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FAP-14

Government of the  
People's Republic of Bangladesh  
Ministry of Irrigation, Water Development, and Flood Control  
Flood Plan Coordination Organization

**FAP-14**  
**FLOOD RESPONSE STUDY**

*Conference*

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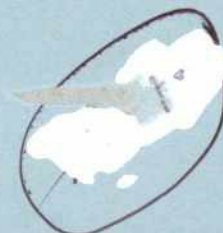
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**BRIEFING NOTES**

*03-04 February 1992*



**Dhaka**



IRRIGATION SUPPORT PROJECT  
FOR ASIA AND THE NEAR EAST

Sponsored by the U.S. Agency for International Development

**Eastern Waters Initiative**  
**ISPAN Activity No.705C**

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People's Republic of Bangladesh  
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## Briefing Note Conference Objectives

### Flood Response and Flood Proofing Studies

These briefing notes are a reference for the Flood Response and Flood Proofing Studies' Conference scheduled for February 03-04, 1992 at the Sheraton Hotel.

### Conference Objectives

The objectives of the conference are to:

- Present an overview of the status of both the Flood Response and Flood Proofing Studies, including what we have achieved to date, what we will be doing during the next 6 months, and what our final outputs will be.
- Share the findings of our surveys and analysis to date and identify key implications for proposed pilot studies, institutional and policy recommendations, guideline formulation, and new research needs.
- Identify next steps needed to complete this phase of the Flood Response study, including identification of action areas that will not be covered by either of the two studies.

### Status

In designing the surveys for the two studies, the rural aspects of flood response and flood proofing were considered under the Flood Response Study. The urban and municipal aspects of flood response and flood proofing were considered under the Flood Proofing Study.

Phase 1 of the Flood Proofing Study was completed in December, 1991 and the final Issues and Interim Reports are nearly finished.

The Flood Response Study, which will include the rural flood proofing findings and recommendations in addition to the flood response guidelines, policy and institutional recommendations and future research needs, will be completed by August, 1992.

### Study Goals and Objectives

The Flood Response and Flood Proofing studies, being carried out by ISPAN as part of the Flood Action Plan, are complementary. The Flood Response Study will lead to a better understanding of how individuals and communities in flood vulnerable areas adapt to and respond to the floods. The study will document responses of individuals and communities to floods; assess the extent to which these and other approaches can be developed to improve the flood preparedness of individuals and communities in flood vulnerable areas; and develop criteria (guidelines) to be used in regional studies under the Flood Action Plan.

The Flood Proofing Study is to identify and test measures to mitigate adverse effects of flooding, especially in unprotected areas and recommend effective measures of proofing against floods. Some of these recommended measures will be tested through pilot studies carried out by others.

Intermediate objectives include:

- A review of literature and experience (reported in August and September, 1991);
- Workshops on survey findings and planning guidelines (August and September, 1991; this reporting conference; and a workshop in July, 1992);
- Development of pilot projects (FAP 23) or planning criteria for project appraisal/evaluation which will lead to the development of planning guidelines (FAP 14).
- Evaluation of Phase 1 activities, the main surveys, guidelines, pilot project proposals, and final reports to determine necessary follow-up activities.

#### Approaches

Primary sources of information for these two studies included field surveys, interviews with individuals and institutional representatives affected by flooding, and literature reviews.

The Flood Response Study (FAP 14) was carried out using intensive survey methods to elicit the experiences and responses of rural households and local institutions to severe floods. The survey included interviews of 2,270 householders and 450 institutional representatives in 15 Upazilas selected to provide representative samples of all types of flooding.

The Flood Proofing Study (FAP 23) used rapid appraisal methods to obtain similar information from urban residents and managers and employees of private and public sector institutions. The rapid appraisal included interviews with 72 residents of six Upazilas and 180 officials working in central government agencies and private sector organizations.

The original intention of the two studies was to provide guidelines for flood response and flood proofing survey and appraisals that could be utilized by the Flood Action Plan regional planning studies.

The later than anticipated start of these two studies resulted in them being out of phase with most of the Flood Action Plan regional planning studies. Despite this delay, the project guidelines and pilot study proposals of FAP 14 & FAP 23 will provide support for project formulation and appraisal at the pre-feasibility and feasibility stages of the Flood Action Plan.

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Briefing Notes  
Perspective of Survey Villages

Flood Response Study

General Characteristics

The 24 villages selected for the initial Flood Response Surveys span broad spectra of physical, social, and development conditions. While the primary selection criterion has been their exposure to, or depth of, flooding; they also can be grouped by their proximity to transportation and other services or to other socio-economic characteristics.

They range from zero to 100% lowland, .3 to 2.9 square miles (mi<sup>2</sup>) in area, and 823 to 2,447 in population. Their occupational makeup ranges from 4.0 to 38% engaged in business and 5.0 to 64% in farming, and the sample includes one village with 38% employed in fishing. Literacy ranges from 13 to 59%, and landless households span a range of 20 to 55% of the surveyed totals.

With such great diversity, analysis has necessarily proceeded from intensive work on disaggregated data to more general interpretation derived from the consolidated data. Included will be the initial 24 villages and the six added later to extend sample representation of char and other 'unprotected' areas.

Following are brief sketches of the six villages (from three Upazilas) that illustrate some of the differences and provide a background for other presentations, to follow. Selected data are presented in Table 1, following this section.

Village Profiles

Dhunat Upazila

Dhunat is located in Bogra District and comprises 96% Karatoya and Bangali River Meander Floodplain and 4.0% active Brahmaputra (Jamuna) Floodplain. The eastern portion of the Upazila is located within the Brahmaputra Right Bank Embankment (BRE) scheme. The flood plain is relatively level, except for relief formed by irregular ridges, natural levees, and cutoff meanders. A small area in the Eastern portion is subject to river bank erosion which has caused breaches in the BRE. Other areas have been flooded by drainage congestion behind the embankment. The area was severely affected in 1987 and 1988 floods. There is a drainage problem in the lower terrain. About 48% of the land is classified F<sub>0</sub>, 37% F<sub>1</sub>, 13% F<sub>2</sub> and 2% F<sub>3</sub>.

Baraitali. This is the lower-lying (70% of plots) of the two villages studied in Dhunat, and it is located in Bhandarbari Union. The village is subject to severe river-bank erosion and flooding. The greater part of the village is out-

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side the BRE. The village covers an area of 0.3mi<sup>2</sup> and has a population of 1,157.

The literacy rate is 35%. The predominant occupation of the village is day laborer (58%), followed by farmer (21%), and business (17%). About 58% are landless.

**Pachthupi.** Pachthupi is a relatively-less flood-affected (64%) village. The village, however, was affected by the 1984, 1988 and 1991 floods. For the first two years, damage was caused by breaches in the BRE, and that in the last year was caused by over flow from the Karatoya and Bangali Rivers. The village has a population of 1,871 located over a 1.6mi<sup>2</sup> site.

Literacy is relatively high at 44%. The dominant occupations are farmer (35%) and day laborer (34%), with 15% engaged in business. Landless households total 43%.

#### Singra Upazila

Singra is situated in Natore District. It is made up of 50% old floodplain basins, 30% young Ganges (Padma) Floodplain, 10% mixed young and old floodplain, and 10% Barind. The district has a wide range of flood depths, 25% of the land being F<sub>0</sub> and 40% being F<sub>1</sub>. The Atrai Basin is a flood vulnerable area, and the area is normally deeply flooded. Parts of the Upazila also are affected by flash flooding from the Barind tract, and there are problems from drainage congestion. Flooding is seasonal, August-September.

**Pakisha.** The first study village comprises all low-lying plots, located about 15 kilometers (km) North-west of the Upazila headquarters. The village is located at the edge of the Chalan Beel. It has a population of 1,000, in an area of 1.7mi<sup>2</sup>. The village is within an embankment to protect against floods caused by the Nagar River. However, in order to ease the water pressure during 1988 flood, the people on the Western side breached the embankment. This caused the Eastern embankment to fail causing extensive damage to standing crops.

The literacy rate is 49%. The predominant occupations of the villagers are farmer (42%) and laborer (28%), with some 17% engaged in business. About 27% are landless.

**Lalua, Ichalbaria and Panchpakhia.** These villages were combined to provide an adequate population (981) for sample validity. They total about 2.0mi<sup>2</sup> area and are slightly less low-lying (99%). They are located at about 15-km East of the Upazila headquarters. People raise their homestead sites and are not flooded except during severe flood. No flood control structures exists in the village. Floods in 1987 and 1988 were the most severe in the last 10 years and caused a total loss of the aman crop. Since aman remains susceptible to damage by flood, boro has taken over as the main crop (80% of the land).

Literacy was found to be 47%. The predominant occupation of the village is farmer (53%), with 21% laborers and 18% in businesses. These villages had the

lowest level (21%) landless households found in the survey.

#### Sunamganj Upazila

Sunamganj, Sunamganj District, includes 50% Surma-Kushiyara Floodplain, 30% piedmont alluvial floodplain, and 20% old floodplain with piedmont alluvium in basins. Much of the area is subject to early and rapid (flash) flooding. There are deeply flooded basins, and the area has submersible embankments in several locations. There are problems of localized rainfall and flash floods. The Upazila is classified as 30% F2, 56% F3 and 4% F4.

**Muradpur** Muradpur is the more flood-prone area with 98% low-lying plots; in normal monsoon, inundation levels in the cultivable lands range from 9 to 10 feet. The village is located about 30km Southeast of the Upazila headquarters and within the haor (basin) area. The village has a population of 2,439 on a 2.0mi<sup>2</sup> site divided into six paras (parts). The floors of houses need to be protected, during monsoon, from wave action. The people in the village, therefore, raise the homestead level and floor level as an annual event before flood. Due to long standing water conditions, only one crop mainly local boro in Kharif-1 can be grown.

The literacy rate is only 13 percent, lowest among surveyed villages. Some 46% are laborers, highest in the survey; and 25% are farmers. Other occupations include fishing (9%) and business (6%).

**Fenibeel.** This village is less exposed (19% low-lying), located approx. 14 km. North of Sunamganj, at the foot hills of Meghalaya Plateau. The Chalti River with perennial flow passes by the Western side of the village. Heavy rains in the upper reaches and steep slopes approaching the area makes the river flashy and causes extensive damage to crops due to carpeting with sand. The flooding condition lasts mainly three to four hours. The village has a population 894 located on a 0.9mi<sup>2</sup> site.

The literacy rate here also is relatively low (23%). About 39% are engaged in farming, and 37% are laborers. Some 12% are employed in business pursuits. About 41% percent are functionally landless.

Table 1  
SELECTED VILLAGE CHARACTERISTICS

Village	% Lowland	% Literate	% Landless
Baraitali	70	35	58
Pachthupi	64	44	43
Lalua, et al	99	47	21
Pakisha	100	49	27
Fenibeel	19	23	41
Muradpur	98	13	65

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## Briefing Notes Householder's Response and Views

### Flood Response Study

#### Scope

This study has four major aims: (a) assess existing flood response of people living in flood-plain areas; (b) evaluate practices in different agro-ecological zones; (c) assess the possible impact of infrastructural flood-protection efforts such as embankments or polders; and (d) formulate guidelines and recommendations on enhancing effective flood-response measures for planning, design and operation of other FAP projects, especially FAP-23.

Thus, the terms of reference (TOR) call for a study to determine how people presently respond to the different regimes of the Bangladesh flood plain, including areas chosen to represent each FAP region, agro-ecological zone, and type of flooding including overbank spill, flash floods, and drainage congestion.

#### Methods

##### Site Selection

As the study has developed, it has been conducted in two segments. The first, concerned 24 villages in 12 Upazilas. Later, in order to expand representation of char and deeply-flooded beel three Upazilas were added. After considering alternative lists and groupings, based in part on staffing considerations, the Study Team, (in consultation with the Program Manager, members of the Panel of Experts (POE) and FPCO) selected 12 Upazilas. Table 1, lists these 12 Upazilas and the additional 3, in relation to the river basin and regional study requirements of the TOR.

The extended survey have been completed, but data analysis is not, so the results have not yet been integrated with the results from work completed earlier. This will be left for the final report. Hence, this briefing note describes mainly results of study of the first group and gives indications now available of whether the new villages are likely to alter the more general findings.

Two villages were selected from each sample Upazila for the household survey. The Study Team sought villages that represented the range of flood vulnerability that is characteristic of the Upazila.

##### Household Sample

A 100% census of the selected villages was conducted to enable drawing samples

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for the detailed household survey. A stratified random sample was then drawn for the detailed household survey. The exact proportion (one household in two, one in three) depended on the overall size of the village, but it was essentially constant for all strata-defined groups, except that each occupational group was represented by at least two households (unless there was only one in the village). To the extent possible, households within villages were selected to represent at least the following groupings:

1. Landed households cultivating their own land (for each of the groups holding land, an attempt was made to include representative proportions of families with a large number of fields for that village, an about average number, and a small number);
2. Sharecropper households;
3. Landless households -- those that are "functionally landless" (i.e. have no arable land beyond a small homestead area, which is generally tended by women);
4. Fishing households -- those that specialize in fishing for a living;
5. Merchant or shopkeeper households -- those deriving the major part of their income from trading; they are likely to include a broad range of income levels from wealthy traders and moneylenders to petty hawkers; and
6. Households with substantial income from members employed out of the area.

#### Survey Instruments

The Phase 1 survey employed three instruments: an initial questionnaire administered to all the households in FAP-14's survey villages; a formal household-level survey for the sample selected, and an open-ended institutional survey to be administered to key persons at villages, union, Upazila and district levels.

The 100% survey questionnaire is a relatively simple, two-page survey instrument, as explained earlier. It was designed to be completed quickly, yet be comprehensive enough to facilitate selection of the household sample for the Phase 1 survey.

Results from the 100% survey for the particular households included in the later survey were carried over and merged in with the latter results.

The Household Survey instrument is the principal data source for FAP-14's statistical analyses. Its development has been an iterative process, extending over a number of months through various reviews, revisions, and a field-testing exercise that was incorporated into the training program set up for the FAP-14 enumerators.

## Household Response

### Householders Actions

Household flood preparation and response have been analyzed in terms of the percentage of respondents adopting a given measure under different circumstances created by normal inundation, average flood and severe flood<sup>1</sup>. The household survey questionnaire included some 18 measures that people in survey areas were expected to use in preparation against an oncoming flood which they anticipate to be a normal or severe event. ISPAN's results show that, of those 18, only four measures were taken by significant numbers of households. These are reinforcing walls, strengthening the corner posts, strengthening the roof, and storing fuel.

The first three measures are connected with pre-monsoon household repair works. Results are provided in Table 2. They show that, apart from those four measures, there are only two other measures (storing fodder and food) that have shown moderately high scores. The rest have not shown any significant response. It is important to note also that results (Table 2) do not show any significant difference as between normal inundation, average flood and severe flood conditions.

Respondents have adopted five out of 22 response (coping) measures with significant frequency while the rest have been adopted with moderately-low to low frequency (Table 2 and 3). Significantly, respondents show wide diversity of measures adopted during severe flood while the range narrows for average flood and is less-still for normal monsoon inundation.



<sup>1</sup> Normal inundation refers to annual cyclical monsoon inundation. Average flood is a situation when water level exceeds normal inundation and causes some damage to crops and the water level in the flood prone areas threatens homesteads not quite submerging them. Severe flood refers to a situation when flood water rises further and submerges most homesteads including dwelling houses and damage to crops and property is quite extensive.

### Local situation

A different picture emerges from examination of response patterns in different villages. There differences are focused between Upazilas and between villages from the same Upazila (e.g. Baraitali, Dhunat Upazila, apparently goes more strongly for preparatory measure while less intense activity is reported during the flood).

Baraitali is a village through which the Brahmaputra Right Embankment (BRE) passes, leaving a major portion unprotected. It is, therefore, not surprising that they value preparation higher than response even during normal inundation, yet higher during average flood.

Panchthupi, the other village in Dhunat, is a relatively flood-free area except during severe flood. The frequency of those adopting measures during the pre-flood situation does not indicate a clear pattern although storing fuel appears to be the preferred activity, adopted both for pre and during flood situations. The other measures are not quite so popular.

### Institutional Actions

The section on household evaluation of institutional responses asked whether a number of specific measures of institutional flood response had been taken and then for the householder's evaluation of these measures, whether or not they had been implemented previously. In addition, an open-ended set of queries was asked of the FAP-14 respondents, soliciting their suggestions about what measures should be taken up at different institutional levels. The basic idea here was to assess (a) what people perceived as having been done along institutional lines to respond to flood problems and (b) what they would like to see done in this regard. In this brief summary, the focus will be on the latter.

The questions aimed at evaluating specific measures were structured on a five-point scale, where 1 was "very helpful," 3 "neutral" and 5 "very harmful." Some mean (average) scores with their standard deviations across the entire sample were as follows:

<u>Flood measure</u>	<u>Mean</u>	<u>Std dev</u>
Embankment between one's dwelling and the major source of flooding	1.84	1.16
Surrounding embankment that would keep out all floods	1.77	1.17
School ground or other high ground for shelter in extreme floods	1.30	0.59
Quick drainage system	1.45	0.61
Storm warning system	1.64	0.58
Tubewell for domestic water	1.17	0.45
Village grain storage facility	1.86	0.71

Results show that overall embankments, are popular, but some other interventions are even more so. The standard deviations show the extent of dispersion around the mean, such that the higher it is, the more disagreement exists between respondents as to their evaluations of the measure in question. Thus, domestic tubewells are seen as more valuable than embankments and there is more agreement about their value (perhaps not surprising, since they are good for many purposes beside supplying safe drinking water in times of emergency).

As expected, people in different villages had diverging views about the efficacy of various flood measures. Given that the sample of villages was intentionally selected to provide a variety of flood conditions, it would be surprising indeed if this were not the case. Table 5 shows the differences among villages (the means) as well as within them (the standard deviations) with respect to embankments between the respondent's homestead and the major flood source. Here it is evident that there is great interest in embankments from villagers in a place like Auliapukur (code 122), much less in Rukuni (52) or Durgapur (101). And while there is absolute unanimity about the utility of embankments in Auliapukur (std. dev. = 0, meaning the same answer from everyone), villagers in Durgapur are in relatively widespread disagreement about their views (std. dev. = 1.20).

For the service delivery measures, there also is a considerable range of opinion, with some esteeming them highly and others showing relatively little enthusiasm. To take storm warning systems as an example, respondents in Rampur village (Nasirnagar Upazila) looked on them with great favor (mean = 1.0125) std. dev. = 0.1118), while those in Shingala village (Bhedarganj Upazila) were less impressed (mean = 2.0625, std. dev. = 0.3526).

The FAP-14 survey included a series of socio-economic questions, to assess how such characteristics correspond with people's concerns about floods. At the sample wide level, there is not much relationship evident for some of the infrastructural measures. The text table below will illustrate the picture for embankments and land ownership category. The differences that emerge between farm-size groups are considerably less than those observed earlier between the villages surveyed.

#### Evaluation of Embankment by Ownership Size

	Mean	Std Dev	Cases
For Entire Population	1.8332	1.1646	1769
By Ownership size:			
Landless	1.7450	1.1396	757
Small farm (0-2.49 acres)	1.9226	1.2014	762
Medium farm (2.5-7.49 acres)	1.8300	1.1213	200
Large farm (7.5 acres up)	1.8200	1.0631	50

Total Cases = 1853

Missing Cases = 84 OR 4.5 PCT.

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With other measures, however, particularly some of the service delivery items, there are larger differences. The text table below shows the assessment of a community grain drying facility by farm size, and here the differences are somewhat larger. Landholding size makes some difference, with households owning larger farms being more in favor of such a measure.

Evaluation of Community Grain Drying Facility  
by Ownership Size

	Mean	Std Dev	Cases
For Entire Population	1.9266	0.7953	1841
By Ownership size:			
Landless	2.0231	0.8008	780
Small farm (0-2.49 acres)	1.9095	0.7831	796
Medium farm (2.5-7.49 acres)	1.7143	0.7604	210
Large farm (7.5 acres up)	1.6111	0.7871	54

Total Cases = 1852

Missing Cases = 11 OR 0.6 PCT.

Other socio-economic indicators yet to be pursued in statistical analysis include operating farm size (as opposed to the size of land owned that has been used for these examples), monthly household expenditure and income, occupation, education and household assets aside from land. And there are other indices as well, such as landholdings in the various F-levels, which might be expected to correspond with differences in views about flood response interventions.

What remains to be seen is whether differences within villages or those between villages will be more salient as the FAP-14 study moves ahead. Also to be included here are gender differences, which are the subject of another part of the FAP-14 effort and which will be integrated into the picture that emerges from the household survey.

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Table 1 GEOGRAPHICAL MATCH-UP FOR SURVEY UPAZILAS		
Upazila (DISTRICT):	TERMS OF REFERENCE AREA	FAP REGION
Chirirbandar (Dinaipur)	Old Tista Drainage	NW
Singra (Natore)	Ganges L.B.	NW
Sarishabari (Jamapur)	Brahmaputra L.B.	NC
Dhunat (Bogra)	Brahmaputra R.B.	NW
Tangail (Tangail)	Brahmaputra L.B.	NC
Sunamganj (Sunamganj)	Surma and Mahasingh	NE
Nasirnagar (Brahmanbaria)	Meghna L. B.	SE
Brahmanbaria (Brahmanbaria)	Meghna L. B.	SE
Matlab (Chandpur)	Meghna L. B.	SE
Bhedarganj (Shariatpur)	Padma/Meghna R.B.	SC
Madhukhali (Faridpur)	Ganges/Padma R.B.	SW
Satkhira (Satkhira)	Old Ganges floodplain	SW
ADDITIONAL Upazilas:		
Sreenagar (Munshiganj)	Dhaleshwari floodplain	NC
Char Bhadrashan (Faridpur)	Active Padma floodplain	SC
Bhuapur (Tangail)	Active Jamuna floodplain	NC

Table-2

## Flood Preparation and response : an overall view

Descriptions of Measures =====	% of Households			
	Normal Inundation =====	Average Flood =====	Severe Flood =====	Did not do =====
MEASURES TAKEN FOR PREPARATION BEFORE FLOODS:				
Make barrier of water hyacinth:	6.16	13.28	17.60	81.59
Make barrier of soil:	6.16	9.72	11.12	86.07
Reinforce walls:	38.12	40.39	38.28	49.78
Reinforce corners:	36.93	38.88	37.42	51.57
Reinforce roof:	36.88	37.63	34.88	54.43
Store fodder:	15.93	19.49	21.76	76.67
Raising Stores of fodder:	5.08	9.83	15.17	83.69
Storing food:	13.23	21.11	22.03	76.13
Raising stores of food:	2.38	7.07	12.37	86.12
Store water:	1.62	6.05	11.39	88.07
Prepare Boat:	3.35	4.00	4.91	94.11
Sell fish from pond:	1.19	3.08	3.19	96.54
Check pond fish from escaping:	1.35	4.05	4.32	95.36
Sell stored food for want of secure storage:	3.19	7.40	8.96	90.93
Buy and store household items:	5.72	14.96	17.01	81.91
Store fuel:	49.14	59.07	57.94	35.58
Raise the floor of the house:	7.99	8.42	8.69	88.12
Prepare a platform:	2.54	8.69	22.25	76.46
MEASURES TAKEN DURING FLOODS:				
Harvesting crops before maturity:	2.11	16.31	22.57	75.32
Entire family leaves for some time:	0.27	5.72	30.51	69.38
Only some of the family leaves for some time:	0.38	4.37	11.29	88.39
Head of household/someone remain house for security:	5.51	8.15	16.09	83.59
Build a wacha:	2.11	18.30	48.70	49.19
Take shelter on a boat:	0.11	1.08	4.10	95.79
Move stored grain to safe place:	2.92	12.47	25.81	73.43
Redrying stored grain soaked by rainwater:	31.21	37.37	42.87	54.59
Use stored pure water:	10.10	17.28	23.87	74.08
Use water brought from distant places:	19.98	27.59	42.12	54.86
Move entire house:	0.05	0.27	2.43	97.57
Move cattle:	0.76	6.91	24.24	75.76
Buying fodder:	7.99	11.88	15.66	83.26
Fish for home consumption	49.57	46.27	31.86	47.57
Fish for selling:	9.29	9.23	6.10	89.52
Arrange to sell pond fish:	1.35	3.40	3.56	96.00
Check pond fish from escaping:	1.40	4.37	5.24	94.38
Sell stored food for want of storage facilities:	3.51	7.61	9.40	90.17
Buy and store household items:	7.18	16.36	18.30	80.02
Store fuel:	43.47	54.97	55.08	39.04
Sell perishable fruits and vegetables:	4.97	00.00	10.37	89.52
Engage in temporary profession:	4.27	6.59	4.97	91.79

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Table-3

Important Measures of Flood Preparation and Response: an overall view

Descriptions of Measures	% of Households			
	Normal Inundation	Average Flood	Severe Flood	Did not do
=====				
MEASURES TAKEN FOR PREPARATION BEFORE FLOODS:				
Reinforce walls:	38.12	40.39	38.28	49.78
Reinforce corners:	36.93	38.88	37.42	51.57
Reinforce roof:	36.88	37.63	34.88	54.43
Store fuel:	49.14	59.07	57.94	35.58
MEASURES TAKEN DURING FLOODS:				
Build a macha:	2.11	18.30	48.70	49.19
Redrying stored grain soaked by rainwater:	31.21	37.37	42.87	54.59
Use water brought from distant places:	19.98	27.59	42.12	54.86
Fish for home consumption:	49.57	46.27	31.86	47.57
Store fuel:	43.47	54.97	55.08	39.04

Table-4

Important Measures of Flood Preparation and Response : by Village  
% of Households

Descriptions of Measures	Normal Inundation	Average Flood	Severe Flood	Did not do
=====				
UNION : BHANDARBARI	CODE : 11	UPAZILA :DHUNAT	Village :BARAITALI	
MEASURES TAKEN FOR PREPARATION BEFORE FLOODS:				
Reinforce walls:	60.32	88.89	55.56	4.76
Reinforce corners:	61.90	92.06	53.97	3.17
Reinforce roof:	55.56	85.71	50.79	14.29
Store fuel:	68.25	90.48	77.78	6.35
MEASURES TAKEN DURING FLOODS:				
Build a macha:	0.00	58.73	57.14	23.81
Redrying stored grain soaked by rainwater:	23.81	44.44	38.10	53.97
Use water brought from distant places:	33.33	38.10	41.27	55.56
Fish for home consumption:	53.97	55.56	46.03	44.44
Store fuel:	52.38	85.71	79.37	14.29
=====				

UNION : CHOWKIBARI	CODE : 12	UPAZILA : DHUNAT	Village : PANCHTHUPI	
MEASURES TAKEN FOR PREPARATION BEFORE FLOODS:				
Reinforce walls:	18.09	17.02	17.02	81.91
Reinforce corners:	26.60	25.53	25.53	73.40
Reinforce roof:	19.15	18.09	18.09	80.85
Store fuel:	95.74	95.74	94.68	4.26
MEASURES TAKEN DURING FLOODS:				
Build a macha:	0.00	0.00	40.43	59.57
Redrying stored grain soaked by rainwater:	3.19	3.19	8.51	90.43
Use water brought from distant places:	5.32	5.32	25.53	73.40
Fish for home consumption:	35.11	35.11	31.91	63.83
Store fuel:	90.43	90.43	90.43	8.51



Table 5

## EVALUATION OF EMBANKMENT BETWEEN HOUSE AND FLOOD SOURCE BY VILLAGE

Union	Code	Village	Mean	Std dev	Cases
For Entire Population			1.8331	1.1649	1768
Dhunat	11	Boroitoli	1.6349	.8482	63
Dhunat	12	Panchtupi	1.0968	.2973	93
Tangail	21	Chhotobashlia	2.0532	1.1765	94
Tangail	22	Bororia	1.1084	.5634	83
Bhedarganj	31	Shibsen	1.1068	.3104	103
Bhedarganj	32	Shingala	1.0303	.1741	33
Shingra	41	Lalua & others	1.5965	.9975	57
Shingra	42	Pakisha	2.7361	1.4822	72
Madhukali	51	Kamaldia	1.2500	.5055	92
Madhukali	52	Rukuni	3.8219	.8873	73
Sunamganj	61	Maradpur	1.3400	.5724	100
Sunamganj	62	Fenibil	1.1220	.3313	41
Brahmanbaria	71	Budhal	1.4625	.7453	80
Brahmanbaria	72	Bhitidaudpur	2.3814	.7136	97
Sharishabari	81	Goalbathan	2.1724	.8195	58
Sharishabari	82	Shanakoir	1.9609	.5082	128
Nasirnagar	91	Rampur	1.0000	.0000	63
Nasirnagar	92	Chotipara	1.0000	.0000	1
Matlab	101	P Durgapur	3.2329	1.1963	73
Matlab	102	UtShankibhanga	2.0580	1.3920	69
Satkhira Sadar	111	Goalpota	1.3962	.4938	53
Satkhira Sadar	112	Bokchara	1.2243	.4191	107
Chirirbandar	121	Kismat	3.7529	1.4631	85
Chirirbandar	122	Auwliapukur	1.0000	.0000	50
Total Cases =		1852			
Missing Cases =		84 OR 4.5 PCT.			

## Briefing Notes Focus on Agriculture

### Production Practices

Crop production practices are guided by agro-ecological conditions, flood being one of the major factors in its determination. Agricultural practices are adjusted with flooding conditions including the time of its initiation, flow velocity, rate of rise, depth, duration, time of recession, and rate of fall.

#### Common Features

The survey questionnaire was specially designed to collect data for each plot of the farming household in respect of planting and harvesting of all crops grown in sequence on the plot during the year. Data on land type, area of plot, soil type, tenurial pattern, production and time of initiation and recession of flood water against each plot were collected.

With the overall number recorded being too large for convenient presentation, crops were grouped into 20 different crop types. It was observed that a total of 423 different cropping patterns were practiced by the farmers in the sample villages. The data then was compiled by land type for each village so that relevance of the adopted cropping pattern with flooding condition can be identified.

As expected, adjustment of cropping patterns with different flooding conditions appears to be common in all the sample villages. There are, however, village to village differences in respect of crop type and time of seeding depending on the time of initiation and recession of flood water. Villages with identical flooding conditions were picked for showing the dominant crop calendar against time of initiation and recession of flood water in different land types.

Multiple cropping appears to be common in high and medium-high land types in all the sample villages. This is due to the fact that flooding time and depth do not act as constraints. But there are variations in planting time under the influence of rainfall pattern, specially time of initiation of rains.

It is the medium low and low land types where flooding condition really dictates the crop combination and planting time. Adjustment of crop production on these land types shows clear dependency on flooding conditions.

#### Selected Site Characteristics

Flash floods engulf medium low and low land types in Muradpur village in Sunamgonj Upazila early in the pre-monsoon season and continue till the end of post-monsoon season. In order to adjust to such prolonged floods, farmers grow a single crop of local Boro in 95% of cultivatable area in the village.

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Farmers in Lalua village in Singra Upazila do not have problems of early flash floods. Flooding is initiated quite late in this village which enables farmers to grow high-yielding varieties of Boro rice in sequence with transplanted Deep Water Aman rice in 65% of cultivatable area in low land type.

Prolonged floods with late initiation in Shibsen village in Bhedorgonj Upazila have led to the growing of broadcast Aman and mixed Aus-Aman on 30% of the surveyed area in low-land plots. Next in importance is local Boro, grown in 28% of surveyed area in low-land plots.

A little delay in entry of flood water provides an opportunity for growing irrigated high yielding varieties (HYV) of Boro rice in 71% of the cultivable area in Bhitidaudpur village in Brahmanbaria Upazila. Transplanted deep-water rice is grown in sequence with HYV Boro rice in 7% of the area in the same village.

Double cropping is practiced in medium-low and low-land types where duration of flooding is short (i.e. initiation of flooding is late and recession of flood water is early). This condition prevails in Baraitali village in Dhunat Upazila where farmers are able to grow Kharif-1 season crops before flood water engulfs the area. The crop is harvested immediately before the initiation of floods. These lands remain fallow in the Kharif-2 season until the recession of flood water. Seedlings of local varieties of Aman rice are transplanted in receding floods.

A short flooding period appears to have enabled farmers to practice double cropping in low land type in Bararia village in Tangail Upazila. In this village, irrigation facilities are utilized by the sample farmers to grow HYV Boro rice in 22% of the area in low land type. Deep-Water rice seedlings are transplanted after harvesting the HYV of Boro rice in 12% of the area. Irrigated HYV Aus rice or rain-fed Jute followed by Rabi crops with a fallow period in the flood season are also practiced in this village.

#### Influence of Floods

It is apparent that flooding conditions influence cropping patterns in several ways. It is equally important that the farmer has to know all aspects of flooding in each of his plots in different land types so that investments made in crops are not damaged by floods. Precise knowledge about the depth and duration of flooding are very important for the farmer. Flood depth dictates the type and variety of crop that can be grown in the Kharif season. The duration of flood including its time of initiation and recession also are important factors.

The data indicate the importance of depth and duration of flooding. Reduced depths provide wider crop choice so that crops with higher yield potentials can be grown. The scope of multiple cropping is enhanced by shorter duration floods. A combination of these two are essential for achieving higher productivity per unit area.

### Farmer's Response

Damage to crops by flood is a regular phenomenon in Bangladesh. This happens in years when water level exceeds the normally expected height based on which farmers select the type and variety of crop. The magnitude of damage, thus suffered, differs with the severity of flood. It has been observed that the farmers in the sample villages try to make up such losses by taking suitable measures in the same or subsequent season. Resorting to such measures depends on the severity of crop loss and the set of conditions that guides the decision making process of the affected farmer.

A section of the questionnaire was designed to collect data on the severity of floods, extent of crop damages in different land types and actions taken to overcome such losses in the course of last five years. Data on the extent of loss and actions taken in a normal year (if there were crop damages), average flood year, and severe flood year were collected. Actions taken were open ended for the respondents for capturing all types of actions taken by the sample households. Appropriate coding was used for computer data entry and analysis.

Data on action taken for recovering from crop damaged by floods were collected from a total of 1,852 households. The respondent's answers to recover crop loss due to floods were grouped into the following 10 categories:

- 1 Increased Boro cultivation
- 2 Increased Wheat cultivation
- 3 Increased Rabi crop cultivation
- 4 Replanting of Aman seedlings
- 5 Replanting of Aus rice
- 6 Increased area under cultivation
- 7 Loan/Lease
- 8 Sale of property
- 9 Others
- 10 No action taken

The numbers of households reporting crop damages in a normal year, average flood year and severe flood year and actions taken by them for recovering crop losses are presented in Tables 1, 2 and 3 respectively.

There are variations in the action taken, to recover from crop damage by flood after the recession of flood water. Very few household reported replantation of Aman and Aus rice meaning that flood water receded after the latest time of planting these crops were over. Most of the actions were taken in the winter (Rabi) season.

Increased cultivation of HYV Boro rice is the most frequently adopted action. This corroborates the national crop statistics that shows 22 and 30% increase in HYV Boro rice after the floods of 1987 and 1988 respectively. Such increase in this crop area highlights the importance of irrigation in the dry season for making up the loss of crops in the flood season. Loan or lease, reported by a

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large number of households, are very closely linked with this action Increased cultivation of rabi crops including wheat was adopted by a large number of respondents. Worst of all actions taken is the sale of property, reported only in case of severe flooding.

Analysis of the data highlights the importance of creation of irrigation facilities and provision of credit that would help the farmers to recover crop damage from floods. It may be equally important to arrange for actions that would check flood damage to crops in the first place. This will save the investment already made by the farmer for raising a crop. Increased irrigation facilities would create scope for growing an additional crop in the winter season.

Table 1

CROP DAMAGE AND RECOVERY MEASURES  
Normal Year

Action Taken	Description of Action	High HH	%	Medium HH	%	Low HH	%	Total HH	% Action	% Total HH
1	BORO CULTIVATION	9	4737	13	5417	33	5893	55	5556	297
2	WHEAT CULTIVATION	3	1579	1	417	1	179	5	505	027
3	RABI CROP CULTIVATION	3	1579	5	2083	6	1071	14	1414	076
4	OTHERS	4	2105	5	2083	16	2857	25	2525	135
Total Action Taken		19	9500	24	9231	56	6087	99	10000	535
No Steps Taken		1	500	2	769	36	3913	39		211
		20	108	26	140	92	497	138		745
Range of crop damage reported by the respondents :		High Land Min Max		Medium Land Min Max		Low Land Min Max				
		500 10000		200 10000		200 10000				

Table 2

CROP DAMAGE AND RECOVERY MEASURES  
Average Flood Year

Action Taken	Description of Action	High HH	%	Medium HH	%	Low HH	%	Total HH	% Action	% Total HH
1	BORO CULTIVATION	33	2727	46	3108	155	3964	234	3545	1263
2	WHEAT CULTIVATION	9	744	10	676	11	281	30	455	162
3	RABI CROP CULTIVATION	37	3058	34	2297	31	793	102	1545	551
4	AMAN CULTIVATION	11	909	17	1149	8	205	36	545	194
5	INCREASE LAND UNDER CULTI	0	000	0	000	2	051	2	030	011
6	OTHERS	12	992	18	1216	70	1790	100	1515	540
7	LOAN AND LEASE	19	1570	23	1554	114	2916	156	2364	842
Total Action Taken		121	9680	148	9801	391	8650	660	10000	3564
No Steps Taken		4	320	3	199	61	1350	68		367
		125	675	151	815	452	2441	728		3931
Range of crop damage reported by the respondents :		High Land Min Max		Medium Land Min Max		Low Land Min Max				
		500 10000		500 10000		1000 10000				

Table 3

CROP DAMAGE AND RECOVERY MEASURES  
Severe Flood Year

Action Taken	Description of Action	High HH	%	Medium HH	%	Low HH	%	Total HH	% Action	% Total HH
1	BORO CULTIVATION	71	3213	59	2731	156	3653	286	3310	1544
2	SALE OF PROPERTY	14	633	7	324	12	281	33	382	178
3	WHEAT CULTIVATION	55	2489	41	1898	59	1382	155	1794	837
4	RABI CULTIVATION	15	679	27	1250	7	164	49	567	265
5	AMAN CULTIVATION	0	000	0	000	1	023	1	012	005
6	AUS CULTIVATION	1	045	0	000	5	117	6	069	032
7	INCREASE ARE UNDER CULTIV	39	1765	54	2500	131	3068	224	2593	1210
8	OTHERS	12	543	10	463	24	562	46	532	248
9	SALE OF PROPERTY	14	633	18	833	32	749	64	741	346
Total Action Taken		221	9693	216	9908	427	8307	864	10000	4665
No Steps Taken		7	307	2	092	87	1693	96		518
		228	1231	218	1177	514	2775	960		5184
Range of crop damage reported by the respondents :		High Land Min Max		Medium Land Min Max		Low Land Min Max				
		1000 10000		1000 10000		500 10000				

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Briefing Notes  
Focus on Institutions

Flood Response Study

Survey Objective

In Bangladesh, a household in a flood-prone area is largely left to its own resources in coping with flood-related problems, institutions at various levels have provided occasional support to those facing calamity. Relevant institutions here include the neighborhood, Union Parishad (UP), Upazila Parishad (UZP), certain district level offices, nongovernmental organizations (NGOs) and local groups. The objective of the FAP-14 institutional survey has been first to take an account of the flood response measures taken by these different institutions and also to find out what flood affected people want in the way of flood response measures from these agencies. The survey focused on preparatory measures, measures to cope with ongoing floods, and measures to rehabilitate flood-affected people once the flood water recedes.

Methodology

The survey began with the 24 villages selected for the household survey, but then branched out to cover some 41 additional villages with their attendant unions for a total of 65. A number of criteria were employed in selecting the newer villages, so as to maximize total sample diversity.

One Institutional Surveyor (IS) was deployed in each upazila to gather information at the various institutional levels, working in close collaboration with the rest of the FAP-14 field team. Each IS took extensive field notes on the basis of which narratives were prepared on the themes and issues that emerged during the course of the FAP-14 work. The geographical coverage of the survey at each institutional level has been as follows:

<u>Institutional Level</u>	<u>Geographical Coverage</u>
Neighborhood	65 villages
Union Parishad	61 Unions
Upazila Parishad	12 Upazilas
District Offices	11 Districts
NGOs	65 Villages
Local Groups	65 Villages

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Out of the 41 extra villages, 11 were selected to cover waterlogging problem, 8 to represent varying degrees of accessibility to upazila headquarter, 6 to reflect problems of erosion, 5 to cover diversity in occupational structure, etc.

## Findings

In presenting the findings the results obtained for the original survey villages have been reported separately from the rest of the villages. One of the 24 household survey villages, Kismat in Chirirbandar upazila, being virtually flood free, has been omitted from this workshop presentation, thereby making the total number of these original villages 23 and for the expanded sample 64. Because the expanded sample villages were picked for reasons different from those dictating the original selection, it should be expected that the patterns uncovered in the FAP-14 analysis should be different in the two groups as well.

### Neighborhood level

The neighborhood was chosen as the first level for institutional focus beyond the household on the thought that this would be the first social structure to which a family would turn for help in time of flood. As it turned out, neighborhoods in the FAP-14 sample took few flood response measures, particularly before and after floods. The most common preparatory measure was earthen road or bamboo bridge construction and repair (17 of the 64 villages) and flood warning (14 villages). During floods, shelter provision was the most common measure (27 villages), followed by drinking water provision (24), and the most popular post-flood measures focused on road repair (14 villages). The desire for neighborhood level measures has been somewhat more ambitious, as can be seen in Table 1, which shows the measures wanted during floods at this level. Half the total villages (32 of 64) wanted measures for reducing crop/cattle/fish losses, but for providing shelter, the 29 shown in the Table are only 2 more than the 27 observed already making such efforts just above.

### Union Parishad

Given that the Union Parishad (UP) represents the lowest tier of elected government structure in Bangladesh, has been in place in its present form longer than any other governmental unit and is visualized by the Bangladesh Government as the focal point for local development efforts, it is not surprising that villagers have many expectations from their UPs. FAP-14's institutional survey concentrated considerable effort on determining what has been practiced and what people want at UP level in the way of flood response activity.

Some flood-related work came to light in connection with the Food for Work (FFW) program, as might be expected from this ubiquitous enterprise so focused on small-scale earth moving efforts. But such work was in fact rather limited. Some 15 of the 61 unions had taken up building small-scale embankments, 18 had re-excavated canals and 9 had constructed shelters. Aside from this FFW effort, the UPs themselves had not taken up any pre-flood activity of consequence that the surveyors picked up in their enquiries. During floods there was considerable activity in distributing food and clothing (56 unions), much less in other spheres with only 14 providing shelter, 11 medicines and 10 drinking water. In the post flood phase, 18 unions offering medical assistance (health camps, ORT distribution, etc.) was the highest number doing anything to help people recover

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from inundation.

Coming to the measures desired by people from their UPs as flood preparations, it is interesting to note that in more than half (34 of the 61) the unions people wanted FFW canal reexcavation schemes. From the UP itself, the most popular measure desired was flood warning at 29, followed by homestead protection with 21 and agricultural protection measures at 19. As in the case of the neighborhood level, the desire from the UP has been most extensive during flood. The relevant data are presented in Table 2, which shows relief distribution the most popular activity, far ahead of the others. Interestingly, though almost all unions both experienced relief distribution (56 unions as mentioned above) and wanted it (52 in Table 2), other measures were much more desired than available. Some 33 unions wanted shelter, but only 14 had actually provided it, while the comparable figures for medicines were 28 and 11, for drinking water 26 and 10, etc. Service delivery, in short, appears to be what is thought most in need at the union level. Most of the measures desired are not hugely expensive, but the UPs will need increased resources and capacity to organize and train people if they are to provide what is needed.

#### Upazila Parishad

In the local government structure of Bangladesh the Upazila Parishad (UZP) has been quite prominent over the past few years in terms of manpower, resources and sectoral coverage. Its future is in some doubt at the present juncture, but it should be safe to say that upazilas or some similar structure at what used to be the thana level will have to shoulder a serious share of any concerted effort to improve flood response. As such the UZP warrants serious examination in the FAP-14 context.

The different offices within the UZP including the Engineer's Office, Project Implementation Office, Agriculture Office, Fisheries Office and the Livestock Office were found to take up only rather limited measures in responding to flood. However, there have been strong desires at village level that the UZPs take up measures before, during and after floods. Among flood preparatory measures the one most frequently desired measure has been flood warning systems (34 of the 64 villages). Altogether 28 villages expressed interest in upazila help for protecting crops and stored food, 25 in transportation and 23 in protecting homesteads. Table 3 shows quite a wide array of measures desired by villagers from their UZPs during floods. Medicine and health top the list with 44 villages, followed closely by relief at 43, then shelter at 35. As for post-flood measures, providing agricultural implements and inputs is seen as the most pressing need, expressed by 48 villages, followed by infrastructure repair (41), disease problems (40) and house reconstruction (35).

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It should be kept in mind that what is being discussed here is the presence or absence of flood response measure (or the desire for it), not the extent of intensity of the measure.

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The flood response activities of the UZP seems to have been quite limited. Although resource constraints have certainly put a limit to what UZPs have been able to do in this regard, it is also true that the development work priorities pursued by UZPs either through their Annual Upazila Development Program (AUDP) grants or through FFW have been quite distorted toward infrastructure and away from service provision. Besides, poor coordination between UZP and UPs has often been a stumbling block in delivering the few goods and services that UZPs have sought to provide to flood-affected households.

#### District offices

The flood response activities of the district administration have mainly centred around gathering information on flood intensity/damage and supply of rather limited relief goods on a piecemeal basis. There is little evidence of coordination with other district level offices like agriculture or fisheries, but on the contrary there have been a number of complaints about bureaucratic complications impeding quick delivery of services to affected people. Clearly more attention should be given to helping the district develop its capabilities in such areas as flood warning, setting up flood shelter units and arranging transportation of marooned people to safe shelters.

The Water Development Board (WDB) has been involved in constructing relatively large scale infrastructure like embankments, sluice gates and regulators in most of the districts. In certain cases the WDB has been found to take up preparatory measures like reconstructing breached portions of embankments, repairing sluice gates and regulators and excavating/reexcavating canals before monsoon for better drainage. People's evaluation of various flood control infrastructures built by the WDB has been incorporated in the household survey findings which should provide some necessary criteria in designing and implementing such projects in future.

Although the Local Government Engineering Bureau (LGEB) has no direct flood response role to play, it has been heavily involved in constructing and reconstructing bridges and culverts, which of course often have a sizeable impact on how flood water moves for good or ill. Its role in post-flood situations, when rural infrastructure is left badly damaged, should be coordinated with other agencies exercising similar recovery efforts, such as the WDB and the Roads and Highways Department. The flood response activities of the District Agriculture Office have mainly been rehabilitative in nature, though quite limited in scope. Its activities need to be better coordinated with those of the Bangladesh Rural Development Board (BRDB).

#### Nongovernmental Organizations

More than 20 Nongovernmental Organizations (NGOs) were found to be working in one or more of FAP-14's 65 villages surveyed, but they have been pursuing various kinds of poverty alleviation programs as their primary mission and have not generally been involved in many flood response activities. Still, many of them did respond to a flood situation by collecting food, clothing and medicine from

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various sources and distributing these among the affected people. These activities have been sporadic in nature and have mainly been triggered by miseries of households during severe floods like the ones occurring in 1987 and 1988. A few NGOs were found to take up post flood rehabilitative measures by supplying house construction material, repairing minor infrastructures, distributing agricultural inputs and supplying credit. These measures have been rather limited, however, when contrasted with demands.

Although they are not usually thought of as NGOs in the formal development sense, various local groups like sports clubs, youth societies, occupational groups, etc. have often taken up relief oriented measures when their areas have been hit with floods. In a good number of instances these groups have volunteered in rescuing marooned people and arranging some food and clothing for those distressed, in some cases working with UPs. Although these local groups under discussion have been formed with intentions quite different from responding to flood calamities, they seem to have the potential of providing a platform for organizing local initiatives in effective flood response.

#### Conclusion

For the most part, the institutional survey findings show a rather poor flood response from institutions at the various levels analyzed. At the same time, the survey also finds that the flood affected people desire a wide array of measures from these institutions. Some of these would be practicable with better planning and implementation than has been the case in the past, and should merit attention in the formulation of policy guidelines.

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Table 1

MEASURES DESIRED DURING FLOOD AT THE NEIGHBORHOOD LEVEL

Category of Measures During Flood	No. of Villages Desiring		
	Out of 23 original villages	Out of 41 extra villages	Out of the total 64 villages
Reducing Loss of Crops, Cattle and Fisheries	16	16	32
Shelter	15	14	29
Protecting Stored Foodgrains	13	15	28
Supplying Drinking Water	6	14	20
Supplying Fuel	8	10	18

Table 2

MEASURES DESIRED BY VILLAGERS FROM UNION PARISHAD DURING FLOOD

Category of Measures During Flood	Number of Unions in which People have Reported Desire		
	Out of 24 original unions	Out of 37 extra unions	Out of the total 61 unions
Distributing Relief Items (food & clothing)	20	32	52
Providing Flood Shelter	17	16	33
Supplying Medicine	15	13	28
Reducing Loss of Crops, Cattle & Fisheries Resources	13	13	26
Supplying Drinking Water	15	11	26
Protecting Stored Food Items	15	8	23
Marketing Services	16	6	22
Supplying Fuel	12	5	17



Table 3

## MEASURES DESIRED BY VILLAGERS FROM UPAZILA PARISHAD DURING FLOOD

Category of Measures During Flood	Number of Villages in which People have Reported Desire		
	Out of 23 original villages	Out of 41 extra villages	Out of the total 64 villages
Supplying Medicine & Medicare Facilities	18	26	44
Distributing Relief Items (food & clothing)	18	25	43
Providing Flood Shelter	13	22	35
Supplying Drinking Water	12	18	30
Reducing Loss of Crops, Cattle & Fisheries Resources	12	17	29
Protecting Stored Food Items	11	11	22
Marketing Services	12	6	18
Supplying Fuel	7	0	7

## Briefing Note Focus on Gender Issues

### Flood Response Study

The Flood Action Plan is likely to have profound social and environmental impacts. Because flooding and its control can and will affect the lives of millions, the FAP's TORs include planning for local participation in decisions to alter the flow of water. This requirement places the FAP in the center of economic development and other social change processes including many functions beyond flood control or irrigation. Rather than simply building public works, those responsible will have to consider numerous complex features of Bangladeshi society as they move forward.

As several others have noted, the social and economic impacts of flooding and flood control alike are determined as much by socioeconomic or political factors as by floods. Different segments of society have different interests to promote or protect and different vulnerabilities. When planning to introduce change, especially with the mandate to include the affected public in decisions, it is essential to give close attention to local social and political factors if planned interventions are to be effective and negative results minimized.

### Relevance of Women's Concerns

Considering the wide range of social and economic challenges facing this country, why must the FAP include a focus on gender issues and "women in development" processes? Are women's interests sufficiently different from men's to justify working separately with them in developing local plans? Are males and females affected differently by flood conditions? The Phase 1 Flood Response Study (FAP14) was designed without a gender focus, but a shift to include one is clearly justified. There are some specific ways in which nearly all women are affected, and some general societal reasons for addressing them separately from men. Specifically, during a flood (a) their normal household responsibilities--fetching drinking water and fuel, cooking, maintaining family health, protecting children, and drying and storing seeds and food grains--are made extremely difficult and (b) they may be pregnant or giving birth and thus at special risk of health and life.

In addition, general features of Bangladeshi society make it imperative to address women's specific concerns when doing local planning. One is that the separation of women's and men's activities is so great that if the plan does not focus on both, it will lack important information on major aspects of the society. The sexual division of labor, though regionally variable, is rigid. Women and men have different relationships, different expertise; and their respective social and economic roles are tightly interdependent. One cannot do without the other, but one may know little about the other's sphere. Thus, a planner from elsewhere cannot be confident that reliable information about the sphere of one sex can be obtained from the other.

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It often is thought that the responsibilities of women are so greatly restricted to the privacy of the home that it is not necessary to include them in public planning processes, but this is a fallacy. As Abdullah and Zeidenstein demonstrated ten years ago, their public invisibility does not mean women are out of the economic mainstream. Women shoulder major responsibilities in the food-production process and other vital economic areas (Safilios-Rothschild and Mahmud 1989), responsibilities at least as important as those of the more visible men associated with them. For example, senior females typically select and germinate seed grains. "...Though they do not go to the fields and in many cases will never have seen the family land..., their knowledge of rice growing is likely to be quite extensive and they are often in a position as widows to supervise laborers and/or to advise their grown sons on proper management of the land." (Abdullah and Zeidenstein 1982:25) They tend to be fully responsible for care of family livestock, a vital asset to any farm household and are even involved in purchase decisions. Without their essential contribution, agriculture, fishing (Lily and Bhuiya 1989), crafts, and other industries would not go forward. As flooding affects these activities, women's points of view are necessary to a complete picture for the FAP.

Furthermore, it is important not to underestimate the increasing monetization of the rural economy and the significance of national and international markets in creating demand for women's employment. Increasing numbers of women--female household heads and others--are as much affected as men by fluctuations in the demand for wage labor, and their position is even more precarious than that of men (World Bank 1990; Adnan 1990). In local economies the increased use of mechanized rice processing has caused serious female unemployment problems. The work of several researchers demonstrates that women subject to these pressures are available for alternative employment, although there is insufficient demand for their services. As Chen and Ghuznavi found in a survey of the female Food For Work employees, many of whom are unmarried, "They will work anywhere," to avoid the ever-present danger of being reduced to beggary or prostitution (1977). As Sen and others have demonstrated, laboring families experience regular food shortages after floods--sometimes approaching famine conditions--not because of absolute unavailability of foods, but because of declines in employment. For women, who typically eat after men and less than men, this means that they are especially at risk of malnutrition and other health problems if they are poor. (Sen 1981 and Lindenbaum 1986.)

These considerations may lead some women, if asked, to favor construction projects which would afford them short-term gains but may or may not be of long-term benefit. It is important that planners remain aware of such considerations.

Because of the patriarchal character of the society, women's options are more limited than men's in every sphere of life. Defining patriarchy as "a set of social relations with a material base that enables men to dominate women," Cain, Khanam, and Nahar (1979:406) found a system in which, power and resources were distributed within families in such a way that "women are powerless and dependent on men. The material base of patriarchy" is "men's control of property, income, and women's labor" by aspects of the kinship and political systems and religion."

Lest we assume that this system benefits women, Marty Chen (1991) has forcefully argued that, "... The evidence suggests that increasing numbers of women receive

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little, if any, social security from traditional family structures and must act independently in order to provide for their families." These generalizations of course need refined application and understanding in terms of different socioeconomic groups, but patriarchy does cross-cut social class, creating insecurity for many who perform their traditionally secluded role.

In planning "local participation" strategies, such considerations must be kept in mind. The patriarchal nature of the society is largely responsible for low rates of political participation. In trying to activate and involve women, it will be necessary to overcome the predominant pattern of minimal or token involvement of women in politics compared to other south Asian countries (Jahan 1982 and Qadir and Islam 1987). The situation is not hopeless, however, as there are many situations in which women have come forward to assert their rights with or without the support of NGOs. (Adnan 1991; and personal communications from Nijera Kori and Usha executive directors). It will be incumbent upon planners to find ways to allow women to make a meaningful contribution to local decision-making despite their political inexperience and other constraints.

A final reason for devoting special attention to women is their responsibility for children's welfare which cannot be separated from that of their mothers (Adnan 1991).

#### Factors Affecting Women's Status

For involving women in any planning or service program, there are several social needs and differences which must be kept in mind, as they will profoundly influence women's point of view.

##### Life Cycle--Normal

Women of different ages and marital or childbearing statuses will have different degrees of security and standing in family hierarchies and different options open to them. Girls before puberty have relative freedom of movement. Married women have more responsibility and more constraints on their movements, at least in their husbands' villages, until they are in their mid- to late-40s. Some reports on polygynous families indicate that co-wives may receive unequal support. Widows may not have a strong position in their families, depending on the quality of their relationships with their sons and economic pressures on their families.

Practical implications of such differences include access to public spaces such as markets or village meetings. Special arrangements thus have to be made to include mature, non-elderly women in planning activities.

##### Life Cycle--Deviant

Some women are abandoned or divorced by their husband without adequate material or social support. Their connection to natal families or others from whom they seek assistance may be strong or weak, depending on the capacity or willingness of these others to help them. Some may be very young and have small children.

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The changing dowry system is not always working to women's advantage, and despite large family investments having been made in their marriages, some are abandoned by men who do not honor financial commitments. Claims on marital family assets are variable, though many households are furnished largely from dowry and associated payments or gifts. (Lindenbaum 1981)

Crises such as rape can disenfranchise women from their families and communities.

### Regional Factors

Although Bangladesh is not a large country, there is sufficient diversity to require consideration of: differences between ethnic and religious groups; strength or weakness of corporate patrilineages; economic factors; and the nature of local political life. The overall profile of a region--especially whether it is rural or urban, its transportation systems, and its available health, educational and other public resources--profoundly affects women of all socioeconomic classes.

### Socioeconomic Class Variation

Social class, defined as degree of access to economic and political resources and social prestige, is no doubt the major determinant of the degree to which a family (with its women) is affected by flooding or other crises. Women's needs in relation to flood preparation, survival, and relief are very much affected by their social and economic status and that of their families. Key factors that may differ according to class are: flexibility in economic options; child labor; marriage customs; educational levels; health status; marital relationships and tolerance of family violence; and general economic or social resiliency enabling women to survive floods or other household crises.

Research indicates that "under the pressure of increasing poverty, male normative [commitment] has eroded." (Cain *et al.* 1979:408) Thus the problem of reduced traditional supports mentioned above is likely to be most acute in poorer strata of society.

The problem here is "vulnerability"--a greater likelihood of suffering devastating loss--resulting from lack of adequate economic or political resources.

### Findings To Date

#### Survey Data

The initial household survey produced some important findings relating to gender issues. Some of these data are presented in Tables 1 - 2. The sex ratio (numbers of males per 100 females) is a commonly used index of female well-being. An earlier flood response study, Hossain *et al.* (1987), found in some flood prone areas that only 45.8% of the rural population surveyed was female, lower than the 1981 national average of 48.4%. In the FAP14 survey, however, the sex ratio was

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found to be at the 1990 national average. (Bangladesh Bureau of Statistics 1991:78). The dramatic differences in the sex ratios of different age groups are signals that female mortality at different ages needs further study, although this matter is beyond the scope of FAP14.

Literacy and education data show that over-all female education levels are increasing, with 21 percent of females aged 15-19 having completed education beyond Class VI and up to S.S.C., whereas only 12 percent of females age 20-24 and eight percent of females age 25-34 have this much education. As might be expected, however, literacy and education rates of females of every age group lag behind those of males. Sixty percent of females over age five are illiterate, compared to 44% of males.

Within the twelve upazilas surveyed four percent (n=71) of all sample households were headed by females. Table 2 presents demographic data on these households as compared to all households surveyed. Noteworthy are data on average income which show that female-headed households have a mean monthly income (taka 1310) only one-fifth that of the population as a whole (taka 6685). Though the proportions of landless are roughly similar to the population as a whole, none of the female-headed households have large landholdings (i.e., over 7.5 acres), although some others do. Further, female-headed households do not seem to use rented land to augment their own cultivated holdings, although numerous others do.

#### Case Studies

The study also included some reports on specific women's experiences with floods. These will be presented in the final project report. They are anecdotal and do not reflect participant observation, but they suggest that women may be expected to continue with their normal work during floods despite extreme hardship. These reports have health implications also, indicating that women feel increased danger from snakes, or danger to young children in their care, or danger from pregnancy complications or giving birth. They also show that women and their families can be very resourceful in coping with problems associated with floods.

#### Phase 2 Study Plan

The next phase of the Flood Response Study includes a survey of female-headed households and wives of household heads to gain more in-depth information on women's social and economic resources and other factors affecting their capacity to survive floods and participate in local planning activities.

#### Involving Women in the Flood Action Plan: A Checklist

Suggested methods to involve women in research and planning are as follow:

1. Utilize female workers whenever possible, to minimize problems of reaching women.



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2. Introduce parallel efforts for men to support and reinforce those addressing women of any area or group.
  3. Seek information from women of diverse socioeconomic classes and ethnic groups, and address any services equally to all. Do not rely exclusively on local elites or leaders to reach others.
  4. Try to avoid stereotypes about ethnic groups, universality of stable marriage, *purda* restrictions, or attitudes of either males or females toward innovative changes. Ask people what they think, assuming as little as possible beforehand.
  5. In analyzing women's "work," (a) avoid limiting this to paid employment, and (b) include areas where women have important responsibilities, even if they do not do the work themselves. For example, they may be active agriculturalists or traders without going out into public areas.
  6. Understand the pervasiveness of physical, economic, and political disadvantages facing most women as compared to men, and accomodate to their special needs in designing programs to serve them.
  7. Explore areas of interest and talent, and seek information on existing areas in which enterprise and resourcefulness (in work or business, for example) exist. Ask about the perceived "costs" (social or economic) and "benefits" of various social and economic strategies pursued by women.
  8. Do not assume that men know about women's world or women's work, or women, about men's. Meet both and stay open to new information.

Table 1  
SURVEY SAMPLE POPULATION BY AGE AND SEX

<u>Age</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Sex Ratio</u> <u>(No. Males per</u> <u>100 Females)</u>
0-9	3144	1543	1601	96
10-19	2210	1166	1044	112
20-29	1744	829	915	91
30-39	1297	732	565	129
40-49	818	436	382	114
50-59	526	276	250	110
60-69	366	186	180	103
70-79	167	109	58	188
80-89	45	28	17	165
90+	12	7	5	140
Totals:	10329	5312	5017	106
Percentages:	100	51	49	

Table 2

DEMOGRAPHIC COMPARISON OF FEMALE-HEADED HOUSEHOLDS TO ALL HOUSEHOLDS  
SURVEYED (FULL SURVEY OR SAMPLE)

	All Households (Percentage)	Female-Headed (Percentage)
Number in Full Survey/Sample	N=6685(100.0)/ N=1852	n=71(4.0)
Mean Age of Household Head, Sample	42.43	44.5
Mean Educational Status * of Households Head, Sample	1.95*	1.25*
Mean Size of Household	5.6	3.3
Mean Monthly Income, Full Survey	Taka 6685	Taka 1310
Income Range	Taka 0 to 62000	Taka 100 to 8000
Land Ownership, Sample Mean Size	.75 acres	.61 acres
Range**	0 to 3**	0 to 2**
Small	798(43.1)	31(43.7)
Medium	211(11.4)	6(8.5)
Large	54(2.9)	0
Landless	789(42.6)	34(47.9)
Farm Size(Owned/Rented), Sample Mean Size	.65 acres	.41 acres
Range **	-3 to 3**	-2 to 2**
Small (Own/Rent)	881(47.5)	32(45.1)
Medium(Own/Rent)	245(13.2)	4(5.6)
Large(Own/Rent)	46(2.5)	0
Landless	680(36.7)	35(49.3)

\* Education Codes: 1-Illiterate, 2-Literate without formal education,  
3-Up to Class-V, 4-Class VI-S.S.C., 5-Completed H.S.C., 6-B.A. or equivalent and above.  
\*\* Land or Farm Codes: 1(Small/  $\leq 2.49$  acres), 2(Medium/2.5-7.49 acres),  
3(Large/7.5+ acres). Negative numbers indicate land leased out. Landless may own homestead but  
own/farm no agricultural land.

## Briefing Notes Analysis And Interpretation

### Flood Response Study

#### Scope

The FAP-14 study is essentially asking two questions of the data universe that it has assembled: What do rural people do in response to floods; and what do they think institutions at various levels should be doing to support them in coping with floods? Analysis of these questions will then lead to recommendations for possible future institutional flood response initiatives and to guidelines for other FAP studies to employ in their work as they develop their own analyses and recommendations.

#### Status

In its efforts thus far, the Study Team has gathered an impressive collection of data on flood response. Some 1,852 rural householder, in 24 villages, have been interviewed at great length using detailed questionnaires comprising more than 800 items ranging from education of household members to flood-caused crop damage for specific plots of land during the different cropping seasons. FAP14's institutional survey, conducted along with the household survey, covered local institutional responses to floods in these 24 areas and included an additional 41 villages for a total of 65 localities overall. At the present time, data entry is in progress of FAP14's expanded sample of six additional villages and its gender issues component.

#### Analysis

Analysis of the FAP14 data has been ongoing since the surveys were completed, but a complete interpretation of findings will take some further time. Still, considerable analysis has been completed, and it is possible to draw a good picture of where the interpretation is heading. The present short essay is intended to give just such a picture. The focus here is on one of FAP14's nine household survey sections, the institutional schedule, and within that, it concentrates on respondents' evaluations of various institutional flood response measures. Included are measures that people would like to see implemented but which require organizational and material resources beyond those that the household itself can provide, thus necessitating some degree of institutional intervention (which in turn can range in level from the neighborhood to national-level agencies like the Bangladesh Water Development Board). The analysis and interpretation given here will be illustrative of what will be forthcoming from the efforts to be completed during the remaining duration of the FAP14 study.

The first task in analyzing these data has been to search for patterns in flood response that will enable the Study Team to determine that x kinds of people respond to floods in y ways and desire z improvements in their abilities to deal

with flood-related problems. In this brief note, the focus will be on the  $x$  and the  $z$ , looking at who wants what in terms of flood response measures. The 24 villages surveyed can be grouped in a number of ways, but two have thus far proven to be most useful in the FAP14 study--level of flood protection and recent flood experience. Survey villages can be considered to enjoy three levels of protection from floods:

1. "Fully protected" villages have embankments or other structures that should prevent all floods, but may occasionally get flooded because of breaches, design faults, maintenance problems with drainage or the like;
2. "Partially protected" villages have some infrastructural flood protection but are not completely protected and thus do suffer from flooding depending on circumstances; and
3. "Unprotected" villages have no infrastructural protection at all.<sup>4</sup>

#### Interpretation

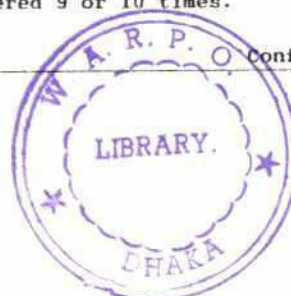
#### Findings

But level of flood protection is by no means a perfect predictor of how often a village gets flooded. FAP14's fully protected villages suffered only during severe floods (mainly 1987 and 1988), but for the other two categories there was not a complete match between protection and experience, as is shown in Table 1. Here it can be seen that some "partly protected" villages suffered only in severe floods while others were affected more frequently.<sup>5</sup> In this briefing note the concentration will be on the flood protection typology, but at the workshop flood experience will be introduced as well.

What is the relationship between the degree of flood protection people are presently afforded and what they value in the way of flood measures? Table 2 presents a number of findings in this regard for various infrastructural and delivery measures. For each of the 11 measures shown in the table, respondents were asked for their evaluation of the specific flood measure on a 1-to-5 scale, in which 1 was "very helpful," 3 was "neutral" and 5 was "very harmful." Thus the lower the score the more positive the evaluation. In the table average (mean) scores are given for the household sample as a whole and for respondents in the three groups of villages classified by level of flood protection. In addition an F statistic is listed for an analysis of variance (ANOVA) computed

<sup>4</sup> These unprotected villages are thus vulnerable to flooding in all years. The FAP14 survey did include one unprotected village located on high ground and thus altogether flood-free (Kismat village in Chirirbindir Upazila of Dinajpur District). This village is understandably different in its response to flood issues from the 23 others, all of which have suffered from floods at least occasionally, and accordingly it is omitted from the analysis in this workshop note.

<sup>5</sup> "Frequent flooding" in this classification means more than twice (i.e., the two severe floods) but less than every year. For the entire expanded village sample of 65 villages, those in the "frequent floods" category endured 3 to 7 floods during the 1980-1990 period, while those in the "yearly floods" class suffered 9 or 10 times.



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for the three groups.<sup>6</sup>

A number of interesting findings are shown by Table 2. First, while there is definite enthusiasm for all the flood measures shown, some are valued more highly than others. Embankments rated well, for example, but high ground for taking refuge in extreme flood conditions ranked even more favorably (overall sample mean = 1.30, vs. a mean of 1.77 to 1.87 for the three kinds of embankments). The inference would be that people are concerned about protecting their households and crops, but they are even more eager for a dry place for their families to go in very severe floods.

Secondly, evaluations differ considerably according to level of flood protection. Those who presently have no flood protection (Table 1) value an embankment between their dwellings and the major source of flooding more highly (mean = 1.55) than those now having full (mean = 1.75) or partial (mean = 1.98) protection. The difference may imply a certain dubiousness about the efficacy of embankments from those who are only partly protected by them. Effective, quick drainage, on the other hand, is highly valued by those with full flood protection (mean = 1.23) but less so by those with no protection (mean = 1.60). People who already enjoy protection, in other words, appear to then go on to worry about other things like more-effective drainage of their fields.

Third, differences among flood protection groups is much greater for some flood response measures than for others. All three groups were essentially alike in their positive assessment of flood warning systems, for instance, a similarity that is reflected in the rather low F listing ( $F = 2.8$ , statistically significant at the 6 percent level).<sup>7</sup> The same is true for community grain drying facilities ( $F = 2.0$ , significant only at the 14% level). In other words, people generally have a middling level of enthusiasm for grain drying (about halfway between the "very helpful" 1 and the "neutral" 3 answers), irrespective of the flood protection they enjoy. And they have a slightly warmer but still uniform interest in storm warning systems (with means ranging around 1.62-1.69).

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<sup>6</sup> The n and mean for the "entire sample" in Table 1 reflects respondents in all 24 villages (sample size is always less than the grand total of 1852 because of non-answers to specific questionnaire items). The ANOVA exercise was performed only for the three groups shown in the table, however; respondents in the flood-free village were omitted, because their evaluations differed so greatly from those of people living in villages actually affected by floods.

<sup>7</sup> Interpreting the F statistic here is relatively simple. The lower the F value shown in any of the lines of Table 2, the less the chance that there is any real difference between the three groups being compared, with respect to the particular flood measure being considered. The real value of F in the present context, however, is somewhat different. Here it gives a good indication of how much difference there is between the groups. Thus there is a great deal more difference between how the three groups evaluate submersible embankments ( $F = 117.1$  in the table) than there is when it comes to assessing the worth of metalled roads ( $F = 3.6$ ). To put it another way, all respondents tend to agree about the value of metalled roads, regardless of the level of flood protection, whereas there is great disagreement about submersible embankments between people when they are divided into groups in the basis of flood protection.

For submersible embankments, on the other hand, there are wide differences among the three groups. Those who have full flood protection have only a mild interest in them (mean = 2.21), most likely because they feel that such devices could not help them much beyond the present facilities but those with no protection see submersible embankments much more favorably (mean = 1.53), presumably thinking that there would be an improvement over their present vulnerability. Because of these group differences, the F statistic is very high indeed ( $F = 117.1$ , significant even at the 00.01 percent level).

The institutional survey also elicited information on what flood response measures people want, but did so in a rather different fashion through open-ended interviewing of a large informal sample of villagers from various strata, local notables, union and upazila level officials, etc. What emerged *inter alia* was a consensus picture of what was desired in more general terms. Table 3 illustrates the findings for just one response measure that people clearly desired--flood warning systems--and it portrays just one level, the union, to serve as an example. Here we see that for the original sample of 24 unions (reflecting the 24 FAP14 survey villages included within them), there is indeed some relationship between level of flood protection and desire for a flood warning system, as indicated by the gamma statistic of .794. When the expanded village sample is tested, the relationship is similar, if not as strong, with a gamma of .628. People at union level are more interested in flood warning systems in fully protected unions than in partly or un-protected unions.<sup>8</sup>

#### Remaining Work

A number of things remain to be done in the FAP14 study:

1. The remaining material from the initial survey round must be analyzed and interpreted. Much of this has been done, but a good deal more remains.
2. Data from the six additional study areas need to be taken up and integrated into the main study findings. Inclusion of these char areas may well affect FAP14's overall findings somewhat.
3. Data gathered in the gender issues study are yet to be analyzed.
4. The question of class remains to be dealt with--what are the relationships between family income level, farmholding size, or education and flood response; and how do they compare with results thus far?
5. Policy and guideline implications for other FAP efforts must be developed.

<sup>8</sup> The analysis here is at union rather than village level, so reference is to the degree of protection enjoyed by the union as a whole rather than to the particular FAP14 survey village within that union. Thus the difference in the marginal totals in Tables 1 and 3. The gamma statistic as used in two-way contingency tables like these is a convenient measure of association between the two things being analyzed. It ranges from 0 (no connection between them) and 1 or -1 (a complete connection between them, given the marginals). Thus for Table 3, we can say there is a somewhat stronger association between flood protection and interest in canal excavation for the original 24 village sample than is the case for the expanded sample.

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Table 1  
FLOOD PROTECTION AND FLOOD EXPERIENCE FOR 24 SAMPLE VILLAGES  
EXPERIENCE WITH FLOODS 1980-1990

Level of Protection	Never flooded	Severe floods only	Frequent floods	Yearly floods	Total
Flood Free		1			1
Fully protected		5			5
Partly protected		3	4		7
Not protected		4	5	2	11
	1	12	9	2	24

Gamma = .740

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Table 2

HOUSEHOLD EVALUATION OF INFRASTRUCTURAL AND SERVICE DELIVERY FLOOD  
RESPONSE MEASURES

Flood Measure	Entire Sample		Level of flood protection			ANOVA	
	n	mean	Full	Partial	None	F	Signif
<u>INFRASTRUCTURE</u>							
Embankment between house & flood	1768	1.83	1.75	1.98	1.55	24.6	<.0001
Embankment surrounding village	1838	1.77	1.79	1.87	1.47	25.7	<.0001
Submersible embankment	1841	1.87	2.21	1.96	1.53	117.1	<.0001
Public high ground for extreme flood	1848	1.30	1.13	1.18	1.40	48.3	<.0001
Quick drainage system	1848	1.45	1.23	1.45	1.60	57.2	<.0001
Metalled road	1849	1.09	1.12	1.12	1.07	3.6	<.03
<u>SERVICE DELIVERY</u>							
Storm warning system	1249	1.64	1.69	1.68	1.62	2.8	<.06
Breach warning system	1831	1.77	1.63	1.79	1.71	6.9	<.002
Domestic tubewell	1847	1.17	1.26	1.14	1.12	16.9	<.0001
Village grain storage facility	1847	1.86	1.75	1.88	1.85	4.9	<.008
Grain drying facility	1840	1.93	1.88	1.96	1.88	2.0	<.141
Total sample n	1852		455	527	784		
Villages n	24		5	7	11		

Note: FAP 14's one totally flood-free village is included in the "Entire sample" column but is not included in the three flood protection groups in the ANOVA statistics

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Table 3

DESIRE FOR CANAL EXCAVATION UNDER FOOD FOR WORK PROGRAM  
AT UNION LEVEL

ORIGINAL VILLAGE SAMPLE

	<u>Level of flood protection</u>			<u>Total</u>
	<u>Full</u>	<u>Partial</u>	<u>None</u>	
Yes	3	6	2	11
No	0	5	8	13
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Total	3	11	10	24

EXPANDED VILLAGE SAMPLE

Yes	7	20	8	35
No	0	13	14	27
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Total	7	33	22	62

Gamma for original village sample = .794

Gamma for expanded village sample = .637

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Briefing Notes  
Preliminary Guidelines

Flood Response Study

Objectives and Goals

Flood-Response Study

One major objective of the Study (FAP-14) is to provide guidelines for planning and design of FCD or FCDI projects and other rural-development programs or projects (interventions).

Guidelines

The guidelines should provide the bases for broad participation of all parties (*stakeholders*) affected by any prospective intervention to ensure its acceptance and effectiveness. Thus, they will provide a reference document to guide planners and stakeholders throughout the process from the initial surveys of perceived need, through the inventory of resources, scoping, plan formulation and evaluation, and onward to design, construction, and implementation stages.

The overall aim of the participation process is to achieve long-term sustainability of a development intervention by ensuring that local people are included in a "bottom-up" planning process in which they are fully involved in shaping their future, rather than being treated as objects of an *expert-directed*, top-down planning approach often applied in the past. People's participation should be an enabling and empowering process for effective, sustainable socio-economic development.

Specific objectives of the participation process should be to:

1. Give stakeholders a voice in the exploration and planning of regional needs;
2. Obtain relevant local knowledge, information, and ideas for the identification of resources, needs, problems and other matters;
3. Stimulate local interest and commitment to eventual development and management;
4. Ensure early detection of possible social conflicts so that they can be minimized through negotiation and education; and
5. Initiate and establish institutions and procedures needed to enable local people to participate in the construction and operation of any resulting facilities or services.

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## Concepts

Before any intervention has been seriously considered, the fundamental questions to be asked are (a) whether or not intervention is necessary and, (b) if so, what kind of measures (components from which to formulate a program, project, or combination) are likely to be effective. Then what is needed before the project-formulation phase, is to ensure responsiveness to felt needs, including the initiation of effective participation that can be continued onwards through planning and implementation. Projects that are planned and designed giving due attention to participation by stakeholders and that include the imparting of necessary technical knowledge are more likely to result in effective utilization and maintenance. 'Public cuts' and ad hoc modifications of structures thus, hopefully, can be eliminated. Public support also will result in earlier and more reliable fulfillment of operating goals.

The methodology used in this study, a two-pronged (household and institutional) flood-response survey-based field evaluation, can be applied, at reduced scale, by regional and project planners to develop a full understanding of stakeholders' needs and social response toward present hazards and future interventions. The Flood Response Study did not use a poverty line to assess needs or even to identify those in need. Instead it elicited people's own statements of their requirements and also sought the needs and priorities implicit in measures actually taken, leaving openings for respondents to add to, or comment on, the categories under which questions were asked.

## Methods

Planners should find the Flood Response Survey approach workable, albeit, for them, involving (a) less extensive surveys, to build on these findings, and (b) combined with more intensive inquiry for some issues, to tailor investigations to area or site conditions. The preliminary methods outlined below should be considered and appropriate elements drawn upon for a given application. Most of the nontechnical requirements for effective planning and identification of needs, resources, and problems can be met with these participatory methods.

To initiate participation and carry it through the evaluation at prefeasibility level for any intervention, the planning team should:

1. Identify and select all stakeholders likely to be affected by the intervention, both inside and outside the project area, with special attention to the rural poor, ethnic groups, minorities and women. Identify the leaders of such groups and, as necessary, assist others with group formation. Social groups may include, but not necessarily be limited to:
  - Laborers (e.g. agricultural, boatmen, manufacturing, rickshaw pullers)
  - Capture fishing households
  - Businessmen (boat operators, grain processors, rickshaw and shop

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- owners)
  - Petty traders
  - Traditional village artisans
  - Affected households (those whose land is acquired or erosion prone)
  - Farmers (marginal, small, medium and large).

2. Define the participation context which involves the:

- Degree to which each group is prepared to participate;
- Level of education and awareness required to help people participate;
- Best way to reach different social groups with respect to their specific location, neighborhood and level of organization.

3. Construct a *participation matrix* which lists the groups described above and links them to methods to be used at various stages of the planning process; and

4. Provide local groups with opportunities to review and comment on project plans.

### Prefeasibility Studies

The Flood-Response Study showed a number of priority areas like fast drainage, pure drinking water, health care and facilities, transport, fuel, credit, house-building materials and public high grounds for shelter. These are largely inter-related and should be explicitly examined by any regional-study team and rigorously evaluated as part of any prefeasibility study. In addition to directly-affected beneficiaries and those adversely impacted, participation should encompass local communities and the wider community of concerned government ministries, national and international NGO's, donor groups, and other interested parties.

Provisionally, it is proposed that the regional- or prefeasibility-level planning team undertake the following steps to elicit stakeholders', and even broader community's concerns to initiate the participation process:

1. Present the project proposal to stakeholders and elicit their input to define specific goals, planning and evaluation criteria, and overall schedule;
2. Discuss possible measures and project-formulation methods and identify how project components are likely to affect local land and water resources and livelihoods of those that depend on them; and
3. Define and return for stakeholders' approval the scope and schedule for planning and evaluation of potential interventions and related authorization.

## Feasibility-Level Planning

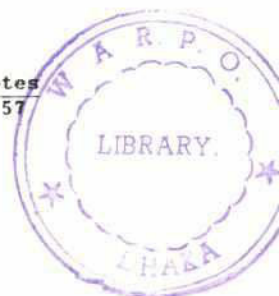
Planning must consider all involved physical parameters (e.g. flood source, timing, intensity, flow velocities, agricultural practices and potentials, and support infrastructure and service capabilities). Equally important for any regional planning effort, and crucial to project planning, is continuing effective participation. The planning team, thus, should:

1. Identify prospective measures, screen out those that have unacceptable features, and formulate alternative plans, including identification of acceptable mitigation or compensation plans, as well as possible project enhancements;
2. Prioritize alternative plans, using standards and criteria agreed in advance with local groups, including proposed mitigation and enhancement plans;
3. Present results to stakeholders, elicit feedback, and evaluate stakeholder's concerns regarding technical and social effects, as well as community proposals on project alternatives, mitigation, and enhancement. Re-examine planning criteria and standards to confirm that the right questions have been answered;
4. Integrate community recommendations into preliminary projects; and
5. Communicate the results of above actions to the stakeholders and involved decision makers with full explanations of why particular concerns may not be warranted or cannot be met.

## Other Considerations

There is much room for improved flood preparation and response at local levels, including village and union level. Effective measures might include a broad flood-proofing strategy that will meet many of the specific needs like quick drainage or safe drinking water, as stated earlier. Planners should consider pilot projects to serve as a model and nucleus for other types of flood-related or development-related activities at the local level, for example, providing public high ground (using a school compound or idgah where people will be able to take emergency shelter along with their cattle but near enough to their houses to provide necessary security to their other belongings that could not be moved). Such a facility could be easily managed by local groups and sustained out of local resources.

For flood proofing in agriculture, farmers' experience can be used as a guide. Similarly flood interventions should be evaluated against the normal and flood-response crop cycles. If there is little or no difference in the farmer's returns, as is quite possible in view of the historical data that shows bumper Boro crops following severe flood years, then there is no real benefit to be gained from the intervention.



ISPAN's agricultural data analysis shows that yields of some varieties depend substantially on timing of sowing and harvest. This means that any project must look carefully to interactions between changes in the water cycle and crop sowing and harvest time. These data indicate existence of a significant percentage of disadvantaged households (25% of the villages have more than 50% landless) . They become the most vulnerable group when flood strikes. Historically, limited work opportunities exist during flood time. This combined with lack of assets pushes them into real hardship. Any intervention to change the water regime brings additional work opportunities, during construction and perhaps with intensification of agriculture, but the long-term incremental gain to the land owners are disproportionately higher, widening the income gap that already exists.

Planners and policy makers should consider the problems of landlessness and unemployment, and perhaps, any future project should also list them as their potential beneficiaries.

Phase 2 studies have been designed to cover issues like gender, local-level planning and public participation, and the role of NGOs and local voluntary groups. These studies will include consultations, with the survey villagers interviewed during the Phase 1 survey, for systematic review and development of alternative ways to address their concerns. When those studies are complete, the flood response study should be able, in coordination with the Environmental Studies, to refine the above preliminary guidelines as well as to provide other guidance on development planning, which can help to form participatory bases for the development and implementation of effective projects through their final implementation.

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Briefing Note  
Prospective Pilot Projects

Preferred Plan of Actions

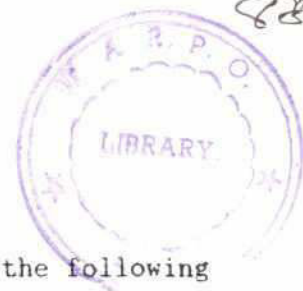
Prospects for Flood Proofing

The Study Team, drawing on input from participants in surveys, individual discussions, and workshops identified the nearly 40 flood-proofing measures listed in Table 6, presented at the end of this chapter.

The process of identification and elucidation of the measures also brought out the following findings and needs:

- Many of the measures identified are already practiced or applied by individuals, communities, private sector and Government agencies in different locations. These can, with education, motivation and support, be adopted as now practiced or with minimum modification, in most flood-affected locations.
- Considerable technical resources, including hydrologic, hydraulic and other flood-related data and information, already exist. However, appropriate institutional arrangements for their systematic and planned use requiring enhanced levels of commitment and cooperation among involved agencies, both public and private, are lacking.
- Assessment of flood hazards and identification of flood-proofing measures to cope successfully with these hazards are, barring some exceptions, not yet integrated with the project-development process. Hazard mitigation or avoidance should be considered during identification, formulation, design, implementation, monitoring and evaluation of any development project undertaken by the Government, individuals, or private entrepreneurs.
- There is now a heightened awareness among Government agencies, donors, local communities, private sector and individual householders of the needs and potential benefits of flood-proofing, and interest and willingness to adopt the same.
- Some of the identified Flood-Proofing measures can not be implemented individually on a stand-alone basis. Even those amenable to independent implementation will generate much higher benefits if undertaken in combination with other appropriate measures.
- Sustainable flood proofing programs at local levels must both (a) respond to real social needs and community demands, and (b) involve local Government bodies, concerned central Government agencies, beneficiaries and donor agencies in all phases of the program.

## Flood-Proofing Action Plan



In the foregoing context, the Flood Proofing Team has identified the following three broad areas to be addressed in a *Flood-Proofing Action Plan*:

1. Flood-Proofing of the infrastructural facilities and installations
2. Enhancement of the institutional capabilities and outreach for flood-risk data collection and dissemination.
3. Flood-Proofing of communities and households.

### Infrastructure

This group of measures calls for systematic flood impact assessment of any structure, installation, or other facility, either in the public or private sector, in a flood-prone area. Such assessment should be conducted by the property owner and cover either an existing, or any proposed, facility.

The first step of such a process will be to predict, in the light of historical experience, the level and duration of a flood of a predetermined return period, on the structure or system and to gage its ability to deliver planned services with minimum disruptions.

Second, the implementing agency should explore the potential of the facility to support damage-mitigation measures to deal with flood-induced human, social and economic problems and emergencies.

Third, the owner should examine costs and needs or benefits of service rendered by the facility as trade-offs for different levels of hazard reduction. Alternative modes to provide such services also should be considered (e.g. there will be little justification for investment of Tk. 10-crore to upgrade the main road if adequate service can be sustained during the flood-affected period by existing rail or boat operations).

Upon decisions about the level of protection, the owner can design or modify the affected facility to achieve the selected objectives. For an existing facility, this will necessitate retrofitting to conform to the flood-proofed design standards.

In time, all elements of infrastructure should be subject to such review, including housing, schools, hospitals, Government offices and other public buildings, roads and highways, utility services like water supply, telephone, and electric-power generation and other systems, and industrial estates. Where justified by such assessment, facilities should be upgraded.

In time, standing design criteria and codes for different flood-proof facilities will be developed and followed for all public investments aimed at creating or improving such facilities and systems. The information and procedures should be

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made available for use by private-sector interests as well. Proposals for development projects should be examined systematically to check compliance with such design requirements.

#### Data Collection and Dissemination

A large amount of hydrologic, hydraulic, and other flood-regime related data already exists. Considerable bodies of such data are also routinely generated by a number of Government agencies. Some of the data currently are used to provide information to the public on river levels at selected points and forecasts during flood periods.

The deficiencies of the current system are the following:

- The information provided is presented as river stage or elevation values at some 50 locations. Individual, villages, unions, upazilas or towns are not able to make meaningful judgements on their expected impacts or sound interpretation to plan mitigation measures.
- Much of the data remains in unprocessed form with different agencies of the Government without any institutional mechanism for its collation, analysis and dissemination.
- Such data either are not used or not available to public or private sector investors as an input for planning, design, or investment decisions on structures or facilities in flood-hazard locations.
- There exist both an inadequacy as well as lack of application of hazard data for preserving floodway capacity to ensure that new construction does not increase hazards for others.

In view of the above, there exists an urgent need for enhancement of institutional capabilities and access to data within the national and local Government agencies for collection, analysis, dissemination of data and information. Expanded use of data by enterprises and individuals exposed to flood hazards will enable them to adopt appropriate flood-proofing measures. The Risk Information Center along with Data Dissemination measures will be the first and most important initiative in this respect.

#### Flood-Proofed Community

Effective flood-proofing can benefit the broadest section the populace. Great benefits ultimately will emerge of from the promotion and development of flood-proofed communities and human settlements. The center piece of such a community in severely flood-affected localities will be Flood Refuges (Shelters) in combination with complementary individual measures.

Measures comprising the package best suited to a particular community will depend on the nature of the flood regimes, resource endowment, and level of and extent

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of community participation. The ultimate objective, for every flood-prone community in the country, should be to achieve a level of flood proofing that is consistent with standards and needs that have been determined by the affected public.

### Immediate Implementation Measures

Many of the flood-proofing objectives and targets described in earlier sections constitute long-term ideals calling for extensive and prolonged effort on educating and motivating public and private sector policy makers and managers on one hand, and individuals and communities on the other. Along with this, there will have to be institutional arrangements in place to initiate, plan, implement and sustain flood-proofing measures. By its very nature, it will be a medium to long term process.

However, some flood-proofing actions can and should be undertaken immediately, with implementation placed on "fast-start" basis. The Study Team has identified such preferred actions in the light of its own findings, interaction with different public and private sector bodies, and individuals and donors within the framework of the workshop and outside. These are:

- Risk Information Center
- Pilot Project for Model Flood-Proofed Community.

#### Risk Information Center

This is a project to provide risk information promptly and openly to all property owners and investors. It will be implemented in stages, with the first stage to be undertaken immediately.

The Center will combine Data Dissemination function along with its role as the collector, collator and repository of data and information. This may be implemented under Disaster Relief (FAP-11) and will have to be closely coordinated with the Flood Forecasting Study (FAP-10).

#### Model Flood-Proofed Community

This will be a pilot project implemented for several communities to demonstrate and evaluate an integrated-development approach to avoiding flood damage, disruption, and suffering by using flood-proofing measures.

Communities tentatively may be identified to represent different types of flood-regime and socio-economic conditions, with each community's package of flood-proofing measures selected by affected parties specifically for their hazards and the value they place on protection.

A pilot project, consisting of one or more communities can be initiated with the

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support of a donor or donors, like World Food Program, Rangpur-Dinajpur Rural Development Centre, or CARE, that have the capability and experience to execute such multifunctional interventions.

#### Other Opportunities

A number of rural development projects and programs, mostly donor funded, presently are under implementation. Others are in the planning or formulation stage. Components of these undertakings usually include development of infrastructure, training and motivation of target groups, and provision of credit. Urban slum-improvement normally have similar objective, but they are fewer and less extensive than many of the rural programs.

Some donors have expressed their strong interest either for supporting concepts like the Fast Start items or for incorporating individual flood-proofing measures in their development programs. Other donors, executing agencies, and NGOs may be persuaded to take similar steps.

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Briefing Note  
Further Research Needs

Flood Response Study

The following areas of additional research were identified by participants and Team Members during and after the August workshop. They were to be undertaken in parallel with continuing work on household and institutional surveys and to be considered part of efforts to develop guidelines and criteria for planning and policy decisions.

Research Program

NGO's.

A study will be made of present activity to identify needs they meet constraints that limit their action, and experience they have obtained with a view toward making recommendations for local institutional adjustments. These would either facilitate their activities or allow them to be taken over by GOB or locally-grounded organizations. For the short run, the study also could formulate recommendations to facilitate the activities of NGO's themselves, consistent with the general aim of enhancing indigenous response capabilities. Organized responses almost always are useful, sometimes essential, especially when disaster strikes. But since floods and other disasters are irregular and unpredictable, it is difficult to build and sustain an organization for this purpose alone. It probably is more effective to add a response capability to an organization formed for other purposes. Therefore, it should be worthwhile to return to some of the original villages to enquire more fully into what the organizations were, how they operated, and what might be done to improve such operations.

The first step will be to examine Phase 1 survey data and compile descriptions and evaluations. Then, enumerators and Senior Specialists will return to the villages to get more-specific explanations and to identify local people who were important in the activities but who may not have been in the earlier sample. Once a picture has been derived and evaluated of the local actions, further input will be elicited from the NGO's that were identified, to see their activities from their own point of view.

Most NGOs also carried out relief operations in the areas where they had been involved with some socio-economic upliftment efforts. In some cases, their relief support was limited to their own beneficiaries and in others relief efforts were more open. NGO's which took a role in disaster relief undoubtedly had valuable experience and can make useful recommendations concerning policies and procedures that would have made them more effective. These should be documented. In the long run, research should show how functions now exercised by NGO's can be more thoroughly institutionalized and localized. Recommendations on facilitating their activities should also have this in view as well.

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## Local Groups

Respondents in the household survey reported that local groups were involved in flood preparation and relief activity in 15 of the 24 villages surveyed. These were generally described as either "volunteers", "Juba Sangha", "Krishi", or "Islamic groups" etc.

The phase 2 study will return to see exactly who they were and what they did, with extended evaluations of their activity both from those in the villages where they served and from those in the villages where they are based. This village level enquiry will be accompanied by a search for regional or national support networks. Were they purely spontaneous? Did they follow some established custom or tradition? Or was there some national or international leadership?

The final aim, as with NGO's is to identify what will be needed to strengthen the capacity of such groups to do whatever it was that was considered useful.

## Water, Fuel and Related Needs

The household survey indicated that needs for storing and gathering water and fuel are much more commonly reported as flood related concerns than storing or obtaining food or fodder. Both are closely related to each other and to health; and since the fuel is mainly for cooking and the water for drinking, the burden of providing and using them falls mainly on women. Accordingly, it is essential to study women's burdens in the flood context generally, as well as to investigate health problems since these will affect children and it will be mainly up to women to identify them and find remedies.

The aim of this activity will be to recommend measures to improve the flood responses generally by facilitating the work that women in particular do, reducing their time and drudgery. Recommendations should include considerations of the time and effort that presently are spent on these activities, and recommendations should reflect critical consideration of how these efforts might be reduced. It seems likely that it will be possible to recommend actions that can be carried out on local initiative, at low cost.

The study will begin with a review of results in hand, then a return to the villages where action was taken to interview a sample of the households drawn proportionally from those that do and not report measures concerned with fuel and water. An extended questionnaire will be used to determine the kinds of water and fuel used, sources, costs, time involved in getting them, and the reasons for which they are got, all in the context of similar questions about other things which women do. Then the question should go on to how women are helped in all of this by others, men or women, and how they are organized for such help (family, neighborhood, friendships, etc.) The idea is to provide better water, fuel, food, sanitation, and so on by focussing on those whose work would be more affected by such changes or improvements.

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## Income Generation

The household returns do not indicate a general practice of taking a second occupation or leaving for work in the flood season, although it is reported for a few of the more deeply-flooded areas. In general, people in the flood season appear to stay in place and endure reduced work and incomes. After analysis to see the exact dimensions of the situation, the Study Teams expects to return to areas where the problem is clearest, document more fully the problem and the present constraints that shape it, explore possible alternatives, and again make recommendations for feasible improvements. This will center on a follow-up field study to inventory variations in economic activity through the year, and identify slack times and slack resources. It is very important, in this, that investigators do not get caught up in a false precision and try to plot anything like actual hours of work per day--in most rural settings the distinction between work and leisure (or non-work) is almost meaningless. We need to focus on the peoples' own conceptions of what is slack, when they could do more, and try to explain them.

The Study Team also should make an explicit effort to relate local activities to transport and communication facilities, including boats. An important preliminary exercise might be to use the computer to look at the frequencies of those who report the second occupation by villages, and see if the higher frequencies seem to correspond to longer inundation periods or more deeply-flooded areas. Data on average length of inundation can be obtained from the plot data base, but that will be a little more complicated. It would require averaging the flood start month and the flood end month for each village, and for each land level.

## Participation

Local-level planning and local-level involvement for flood preparation and protection measures received, in the household survey, the highest ratings. Included are any measures at local level, and all should have a substantial component of local involvement in planning and operation (e.g. roads, particularly roads which will not block drainage, designation and construction of public high ground for refuge, security, and possible infrastructure for improved water and fuel supplies). It also now is generally recognized that there should be greater local involvement by affected communities in planning and operation of larger projects, such as embankment or polder schemes.

The Study Team expects to return to the field to document the present constraints on local participation, information and implementation of desired programs, at the village and Union Parishad level.

From that starting point, the Team should make further studies as far up the system as is required, in order to develop, with people in the study areas, recommendations for ways to move effective decision making to a more local level while assuring public oversight and the necessary financial and technical support from above.

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### Other Prospects

Other research areas are (a) gender issues which has been initiated very recently and has been reported separately in the conference and (b) agricultural adjustments which awaits discussion and outcome of the agricultural focus of the household survey presented yesterday.



