. LGED, CARE, and the SICs could then fill their appropriate implementation and monitoring roles as owners'

representatives and construction inspection agencies rather than as direct supervisors of implementing labor.

A second option for improving supervision would be the hiring of trained, salaried job site supervisors as LGED employees. The supervisors would be responsible for the hour-to-hour supervision required to complete earthwork schemes in a timely and professional manner. They would be empowered with the authority to enforce the implementation standards and to discharge unsatisfactory work crews.

Under this option, the SIC chairmen would retain their oversight duties and responsibilities and expect that the supervisors would participate in the scheme as team members assisting the SIC chairman in the stated goal of completing the earthwork on time and in accordance with the guidelines.

The difficulty of accessing an adequate number of qualified supervisors for the 300 or so earthwork schemes implemented each year is recognized. If it is decided that the SICs continue to function as earthwork contractors, there are two suggestions for sources of adequate supervision.

The first would be to require the SIC to appoint a paid supervisor who would be responsible for the day-to-day implementation of the earthwork scheme and who would report to the SIC chairman. This supervisor would be required to attend adequate training and have demonstrated the ability to provide the level of supervision and assume the level of responsibility required to the satisfaction of the SIC, LGED, and CARE. This selection would be made prior to LGED and CARE authorizing the implementation of an earthwork scheme.

The second would be to offer a training course for certification of potential supervisors. Upon successful completion of the training course and a positive evaluation by CARE and LGED stating that the individual is qualified to supervise IFFD earthwork, a certificate of competence would be issued. A list of certified supervisors would then be submitted to the SIC for their choice of a qualified supervisor.

A positive impact was being made on food security from IFFD roads when they were well selected and properly constructed and maintained. If not properly constructed, most of the roads will deteriorate rapidly and either all benefits will be lost or maintenance costs will be extremely high. Hence, proper construction is essential, and that is not feasible without improved supervision. If the foregoing proposals are not acceptable to IFFD, a different approach may be improved training of SIC chairmen and sardars, possibly coupled with the hiring of additional monitoring personnel by LGED.

ROADWAY SURFACES

A basic precept of IFFD is that earthen roads can be constructed with unimproved surfaces that will serve as and be sustainable as commercially viable components of the rural infrastructure of Bangladesh. Presently, IFFD includes no provision for improvement of roadway surfaces. The planning and implementation guidelines are silent on the issue of road surface condition.

According to the latest passability survey report, poor road surface condition is the single major contributor to road nonpassability, accounting for 50 percent of the frequency of nonpassability causes. Clearly, the issue of road surfacing has become the major cause for concern as to the viability of IFFD roads.

It is obvious that the soil and climatic conditions are not ideal for unimproved earthen roadway surfaces in Bangladesh. Soils are fine grained and sandy alluvial deposits, some with high plasticity. When wet, plastic soils lose their load-bearing capacity and road surfaces become rutted. Wet plastic soils are sticky and slippery. Sandy soils erode and rain cuts develop in road surfaces.

Monsoon climatic conditions yield over 200 inches of annual rainfall in sections of the country. The terrain is flat and large areas of the country are covered for portions of the year with surface water. Much of the country is subject to flooding.

The subject of design and passability of roadways in Bangladesh has been an area of much thought and research for more than a decade. The first Road Surfacing Trial Project (RSTP) on Rajbari-Baliakandi Road was conducted in 1985-86. A continuation of this effort, known as the Road Construction Trial Project (RCTP), was carried out in 1988-89. A final report was published in December 1990, and a monitoring report was published in October 1994.

At this time, IFFD has recognized the problem of road surfacing and has instituted the soil sand aggregate (SSA) pilot to evaluate alternate road surface improvements for durability.

The issue is not one of capability but of cost. There is no doubt that with an unlimited budget, the R1 road system could be upgraded and provide reliable passability and satisfactory riding ease for all types of vehicles usually associated with rural transportation.

The road surface profiles for the SSA program have been specified for the test sections built with full access to the information generated in the previous studies. They are similar and are a matter of improving a successfully tested design concept rather than beginning anew by testing new and untried methods.

Since the issue is one of cost rather than capability, it follows that the option for the expense of application of the technology should be based on a realistic cost-benefit analysis of the use of the technology at hand.

The present cost-benefit ratio, as defined in section 4.6, step 5, Determining the RCA and Cost-Benefit Factor, of the Planning Guidelines, is inadequate. It is concerned only with the initial expense component of the cost, ignoring ongoing maintenance costs and eventual replacement costs. The benefit side of the equation includes no factor for measurement of benefit, consisting only of the number of potential benefactors of the intervention. The ratio shows the initial expense per capita in the catchment area.

In an attempt to determine a true picture of the cost-benefit relationship of various road surfacing scenarios, a series of four IRR calculations were run by the IFFD M&E staff, using information readily available from the CARE MIS database.

The results of these calculations are not meant to be the defining factor for the initiation of immediate action. These results should be considered to be estimates of forecasts of results to be expected. Nor should each and every road intervention be examined in this way. However, this type of calculation is very useful as an evaluating tool, and it has value as an application to typical, generic road alignments for comparison of levels of intervention.

The following assumptions were made to compare the internal rate of return (IRR) for investment in earthen versus SSA-surfaced roads:

- Road length of 5.4 kilometers;
- Benefit cost savings calculated from the average of all TFS alignments for the model and result roads and from the average of the best performing alignments for the SSA alignments;
- The structure and earthwork costs are the average actual per-kilometer, system-wide costs, multiplied by 5.4 to fit the generic road model chosen;
- The SSA without seal coat costs, with seal coat costs and additional earthworks costs are averages from the tenders accepted for the 12 SSA pilot projects tendered in FY 1996-97 per kilometer of roads, multiplied by 5.4 to fit the generic road model chosen;
- The maintenance cost for the model road is the annual cost of a 10-woman Rural Maintenance Program (RMP) crew, divided by 20 km and multiplied by 5.4, to fit the generic road model chosen;

- The maintenance cost for the result road is the annual cost of a 10-woman RMP crew, divided by 10 km and multiplied by 5.4, to fit the generic road model chosen;

- The maintenance cost for the 4 SSA alignments is the annual cost of a 5-woman RMP crew, divided by 20 km and multiplied by 5.4 to fit the generic road model chosen; and,

- The replacement cycle for the general earthwork for the model is assumed to be five years.

The IRR calculated for the SSA alignments using these assumptions is significantly better than for the earthen alignments. This suggests that, with proper selection of existing IFFD R1 interventions, there is a significant investment that can be made in application of SSA surfacing that will have a more positive impact on the economy of Bangladesh than the present IFFD earthen roadways are having. (See table IV-1 on the following page.)

Recommendation

17. This type of IRR investigation for the SSA alignments should be made in a rigorous way as soon as possible to determine definitely the value of SSA.

It has been observed that the road surfaces in the areas of markets, villages, and homesteads deteriorate more quickly than in open areas due to the concentration of traffic near these facilities. To alleviate this condition, it is suggested that the installation of SSA surfacing be considered in the immediate area of these facilities on interventions where the remainder of the alignment has an unimproved, earthen road surface.

A poor riding surface can negate all the high quality work of the other components of the IFFD roadways being produced. It is believed that the judicious application of SSA surfacing techniques will upgrade the R1 roads to the all-weather passability contemplated in the original IFFD design.

MAINTENANCE

Proper maintenance is a major component of the longevity and sustainability of the IFFD interventions and, ultimately, the success of the IFFD project. At this time, the maintenance of the IFFD interventions is relegated to the RMP crews of destitute females. (It is not within this scope of work to assess, evaluate, or comment on the structure, management, goals, or implementation of the RMP project, and the comments concerning RMP contained herein are not to be construed as an evaluation of RMP.)

Table IV-1
INTERNAL RATE OF RETURN COMPARISONS

Benefit							
Passenger cost saving	Tk/year	56,153	56,153	255,054	255,054	255,054	255,054
Freight cost saving	Tk/year	163,869	163,869	1,175,365	1,175,365	1,175,365	1,175,365
Passenger time saving	Tk/year	74,871	74,871	286,936	286,936	286,936	286,936
Total benefit	Tk/year	294,893	294,893	1,717,355	1,717,355	1,717,355	1,717,355
Cost		Model	Result	SSA	SSA	SSA	SSA
Initial Cost							
Structure	Tk/road	1,035,489	1,035,489	1,035,489	1,035,489	1,035,489	1,035,489
Earthworks	Tk/road	306,120	306,120	306,120	306,120	306,120	306,120
SSA without a seal coat	Tk/road	--	--	4,530,249	4,530,249	4,530,249	4,530,249
SSA with a seal coat	Tk/road	--	--	5,704,749	5,704,749	6,879,249	6,879,249
Replacement cost							
Earthworks	Tk/road	306,120@5yrs	306,120@3yrs	45,000@10yrs	45,000@10yrs	45,000@10yrs	45,000@10yrs
Seal coat (if provided)	Tk/road	--	--	1,174,500@5yrs	1,174,500@3yrs	2,349,000@5yrs	2,349,000@10yrs
SSA (if seal coat is provided)	Tk/road	--	--	4,530,249@10yrs	4,530,249@10yrs	4,530,249@10yrs	4,530,249@10yrs
SSA (if seal coat is not provided)	Tk/road	--	--	4,530,249@5yrs	4,530,249@5yrs	4,530,249@5yrs	4,530,249@5yrs
Maintenance cost	Tk/year	36,500	73,000	18,000	18,000	18,000	18,000
	IRR	13%	10%	19% 17%	13% 17%	11% 17%	16% 17%
			seal coat	with 12mm without	with 12mm without	with 12mm without	with 24mm without

Given, however, that maintenance is a primary element in the sustainability of the IFFD improvements and in the overall success of the project, it is appropriate and necessary to comment on the output of RMP as it is related to the maintenance of IFFD roads and to make recommendations as to the application of the services provided by the RMP crews. The comments are an evaluation of IFFD management's perception of the designed output of RMP, light maintenance of roadways, and the appropriateness of the IFFD policies in relation to the designed and observed outputs of RMP to the actual maintenance requirements of the IFFD interventions as they develop.

Visits were made to all of the CARE IFFD suboffice areas in Bangladesh. In order to gain as much information as possible, much of the time was devoted to interviewing both CARE and LGED field staff and confirming information so gained from the field observations of completed IFFD alignments, IFFD alignments under construction, and alignments under consideration for IFFD implementation.

All CARE and LGED field staff interviewed were Bangladesh natives and completely familiar with the local culture, customs, and practices as they apply to rural road building in Bangladesh. There is universal agreement among both CARE and LGED field staff and the evaluators that the maintenance input of RMP is not adequate at present levels. There is a major concern that RMP in and of itself does not have the designed output or the ability to accomplish all of the maintenance required for the IFFD interventions.

Some of the repairs that were observed to be required in the field, which were expected by CARE and/or LGED staff to be accomplished by RMP, were beyond the scope of normal maintenance. RMP is designed for light maintenance. It cannot be expected to accomplish major maintenance or rebuilding tasks that are required for the intended passability and use of the IFFD interventions.

Recommendations

18. The level of effort of RMP required for proper light maintenance of IFFD interventions should be reviewed and increased as needed.

It is suggested that doubling the input to the level of 10-woman crews being responsible for 10 km of IFFD roads be considered.

19. In addition to RMP, a separate maintenance fund should be established to cover the cost of repairs of IFFD-rehabilitated roads.

It is suggested that an amount of 10-15 percent of the earthworks costs per year be budgeted for this fund, with the funds coming initially from the IFFD project budget, but gradually assumed up by the GOB or local communities. The sustainability of the IFFD roads depends wpon maintenance, and the sustainability of the required maintenance effort

depends upon adequate funding. Using the maintenance model recommended, it is possible to estimate the cost of maintenance (per kilometer) of the IFFD roads:

Cost of RMP maintenance = annual RMP salary x 10/10
Cost of repair fund = cost of earthwork to date/km x .125
Total maintenance budget = estimated output in km x unit cost
Cost of RMP maintenance = 37 taka/day x 30 x 12 = 13,320 taka/km
Cost of repair fund = 277,075,754/8214 x .125 = 4,216 taka/km
Total maintenance budget = 11,000 km x 17,536 T/km = 192,896,000 taka/year

This calculation is not rigorous, nor does it reflect the total annual budget required to maintain the projected IFFD output on a sustainable basis. Replacement costs of major components of the interventions are not included. Rigorous analysis of the actual costs of maintenance are beyond the scope of this report and have not been attempted. These calculations do have the benefit of indicating that the scope of ongoing carrying costs of the projected IFFD output are significant and planning for the source of the required funding should not be ignored or postponed.

Recommendation

20. The annual requirement for maintenance should be rigorously estimated and a revenue stream from GOB sources should be identified to meet these costs.

It is suggested that, to protect the investment made through IFFD, consideration be given to providing for ongoing maintenance of IFFD interventions through IFFD funding sources until the GOB revenue stream is sufficient to provide adequate funding.

SOIL SAND AGGREGATE (SSA) ROADWAYS PILOT

The SSA pilot addresses the major unresolved technical issue facing the project. The pilot is well planned and has evolved from previous, rigorous studies of the same issue. There is good reason to accept the validity of the sections proposed for testing from a review of the results of the previous work accomplished. The fact that there is general disagreement in the technical community as to the success of the seal coat provided is evidence that pilot testing is required.

Some recent improvements of the application of the seal coat on the pilot sections have been completed. With this modification, the controversy over the durability of the seal coat recommended, as contrasted to the durability of the SSA surface paved to the accepted standard of 25 mm thickness and the durability of an unprotected SSA surface, will be settled.

There is no doubt as to the increase in the initial cost of the application of SSA surfacing compared to the cost of unimproved earthen road surfaces. It may be, however, that when replacement costs and maintenance costs are included in the calculations, the SSA-surfaced roads offer a better economic return than earthen-surfaced roads. As indicated in the section above on road surfaces, further investigation is required to determine definitely the relative cost benefits of the two systems.

It is now evident that there is a greater place for hardened surfaced roads in the R1 network than originally perceived in the design of the IFFD project. The SSA pilot addresses this issue.

The latest passability survey shows that 90 percent of the frequency of nonpassability caused by a poor road surface occurs in the regions covered by the Bogra and Jessore suboffices.

Recommendations

21. **Any additional roads under consideration for SSA should be selected on the basis of the best estimate of economic benefit and real need, dictated by onsite conditions, and not on the basis of arbitrary geographic distribution of these expensive roads.**

22. **The SSA program should continue at present FY 1997-98 levels until a rigorous economic evaluation of the IRR of the large unit investment required for application of SSA surfaces is completed.**

TREE PLANTATION PILOT

Based on the limited number of tree plantation alignments visited, the side slope stability benefit of the trees is marginal when compared to the benefit of turfing. Turfing has the additional immediate benefit of supplying a grazing resource for livestock. Regarding the value of the trees, the pilots visited generally included very few, if any, fruit trees. Thus, the benefits would be in the distant future.

In one of the tree plantation pilots, the NGO responsible was using the activity to promote other positive interventions with the group of women who are designated to share in the benefit of the tree-farming activity. In another, however, there was no such activity. Given the questionable technical justification for the tree plantation and the time delay before any significant benefits can be expected for the forestry aspect of the program, it seems important that the welfare element be well organized and making a significant near-term contribution.

Recommendation

23. The implementation of the tree plantation pilot program should be reviewed with emphasis on comparing the content and expected results of the programs of the different NGOs and evaluating alternate forms of intensive agricultural enterprises that are compatible with the requirement of slope stabilization.

If the proposed review is not immediately undertaken, it is suggested that there be a special review of the tree planting pilot visited by the assessment team during its trip to the Rangpur suboffice.

SLOPE PROTECTION PILOT

Only one slope protection pilot alignment was visited, and the installation on that alignment was incomplete. The slope protection methods that had been installed were the bamboo and drum sheeting palisading methods. Both methods had failed, and the results did not indicate that there was any possibility of achieving a satisfactory result through redesigning either of these methods. (USAID has decided that the pilot installation of rip rap protection and brick mattressing will proceed, and that palisading methods of slope protection have been abandoned, which is consistent with the assessment's findings.)

Recommendation

24. Some additional research should be conducted to study the advantages of various species of turfing grasses and alternate forms of vegetation, evaluating the species selected for the value of their agricultural output as well as for the slope protection provided.

CONTRACTOR-EXECUTED EARTHWORK PILOT

The success of the contractor-implemented earthwork schemes, both in the quality of the output and the ability to complete the work on a timely basis, is demonstrated by the results of this pilot. A major contributing factor to the comparative efficiency of the contractor's effort, in relation to the SIC labor force effort, is the level of supervision required for the success of a contracting organization compared to the lack of supervision provided in the typical SIC-implemented earthwork scheme.

There are ramifications of the form of implementation on the technical aspects of the interventions. If the recommended modifications to the earthwork implementation guidelines are to be achieved, adequate site supervision is required, assuring the needed higher level of performance. Contractors are a potential source of that supervision.

V. ENVIRONMENTAL MANAGEMENT SYSTEM

DESCRIPTION OF THE PROCESS

USAID and Environmental Regulations

Title 22 of the Code of Federal Regulations Part 216 (22 CFR 216) is a primary means to implement the requirements of the National Environmental Policy Act (NEPA) as they affect the USAID program. Within this framework, it is USAID's policy to ensure that environmental consequences of its activities are identified and considered by USAID and the host country prior to the final decision to proceed and that appropriate environmental safeguards are adopted. Although processes by which this policy is ensured involve a variety of environmental analyses dependent upon the type, size, and scope of activities, USAID assists developing countries to strengthen their capabilities to appreciate and effectively evaluate the potential environmental effects of proposed development strategies and projects and to select, implement, and manage effective environmental programs.

Some projects and activities that involve international disaster assistance, other emergency circumstances, and exceptional foreign policy sensitivities are exempted from USAID environmental procedures. Categories of exclusion involve criteria such as no effect on natural or physical environment; no USAID knowledge or control over details of specific activities per USAID's objectives; and, research activities with no significant effect on the environment as a result of their limited scope, carefully controlled nature, and monitoring.

CARE/Bangladesh

CARE/Bangladesh has been the cooperating sponsor for the PL-480 Title II programs in Bangladesh since 1975. The project has been the largest single program of its type in the world. CARE has participated in three Food for Work (FFW) programs in which each program was designed for five years. These projects were involved primarily in the construction and rehabilitation of rural earthen roads.

In the 1980's, several environmental problems associated with the earthen roads in rural Bangladesh were identified. In 1991, USAID sponsored a review of the proposed new FFW replacement program, Integrated Food For Development (IFFD). This review was carried out by KBN Engineering and Applied Science, Inc., and Tropical Research and Development, Inc., of Gainesville, Florida. Their report was entitled, *Programmatic Environmental Assessment of USAID/Bangladesh*. Its environmental assessment reported that the rural earthen roads were being constructed or reconstructed without proper site planning, engineering, and all required drainage structures. The environmental and socioeconomic impacts of these hydrological interruptions included an exacerbation of local flooding in many areas, capture of fish had begun to decline due to reduction in access of migrating species to traditional spawning areas now cut off by the roads; agricultural production had declined in areas where water did not readily drain after monsoon rains, causing waterlogging of fields and reduction in arable acreage and growth season for certain crops;

and, water stagnating behind roads in certain low-lying areas began rapidly eutrophying, producing unpleasant odors and a habitat for insects and potential disease vectors (Paul Dublin and William J. Colles, 1996).

A recent report estimated that 50 percent of the total land surface of Bangladesh is vulnerable to floods of one kind or another. Flood plain areas of low-lying land are usually inundated seasonally, ranging in depth from 1 foot to between 10 and 12 feet, depending on the local topographic conditions. The region is home for more than 500 species of fish, out of which about 250 are species believed to inhabit the rivers, flood plains, haors, beels, and ponds. Biological diversity also is high within cultivated land. More than 10,000 varieties of rice have been recorded (KBN, 1991).

Considering the ecological complexity of the flood plains in the country, a greater depth of analysis was required to mitigate the adverse environmental effects the rural dirt road network might have.

The IFFD program has rigorously used several environmental management consultants to overcome what initially seemed an unsurmountable environmental problem.

IMPLEMENTATION OF THE PROCESS

Preliminary Environmental Reviews for All IFFD-Financed Rural Road Network Component Construction and Rehabilitation Activities

Initial Road Screening and Environmental Classification

LGED, CARE, and USAID jointly produced planning guidelines for implementation of the IFFD Rural Road Network (RRN), which include environmental guidelines which incorporate and expand on LGED environmental guidelines developed at a prior time.

An initial environmental examination (IEE) is required for all IFFD roads. The purpose of the environmental guideline is to direct project implementation in such a way as to maximize positive environmental effects and minimize negative effects. The IEE is conducted jointly by CARE and LGED staff for each alignment under consideration.

The IEE is designed as an examination process to be used to estimate any potential environmental problems that a proposed alignment may have. The IEE procedure assigns a numerical environmental impact value (EIV) for each environmental parameter listed as a potential environmental threat along the alignment. All evaluative parameters are totaled to yield a composite EIV score. In the case of Bangladesh, agriculture, fisheries, wetlands, and employment/livelihood are assigned the highest relative (EIV) importance.

The environmental parameters in consideration during the IEE are divided into **ecological**, such as fisheries, wildlife, forest, tree plantation, wetland, aquatic plants; **physio-chemical**, including erosion and sedimentation, drainage and water congestion, regional hydrology, flooding, soil characteristics, fertility, ground water and water quality; and, **human interest related parameters**, including health and nutrition, agricultural land, employment, service facilities, navigation and transport, irrigation, land ownership, landscape. If the composite EIV score is less than 0, the alignment or part of it is subjected to an environmental impact assessment (EIA).

An EIA is usually required if

- an alignment is parallel to and within 100 meters of a river;
- the alignment runs through high risk areas, such as active flood plains (every year being inundated by flood water), forest areas, beel, and haor areas;
- the alignment is below the high flood level;
- realignment is recommended;
- the EIV of a single parameter is -3; or,
- the IEE team recommended an EIA.

IEE and EIA activity in FYs 1995-97, including the major reasons alignments were dropped, are shown in table V-1 below. Environmental accomplishments for the same period are shown in table V-2 on the following page.

Table V-1
IEE AND EIA ACTIVITY CONDUCTED IN FYs 1995-97

FYs	No. of IEEs Conducted	No. of EIAs Required	No. of Alignments Dropped During IEE	No. of Alignments Dropped After EIA	Major Reasons for Dropping Alignments
1995	1,101	None	219	None	1. Road running through flood plain 2. Road prone to erosion 3. Road will have a negative impact on the natural flood flow
1996	766	54	247	11	
1997	829*	81	341	6	
Total	2,691	135	807	17	

*Both earthwork and structures
Source: CARE/Bangladesh Environmental Unit

Table V-2
ENVIRONMENTAL ACCOMPLISHMENTS IN IFFD PROGRAM, FYs 1995-97

Targeted Output in the MYOP	Accomplishment
3,115 schemes for environmental review	2,691 alignments reviewed
13,600 km of roads made environmentally sound	7,762.5 km covered
Regional planning needs assessment	Conducted at the start of the first project year and each fiscal year
CARE and counterpart staffs trained on environmental management, review, and awareness	Over 3,000 trained, including CARE and LGED counterpart staff, union parishad officers, and individuals from other agencies
Add activities in the original plan in the second year of project implementation	Introduced slope protection and tree plantation piloting activities; program is ongoing
Evaluate environmental review process	Conducted 78 case studies on problematic alignments in the first year and prepared reports; formulated an internal impact monitoring system; hired a third party to assess the environmental impact on IFFD alignments.

Post-Intervention Impact Monitoring Procedure

This procedure was designed to determine the environmental impact of the IFFD intervention. In FYs 1995-96, a total of 78 selected post-intervention environmental assessment case studies were conducted along the respective alignments. The case studies measured the effect of mitigation methods implemented during road rehabilitation. If any additional mitigation measures were required, recommendations were made for further action.

In 1996, CARE/Bangladesh signed a contract with the Center for Natural Resource Studies (CNRS) to conduct a 3-year study on selected IFFD alignments in different regions of the country. The study is to provide qualitative and quantitative data on several environmental parameters likely to be affected by the IFFD schemes. It is hoped that this study will provide inputs for policy options and proposals for designing environmentally sound, socially just, and ecologically sustainable projects in the future.

The study will generate a pre- and post-intervention database on three main activities along the IFFD alignments: 1) capture fisheries; 2) agriculture; and, 3) settlement and assets. The first activity is monitoring fish harvest rate, species diversity, fishing intensity and catch per unit of effort, and the spatial and temporal extent of fish habitat. Because the impact of the rural roads on agriculture is mainly due to waterlogging, the second activity will monitor land availability for cropping, crops yield and damage, cropping patterns, and cropping intensity. Under the settlement and asset monitoring, the effect of land, homestead, trees, area under erosion, and sedimentation will be assessed. Preliminary results are expected in 1998.

Environmental Management Training

Since its creation in 1991, CARE's environmental management unit (EMU) has developed several environmental review procedures. In 1992, CARE conducted the first environmental management training under the IFFD project. LGED had begun using environmental guidelines during the early 1990's and had provided training to all of its field engineers. LGED considers the training on IFFD environmental issues to be an enrichment of their engineers' ideas.

The main issues addressed in the CARE-sponsored environmental training were basic environmental concepts, environmental assessment procedures, and training of trainers. A total of 270 CARE and LGED deputy administrators, project engineers, field engineers, technical officers, project officers, and assistant engineers participated in a total of 14 sessions.

In 1993, EMU conducted a 2-day workshop on CARE's environmental policy for 32 high-level officials from CARE, USAID, Directorate of Relief and Rehabilitation (DORR), LGED, United Nations World Food Program (WFP), Private Agencies Collaborating Together (PACT), Private Rural Initiative Project (PRIP), the Ministry of Relief, and the Ministry of Environment and Forestry. The main issues addressed were environmental management and sustainable development, concepts and importance of wetlands, the disruption of wetland and its implications, environmental assessment procedures, and mitigation measures.

In April 1994, Environmental Management II (a 2-day refresher training course) was provided for 175 assistant project officers in all of CARE's suboffices. In FY 1995, a total of 610 LGED thana engineers and subassistant engineers and CARE project, field, and technical officers received training in environmental orientation, environment and sustainability concerns, environmental impact assessment, and environmental law.

In FY 1995 and FY 1996 and until September 25, 1997, several workshops were held on initial environmental examination (IEE), environmental impact assessment (EIA),

environmental awareness, and environmental management III. There was a total of 2,807 participants, including representatives of the local union parishads.

IMPACT OF ENVIRONMENTAL MANAGEMENT SYSTEM

Sample rural roads in all six CARE/Bangladesh suboffices were visited. In several instances, CARE and LGED engineers were observed carrying out an IEE on planned 1998 schemes. In all instances, environmental problems were identified and appropriate intervention measures were recommended to mitigate any existing or potential environmental problems along the alignments and in the general area. The level of understanding of CARE and LGED staffs of the major environmental issues associated with the rural road network is impressive. This reflects the quality of training that has been provided by CARE and its partners for their staffs.

In all the alignments visited, individuals were appreciative of the environmental improvements. In addition to the general benefits resulting from road improvement, the importance of the additional drainage structures on the alignment was noted. Others reported that the reduction of waterlogging in agricultural fields permitted farmers to transplant their paddy rice earlier in the season.

Conclusion

- The environmental component of the IFFD program is highly commendable, due to the work of the USAID, CARE, and LGED staffs.

SOME POTENTIAL PROBLEMS

Potential problems deserving additional consideration by the collaborating agencies are discussed in the following three paragraphs.

The inadequate compactions in structural approaches of the earthen roads and the lack of drainage systems in the areas where the roads pass through villages and markets remain problematic for surrounding farms and fish ponds. The major problem is erosion. IFFD staff recognizes these problems. (Section IV of this report offers some recommendations and suggestions for improving compaction and alleviating drainage problems.)

In some cases, union parishads recommended that the IFFD program include a compensation system for soil losses from agricultural fields and household gardens in the villages. IFFD policy has been that soil for earthen roads is to be collected from fish ponds and permanent beels. During implementation, however, the guidelines are not always strictly followed. Soils are collected from the right and left sides of the road, wherever the road needs earthwork. (This issue is also addressed in section IV.) Further dialogue should be

carried out with communities to search for a more equitable way to deal with the problem of taking soil from the private property adjoining the alignments.

Thana and district engineers in IFFD operational areas have attended one or more environmental training sessions. In addition, the LGED document, *Guidelines on Environmental Issues Related to Physical Planning*, is provided to each LGED district and thana office. LGED field engineers reported that they consider environmental issues when planning non-IFFD projects, but they do not fill out the IEE and EIA forms. This suggests that the use of the IEE and EIA system will not be maintained when the IFFD project ends.

IFFD personnel, to the extent feasible, are urged to work with the GOB Ministry of Environment and Forestry, other donors, and other government agencies to promote interagency efforts to improve the environmental soundness and sustainability of all rural development projects.

VI. INSTITUTIONAL STRENGTHENING AND TRAINING

There are three primary groups to whom CARE has attempted to provide institutional strengthening: LGED, NGOs which CARE has recruited to participate in the IFFD program, and those implementing the IFFD program (contractors, union officials, scheme implementation committees [SICs], and workers on the earthwork schemes). The principal institutional strengthening has been through training (offshore, local workshops/seminars, and on-the-job). Some institutional strengthening may also take place in the carrying out of joint activities by LGED and CARE engineers or other specialized personnel, for example, GIS personnel.

LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED)

In-Country Training

The principal in-country training is listed in table VI-1 on the following page. In terms of numbers, the greatest amount of training has been orientation to the IFFD program and environmental considerations, implementation guidelines, and planning guidelines. Some specialized technical training has also been provided.

Although not shown in table VI-1, LGED engineers have also attended flood proofing workshops with CARE and NGO personnel and contractors' training courses. Even so, the figures in table VI-1 may be somewhat overstated because CARE personnel may also have attended some of the courses and the source data provided total figures. As indicated, union officials have also attended some of the courses listed in the table.

LGED and NGO staff members interviewed in the field have expressed appreciation for the training provided.

Offshore Training

The amount of offshore training has been minimal; prior to 1997, four people had attended management training in the Philippines. By early November 1977, 11 LGED staff (including the previously mentioned 4) had been sent on overseas training in Bangkok, Thailand, the Philippines, and the United States. The need to pass a special English fluency test is reported to have been the problem limiting LGED participation in U.S.-sponsored training.

Table VI-1
TRAINING PROVIDED TO LGED PERSONNEL

TYPE OF TRAINING	NO. OF TRAINEES	PERIOD OF TRAINING
IFFD Orientation	677	Jul 1994
Environment Orientation	588	Aug 1994
IFFD Implementation Guidelines	7,126	Nov 1994
IFFD Planning Guidelines, 1996	6,170	Jul-Sep 1995
Earthwork Calculation Software	2	Sep 1995
SIC Pilot Training Dry Run	12	Dec 1995
Implementation Guidelines	2,954	Jan-Feb 1996
Materials Testing	20	Jan 1996
Compaction Training Pilot	19	Jan 1996
Compaction and Turfing	31	Feb 1996
Training of Trainers	5	Apr 1996
Structure Software Training	29	Jun 1996
Planning Guidelines	2	Aug 1996
Field Demonstration on PSD/IEE	2	Aug 1996
Training of Trainers	5	Aug 1996
Planning Guidelines, 1997	4,952 (includes unions)	Sep 1996
Road and Structure Inventory Update	317	Nov-Dec 1996
Implementation Guidelines, 1997	3,587 (includes SIC and unions)	Jan-Mar 1997
Environmental Management III	91	Jan-Mar 1997
Preparing a Road Inventory	35	Jan 1997
Materials Testing	8	May 1997
Local Level Planning Workshop	4	Jun 1997
Software Training	8	Jun 1997
Participatory Learning and Action	5	Jun 1997
Program Management	47	Jul-Aug 1997
Environmental Management	163	Jul-Sep 1997
Planning Guidelines, 1998	5,470 (includes unions)	Jul-Sep 1997
Training of Trainers	5	Jul 1997
Environmental Awareness	645	Jul-Sep 1997
Local Level Planning Workshop	224 (w/TDCC)	Jul-Sep 1997
Computer Training	5	Sep 1997
GPS Survey	18	Sep 1997

Source: Derived from reports of the CARE Training Unit.

Joint Activities

There have been many activities in the IFFD implementation process in which joint LGED/CARE action has been prescribed: critical phase monitoring, for example, in structure construction, preliminary survey design/initial environmental examination, and acceptance of completed structures. The chief engineer of LGED reported that he found this useful. While this can be helpful to the thana engineers, the benefit appears to be more in helping them learn to work with contractors than in terms of any institutional strengthening.

NONGOVERNMENTAL ORGANIZATIONS (NGOs)

The principal institutional strengthening with NGOs has been in preparation for flood proofing activities. The representatives of the NGOs involved in this activity stated that they appreciated the training received from CARE, particularly that related to the participatory learning and action activity, which was subsequently carried out with the beneficiaries. This training took place in 1996 and 1997.

The World Food Program and the Integrated Food Assisted Development Project (IFADEP) have also participated in CARE training activities in the environmental field. Representatives of these organizations spoke highly of the CARE training.

IFFD IMPLEMENTERS

Because of the important role they play in the implementation of earthwork schemes, union parishad chairmen have received a number of training opportunities. Nearly 50 participated in 3 pilot environmental awareness training courses from October to December, 1995. In 1996 and 1997, they participated in orientation and training sessions on the 1997 and 1998 implementation and planning guidelines. Union parishad chairmen and other council members attended environmental awareness training in the latter part of 1996 and the first half of 1997. Some union officials received special briefings in early 1997 on the planned flood proofing activities. As members of the TDCC, they have also participated in the local level planning workshops held in 1997. A special program was designed in 1996 for union members—Union Parishads Working to Achieve Real Development (UPWARD).

The quality of the earthwork on the FY 1995 IFFD roads was often unsatisfactory. Therefore, a special program was developed for sardars (recruiters and supervisors of earthwork crews) and overall earthwork supervisors from the scheme implementation committee (SIC). Nearly 400 sardars and supervisors participated in 6 on-the-job training exercises in 1996. On-the-job training was also provided in compaction and turfing to 630 workers and SIC personnel in 1996, over 5,000 in the first half of 1997. More than 700 masons received training in the first half of 1997. IFFD structure contractors also participated in CARE-sponsored training: over 200 in 1996 and more than 3,000 in the first half of 1997.

Other CARE training activities have included training the enumerators for the ongoing transport and freight survey. CARE has conducted much training of its own personnel which, indirectly, contributes to the institutional strengthening of the organizations with which CARE works.

CONCLUSIONS

- CARE's in-country training program is impressive.
- It is to be hoped that a way might be found to permit LGED to send additional personnel to offshore training when useful programs are available.
- To facilitate its institution building, additional computer-related training and local-level planning is necessary (and would be welcomed by LGED).
- It would appear useful to expand the collaboration between the CARE and LGED training units, including an expansion of CARE training activity in conjunction with the LGED regional training centers.

VII. PROJECT MANAGEMENT

This section is concerned with the principal project processes (planning, implementation, monitoring, and evaluation), how CARE uses IFFD project resources (personnel and funds), and assessing CARE's relations with the project's other stakeholders.

PROJECT PLANNING

Although there are long-term objectives (number of kilometers of roads to be upgraded during the life of the project), there is no plan for road development by district or thana that the project is pledged to support. Rather, a process has been developed for selecting annually which road alignments will be included in the annual program. Although the original project intent had been to develop long-term plans at the union and thana levels to which a long-term commitment could be made, this did not happen. Had this occurred, predictions could have been made about the economic and/or socioeconomic impact of the planned road rehabilitation activity.

The initial concept had been to develop a thana-level, union parishad-generated plan for rehabilitating R-1 roads, the priority determined by internal rates of return (IRRs). Before the project was initiated, this was found to be impractical, primarily because the quality of maps and data were inadequate for calculating realistic cost estimates or benefit flows. It was decided that the best approximation of an IRR would be a cost-benefit ratio calculated as the anticipated initial cost divided by the population along the alignment. Because local-level politics were believed to be skewing the union ranking of proposed alignments, the cost-benefit ratio was given a weight of three versus a weight of one for the thana priority list.

The project began operating in the 310 thanas where IFFW had been operating. The allocation of funds annually by thana is a percent of the total estimated funding for the year where the thana's percentage is the estimated length of all unrehabilitated R-1 roads divided by the thana's share of the total inventory. Again, the inaccurate thana inventory led to complications in fund allocations, making it necessary to adjust these allocations.

Attempts are made to update the inventory annually. Sometimes, however, new information has been sent to LGED but not entered in time. Thanas which are not participating may not bother to update the inventory. The latter was apparent when CARE moved into new thanas in the Chittagong area in 1997; it found that the inventory of R-1 roads was very inaccurate. In comparing the FY 1997 inventory with the FY 1998 inventory, CARE found that 11 thanas had added over 100 kilometers of R-1 roads to their inventories, and 50 had added 30 or more kilometers. The greatest increase was 42 roads and 272 kilometers.

In an attempt to overcome problems previously encountered in IFFW, for example, poor construction practices and inadequate maintenance of upgraded roads, the IFFD project

instituted both positive and negative incentives to encourage better construction practices. It provided bonuses to those unions and thanas that completed projects ahead of schedule and penalized those whose implementation lagged behind schedule by excluding them from the program for the following year. To address the maintenance problem, roads would not be considered for the program unless there was a rural maintenance program (RMP) operating in the union.

Planning guidelines are developed and approved by LGED and CARE and sent to the field to guide unions, thana engineers, and CARE field personnel in carrying out the selection process. In addition, the planning guidelines set forth the procedure for undertaking environmental reviews, developing cost estimates of proposed alignments, and carrying out preliminary and final designs of selected alignments. Extensive training is carried out in the field to ensure that all concerned understand the process and know how to complete the 21 forms that are prepared in carrying out the planning process.

In 1997, CARE initiated with LGED participation a series of workshops for thana development coordinating committees (TDCCs), whose memberships include, among others, all union chairmen of the thana. This local-level training is about rural infrastructure planning and is concerned with the IFFD planning and implementation processes, orienting the local leaders on the planning resources available in the union and thana offices of government ministries. This training effort will be intensified in 1998 in order to orient quickly all the new union councils and chairmen that will be elected in December 1997.

Conclusions

- The planning process is a lengthy, rather complicated process, the completion of which often overlaps with the designated implementation period—a period which is short in the best of circumstances because of the weather/flood and agricultural patterns—but it is doubtful the process can be simplified much unless the overall funding allocation process and the alignment selection process are changed.

- Because of the way funds are allocated to thanas and the IFFD alignments are selected, the system is not intentionally allocating funds to the areas with the highest food insecurity nor automatically funding the alignments that would provide the greatest economic or socioeconomic return.

- The incentive system, which is based on the speed of implementation, may be fostering poor work, for example, the quality of compaction (discussed further in section IV above). Bonuses given to LGED personnel may or may not be given to the best performers because the speed of implementation of schemes is frequently affected more by other factors than the attention provided by the engineers.

Recommendations

1. **The funds allocation process should be modified to focus primarily on areas of high and very high food insecurity according to the GOB-World Food Program food insecurity map and/or areas of low and moderate development according to the CARE-funded thana stratification studies (see section VIII).**

2. **The alignment selection process should be modified to incorporate factors indicative of economic growth (see section VIII).**

3. **CARE should seek to modify the incentive scheme as presently constructed to ensure that quality performance, not just speed, is being rewarded.**

PROJECT IMPLEMENTATION

CARE and LGED have also prepared and distributed implementation guidelines. Detailed guidance is given on the various steps in the implementation process, on technical issues that can be expected to arise, and on completing the 23 forms that have been designed for use in carrying out, documenting, and monitoring the implementation process.

Part of the reason for the large number of processes and forms is that the construction of structures is carried out by contractors who are paid in cash and the earthwork is managed by SICs which pay workers with wheat as well as cash. Extensive and intensive training programs have been carried out by CARE with LGED participation on the use of the implementation guidelines.

Five of the reports called for in the guidelines are notification reports in which the thana engineer informs the CARE suboffice that a scheme (structure, earthwork, or turfing) is ready for inspection, or re-inspection if it failed the first inspection. On the basis of the foregoing, the CARE suboffice arranges with LGED to make the inspection visit. Particularly in those cases in which CARE field offices have been collocated with district or thana engineers, these notification forms would seem superfluous.

Thana engineers are required to prepare a progress monitoring report each time they visit an implementation scheme (structure or earthwork). The thana engineer submits a consolidated monthly progress report for structure schemes and a similar report for earthwork schemes. During the field visits, it was reported that the thana engineers do not always prepare a progress monitoring report for each site visit. Given the number of activities for which each thana subassistant engineer is responsible, the need for them to visit most projects daily, and the fact that an individual visit may be for as little as 5 minutes, it is understandable that they would not do a form for each visit.

Conclusions

- The implementation guidelines, in general, are thorough and the publication is an appropriate and effective way to ensure that implementation is carried out effectively and that there is appropriate written documentation which can help safeguard the integrity of the funding and grain distribution processes.

- Time spent completing forms may be keeping technical staff from observing and monitoring and should therefore be kept to a minimum.

Recommendation

4. **CARE should arrange for an outside consultant to review the reporting requirements and the utility of the forms being prepared, particularly those cited above, with a view to reducing the paper workload on the thana engineer's office.**

(Additional recommendations regarding technical issues covered or to be covered in the implementation guidelines are included in section IV of this report.)

MONITORING AND EVALUATION

The IFFD project designed a project monitoring and evaluation system, using the services of consultants in the process, composed of four principal subsystems: road passability survey; transport and freight survey; socioeconomic impact assessment survey; and, management information system (MIS).

The first three subsystems are discussed in section III of this report because they are interrelated and are designed particularly to provide impact data or impact data proxies or precursors.

The MIS encompasses the foregoing databases, but also captures the data generated by a number of the forms utilized in the project implementation process. It includes cost information on all alignments in the program. A list of the major documents produced by the MIS unit is shown in table VII-1 on the following page. The MIS database can be accessed by all offices in headquarters. Field offices are connected to headquarters through electronic mail.

Based on its use of the MIS data and the speed with which the MIS unit was able to respond to special requests, the system and its management is impressive.

TABLE VII-1

List of Major Documents Produced by MIS Unit As and when necessary (Monthly & Annually)

Sl.#	Subject	Remarks
1	Analysis of Total Resource for TRA	Analysis of Available Resource and Targetted Utilization
2	Tentative Resource Allocation	Thanawise Tentative Resource Allocation generated by MIS
3	List of Thana Eligible for Incentive	Produced by MIS from SCN/RCN Database on the basis of Thana performance .
4	Comprehensive Tentative Resource Allocation	This is total resource available for the Thana (Original Tentative Allocation + Bonus Allocation).
5	Alignment Improvement Funding Request	CARE Funding Approval for Implementation of Earthwork and Structure Schemes
6	Allotment Order for Earthwork schemes	Produced by MIS infavour of LGED for Funding Approval of Implementation of E/W schemes
7	Allotment Order for Structure schemes	Produced by MIS infavour of LGED for Funding Approval of Implementation of Structure schemes.
8	Alignment Improvement Funding Request Summary	This report is produced from E/W & Structure Funding Databases.
9	Summary of Funding Information	At a glance Field Office wise funding information
10	Funding for Road Contracting Pilot Schemes	Advance to LGED for Implementing RCP schemes.
11	Funding for Flood Proofing Pilot Project	Advance to LGED for implementing FPP Projects.
12	Funding for Pilot Aggregate Sand Soil Alignments	Advance to LGED for implementing PASS Schemes.
13	Funding for Slope Protection Pilot Schemes	CARE Funding Approval for Implementation of Slope Protection Pilot Schemes.
14	Summary of Advances for Structures Scheme	Advance to LGED for Implementing Structure Schemes
15	Analysis of Thana Inventory	Analysis on FY'97 & '98 Inventory submitted by LGED.
16	PMR Employment Generation Data	Consolidated Work Progress and Employment Status of Ear Structure Schemes
17	List of Incomplete Structures	Field Office wise incomplete Structures
18	List of ongoing Structures	Field Office wise ongoing Structures.
19	Final Status Report	Final Status Report Receiving Status of Earthwork and Structure Schemes.
20	Project Status	Project Status from FY'95 to FY'97
21	Earthwork Final Report to LGED	Final Report produced on the basis of Fina Status Report submitted by Field Offices
22	Structure Final Report to LGED	Adjusted of the Advances and Final Payment to LGED on the basis of Final Status Report submitted by Field Office
23	Training Unit Database Software	MIS Unit produced several software packages as and when required by Training Unit
24	List of FY'96 Alignements selected for Passabilities Survey	Automated Random Sample Generation for M&E Passability Survey
25	Activity Tracking Tools for Staff	Monthly Staff Time Spent Report

PERSONNEL MANAGEMENT

The organization chart of the CARE IFFD operation is shown on the following page. The headquarters staff, excluding the disaster preparedness unit, the UPWARD project and flood proofing pilot project, contains 33 persons. The field staff, which is located in 6 suboffices, totals 249. An organization chart for one of the field offices, reflecting its new team organization, is shown on page 76. All of the suboffices have at least one district-based team located outside the suboffice. The location of these teams is shown in the table below.

Table VII-2
INFORMATION ON DISTRICT-BASED TEAMS

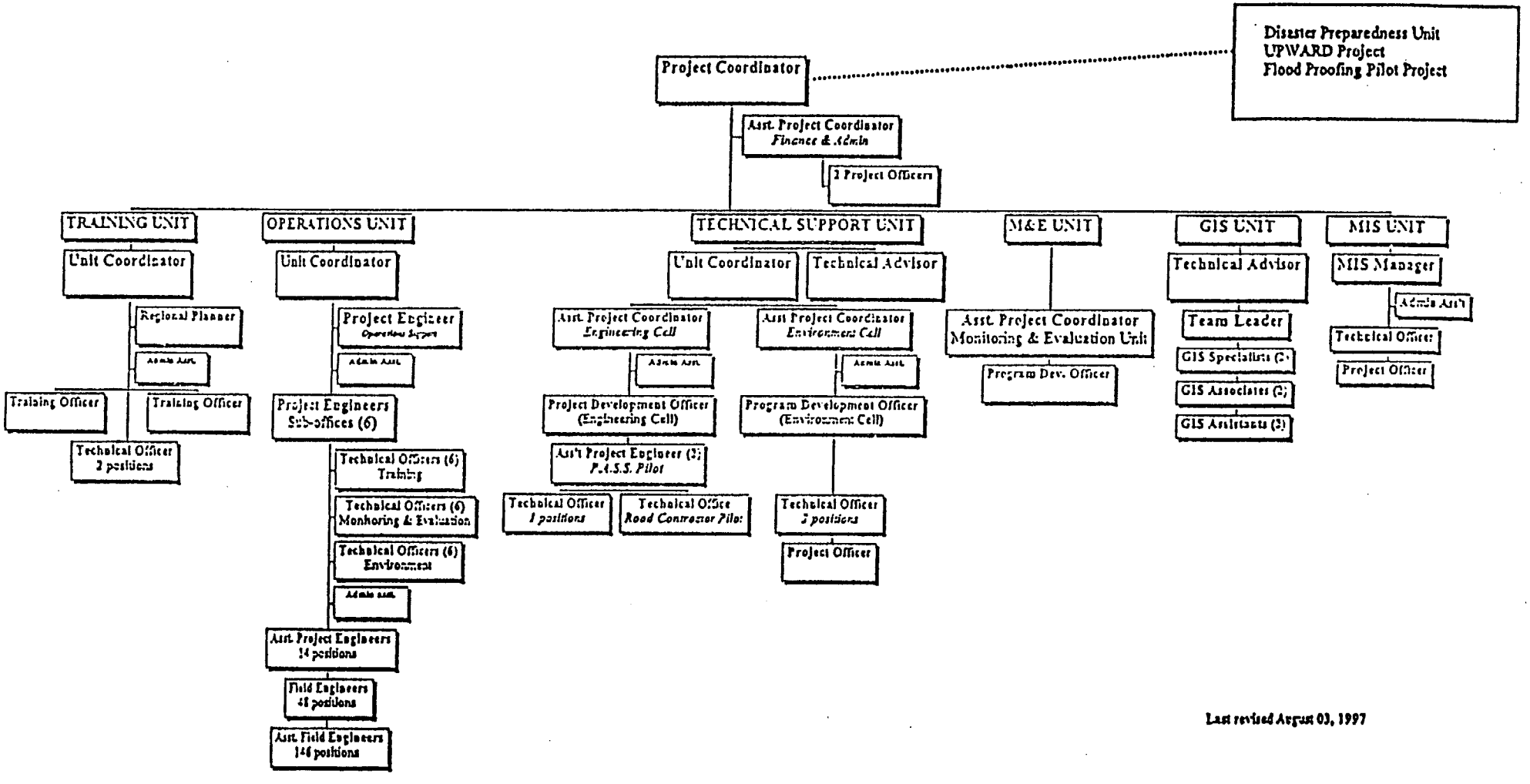
MAIN SUBOFFICE	DISTRICT TEAM LOCATION	NUMBER OF STAFF MEMBERS	START DATE
Rangpur	Kurigram	4	Jan 1977
Bogra	Rajshahi	5	Jan 1977
Jessore	Kushtia	4	Jan 1997
Jessore	Khulna*	14	Aug 1997
Mymensingh	Jamalpur	4	Jan 1997
Dhaka	Tangail	3	Jan 1997
Comilla	Brahmanbaria	3	Feb 1997
Comilla	Chittagong	5	Aug 1997

*In Khulna, two district teams are posted. Khulna district team is operating from a CARE office; all other district teams are operating from the respective district executive engineer's office.

The capabilities and spirit of the CARE personnel, both in headquarters and in the field, reflect well on the recruitment process, the intensive training given to CARE personnel, often in conjunction with training for LGED personnel, and management's appreciation of its personnel.

CARE has recruited some women engineers and trainers and there is an internal effort within the IFFD component to look at the special needs of women in relation to their ability to advance in the organization. There have been gender seminars in the suboffices to examine the special problems faced by female engineers. A training course entitled, *Women in Management*, is being developed for presentation to CARE and LGED female employees. In addition, a special committee in headquarters is looking further into the special needs of IFFD's female employees.

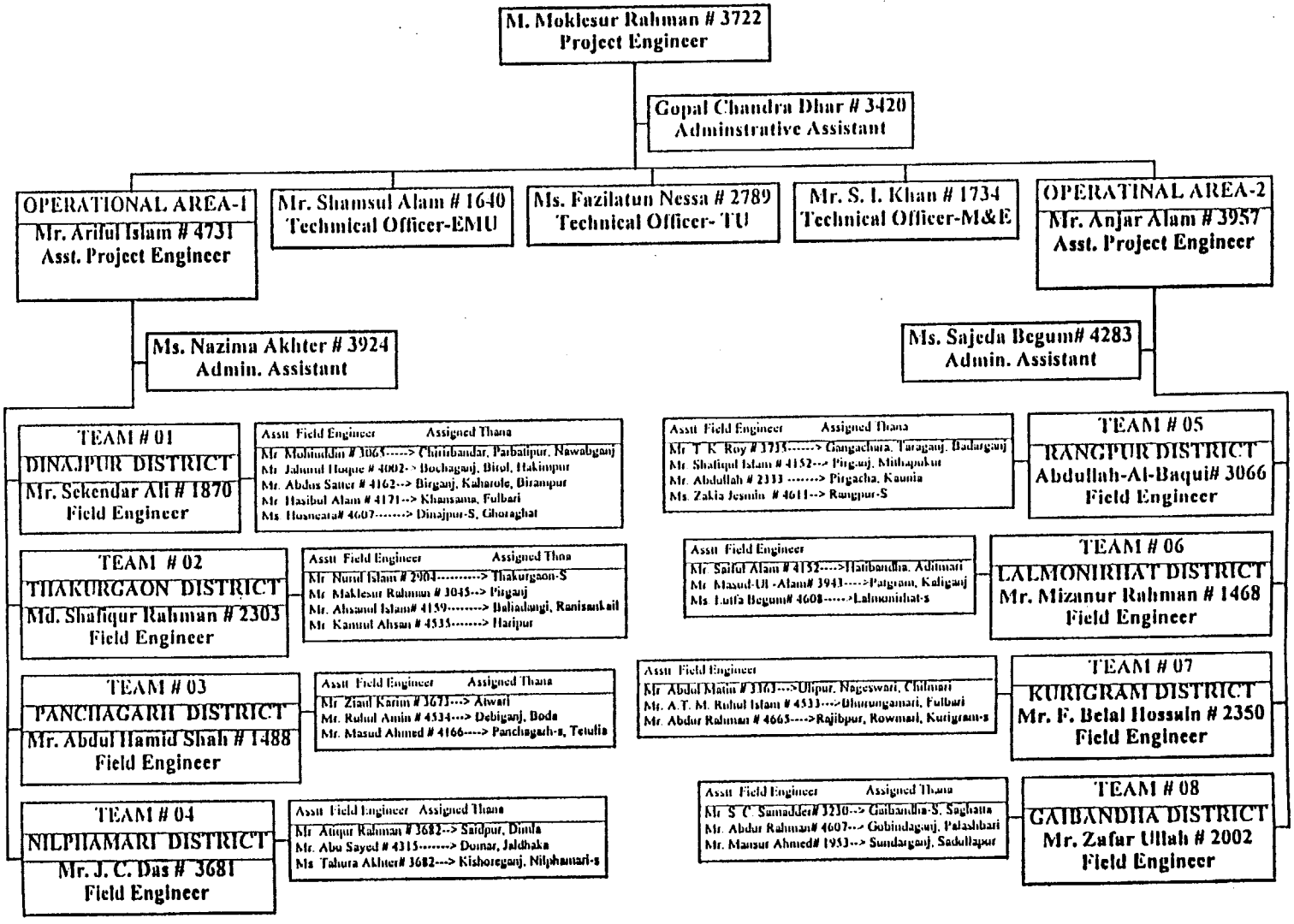
Integrated Food For Development Project



Last revised August 03, 1997

CARE-RANGPUR

IFFD ORGANOGRAM



CARE carries out a very extensive training program in support of the IFFD program, including training for its own personnel—sometimes alone, sometimes with LGED. CARE personnel have averaged about 10 training programs per year over the last three years. A small amount of training has been offshore, but this has usually been specialized, for example, MIS, GIS, environment.

Assuming the introduction of additional economic and food security factors into the process of selecting priority areas for IFFD intervention, CARE needs at least one senior and one junior staff person knowledgeable of development economics or agricultural economics to undertake needed data gathering and analysis and presentation of the results to the IFFD partners.

Recommendation

5. CARE should establish a small economics unit to assist in the planning needed to carry out the recommendations in section VIII.

FINANCIAL MANAGEMENT

The budget for the IFFD operation comes from three sources: a USAID development assistance grant, monetized funds from the USAID Title II, Public Law-480 program (hereafter referred to as Title II), and a contribution from the GOB. The funds monetized from Title II is something of a misnomer in that the Title II wheat is not actually sold. Rather, it is turned over to the GOB for use in its various food distribution programs (or to be held in a reserve), and the GOB advances the counterpart value in taka into a temporary LGED account from which it is transferred to CARE. This year, for the second time during the project, the GOB has been delinquent in transferring the funds to LGED. A description and diagram of the monetization/fund transfer activity is provided in annex D.

CARE, upon receipt of the funds, uses them to finance 90 percent of the IFFD program (the GOB finances 10 percent) and to cover a share of its operating costs. The balance of its operating costs is funded from the USAID development assistance grant. The original project documents indicated that the GOB would pay all the initial costs of the IFFD activity and CARE would reimburse it only after the year's activity had been concluded. Because of GOB liquidity problems, CARE agreed to advance part of the funding needed, while holding back some to ensure that all work was properly completed and documented. At first, there were two advances, one for 40 percent and one for 35 percent. For FY 1997, one advance of 60 percent was made.

This year the wheat was delayed because the ship carrying it to Bangladesh had trouble at sea. Hence, the program began without full funding available. In the meantime, the wheat has arrived and been turned over to the GOB, but a problem in the Ministry of Finance remained unresolved for an extended period of time. The result is that CARE has

not yet received the funds which it can transfer to LGED to pay for the work that was finished during the early summer. Many contractors who built structures have received only 70 percent of what they are due (60 percent advanced by CARE and the GOB's 10 percent contribution). The GOB retains 10 percent as insurance against the work. Thus, there is a current shortfall in the payments to contractors of 20 percent, with contractors waiting at least 5 months for their final payment.

Recommendation

6. **For the coming year, CARE should advance 80 percent of the program cost. If it does not have sufficient funds from the GOB monetization to do that, then contracts should not be let for the work.**

The IFFD budgets for FYs 1995-98 and the actual expenditures against those budgets are shown in table VII-3 on the following page.

Of the total project budget of $75 million, $61 million was to come from monetization of Title II commodities, a development assistance grant from USAID of over $10 million, and nearly $4 million from the GOB.

RELATIONS WITH STAKEHOLDERS

The principal stakeholders are LGED, CARE's counterpart and the principal implementing agent of the IFFD program; USAID, the principal funding agency; and, some local NGOs who are participating in the implementation of the flood proofing pilot activity and handling the tree planting activity.

Although there may be some resentment of the CARE role in LGED headquarters, the LGED and CARE field teams were working well together. In some cases, it appeared that the LGED team might be overly dependent upon the CARE team. This is somewhat understandable, given that the CARE team is well endowed with vehicle support and the LGED personnel have a very heavy workload beyond the IFFD activity.

As indicated in the personnel section above, many CARE personnel are being collocated with district engineers. This is seen as a positive move. Part of this group could perhaps become the core of a planning team in the type of follow-on activity that is recommended in section VIII below. The GIS field operation is to be a joint activity, with LGED playing a strong role.

LGED has asked for institutional support from CARE and some personnel have been provided. Six engineers formerly assigned to LGED headquarters are now assigned to the six CARE suboffices.

Table VII-3
IFFD BUDGETS AND EXPENDITURES
(In millions of U.S. $ equivalents)

BUDGET ITEM	BUDGET ALL YEARS	FY 95 ACTUAL EXPEND.	FY 96 ACTUAL EXPEND.	FY 97 ACTUAL EXPEND.	FY 98 BUDGET	CUMULATIVE FY 95-98
Personnel and Travel	12.88	1.93	2.13	2.26	2.23	4.33
Training	.67	.05	.15	.27	.14	.06
Consultants	1.66	.16	.28	.39	1.00	- .17
Office Administration	3.56	.75	.73	.88	.61	.59
Vehicle Operations	0.84	.16	.18	.23	.18	.09
Vehicle Purchases	2.70	.07	.39	.01	.28	1.95
Road Rehabilitation	48.80	8.27	10.74	10.91	9.31	9.57
Subtotal	**71.11**	**11.39**	**14.60**	**14.95**	**13.75**	**16.42**
Indirect Costs	4.22	.84	1.13	2.97	n.a.	- .72
GRAND TOTAL	**75.33**	**12.23**	**15.73**	**17.92**		

Sources: All-year budget derived from MYOP FY 1995 Update, 1994; FYs 1995-96 derived from audited CARE reports; FY 1997 figures are preliminary data derived from CARE Report EA-R1 of 28 July 1997; and, FY 1998 data are from CARE-supplied FY 1998 project budget worksheet.

Conclusion

- CARE needs to provide an increase in institutional support to LGED in addition to providing personnel.

Recommendation

7. LGED and CARE, with USAID's participation, should explore other possibilities by which CARE could increase its institutional support to LGED.

The project should pay for LGED-hired personnel on a temporary basis if LGED were taking steps to hire the individuals as permanent employees and if their jobs would be supportive of the IFFD program. It would also seem appropriate for the project to pay for temporary personnel, or to assign CARE employees to LGED offices, to help carry out a special activity that is important to the IFFD program, for example, the GIS activity to update the road inventory or a special planning activity regarding a follow-on CARE program along the lines discussed in section VIII below.

The CARE/USAID relationship appears to be a good one. USAID participates in the monthly CARE/LGED sessions, visits project sites, and generally provides technical, moral, and financial support to the project.

CARE did not carry out any internal evaluation of the IFFD activity during the first three years' of operations and there was no annual CARE/LGED/USAID review. Such a review, particularly in the absence of a CARE internal evaluation, would seem to be desirable. A report prepared by a joint task force could be reviewed, perhaps in a retreat, with the report providing a summary of the year's operations and a discussion of issues to be considered. In addition, in the future, it could review the actions taken to respond to the recommendations in this evaluation.

Recommendation

8. **CARE, LGED, and USAID should conduct an annual review of the program, concentrating on long-term issues, such as program impact and sustainability, rather than the day-to-day implementation problems that are discussed in the monthly meetings.**

CARE has contracted with local NGOs to help carry out the flood proofing pilot project in haors and chars and the tree planting along the side of newly rehabilitated alignments. The work of the NGOs working on the flood proofing activity was impressive. The NGO representatives expressed their pleasure with working with CARE and especially appreciated the training provided, particularly the participatory learning and action activity. (For a discussion of the tree planting projects visited, see section IV of this report.)

Conclusion

- The activities of the NGOs conducting the tree planting need to be reviewed by CARE to ensure that all are properly administering the activity and using the opportunity to foster some immediate development activity.

GENERAL CONCLUSIONS

- CARE and LGED, with an appropriate supporting and monitoring role from USAID, are performing well the management of a complex program in 315 thanas (two thirds of the country).

- CARE and LGED are working well together, but they should seek ways to improve collaboration and to pass activities from CARE to LGED as LGED either adds staff or increases training efforts to absorb additional functions.

- As stressed in section IV, the supervision of earthworks activities is a major unresolved management issue.

VIII. FUTURE DIRECTIONS

Overall, the IFFD program has been useful, but there is some concern that the potential impact of the program is not being realized. The following are seen as detracting from the benefits of this highly useful program:

- an insufficient input of economic criteria in the road selection process;
- the inability to keep an increased percentage of roads passable throughout the year, reflecting
  - types of soil and levels of rainfall in some areas;
  - quality of construction of some of the roads, particularly earthwork compaction, slope protection, and structure approaches; and,
  - lack of a repair and maintenance budget in the project.

For the remaining two years, a high priority should be accorded to improving the foregoing. Some remedial actions have already been initiated, for example, the expansion of the SSA pilot activity.

GEOGRAPHIC INFORMATION SYSTEM (GIS)

The IFFD project is implementing a plan for the production of global positioning system (GPS)-generated maps for 150 thanas. The output of the current GIS will be of great benefit for planners of infrastructure interventions. The additional cost of using the CARE GIS unit to continue the job and expand it to the bulk of the country would appear quite small in terms of the IFFD budget and especially small in relation to the benefits to the country.

Recommendation

1. **The present GIS activity should be increased in scope to include the entire land area of Bangladesh and to include as much hydrologic and flood plain data as required for the planning of future infrastructure projects.**

MAINTENANCE

Another priority is the creation of a sustainable system of road maintenance for the earthen road network. RMP has pointed out that its teams should not be expected to do other than routine maintenance, that is, no repair work. Yet the latter will be needed until a higher standard of road than currently exists is built. Even with regard to routine maintenance, LGED has stated that B-category feeder roads must take priority over R-1 roads. For the present, the project cannot plan on being able to use LGED's limited funds.

Given the foregoing, it is essential that an increased level of attention be given to this problem. While it probably cannot be solved during the balance of this project, it can be alleviated (see recommendations in section IV). More importantly, perhaps, would be to start the design process now of a local-level maintenance program that could be a part of a follow-on program.

Recommendation

2. **LGED and CARE should establish a special working group to design a scope of work for a special study group and/or a group of outside experts to explore this issue in depth and offer recommendations for the GOB's consideration.**

3. **Concurrent with the foregoing, CARE should incorporate a sustainable rural road maintenance system as a component of the curriculum for the local-level planning training, with a view to making local leaders sensitive to the problem and also seeking their input in the search for solutions.**

PROGRAM IN GENERAL

Conclusion

- A continuation of a rural infrastructure program, including a significant road component, can make a strong contribution to the economic development of Bangladesh and a significant contribution to the food security of rural Bangladeshis. It would be appropriate, therefore, for USAID to authorize a follow-on Title II program.

The question was raised about saturation: are there really enough R-1 roads remaining to be completed to justify a follow-on program? A definitive answer to this question cannot be provided at this time, but some relevant data have been analyzed. Through FY 1997, the IFFD program has upgraded less than 25 percent of the R-1 roads: 23 percent by number of roads, 22 percent by percent of kilometers. The 1997 inventory was used for comparison purposes; the total figures include only the thanas in which the program was operating in FY 1997.

This does not appear to be saturation. On the one hand, the inventory could be overstating the number of roads; on the other hand, these calculations do not take into account any thanas in districts where the program is not now operating, and some movement or expansion into other thanas is probably appropriate in terms of working in more food insecure areas. There is also likely to be plenty of possibility for SSA upgrading in a follow-on program.

Furthermore, the current road selection process excludes a number of roads for reasons totally unrelated to their economic and/or food security importance. This results in a

selection of what would be higher priority roads if different criteria were in place. This contributes to an appearance of saturation.

A follow-on program could be designed to incorporate economic and food security factors in the selection process and to have a geographic focus, rather than limiting program activity to R-1 roads. In some cases, upgrading of an R-2 road could make good economic sense, particularly if there were environmental factors that needed to be mitigated. In addition, the follow-on program should be willing to encompass other rural infrastructure with clear socioeconomic payoff for the food insecure, for example, markets, ghats (ferry landings), and dikes.

Recommendations

4. **CARE and LGED should establish a joint planning effort consisting of the following:**

    a. **a planning committee for the FY 1999 program, incorporating recommendations made about the program; and,**

    b. **a program committee to develop the outlines of a follow-on program and develop a transition plan, taking into account the following recommendation.**

5. **The follow-on program should**

    a. **have an economic planning, food security, and market analysis foundation;**

    b. **combine a district-level overview (to ensure an integrated, efficient transport network) with local-level planning (to increase a sense of ownership and ensure that program activities are implementable);**

    c. **make the development of a comprehensive rural road maintenance system a part of the program; and,**

    d. **include other transport modes and marketing infrastructure as components of the program.**

The foregoing recommendations are not meant to be restrictive with regard to any of CARE's follow-on planning. The type of program set forth above is needed, and CARE is capable of working well with the appropriate Bangladesh organizations to carry out such a program. Further, such a program would appear to be a logical follow-on and an improvement of the current program.

With regard to recommendation 5.a., the programming division of the GOB Planning Commission and the World Food Program (WFP) jointly developed in 1995 a map to determine the resource allocations to two major WFP projects supported with food aid. The map, the latest version of which was published in April 1997, shows the relative food insecurity of the various thanas based on the following factors:

- incidence of natural disasters (flood, cyclone, drought, erosion);
- foodgrain deficit/surplus;
- agricultural wage rate;
- proportion of households not owning agricultural land;
- proportion of unemployed persons;
- proportion of widowed, divorced, and separated women; and,
- proportion of literate women.

The CARE GIS unit has reprinted the relative food insecurity map, superimposing on it the location of IFFD project activity (see the following page). Table VIII-1, on page 87, indicates how the FY 1997 IFFD locations compare with the food insecure areas. Data comparable to that in table VIII-1 for each of the CARE suboffice areas are shown in annex E.

Conclusion

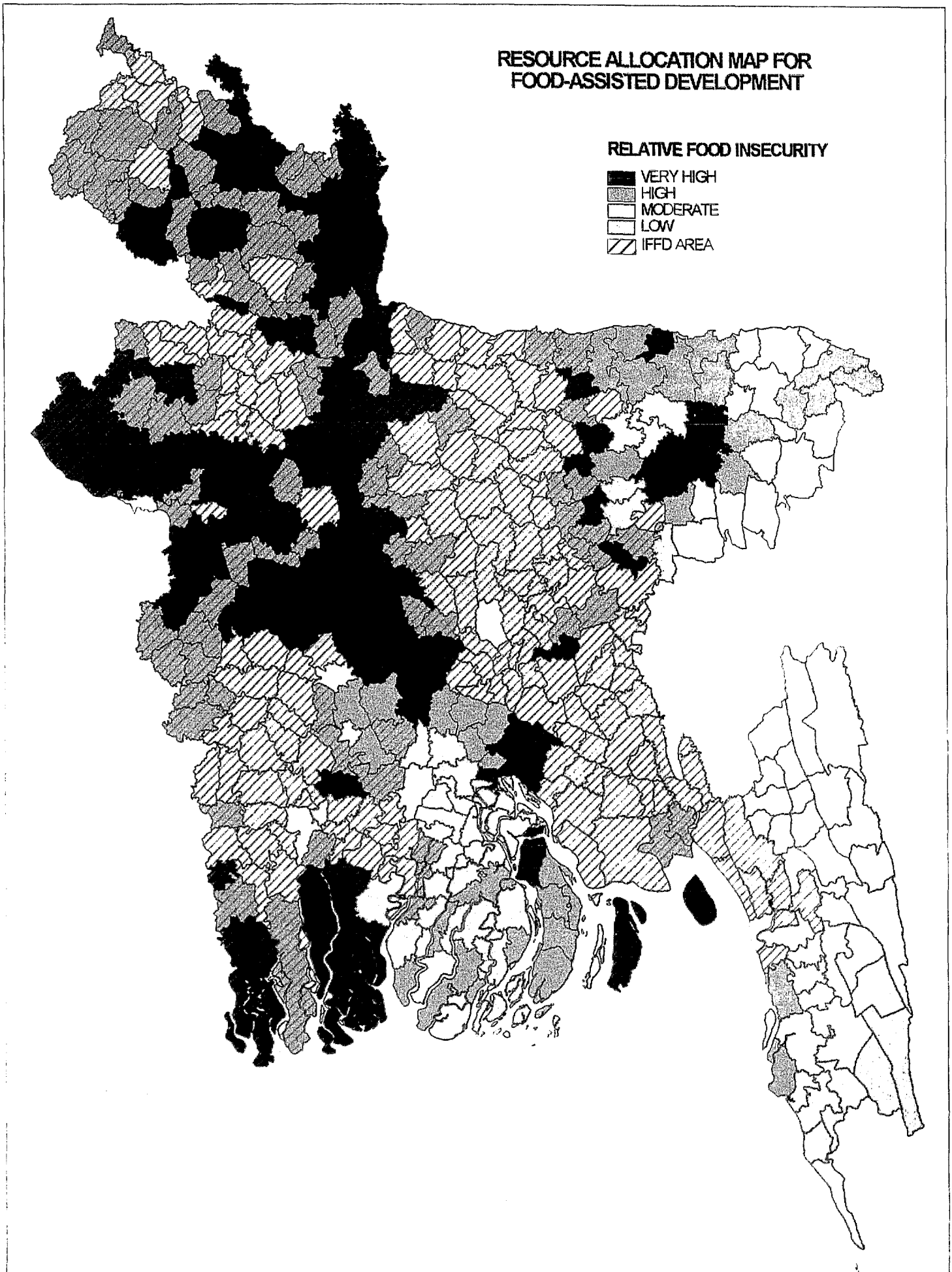
- Based on the data in table VIII-1 and the annexed tables, it would appear appropriate to move IFFD activity out of a number of the thanas in the lower two levels of insecurity and shift into the areas in the two highest levels of insecurity.

The WFP map is being updated, and the revised map and backup data should be available in January 1998.

As part of the pre-design activity for the transport and freight surveys, a thana stratification study was conducted. All thanas were classified as being at a high, medium, or low level of development. An analysis of the transport and freight data confirmed the view of the CARE M&E officers that the best results from IFFD road improvements were appearing in the thanas in the low category of development (see table VIII-2, page 88). The revised thana selection process for the IFFD program should reflect an analysis of these data as well as the revised WFP data.

TRANSITION

It will take some time to make the transition to a restructured and expanded program. The ongoing program, with proposed improvements, is too important to be allowed to lapse for a year as happened during the transition from IFFW to IFFD.


RESOURCE ALLOCATION MAP FOR
FOOD-ASSISTED DEVELOPMENT
RELATIVE FOOD INSECURITY
VERY HIGH
HIGH
MODERATE
LOW
IFFD AREA

TvT
ASSOCIATES

Table VIII-1
CARE ROAD PROGRAM COMPARED TO FOOD INSECURITY MAP

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	87	76	69	52	284
FY 1996	46	47	40	30	163
FY 1997	71	57	62	50	240
Average FYs 1995-97	68	60	57	44	229
Percent by Category	30%	26%	25%	19%	100%
Total Thanas in Category in Suboffice	105	94	87	77	363
IFFD ROADS					
FY 1995					
No. by Category	200	187	151	121	659
Percent by Category	30%	28%	23%	18%	100%
FY 1996					
No. by Category	128	130	109	70	437
Percent by Category	28%	30%	25%	16%	100%
FY 1997					
No. by Category	132	108	111	74	425
Percent by Category	31%	25%	26%	17%	100%
TOTAL 3 YEARS					
No. by Category	460	425	371	265	1,521
Percent by Category	30%	28%	24%	17%	100%

Percentages may not add due to rounding.
Tables for individual suboffices are included in annex E.

Table VIII-2
ANALYSIS OF TFS DATA BY DEVELOPMENT LEVEL

I. BY NUMBER OF THANAS SHOWING INCREASE OR DECREASE IN TRAFFIC

	No. of Thanas Increasing			No. of Thanas Decreasing		
	High Devm.	**Medium Devm.**	**Low Devm.**	**High Devm.**	**Medium Devm.**	**Low Devm.**
Passengers	14	20	32	6	5	2
Freight	13	19	29	7	6	5
Trucks *	15	12	17	3	0	4

*There was no truck traffic either before or after intervention in 28 thanas, distributed as follows: high: 2; medium: 13; low: 13.

II. NET GAIN IN MONTHLY VOLUME (000s)

	High Development	**Medium Development**	**Low Development**
Passengers	121	417	691
Freight	59	167	367
Trucks	112	128	227

III. MEAN VOLUME OF MONTHLY TRAFFIC PER ALIGNMENT

Traffic Volume		Development Level					
		High		Medium		Low	
		No.	Col.%	No.	Col.%	No.	Col.%
Passenger Traffic (person-km)	Pre	52,485		44,582		39,127	
	Post	58,524		61,378		59,278	
	Change	**6,040**	12%	**16,796**	38%	**20,151**	52%
Freight Traffic (maund-km)	Pre	12,651		9,129		10,528	
	Post	15,572		15,799		21,340	
	Change	**2,921**	23%	**6,670**	73%	**10,812**	103%

Recommendation

6. **USAID should be prepared to seek authorization from USAID/Washington to extend the present program for one or two years, if necessary, to avoid any lapse of operations.**

The program being proposed is not very different from what was anticipated in USAID's Project Paper authorizing the IFFD project four years ago, but which did not materialize. It is believed that inadequate time existed then for the planning and piloting necessary for a smooth transition. USAID (Bangladesh and Washington) is urged to avoid such a situation this time.

TvT
ASSOCIATES

ANNEXES

A: Scope of Work

B: Persons Contacted

C: Bibliography

D: Monetization Process

E: CARE Road Program by Suboffice Compared with Food Insecurity Map

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ANNEX A

SCOPE OF WORK

(USAID document)

1.1 BACKGROUND

The Integrated Food For Development (IFFD) is a five and a half year joint USAID/CARE effort to improve the development impact, environmentally sound, sustainable local-initiated Food For Work program in Bangladesh. The IFFD Project Paper and the Title II Multi Year Operation Plan (MYOP) call for a mid-term assessment of the project after the third work season. This is the assessment for which this Delivery Order is being issued.

1.2 TITLE

Activity Title:

Integrated Food For Development Program (IFFD)

1.3 OBJECTIVE

The objective of this delivery order is for the contractor to perform a mid-term assessment of the IFFD activity and deliver the mid-term assessment report to USAID. The report shall: 1) ascertain achievement of targeted results by IFFD; 2) assess IFFD activities in the specified areas; and 3) review the project operational area in terms of appropriateness of road type, saturation of appropriate road for IFFD intervention, and probable shifting to other areas.

1.4 STATEMENT OF WORK

Background: The IFFD is a rural infrastructure activity which rehabilitates rural earthen roads in about 60% area of the country. The rehabilitation efforts consist of earthwork to raise and widen the existing roads including compaction of earth and turfing the side slopes, construction of all required structures such as U-drains, pipe and box culverts, and bridges up to 20 meter in length using reinforced cement concrete. The project is financed by USAID through a Development Assistance (DA) Grant, PL 480 Title II wheat, and by the Government of Bangladesh (GOB). The Local Government Engineering Department (LGED) of the GOB implements the project's structure works through local contractors and the earthwork activity through local Scheme Implementation Committees (SICs). CARE-Bangladesh is the Cooperating Sponsor for the Title II. As such, CARE's role is to assist the LGED, and the local governments to select, design, contract, and implement road rehabilitation efforts on approximately 2,500 kilometer of earthen roads on about 400 alignments per year. The total cost of the Activity is approximately $90 million over five years (from 1995 to 1999).

Presently the IFFD utilizes about 75% of the 80,000 metric tons of Title II wheat monetized proceeds for the construction of appurtenant structures while the rest is paid as in-kind wages for the earthwork laborers and a part of the program operating expenses. The DA is used for expatriate staff services, procurement of vehicles and equipment, studies and evaluations, etc.

The IFFD carries out extensive impact monitoring on the impacts and effects of its road improvement activities. CARE's Monitoring & Evaluation section is involved in extensive data collection and reporting on increased access to basic goods and services for people living along the roads; an increase in traffic and freight volumes along the roads rehabilitated; a decrease in freight costs; decrease transport cost due to time savings; and effects on the nutrition of the poor in the road beneficiary areas. Prior to any intervention on a road, a thorough environmental examination is carried out jointly by CARE and LGED staff, and appropriate drainage structures are planned and implemented with a view to maintaining wetlands and waterflows, and decreasing waterlogging and flooding. CARE's environmental monitoring cell is also studying long term environmental effects on selected IFFD alignments.

The IFFD also funds Disaster Management and Mitigation activities. CARE's Disaster Management Unit (DMU) works with 20 local pre-qualified NGOs to increase the disaster preparedness and response capabilities. To help mitigate disasters, CARE is conducting a flood proofing pilot which is implementing village-based flood proofing interventions and systems which, if they prove successful, can be replicated on a wider scale.

Tasks: The contractor shall perform a mid-term assessment of the IFFD activity and deliver the mid-term assessment report to USAID. The assessment and report shall address the following:

- ascertain whether IFFD is realizing its output with high quality performance, on schedule, in a cost effective way and whether it is likely to achieve targeted results;

- assess IFFD activities in the areas of management, rural road improvement, institutional strengthening and training, environmental management, and monitoring and evaluation;

- make recommendations as to modifications needed for the following years of implementation; and

- Review the project operational area in terms of appropriateness of road type, saturation of appropriate roads for IFFD intervention, and probable shifting to other areas.

Methodology: In accomplishing the aforementioned tasks, the following methodology and time-schedule pursuant to the technical proposal dated August 20, 1997 submitted to USAID will be followed:

The evaluation team will adopt *rapid assessment methods* to gather both qualitative and quantitative data for determining the overall effectiveness and impacts of the IFFD. A more formal research design will be integrated into the preliminary workplan and subsequent final workplan produced by the team during the team planning meeting in Washington, D.C. and in consultation with USAID/B's project personnel once project documentation and database are reviewed. In brief, the following methods will be used to collect data on project activities and outcomes. The team will:

1. Conduct key-information interviews with key project personnel and stakeholders both in USAID, CARE, and in Bangladesh government ministries. Once in the field, the team will interview members of local Scheme Implementation Committees (SICs) throughout rural Bangladesh along with selected community participants.

2. Make direct observations of road building activities in selected sites -- comparing earlier activities with current project activities -- assessing construction practices, the quality of the road construction, and the impacts to local environmental settings. Special attention will also be given to determining socioeconomic impacts along with the directly observable natural environmental impacts. Additionally, quality control checks will be made by the civil engineer assessing the reliability of the data points being collected as part of the on-going part of the M&E system.

3. Carry out focus group and group interviews with local customers - beneficiaries in project settings assessing their views regarding the benefits of the project, unanticipated consequences of project activities, and possible areas of modification or redesign of the project based on local customer input. Focus group interviews permit the collection of relatively large amounts of information quickly and inexpensively which permit the corroboration of individual interviews and focusing on specific issues within designated target groups or a very

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small select sample of participants. In contrast to this approach, group interviews with a broader array of community members will permit gathering more general information from persons not actively involved with the project.

4. Develop and administer a mini-survey among all of those individuals participating in individual and group interviews. It is envisioned that survey items could be derived from variables within existing database therein a quantifiable set of responses (albeit limited) for comparing with the qualitative data collected by the team members. The survey instrument would be very brief, not over 10-15 minutes to complete, and questions would be close-ended enabling very rapid data entry analysis. The questionnaire would be printed in both English and Bangla and administered by translators used by the team. Strict anonymity would be maintained for all survey participants.

Time Schedule: The following time schedule will be followed for the assessment:

Prior to arriving Bangladesh:

- Conduct a one-day debriefing with BHR/FFP personnel in USAID/Washington;

- Conduct a one-day Team Planning Meeting in TvT's office resulting in preliminary team workplan;

In Bangladesh:

Week One:

Evaluation Team meets with appropriate USAID officials, CARE Project personnel etc. and other appropriate Bangladesh Government personnel. Relevant documents are reviewed as well as available project databases, survey instrument is developed. Draft Final Workplan is submitted to USAID/B for review and subsequently finalized -- including team assignments and travel agenda. Three Bangladeshi team members are identified and hired. Their respective roles are incorporated into the approved workplan.

Week Two:

Team departs for the field; initiates first interviews in selected target sites to pre-test the team interview strategies. Revisions are made accordingly.

Initiate site visits, review roads, drainage, etc. Conduct Individual Key-informant Interviews; Conduct Direct Observation of IFFD operations; Initiate Mini-survey Data Collection; Conduct Focus Group Interviews; On-going data analysis.

Week Three:

Conduct further site visits, reviewing roads, etc; continue Individual Key-informant Interviews; continue Direct Observation of IFFD Operations; continue Mini-survey Data Collection; continue Focus Group Interviews; On-going data analysis.

Week Four:

Team returns from field.

Team reviews field data, conducts initial briefings with select group of stakeholders for their comments and any suggestions to improving data collection, determines where data gaps exist and revises workplan accordingly.

Week Five:

Team departs for second set of visits to field.

Conduct further site visits, reviewing roads etc. continue Individual Key-informant Interviews; continue Direct Observation of IFFD Operations; continue Mini-survey Data Collection; continue Focus Group Interviews; On-going data analysis.

Week Six:

Conduct further site visits, reviewing roads, etc; continue Individual Key-informant Interviews; continue Direct Observation of IFFD Operations; continue Mini-survey Data Collection; continue Focus Group Interviews; On-going data analysis.

Week Seven:

Completion of site visits, final interviews, and focus groups.

Team returns to Dhaka from field, begin data analysis; prepares for Stakeholder Workshops.

Week Eight:

Team conducts Stakeholder Workshop(s) to a variety of stakeholders.

Team incorporates stakeholders' comments into data findings and prepares Draft Assessment Report for submission to USAID/B. Briefing to USAID officials can take place prior to completion of Draft Report.

Week Nine:

Team departs Bangladesh;

USAID/B reviews draft final report and provides comments to Team Leader. Due date to receive comments on the draft report will be decided in Dhaka.

Team Leader completes Final Report and submits to USAID/B on or before completion date of this Delivery Order.

1.5 ACCOUNTING AND APPROPRIATION DATA

See Item 9 on Cover Page

1.6 REPORTS & REPORTING REQUIREMENTS

The assessment Team Leader shall brief the IFFD Activity Coordinator, USAID/Bangladesh, on team activities and progress at least once a week while at Dhaka.

The Contractor shall submit 10 copies each of the preliminary and revised draft reports to USAID/Dhaka during weeks 7 & 8 of the performance period of this delivery order. The Contractor shall mail 15 copies of the final assessment report to USAID, IFFD Technical Office no later than week 9 of the performance period of this delivery order, unless otherwise agreed to in writing.

1.7 TECHNICAL DIRECTIONS

Technical Directions during the performance of this delivery order shall be provided by the Technical Officer as stated in Block 5 of the cover page pursuant to Section F of the contract.

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ASSOCIATES

ANNEX B

PERSONS CONTACTED

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ASSOCIATES

ANNEX B

PERSONS CONTACTED

CARE

Headquarters

Steve Hollingworth, Acting Country Director
Douglas Steinberg, Assistant Country Director
Kevin Fitzcharles, Coordinator, Integrated Food for Development (IFFD) Project
A. T. M. Zubaidur Rahman, Assistant Coordinator, IFFD
Magfurar Rahman, Assistant Coordinator, M&E, IFFD
Wahid Murad, MIS Manager, IFFD
Abu Md. Habibullah, Coordinator, Operations Unit, IFFD
Md. Shofiqul Alam, Project Engineer, Operations Unit, IFFD
Md. Golam Mustafa, Coordinator, Technical Support Unit, IFFD
Ekramul Kabir, Assistant Coordinator, Technical Support Unit, IFFD
Kh. Mohammed Amzad Hossain, Technical Officer, Technical Support Unit, IFFD
Chris Perine, Technical Adviser, Technical Support Unit, IFFD
Sajedul Hasan, Project Coordinator, Flood Proofing Pilot (FPP) Project, IFFD
Ms. Shawkat Ara, Technical Officer, FPP, IFFD
Tofayel Alam, Program Development Officer, FPP, IFFD
Dewan Arif Rashid, Program Development Officer, FPP, IFFD
Md. Shah Alam, Training Officer, IFFD
Md. Ikramul Islam, Technical Officer, Training Unit
Ms. Razia Khatun, Technical Officer, Training Unit
Mamanul Hoque Khan, Environmental Management Analyst, IFFD
Phil Sutter, Infrastructure Sector Coordinator, IFFD and RMP

Rural Maintenance Program (RMP)

A. F. Sarkar, Coordinator
Md. Zulfikar Ali Khan, Assistant Project Coordinator

Suboffice Bogra

Md. Sharif Hossain Sarker, Project Engineer
Md. Mizanur Rahman, Assistant Project Engineer, Area #4
Tapan Kumar Barua, Assistant Project Engineer, Area #3
Mahabubuzzan, Assistant Project Engineer, Area #5
Swapan Kanti Paul, Assistant Project Engineer (SSA)

Suboffice Bogra (continued)

Afzal Hossain, Field Engineer (Sirajganj District)
Rezaul Karim, Assistant Field Engineer (Durgapur, Godagari)
Abu Taher, Project Manager, INTERFISH Project
Md. Mobarak Hossain, Technical Officer (Training)
Delwar Hossain, Technical Officer (M&E)
Six field engineers and 14 assistant field engineers in focus group

Suboffice Comilla

K. M. Mizanur Rahman, Project Engineer
Delowar Hossain, Technical Officer (Road Contract Pilot)
A. R. Talukder, Technical Officer (Environmental Management Unit)
Md. Abul Kalam, Field Engineer (Chittagong District)
N. Mohammad, Assistant Field Engineer (Mirsarai, Sitakundu)
Nepal Chandra Burua, Assistant Field Engineer (Rangunia, Boalkhali)
Harunur Rashid, Assistant Field Engineer (Rauzan, Anowara)
Two field engineers, two technical officers, and three assistant field engineers in focus group at Comilla

Suboffice Dhaka

Mazhar Hossain, Field Engineer (Munshiganj District)

Suboffice Jessore

Abdus Shaheen, Project Engineer
Jamanur Rahman, Assistant Project Engineer
Jamal Hossain, Field Engineer
Ohidullah, Field Engineer
Tayeb Hossain, Field Engineer
Atahar Ali, Technical Officer (M&E)
Three field engineers and nine assistant field engineers in focus group at Khulna
One assistant project engineer, 3 field engineers, 6 assistant field engineers and 1 technical officer (Environment) in focus group at Jessore

Suboffice Mymensingh

Rashendra Kumar Das, Project Engineer
Sayed Fazle Rabbi, Assistant Project Engineer
Bimal Kanti Kuri, Project Manager, FPP
Rukshana Begum (Khuku), Project Officer, FPP

Suboffice Mymensingh (continued)

Ms. Khorshida, Training Officer, FPP
Azibar Rahman, Technical Officer (Environment)
Ten staff members in a general discussion

Suboffice Rangpur

M. Anjar Alam, Assistant Project Engineer
Md. Shahidul Islam Khan, Technical Officer (M&E)
Md. Sekendar Ali, Field Engineer, Team #1 (Dinajpur District)
Md. Shafiqur Rahman, Field Engineer, Team #2 (Thakurgaon District)
F. Belai Hossain, Field Engineer, Team #7 (Kurigram District)
M. A. Rashid, Project Manager, FPP, Kurigram
Ms. Dilara Asma, Project Officer, FPP, Kurigram
Atiqur Rahman, Assistant Field Engineer (Dimla, Saidpur)
Six field engineers and nine assistant field engineers in focus group

LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED)

Headquarters

Quamrul Islam Siddique, Chief Engineer
Md. Monowar Hossain Chowdhury, Additional Chief Engineer
Saroj Kumar Sarker, Superintendent Engineer (Planning)
A. F. M. Munibar Rah, Deputy Superintendent Engineer (Planning)
Md. Ataullah Bhuiya, Superintendent Engineer
Aminul Islam, Assistant Engineer, Planning

Chittagong District

Engr. Gholam Musafa Patwary, Executive Engineer
Md. Akbar Hossain Patwaryl, Thana Engineer, Sitakundu

Jessore District

Md. Abdus Shaheed, Executive Engineer

Khulna District

Md. Abdul Mazed, Thana Engineer, Dacope

Kurigram District

A. K. Azad, Assistant District Engineer
Md. Ataur Rahman, Thana Engineer, Ulipur

Manikganj District

Md. Emarot Hossain, Subassistant Engineer, Ghior
Md. Abuddin, Subassistant Engineer (Draftsman), Ghior

Munshiganj District

Md. Manzurul Islam, Thana Engineer, Gazaria
K. M. Fozlulkabir, Senior Subassistant Engineer, Gazaria

Mymensingh District

Shafiqul Islam Akand, Assistant District Engineer
Eight thana engineers in a discussion at district headquarters

Natore District

Md. Abdur Rashid Miah, Assistant District Engineer/Thana Engineer, Singra

Nilphamari District

Md. Rayhan Shiddique, Thana Engineer, Dimla
Md. Motluber Rahman, Subassistant Engineer, Saidpur
Md. Aminur Rahman, Subassistant Engineer, Saidpur

Pirojpur District

Md. Subhash Chandrakar, Thana Engineer, Nazirpur
Subassistant Engineer

Sirajganj District

Obyedur Rahman, District Engineer
Mr. Akhtaruzzaman, Thana Engineer, Ullapara

Tangail District

Javed Karim, Assistant District Engineer
A. K. M. Badrul Alam, Thana Engineer, Ghatail

OTHER GOVERNMENT REPRESENTATIVES OF BANGLADESH

M. A. Rahim, Joint Secretary, Ministry of Food
Anisur Rahman, Deputy Secretary, Ministry of Local Government, Rural Development and Cooperatives (MLGRDC)
Md. Abul Bashar, Senior Assistant Secretary, MLGRDC
Md. Reazuddin Ahmed, Deputy Director, Directorate of Environment, Ministry of Environment and Forestry
Mr. Ilias, Thana Executive Officer (TEO), Moduphur Thana, Tangail
Md. Delwar Hossain, TEO, Dacope, Khulna
Tobibul Islam, Chairman of Balapara Union, Dimla Thana, Nilphamari
Reaz Ahmed, TEO Gazaria, Munshiganj
Md. Monwar Hossain Sarker, TEO Saidpur, Nilphamari
Md. Abdul Gafur Sarker, Chairman, Kamarpukur Union
Md. Abdul Latif Sarker, Chairman, Bangalipur Union
Md. Kazi Motahar Hossain, Chairman, Kashiram Belpukor Union

USAID/BANGLADESH

Flynn Fuller, Food for Peace Officer
Md. Golam Kabir, Program Management Specialist and IFFD Coordinator
Syed Sadrul Ameen, General Engineer
Azharul Mazumdar, Environmental Officer
Briefing also provided to the Director, Deputy Director and other USAID officers.

USAID/WASHINGTON

Tom Ray, Food for Peace Office, Bureau for Humanitarian Response

OTHER ORGANIZATIONS

Bruce Cogill, Project Director, IMPACT (Food Security and Nutrition Monitoring Project), Arlington, Virginia
Anne Swindale, Deputy Director, IMPACT, Arlington, Virginia
Lynnda Kiess, Country Director, Helen Keller International (HKI)
Ravi Loganathan, Project Officer/Economics, HKI
Mugo Muita, Project Officer, HKI

Other Organizations (continued)

Bishow B. Parajuli, United Nations World Food Program (WFP) Adviser, Rural Development Program

Kumud Bondhu Bhowmik, Senior Systems Officer, WFP

B. W. E. M. Athmer, Chief Technical Adviser, Integrated Food Assisted Development Project (IFADEP)

Akhund Habibul Alam, Project Director, IFADEP

M. Serajuddin, Director of Geotechnical and Material Laboratory, Development and Design Consultants, Ltd.; formerly Director General of the River Research Unit of the Water Development Board

Ms. Begum Rokeya, Project Director, Sabalamby Unnayan Samity, Self-Reliance Development Society (nongovernmental organization [NGO])

Ms. Rubia Halal, Legal Adviser/Founder Chairman, Bangladesh Jatya Mohila Sangstha (Bangladesh Women Development Association) (NGO)

Sheraful Hossain, Area Coordinator Rangpur, ASOD (NGO)

Shyamal Chandra Sarker, Director, Mahideb Jubo Somaj Kallayan Somity (MJSKS) (NGO working on FPP in Ulipur Thana)

Harun Ar Rashid Lal, Executive Director, Solidarity (NGO working on FPP in Ulipur Thana)

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ASSOCIATES

ANNEX C

BIBLIOGRAPHY

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ANNEX C

BIBLIOGRAPHY

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3rd Quarter, FY 1995, April 24, 1995
4th Quarter, FY 1995, July 26, 1995

1st Quarter, FY 1996, November 30, 1995
2nd Quarter, FY 1996, February 12, 1996
3rd Quarter, FY 1996, May 6, 1996
4th Quarter, FY 1996, July 30, 1996

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ASSOCIATES

ANNEX D

MONETIZATION PROCESS

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ANNEX D

MONETIZATION PROCESS

On receipt of the survey report from CARE, the government of Bangladesh (GOB) starts the processing for the monetization of the quantity of wheat mentioned in the survey report.

In accordance with the agreement, the amount deposited to the CARE-operated project account will be the local currency value of the commodity based on the Public Food Distribution System's highest sale price of the shipped commodity prevailing on the day CARE turns over the commodity to the GOB.

The monetized funds will be deposited by the GOB within 120 days of the receipt of the commodity by the GOB, whether or not the GOB has actually sold the commodity. The monetization process involves the following steps:

1. The Directorate of Food, Ministry of Food, receives the commodity from the donors at the ports and transfers it to different storage centers. The commodity is sold by the Directorate of Food through its established channels.

2. The Directorate of Food prepares a periodic statement about the quantity of food aid received and the amount of sale proceeds generated and deposited to Bangladesh Bank Account No. 2 (food).

3. The Ministry of Food issues a government order (G.O.) for transferring the sale proceeds from Account No. 2 to the short-term deposit (STD) account of the chief accounts officer. A copy of the G.O. is sent to the Ministry of Finance for endorsing the G.O. to the chief accounts officer.

4. Upon receiving the endorsed copy of the G.O., the chief accounts officer examines the budgetary provisions and issues advice to the controller general of accounts to arrange transfer of the money to the STD account of the chief engineer, LGED.

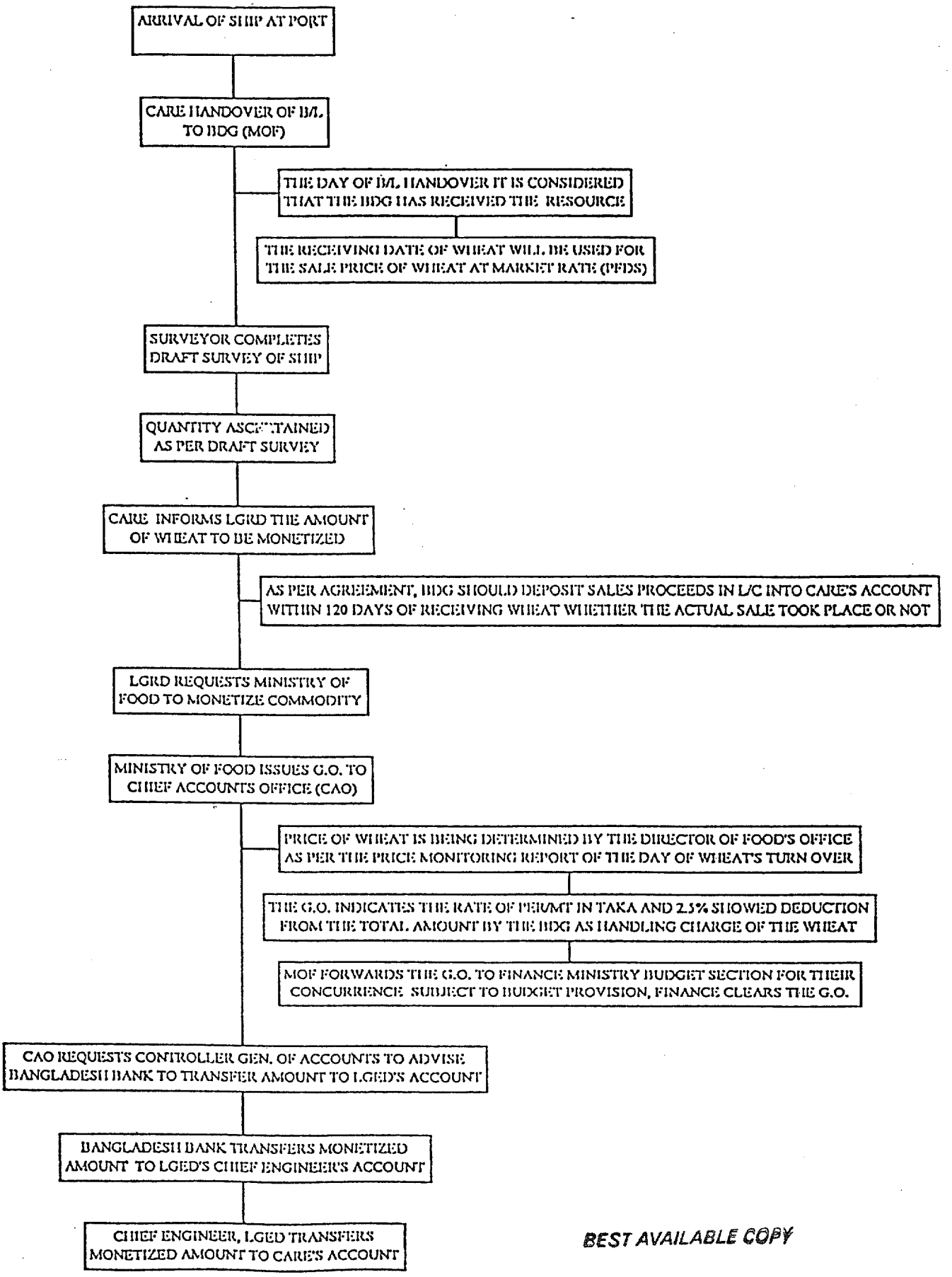
5. The controller general of accounts then sends authority to Bangladesh Bank to effect the transfer.

6. On receiving the authority from the controller general of accounts, Bangladesh Bank transfers the sale proceeds to the STD account of the chief engineer, LGED.

7. The chief engineer, LGED, transfers the money to the CARE-operated project account.

A monetization flow chart is shown on the following page.

FLOW CHART
TITLE II WHEAT MONETIZATION



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ASSOCIATES

ANNEX E

CARE ROAD PROGRAM BY SUBOFFICE COMPARED WITH FOOD INSECURITY MAP

TABLE E-1
DAKAR SUBOFFICE

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	7	2	5	19	33
FY 1996	2		2	7	11
FY 1997	9	2	6	15	32
Average FYs 1995-97	6	1	4	14	25
Percent by Category	24%	4%	16%	56%	100%
Total Thanas in Category in Suboffice	10	2	7	20	39
IFFD ROADS					
FY 1995					
No. by Category	12	6	7	33	58
Percent by Category	21%	10%	12%	57%	100%
FY 1996					
No. by Category	5	0	5	14	24
Percent by Category	21%	0%	21%	58%	100%
FY 1997					
No. by Category	18	5	11	22	56
Percent by Category	32%	9%	20%	39%	100%
TOTAL 3 YEARS					
No. by Category	35	11	23	69	138
Percent by Category	25%	8%	17%	50%	100%

Percentages may not add due to rounding.

TABLE E-2
MYMENSINGH SUBOFFICE

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	10	16	11	7	44
FY 1996	2	6	3	4	15
FY 1997	8	12	9	8	37
Average FYs 1995-97	7	11	8	6	32
Percent by Category	22%	34%	25%	19%	100%
Total Thanas in Category in Suboffice	11	20	16	11	58
IFFD ROADS					
FY 1995					
No. by Category	19	39	24	27	109
Percent by Category	17%	36%	22%	25%	100%
FY 1996					
No. by Category	6	12	4	10	32
Percent by Category	19%	38%	12%	31%	100%
FY 1997					
No. by Category	13	21	13	18	65
Percent by Category	20%	32%	20%	28%	100%
TOTAL 3 YEARS					
No. by Category	38	72	41	55	206
Percent by Category	18%	35%	20%	27%	100%

Percentages may not add due to rounding.

TABLE E-3
RANGPUR SUBOFFICE

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	21	26	5	1	53
FY 1996	14	20	5	0	39
FY 1997	14	18	5	1	38
Average FYs 1995-97	16	21	5	1	43
Percent by Category	38%	49%	12%	2%	100%
Total Thanas in Category in Suboffice	25	27	5	1	58
IFFD ROADS					
FY 1995					
No. by Category	63	63	18	3	147
Percent by Category	43%	43%	12%	2%	100%
FY 1996					
No. by Category	38	65	7	0	110
Percent by Category	35%	59%	6%	0%	100%
FY 1997					
No. by Category	37	45	14	4	100
Percent by Category	37%	45%	14%	4%	100%
TOTAL 3 YEARS					
No. by Category	138	173	39	7	357
Percent by Category	39%	48%	11%	2%	100%

Percentages may not add due to rounding.

TABLE E-4
BOGRA SUBOFFICE

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	33	13	14	2	62
FY 1996	15	3	8	1	27
FY 1997	27	10	11	2	50
Average FYs 1995-97	25	9	11	2	46
Percent by Category	54%	19%	24%	4%	100%
Total Thanas in Category in Suboffice	35	13	14	2	64
IFFD ROADS					
FY 1995					
No. by Category	81	46	44	6	177
Percent by Category	46%	26%	25%	3%	100%
FY 1996					
No. by Category	46	15	27	5	93
Percent by Category	50%	16%	29%	5%	100%
FY 1997					
No. by Category	42	19	27	1	89
Percent by Category	47%	21%	30%	1%	100%
TOTAL 3 YEARS					
No. by Category	169	80	98	12	359
Percent by Category	47%	22%	27%	3%	100%

Percentages may not add due to rounding.

TABLE E-5
JESSORE SUBOFFICE

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	12	15	23	5	55
FY 1996	9	15	18	6	48
FY 1997	9	12	22	7	50
Average FYs 1995-97	10	14	21	6	51
Percent by Category	20%	27%	41%	12%	100%
Total Thanas in Category in Suboffice	19	28	34	23	104
IFFD ROADS					
FY 1995					
No. by Category	16	25	36	8	85
Percent by Category	19%	29%	42%	9%	100%
FY 1996					
No. by Category	27	31	56	15	129
Percent by Category	21%	24%	43%	12%	100%
FY 1997					
No. by Category	12	15	31	9	67
Percent by Category	18%	22%	46%	13%	100%
TOTAL 3 YEARS					
No. by Category	55	71	123	32	281
Percent by Category	18%	25%	44%	11%	100%

Percentages may not add due to rounding.

TABLE E-6
COMILLA SUBOFFICE

	VERY HIGH	HIGH	MODERATE	LOW	TOTAL
THANAS IN IFFD					
No. by Category					
FY 1995	4	4	11	18	37
FY 1996	4	3	4	12	23
FY 1997	4	3	9	17	33
Average FYs 1995-97	4	3	8	16	31
Percent by Category	13%	10%	26%	52%	100%
Total Thanas in Category in Suboffice	5	4	11	20	40
IFFD ROADS					
FY 1995					
No. by Category	9	8	22	44	83
Percent by Category	11%	10%	27%	53%	100%
FY 1996					
No. by Category	6	7	10	26	49
Percent by Category	12%	14%	20%	53%	100%
FY 1997					
No. by Category	10	3	15	20	48
Percent by Category	21%	6%	31%	42%	100%
TOTAL 3 YEARS					
No. by Category	25	18	47	90	180
Percent by Category	14%	10%	26%	50%	100%

Percentages may not add due to rounding.