BANGLADESH FLOOD ACTION PLAN

EVALUATION REPORT

FLOOD RESPONSE STUDY (FAP 14)

Prepared for

The Flood Plan Coordination Organization (FPCO)
of the
Ministry of Irrigation Water Development and Flood Control

Preliminary Draft, October 1991

Draft Final Report, December 1992

ISPAN
IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST
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AND THE NEAR EAST

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ACRONYMS

BARC	Bangladesh Agricultural Research Council
BSS	*Bittaheen Samabaya Samiti*
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
DAE	Department of Agricultural Extension
EIP	Early Implementation Project
FAP	Flood Action Plan
FFW	Food for Work
FPCO	Flood Plan Coordination Organization
IFDC	International Fertilizer Development Centre
IFPRI	International Food Policy and Research Institute
ISPAN	Irrigation Support Project for Asia and the Near East
KSS	*Krishak Samabaya Samiti*
LGEB	Local Government Engineering Bureau
MPO	Master Plan Organization
MBSS	*Mahila Bittaheen Samabaya Samiti*
NGO	Nongovernmental Organization
ORT	Oral Rehydration Therapy
PACT	Private Agencies Collaborating Together
SCF	Save the Children Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Chapter 1

INTRODUCTION

1.1 Background

The Terms of Reference (TOR) for Flood Action Plan (FAP) 14 provided for a phase I or Pilot Survey Report. That report was completed and submitted in September 1991. According to the TOR, an Evaluation Report was to be submitted to Flood Plan Coordination Organization (FPCO) following the Pilot Survey workshop in August 1991. The report evaluating the progress of the study up to and including the August workshop, called the Pilot Survey Report, was prepared and submitted to FPCO in September 1991. The purpose is to appraise the work completed to date so that an appropriate list of study topics can be identified for phase II of the study.

1.2 The August 1991 Workshop

The Workshop to review the survey and suggest priorities for the phase II study was held on 13 and 14 August 1991. It was not possible to circulate complete analysis of findings and a well digested summary in advance of the workshop. However, some preliminary findings were presented with the understanding that the results would probably change. Presentations were made on methodology, an overview of staffing, and the main variation parameters that emerged from the census data of the sample villages. The main point stressed was that although people indicated a concern with flood and flood response, there was great diversity within their concern. Great differences existed from village to village in almost every respect to flood, so much that each actual flood situation was almost unique. It is, therefore, extremely important to avoid thinking of the situation in global terms or proposing global solutions.

Presentations also were made on the major points that emerged from the Household Survey. These points included household response to flood and evaluation of institutional measures, and, again, the diversity of responses emphasized that problems and solutions must be considered from a local perspective. Sample analysis of institutional data from four upazilas also were presented in the workshop. Emphasis was on the complementary way the Institutional Survey and the Household Survey reflected the local perspective of problems and possible solutions from the household up, rather than the government down. A distinct feature of this institutional focus was on the need for a mixture of measures and approaches local and national, physical and institutional. Details of all the presentations have been included in the Pilot Survey Report prepared and submitted in September 1991.

The lack of advance information necessarily limited the capacity of those attending the workshop to consider the technical aspects of the study. This problem was compounded by the diverse (as it should have been) composition of the workshop group and the limited time available. Consequently, although the workshop did generate some helpful criticism, the suggestions for future research were general, but not closely tied to the survey data. They focused on large national concerns such as peoples' participation in various forms. Details are given in Chapter 2.

In general, the flood response study staff took suggestions as a welcomed vindication of their interest in the institutional dimensions of the flood problem and flood response, and of its focus on the household-

institutional interrelationship in a local context. But these topics can not, as they stand, directly be researched within the context of the TOR. Accordingly, the team organized a second small workshop of technical staff from agencies whose service and research activities fell most closely in the areas that the data indicated were priorities for the people interviewed. These were areas that also seemed consistent with the priorities that had emerged in the larger workshop mentioned earlier.

This small workshop reviewed the research topics and made several suggestions of emphasis and method, which the team accepted. Organizations represented included FAP 5, CARE, World Health Organization (WHO), Save the Children, International Food Policy Research Institute (IFPRI), International Fertilizer Development Corporation (IFDC), Private Agencies Collaborating Together (PACT), and USAID. The discussion focused around a detailed presentation of the more salient patterns in flood response and in institutional evaluations from the Household Survey. In particular, workshop participants looked for ways in which the study could boost suggested research programs that would complement those already underway. The most important suggestions were: addressing questions about risk and its relation to the evaluations people make in all priority areas; broadening the study of water and fuel problems to include health and medical services; the role of water transport, as both a source of income and a facilitator of or limiting condition for agricultural change; and the impact of flood durations on household and agricultural responses, rather than just different flood levels. There also was considerable interest in documenting the ways poor people use social linkage to recover from flood related losses, and the relation that linkage has with financial indebtedness.

1.3 Plan of the Report

This report is presented to give an overview of the critical evaluation of the Pilot Survey (reported separately) and to provide some indicative outline of activities to be undertaken in phase II of the study. Chapter 2 deals with the August workshop deliberations including the outcome of the various group discussions. Chapter 3 presents some preliminary analysis of the Household and Institutional Surveys, highlighting the point that people who cope with flood have a reasonably accurate idea about what to do. Therefore, people's active participation should be solicited in planning and implementing flood response measures. An effort is made to draw some conclusions and recommended actions in Phase II in Chapter 4.

Chapter 2

WORKSHOP ON THE PILOT SURVEY

2.1 Introduction

The workshop was attended by approximately 65 people on the first day (presentation and discussion of phase I preliminary findings), and approximately 40 people on the second day (development and evaluation of phase II direction). A list of the participants is provided in Annex 1.

In preparation for day two, participants were asked to rank seven prospective discussion topics defined by workshop leaders for possible phase II study. Participants also were asked to suggest additional topics that might be included in the phase II work. The results of the participant ranking are discussed later in this chapter.

The purpose of the workshop was to present preliminary findings of the flood response study team's pilot survey of household responses to flooding and of institutional mechanisms for dealing with flooding. In addition, the workshop was to seek participant input on topics that might be pursued in phase II surveys.

2.1.1 Opening and Working Sessions

The opening session was comprised of introductory remarks and the presentation of preliminary findings in a conventional seminar setting. The presentations were followed by comments or questions from participants which were collected and followed by responses or answers by the presenters, individually or in teams.

Participants were polled following the seminar portion to obtain rankings and additions to proposed discussion topics and preference for participation. Poll results were tallied, and participants were assigned to small groups for the main working sessions. Detailed instructions for the working session follows:

- Participants were asked to individually write their responses to the discussion question "What are the flood-related problems, needs, and obstacles that the flood response team should study in its phase II work for the topic area in which you are working"?

- Each participant was asked to present as many items from his or her list of ideas as were thought to be appropriate for the discussion. Each participant presented one item until all in the group had finished. These ideas were written on large sheets of paper posted on the wall in each discussion group. Recorders were members of the flood response study team. During an extended tea break, participants were asked to move about the room to review the work of other discussion groups, and to use self-adhesive note paper to offer additional suggestions.

- After the tea break, additional suggestions were considered. Participants were asked to discuss each of the ideas posted on its wall charts. The purpose of this discussion was to ensure that every suggestion was clearly understood, and that its importance, or lack of importance was advocated.

- When the discussion of step three (above) was completed, participants in each group were asked to personally evaluate the items on that group's list. Each participant was given seven slips of paper on which to record the ones considered most important. When this was done, each person was asked to rank the seven choices, with seven points given to first choice, six points to second choice, and so on. In each discussion group, these rankings were tallied, and an aggregated score was added for each item on the group's list of suggestions.

During the lunch break, each participant was given three self-adhesive, colored dots to be used in a further evaluation of the top ranking suggestions. Each small group had transcribed its top-three ideas onto separate strips of chart paper that were posted in the luncheon area. Each participant then applied his three colored dots to the selected topic in a scoring system.

2.1.2 Concluding Discussion

The working sessions were closed in a controlled open discussion and used the "The Samoan Circle" process. In this process participants were seated in concentric circles around a central table. There were four empty chairs at the table, and several aisles were arranged to permit people to move from the encircling chairs to the central table, as shown in Figure 1.

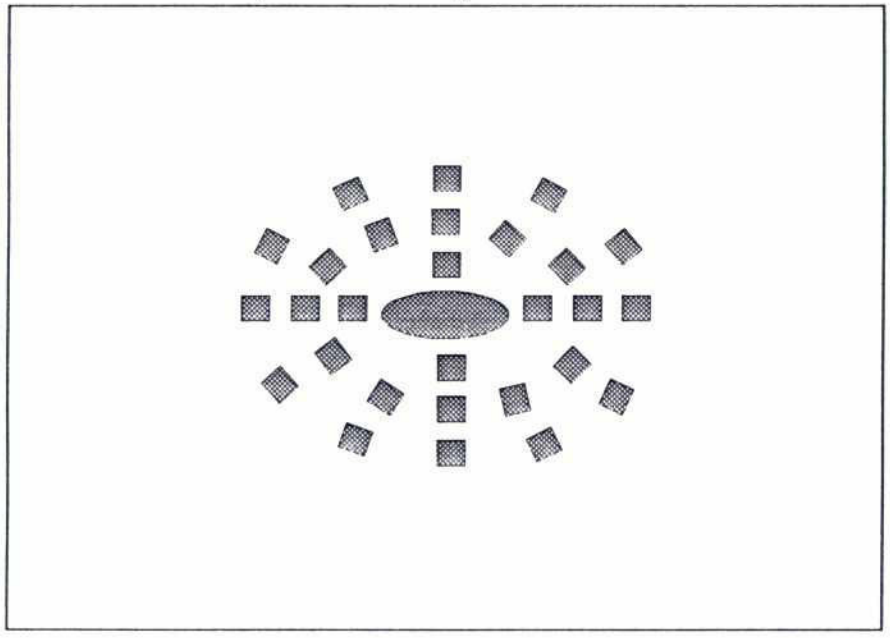

Figure 1

Plan of Samoan Circle

The discussion question ("What have we learned from this workshop, and what should be done about it"?) was announced, and the participants were advised of the rules for the Samoan Circle discussion:

- You may talk about this subject as often as you want, and as long as you want. You can ask questions, challenge others or support what they have said. You can change the subject if you wish to do so or you can applaud, hiss or boo, or make other signs of

approval or disapproval. But, to do any of these things, you must be sitting in one of the four chairs at this table.

- If you want to participate in the discussion and there are no empty chairs at the table, stand near the table to make it known that you want a seat when available. If you want to talk with someone at the table, stand behind that person's chair until one of the other three seats is vacated.

- All persons in the Samoan Circle discussion are asked to obey these rules--including the chairman, facilitator, and all ranking or honored persons in attendance. No one is in charge of the meeting. It will proceed on the basis of your interest in the topic and in the principles of fairness and respect for others".

2.2 Participant Comments and Response

2.2.1 Household Survey

Liaquat Hossain, Bangladesh Water Development Board (BWDB): Farmers were not asked about siltation of their land by annual amounts of debris and sand, annual land loss to river erosion, and annual crop loss to water hyacinth.

Response: The Household Survey was meant to capture rural people's response to flood situations, and therefore some points were not included. Erosion, however, is covered separately in the institutional part of the survey.

S. R. Khan, WFP: During high flood water outside the BWDB poldered area, it is observed that some cut the embankment. Who is responsible for these cuttings? What is the reaction of the people living inside the polder? How have these people responded to ensure no cutting in the embankment? Was there a question relating to this?

Response: This aspect has been covered in the Institutional Survey.

K. M. Elahi, Jahangirnagar University:

1. It appears from the map showing sample areas, that the coastal plain of Bangladesh has been excluded entirely. Please refer to your presentation (Dr. Alamgir) that the basis of selection was agro-ecological zones and inundation levels. This does not satisfy the selection of study areas by excluding coastal zones.
2. How do you define farmers—are they land owning groups or do they include landless farm labor as well?
3. You have presented some tables that portray only aggregate picture. Do you think a different or better picture may be obtained by analyzing data on regional basis [agro-ecological/inundation levels]?
4. How was questionnaire administered? Multiple answers accepted? Whether question, were prompted or unprompted?
5. The questionnaire may be upgraded by incorporating questions on women's perception on flood as their activity interrelate, and on individual and household level dislocation of activities and adjustment strategies.

Response:

1. The coastal areas have been kept out of the FAP, presumably to cover under some separate initiative.
2. The definition of farmer as adapted in the Household Survey questionnaire is a person operating some farm land either as a owner or as a tenant. Therefore, even a landless holder can be identified as a farmer if he is operating some cultivable lands either as a sharecropper or as some one who rented some land to cultivate.
3. Presentation of the aggregate data does not necessarily mean disaggregation is impossible. In fact, a closer picture of the selected upazila can be obtained by desegregated analysis, which the FAP 14 team is currently pursuing.
4. Most of the questions belonging to preparedness and response as well as the institutional aspects of the Household Survey were open-ended providing ample opportunity for the respondents to come up with answers. The field personnel of the study were also instructed accordingly. If, however, no answer was forthcoming, the enumerators gave them some guidance towards some possible answers.
5. As indicated elsewhere, the gender issue has not been appropriately addressed in the first phase study. This would be pursued in the second phase. The concern about dislocation of the activities at household level is not altogether acceptable as this has been covered in the survey.

A. L. Sarker, FPCO:

1. My question is on the selected criteria. What was the basis of selecting only 24 villages and how were the respondents selected? The groups selected do not include any fish farmers.
2. The coastal area has not been include in the sample.
3. What is the number of field staff that worked on the questionnaire survey and what are their qualifications? The background and qualifications are indeed important for good quality of survey results.

Response:

1. The first part of the question has been answered for similar queries made by other participants. On the second, when we drew samples of households, occupation of the person was used as a criterion. Thus, fish farming and fishing as an occupation, came into consideration and has been included in the villages where they existed.
2. Coverage of the coastal area under FAP has been discussed elsewhere.
3. Each upazila had a four-member team, one supervisor, one institutional surveyor and two enumerators. Each of the team members, in most cases, holds a master degree, mostly in social science subjects. They were trained thoroughly for 10 days during which they received class-room lectures, classroom exercises, and a chance to pretest the questionnaire in the field. In fact, the final version of the questionnaire was made after the training program to incorporate the suggested improvements from field testing and class room interactions.

M. H. Siddiqi, BWDB:

1. Distress sale of land is missing in the questionnaire (printed in Bengali). Why?
2. A note of caution: The numbers obtained from the household survey data processing gives a feeling as though the rural population is either indifferent to or not desirous of having a flood-free regime. There are several possibilities: (a) People are used to flooding as an annual event over centuries, so they can't even visualize a situation without water. (b) Since many dikes failed to protect them last time (1988), they have developed apathy. (c) An apprehensive farmer is a master in distorting facts.

Response:

1. The household survey is particularly directed toward flood situation response of the people. Naturally, therefore, distress land sales which do not normally occur at the time of flooding, has not been incorporated.
2. This is taken as a note of caution. The possibilities covered under (a) and (b) only establish the apparent idea contained in the note of caution. The possibility covered under (c) can perhaps be minimized with adequate training of the field personnel and by maintaining close supervision of the survey activity itself by the senior advisors, as has been done under this first phase study.

Andrew Russell, FAP 1: Is it possible to determine the willingness of different categories of households to participate actively (i.e., providing finance or labor) in structural flood control measured, either for construction or for maintenance?

Response: There was a specific question dealing with the issue incorporated in the questionnaire at the end of Chapter 3.

Syed Anwar Yusuf, BWDB: Doubts have been expressed, in the house about the correctness of the information collected through the questionnaire of the study. My questions is: What was the cross-check to verify the figures?

Response: The usual cross-check used was discussion within the field team at the end of each day and, if some doubt persisted, it was followed by rechecking with the respondent himself.

A. Hannan, Bangladesh University of Engineering and Technology (BUET): It is stated that most households make successful adjustments to the water regime and are not distressed by usual expected cycle of rise and fall of water.

1. Is the water rise and fall predictable before hand? If not, can we plan the agricultural activity in an effective way? Is it not nice to try to control rise or fall of water level up to some desired degree at least in certain regions?
2. It is not clear to me how the conclusion can be drawn, that in effect 86 percent of the families are satisfied with their adjustments for normal inundations, and do not want that situation changed.
3. The response you have received may change substantially if you explain what happens if flood conditions are changed by some interference.
4. It is mentioned that about 40 percent would like less depth of flood. How can we achieve it?

Response: The questions raised and observations made are accepted as extremely valuable. Some of these can be used as important guidelines for the second phase study. However, survey results should be valid, as most of the questions were kept open-ended to capture the unbiased perception of the people in the study areas.

Anwarul Kibria, Department of Agricultural Extension (DAE):

1. Existing cropping systems and patterns practiced in the floodplains at normal flooding and at severe floods, if collected through the questionnaire, would help interventions for higher productivity with the available technologies. It is important to identify options for better living in such distressed areas.
2. Floods causing crop damage call for rehabilitation. In order to address the issue, it is necessary

to assess the type of problems and constrains the farmers face for timely rehabilitation.

Response: The suggestions are well taken. The team, however, wants to make it clear that the Household Survey covered both the above areas although due to time constraints, the analysis of the data is yet to be complete.

S. Waliullah, FPCO: It appears from the presentation that you have asked some questions presupposing that respondents hold knowledge and understanding of the FAP for their area and that we are to accept the responses for our purpose. Could you explain?

Response: The field enumerators were informed about the FAP and they were trained to explain the same to the respondents before they were asked to respond.

Dirk Frans, FAP-20: What is the understanding of those interviewed of the category "unemployed" under occupation?

Response: The "unemployed" was adequately explained to the field enumerators. It is therefore, expected that the respondents would have a clear and unequivocal understanding of the term.

Theresa Blanchet (Ms.), FAP-6:

1. The questionnaire has a lengthy inventory but very little question to understand the dynamic processes at household level.
2. A very narrow and biased conceptualization has been used for households which are units of consumption, but they also have some production functions.
3. They (households) are the location where women live. The study is gender blind in the areas of women's competence and so very poorly covered areas such as sanitation (Paikhana), food preparation, household gardening, health care of family (children), and transport as a different problem for men and women.

Response: All the above comments are rated as highly valuable. The team agrees that the areas covered above may not have been fully dealt with in the first phase survey. In the second phase, however, special efforts would be made to incorporate most of the above areas, if not all.

Richard Holloway, PACT/PRIP:

1. In reference to fodder, many landless laborers will not own animals. They will therefore have no need of collecting fodder. This needs to be broken down by category of respondents.
2. For fuel collection and saving, it is important to know what fuel and from where. This is very important from environmental perspective, to make sure that trees are replanted.

Response: Points have been noted and they would be used as guiding ideas for designing second phase study.

A.T.M. Khorshed Alam, Master Plan Organization (MPO):

1. No area in the Mathamuhuri and Sangu River basins is included in the survey. These areas are very vital in considering of recurring flood (flash flood from the hills within Bangladesh).
2. Lands are classified giving due consideration to flood depths by MPO and other agencies. But this FAP study classified land in a different way. There should be a similar classification of land (FO, F1, F2 land, etc).

3. When interest of one person is likely to be adversely affected by future development, he is least likely to agree on the future expected benefit. For example, it is observed that while planning a project for embankment construction where land acquisition becomes necessary, the persons whose lands are likely to be affected will simply say that there is no flood in the area, so no embankment is necessary. So, during survey of the opinion on flood protection, was attention given to evaluate such wrong statements?

Response:

1. Mathamuhuri and Sangu River basins fall in the southeast region which has been largely kept out of the FAP studies.
2. The flood response study (FAP 14) used the MPO classification of land by F0, F1, F2, etc.
3. The study villages were either inside a polder or embankment or outside. The respondent from inside talked about the impact of the existing structure while one outside gave his perception of measures, in future, without knowing whether or not he himself will be affected.

K. B. M. Shafiuddin, FPCO:

1. What is the overall response for reduction of peak flood by about three to four feet?
2. How many man-days up to Aug. 10 were spent for survey of the 1,852 households? Is the survey being done in a hurry or is adequate time allowed?
3. Response to such lengthy topics (4,007 in Household Survey) are quite difficult for rural people.
4. It is stated that about 60 percent of the persons interviewed under code "0" responded to live with flood. Please explain code "0".

Response:

1. No such question was asked.
2. It required 984 man-days to cover 1,852 households, or approximately two questionnaires per day. This is considered adequate enough for a meaningful outcome.
3. Responding to 4,007 questions in one sitting is certainly difficult. That is why, in many instances, enumerators had to make more than one visit to the concerned household at predetermined times. Moreover, all the questions are not equally relevant to each and every household.
4. A "0" answer included a straight no answer, and also no response.

M. A. Salam, BWDB: Some area beside the Congso River (for sample survey) near Mymensingh and Netrokona should have been selected. It is considered a flash flood river and would make the survey more representative?

Response: From the 12 sample upazilas, there are quite a number that represent flash flood rivers. Examples: Sunamganj, Chirirbandar, Brahmanbaria and Nasirnagar.

K. Nizamuddin, University of Dhaka:

1. The researcher would know the shortcoming of the projects and would try to incorporate actions or suggestions which would help avoid the same type of errors in future projects.
2. Also, if an existing empoldered area is surveyed, then the before and after situation would become more clear.

Response: The points have been noted.

Albert Heringa, FAP 20: Do you have related questions on the desire for flood free conditions for

protection of homesteads, crops, or both?

Response: Flood free condition, as incorporated in the survey, referred to crops only. When croplands are lower in elevation than homesteads, flood free cropland automatically implies flood free homestead.

B. A. Hamaid, FAP 8:

1. One of the objectives of the study FAP 14 was to assess the possible impact of structural flood protection efforts such as embankment or polder. In that context, the survey does not address the probable impact of flood action programs on fish production and fish habitat.
2. Representative sampling of the areas selected and the households surveyed should have been rational. The present survey will give a biased result. I think the sample villages studied should have included one or two villages situated in greater Khulna or Barisal, where the existing polders or embankments have adversely affected the socioeconomic condition of the people (for example, Beel Dhakatia).

Response:

1. The purpose of the study was not to make an assessment of the impact of water control structures either on crops or on fisheries. The purpose however, has been to take account of how people in the flood prone areas prepare themselves and respond to different flooding conditions.
2. Sample upazila selection and exclusion of coastal areas has been discussed elsewhere.

N. Huq, FAP-12/13: What were the selection criteria of the 24 selected villages?

Response: As explained in the methodology, the 12 sample upazilas were selected on the basis of their exposure to various types and intensities of flood, with the assumption that these would represent similar situations in the rest of the country. In order to reflect a representative situation of each sample upazila, two villages were selected with one representing more and the other less flood prone areas. Another criterion was relative accessibility in terms of closeness to the upazila headquarters or growth center and transportation network.

N. A. Gazi, BWDB:

1. The 12 sample upazilas selected by the study team, have within them about 2,870 villages. Out of them, only 24 village representing less than one percent were drawn as sample villages. This appears to be a seriously under-representative sample for any meaningful conclusions to be drawn.
2. The hydrological units of the country have been the basis for selecting the sample study areas.
3. The Household Survey questionnaire does not cover social aspects like community living, etc.
4. The findings about people's preference to store fuel and pure water as a response measure appears to be wrong. I would presume 60 percent of the people in the flood affected areas need fodder to feed their cattle during flood.

Response:

1. The purpose was not to draw a sample of villages to numerically represent all the villages within the 12 selected upazilas. However, on the basis of topographic and hydrological characteristics each upazila was divided into two areas: one more and the other less vulnerable to flood. The two villages selected, one from each one of them, were to represent these two areas of the upazila and, hence, the upazila as a whole.
2. As apparent from the above response, the selection of sample upazilas, as well as the villages

within them, was mainly based on the topographic and hydrological characteristics of the upazila. Naturally, the hydrological units of the country, and the data available from MPO about these units, as well as agro-ecological zones were extensively used for selection of the sample upazilas.

3. The purpose of the Household Survey was to capture the various response measures taken by the individual families. Therefore, most of the measures adopted at the family level as preparatory and response steps against flood have been taken into consideration. The Household Survey format has a specific section dealing with institutional aspects of preparation and response to flood. The community aspects have been incorporated in that section.
4. The findings on people's preference to store fuel and pure water during flood came out of the Household Survey. There is no reason, why, one should term it as wrong.

Z. Karim, Bangladesh Agricultural Research Center (BARC):

1. The Household Survey questionnaire incorporates normal inundation, average flood, and severe flood to capture preparatory and response measures of the people in the rural areas. I would think, the approach should have been to incorporate early flood, late flood, and inspect the duration of flood that affects the crop cycle and the agricultural production system as a whole.
2. How the farmers adjust crop production with different flooding conditions, i.e. their innovative practices, needs to be inventoried to identify appropriate measures and techniques to cope with various flood regimes.
3. Farmers' view of beneficial effects of annual inundation of the cultivable land, especially in terms of soil fertility, needs to be documented.
4. Post-flood agricultural activities including farmers loss or damage recovery needs to be adequately supported by an appropriate institutional mechanism. Perhaps the idea of having two distinct institutional arrangements for "flood affected" and "not affected" needs to be explored.

Response: The points mentioned above are considered to be extremely valuable and would be extensively addressed in the design of the second phase of the flood response study.

Alamgir Chowdhury, E.I.P.:

1. How do you define normal inundation?
2. Are hand tubewells, deep tubewells, and shallow tubewells moveable properly?
3. The questionnaire does not include issues especially related to the landless farm families and women.

Response:

1. Definition of normal inundation has been incorporated in the questionnaire. However, to repeat, it is defined as a condition under which water level during the monsoon months does or does not inundate the crop land (depending on the elevation of the concerned area), but does not inundate homesteads even in the relatively low-lying areas.
2. Yes, these items are considered to be movable properties, as the main components could be moved from one place to another.
3. The point is well taken. These are some of the areas that would be covered in the second phase.

Imam Hossain Khan, BWDB:

1. When does the FAP 14 team call it a flood?: when the homestead is inundated or when only the cropland is inundated?
2. Farmer's response to early flood, late flood, long and short duration of flood, as earlier mentioned by Dr. Z. Karim, needs to be adequately recorded. Appropriate crop-mix needs to be

devised as well.

Response:

1. Definitions of normal inundation, average flood, and severe flood were incorporated in the questionnaire, and enumerators were adequately trained to cover this aspect. Field inundation without inundating the homestead is normal inundation. When homesteads in some areas are inundated and crops in F2 and onward lands are partly or completely damaged, then it is an average flood. Severe flood reflects a situation when most homesteads as well as the floors of dwelling houses are inundated along with damage to crops even in F0 and F1 lands.
2. The point is well taken and will help the FAP 14 team in designing the second phase study.

2.2.2 Institutional Survey

M. N. Huda, FPCO: Information on embankments and other structures needs to be double-checked with appropriate agencies.

Steve Jones, FPCO: How were income figures derived for households?

Response: Information on expenditure was sought prior to seeking information on income to have a cross-check on the income figure which is often difficult to be assessed for a household. The market value of consumption of self-produced commodities was considered part of the household income.

N. A. Gazi, BWDB:

1. Did the survey cover problems relating to transportation?
2. Are both sample villages in each upazila close to urban centers?
3. Damages to public institutions and facilities need to be recorded.
4. Differences in response from region to region should be looked into.

Response:

1. The survey covered problems relating to transportation from village to union headquarter, union to upazila headquarters, and upazila to district headquarters. Transportation facilities (or the lack of them) to nearby towns also were recorded. The information was collected for dry and rainy seasons, as well as for flooding conditions.
2. The two sample villages in each upazila were purposely selected to represent different topographic and flooding conditions, as well as different degrees of accessibility to urban centers. Although it has been difficult to satisfy all these criteria simultaneously for each of the 24 sample villages, in most cases, the villages do represent the desired diversity.

Nurul Haq, FAP 12/13:

1. Were responses at the *para* level recorded?
2. Were different religious groups properly represented?

Response:

1. Response at the *para* or neighborhood level were recorded under response categories relating to pre-flood, during flood and post-flood situations.
2. Since there still exists some concentration of people from minority religions in certain

occupations, and since responses were sought from people in these occupations, the study should be able to indicate "special" responses, if any, from them.

Richard Holloway, PRIP: Who were the respondents in the villages?

Response: The respondents included people from all walks of life including cultivators, day laborers, fisherman, traders, teachers, government extension workers, NGO workers, and other professionals (i.e. whoever had the relevant information).

K. Nizamuddin, FAP 3: Were there queries on relief and rehabilitation?

Response: Information on whatever relief and rehabilitation work has gone on in the study areas through different agencies has been collected at village, union, upazila, and district levels.

A. L. Sarker, FPCO: The term "mariculture" would be a misnomer for the brackish water shrimp farming in Satkhira.

N. A. Gazi, BWDB: Per acre profit from the shrimp farming is much higher than profit accrued from the same land if devoted to agriculture. Besides, shrimp exporting plays an important role in earning foreign exchange. Thus, any policy recommendation affecting shrimp farming needs to keep these considerations in mind.

2.3 Results of Nominal Group Discussion

The study team proposed the following tentative list of topics to the workshop participants. Those topics with their ranks are shown in Table 1.

Table 1
Topics for Study

Score	Rank	Topic
108	4	Enhancement of income earning opportunities at the local level particularly for the rural poor.
89	5	Research priorities for the development of flood related crops and appropriate agricultural technologies.
171	1	Public involvement in design and planning of physical infrastructure at the local level to deal with drainage, flood protection, and shelter.
110	3	Improvement in availability of food, water, and fuel related to nutrition and health at the local level.
128	2	Improving local government's role and responsibility in flood protection planning and relief (specify levels-village, union and upazila).
74	6	Improving agricultural support services at the local level (including fisheries and livestock).
72	7	Role of NGOs.

The underlying question behind the selection of these topics is what are the flood related problems, needs, and obstacles that the study team should address in its phase II investigations?
The results of the group discussion are presented below.

Group 1

Subjects Discussed: Enhancement of income earning opportunities at the local level, particularly for the rural poor.

Participants: Chowdhury, A.; Huq, E.; Frans, D.; Huq, N.; Leaf, M.; Salam, A.; Alamgir, M.; and Alam, A.T.M.S.

Issues Identified:

1. Promotion of horticultural products for homestead and home gardening.
2. Improvement of quality and diversity in cottage industries.
3. Intensifying land-saving cattle poultry and fish culture particularly with reference to landless.
4. Acquisition of nontraditional technology for the poor.
5. Fish culture in ponds and canals.
6. Social forestry.
7. Leasing of embankment borrow pits, etc., for maintenance and use.
8. Credit provision and rural electrification for small scale self-employment.
9. Strengthening of local institutions to provide training.
10. Benefits and problems of food for work (effect on embankments,drainage, rural road and income).
11. Improve rural transportation technology.
12. Bottlenecks to further agricultural expansion.
13. Autonomy and effectiveness of KSS, BSS, and MBSS [local NGOs] at local level.
14. Propagation of beekeeping within kitchen gardens.
15. Vocational training (short term).
16. Improvement of boat designs and their fabrication. Facilitation of their availability to small income earners.
17. Facilitating petty trading with credit without collateral.
18. Analyze flood season fish catch with a view to exploring commercial prospect.
19. Water pumping technology.
20. Small agro-based industries.
21. Marketing.
22. Identification of skill and training needs.
23. Decentralization of authority to enable execution of contracts regarding utilization of BWDB properties.
24. Acquisition of nontraditional technologies to enhance local production.

Group 2

Subjects Discussed: Research priorities for the development of flood-related crops and appropriate agricultural technologies.

Participants: Chowdury, K.H.; Holloway, [illegible]; Karim, B.; Rahman, H.; Karim, Z.; Alam, A.T.M.K. and Haque, M.

Issues Identified:

1. Current stage of technology adoption in flood vulnerable areas.
2. Farmers' innovative practices in response to different flood types.
3. Farmers' desired technological options for mitigating risk.
4. Farmer response on the role of public /private agencies working in technology transfer system.
5. Changing soil fertility status under flooded/nonflooded conditions.
6. Adoption pattern of aman cultivators under changing flood conditions (late high flood and rapid water rise).
7. Research on fuel, fodder, housing materials, and crops used and needed by flood affected people.
8. Risk and uncertainties for intensifying crop production inside polders.
9. Role of institutions in badly managed polder areas and their effect on farmers (rich and poor).
10. Seed storage and seedling preparations at flood time.
11. Possible improvement of existing cropping pattern and future cropping pattern under changed situation (ideal for and expected by the farmers).
12. Measures to improve personal security for seeds and crops against criminals.
13. Cropping patterns adjustments for different flood types.
14. Assessment of the status of improved cropping patterns in poldered areas.
15. Problems farmers face due to deposition of sand on agricultural productivity.
16. Suffering people experience when embankments fail during devastating floods.
17. Response/adaptability of farmers outside the polders.
18. Assessment of fish/shrimp fry resources in the Padma/Brahmaputra River system.
19. Food preservation for use during disaster events.

Group 3

Subjects Discussed: Public involvement in design and planning of physical infrastructure and services at the local level to deal with drainage, flood protection, and shelter.

Participants: Ahmad, K.; Masuduzzaman, M.; Yamaguchi, H.; Ali, F.; Russell, A.P.G.; Ahmad, A.T.A.; Wahra, N.; Chowdhury, M.H.; Ahmad, I.; Ahmad, M.; and Alam, S.

Issues Identified:

1. Determine facilities/services needed by local people.
2. Steps needed to involve people in the planning and design process.
3. How to involve the union parishad and upazila parishad in identifying schemes and priorities.
4. Role of NGOs to ensure people's participation.
5. How to explain the project's features to the union parishad and upazila parishad members. Who explains?
6. Involvement of beneficiaries at various stages of project development.

7. How to determine what local people actually need.

8. How to incorporate peoples knowledge about local hydrological conditions and design.
9. How to involve locals in monitoring and maintenance.
10. How to incorporate people's knowledge in preparation of union and upazila plan books.
11. Is the Local Government Engineering Bureau's (LGEB) current arrangement sufficient to involve people's participation?
12. How to ascertain project viability from the union parishad and upazila parishad.
13. Is the current BWDB arrangement for involving beneficiaries in project for planning, designing, construction, and operation and maintenance sufficient.
14. Who identifies the appropriate institutional mechanism to exercise the rightful claim of the beneficiaries?
15. Who participates?
16. Identify and ask people why they need the project?
17. Can local people veto an infrastructure?
18. Why is people's participation lacking?
19. Can local people be involved in voluntary participation?
20. Can people operate and maintain the project?
21. Do the people have any complain on the existing and ongoing projects?
22. How to obtain public confidence on projects?
23. Who organizes and leads the participation?
24. Is the project feasible and justifiable? Who decides?
25. How much should the government to listen to local views?
26. How to involve people in local resource mobilization?
27. Is there any possibility of poor women's participation?
28. Should credit be made available from institutional sources?
29. What administrative and legislative orders are needed?
30. Is there any possibility of local management?
31. What change is needed in existing laws to facilitate local union parishad's capability to handle the emergency crisis?
32. Are local people willing to participate in operation and maintenance of the project?
33. Who provides for an operation and maintenance fund for emergencies.
34. What skills and training are necessary and who provides them?
35. Should local people bear part of the cost?
36. What is the role of the media in public participation?
37. How do we involve the displaced?
38. How to recover the cost from the beneficiaries.
39. How to involve local participation for relief activities.
40. How do we control power groups?
41. Who identifies the possible adverse impacts and possible mitigation measures?
42. Identify the appropriate locations for the projects.
43. How to involve local people in land acquisition problems.

Group 4

Subjects Discussed: Improvement in the availability of food, water, and fuel, and in nutrition and health at the local level.

Participants: Gazi, N.A.; Chowdhury, [illegible]; Sarker, A.L.; Shafi, A.M.; Lane, P. (Ms.); and Blair, H.

Issues Identified:

1. Improvement of water testing Hach Kit.
2. Credit for agricultural inputs.
3. Increase fish production (introduce different technologies, e.g., cage culture and extension).
4. Improve water management for crops (control flooding, improve drainage, etc.).
5. Better stoves for cooking and motivation for their use.
6. Water transport (all types) during flood.
7. How important is drinking water?
8. Establishing secure community drinking water supply (tubewell).
9. Coverage of health facilities (NGOs and official).
10. Improve water quality, including pollution control.
11. Change food habits during flood.
12. Store family and community food grains.
13. Operate community relief kitchens.
14. Gender responsibilities.
15. Water purification methods such as tablets and boiling.
16. Consideration of small portable gas cylinders when other fuel is not available.
17. Raised latrines.
18. Supply necessary medicines.
19. Supply essential commodities like food, fuel, clothing, matches, etc.
20. Raise earthen platforms for food stocks, livestock, and refuges.
21. Uses and priorities of fuel.
22. Milk for infants and children.
23. Government kerosene depots and fair price sales.
24. Prevent salt water intrusion in coastal areas.
25. Supply of fuel.
26. Store fodder.
27. Fish processing and preservation.
28. Dangers of diarrhoea outbreaks during flood.
29. Separating drinking water and sanitation facilities.
30. Pond fishery protection (embankment).
31. Supply water containers to poor families.
32. Floating vegetable and seedling cultivation.
33. Contingency planning for diarrhoea and other infectious diseases.
34. Training for flood related emergency measures.
35. Floating medical units.
36. Allocating agricultural land to fish production.
37. Source of safe drinking water (tubewell embanking).
38. Supply dried food (ready to eat).
39. Livestock diseases.
40. Problems with uncooked food and reduced intake.
41. Establish protected fish /shrimp hatcheries.
42. Improve drainage systems.

43. Rural electrification and assuring supply during flood.
44. Fingerling release in open water.
45. Duck farming.
46. Integrated fish/poultry/livestock farming.
47. Corruption and malpractice in distribution of relief and post-flood reconstruction.

Group 5

Subjects Discussed: Improving the local government's role and responsibility in flood protection planning and relief (specify level: village, union, and upazila).

Participants: Hossain, L.; Elahi, K.M.; Haq, N.; Hannan, A.; Rahman, H.; Hamid, B.A.; and Alam, M.

Issues Identified:

1. Avoid blocking natural drainage.
2. Identification of flood protection problems.
3. Causes of flood at local level and assessment of flood hazard identified.
4. Participation of people in planning, implementation, and operation and maintenance to ensure acceptance.
5. Integrating flood forecast/warning between local and national bodies.
6. Identify options available for mitigation of flood.
7. Harnessing contributions of local people through local government.
8. Evacuation mechanism: people and livestock during high flood.
9. Enhancing people's awareness regarding flood-related issues.
10. Being sensitive to needs of different groups/professions (e.g., landless, agriculture, fisheries).
11. Construct embankments/metal roads in such a way as to prevent flood and help drainage.
12. More field surveys to identify problems and facilitate documentation and extend strategies for flood preparation technologies (on oral rehydration therapy (ORT), food drying, sanitation, etc.).
13. Improve flood preparedness and disaster management. Why is not flood risk information disseminated?
14. What should be the upazila role in flood planning? Who should do it? Should the upazila relief and rehabilitation officer be a flood planner or should someone else? Develop and plan according to flood protection needs (look at the existing materials and practices already developed by NGOs).
15. Assess the ecological consequences of infrastructure.
16. Encourage cost recovery of project.
17. Controlled flooding/compartmentalization in flood protection planning.
18. Improvement of coordination among agencies/institutions.
19. Financial institutions for long-term rehabilitation (flood insurance, disaster loans, etc.).
20. Preparation of short-term and long-term action plans for local government institutions.
21. Local level debate on and display of plans.
22. Improvement in communication.
23. Rapid rural appraisal on the whole issue.
24. Resource mobilization for execution of plans.

25. Research on local housing
26. Legal framework for land use control and policing to ensure it is used to minimize flood loss.
27. Assign responsibilities for implementation of plan.
28. Democratization of local government.
29. Assessing loss of private land due to infrastructure building and consequences thereof.
30. Identification of projects to be implemented through Food for Work (FFW) programs, and subsequent implementation and maintenance.
31. Plantation and maintenance of trees on roads and embankments for erosion control.
32. Evaluate embankments cuts made by the public and determine what action to take.
33. Measures for protecting common properties (schools, hospitals, etc.) and markets.
34. Coordination in relief distribution.
35. Involve local level institutions.
36. Relief related to disease/epidemics.
37. Upgrade local institutions to deal with short-term relief.
38. Annual plan for relief and rehabilitation.
39. Relief aspects should be left to the local people.
40. Community shelters at union level (people/livestock).
41. Ensuring proper distribution of relief.
42. Rehabilitation of people displaced due to erosion.
43. Food storage.
44. Stock taking/deliberation of the past and plan for future.
45. Identifying preflood, flood, and post-flood issues.
46. Assess existing capabilities/responsibilities of local governments.
47. Enhancing efficiency of administration.
48. Local resource mobilization/utilization.
49. Strengthening local government institutions at the union level.
50. Coordination of FAP activities at local and national levels.
51. Proper programming for rehabilitation.
52. Monitor/evaluate programs implemented.
53. Coordinating/integrating government/NGO efforts.

2.4 Ranking of Research Topics

Five small discussion groups generated over 200 suggestions for FAP 14 phase II research topics. For summary purposes, each small group identified its three "most important" suggestion. The 15 research topics thus identified were evaluated by all of the participants; their prioritization is shown in Table 2.

Table 2
Ranking of Research Topics

Rank	Score	Topic
1	51	Participation of people in planning, implementation, operating and maintenance to ensure acceptance.
2	36	Improve flood preparedness and disaster management.
3	28	Who organizes and leads the peoples's participation?
4	22	Intensify land-saving cattle, poultry, and fish culture with particular reference to the landless.
5-1	14	Financial institutions for long term rehabilitation (flood insurance, disaster loans).
5-2	14	Farmers' desired technological options for mitigating risks.
5-3	14	Strengthening local institutions to provide vocational training-agricultural and nonagricultural.
6		Adjusting behavior of cropping patterns in response to different types of flood.
9	8	What public movement process should be followed?
10	5	Is the project feasible and desirable? Who decides?
11-1	4	Credit provision and rural electrification for small scale rural self-employment.
11-2	4	Contingency planning for diarrhoea and other infectious diseases.
11-3	4	Safe drinking water sources and importance (how important do people think it is?)
12	2	Adoption pattern of aman cultivation under changing flooding conditions (late high flood and rapid water rise).
13	1	Increasing fish production through different technologies and extension services.

Too much emphasis can be put on this simple ranking. The purpose of this exercise is to bring a sense of procedural closure to the small group discussions. As was stated several times, this was not a referendum as for what the group thought FAP 14 phase II should include.

Nevertheless, the following certain observation can be made:

- Of the 36 people asked to rank 15 items as first, second, or third choice, 14 participants (39 percent) ranked "participation of people" first. This topic received 24 percent of all

points awarded to the question

- The second highest ranked topic, "improve flood preparedness," received 17 percent of the total points and 14 percent of the first choice votes.
- The third highest ranked topic, "who organizes public participation," received 13 percent of the total points and 11 percent of the first choice votes.
- The fourth highest ranked topic, "intensify land-saving," received 10 percent of the total points and eight percent of the first choice votes.
- The four top-ranking topics aggregated 64 percent of the total points and 72 percent of the first choice votes. There is a clear breaking point in participant prioritization of topics between these top four items and the remaining 11 items.
- All 15 topics ranked in the top three of some small group no matter how few points it gained in the total group prioritization.

2.5 Summary of Samoan Circle Discussion

At the outset, the team members were requested to initiate the discussion of the Samoan Circle by briefly reflecting on the proceedings of the workshop to that point. The team appreciated the active roles played by the participants on relevant issues, sharing experiences, and their positive contributions. The team expressed particular satisfaction at selecting "people's participation in planning, implementation, and maintenance to ensure acceptance of projects" as the most important topic. This indicated the importance of involving the public at all levels of development efforts.

In recapitulating the gender issue, members of the team appreciated the need for looking into the specifics of this issue in phase II. They explained that the phase I survey was designed in a more general way and did not intend to exclusively focus on this aspect. On this issue, suggestions were made to design the future research in such a way that female respondents are interviewed by female enumerators.

The team also felt that the workshop deliberations on agricultural adjustments and income generation for those who are more vulnerable to floods would provide valuable inputs for phase II work.

There were concerns among some of the participants as to whether the sample was comprehensive enough to encompass existing and potential interventions. The team members cited examples that showed the samples did include areas to capture responses which would relate to the given issue.

In researching into the present and potential roles of NGOs and local groups, it was suggested that the roles they played during the 1987 and 1988 floods could be a starting point.

During discussion it was determined that there is a need for analyzing the data stratified by different socioeconomic categories. The team said that due to limited time between the completion of field work and the workshop, the stratified analysis could not be completed and that this would be continued following the workshop.

Some of the participants felt that although it would be prudent to concentrate on the topics which ranked very high, it would be wise to research some areas that did not score as high. The team noted that the highest ranking topic, i.e., participation of people, was wide in scope and would cover diverse items including infrastructure and service delivery relating to food, water, fuel, medicine, and extension in delivering production inputs.

The Samoan Circle discussion was concluded by a vote of thanks from the team leader. He assured participants that the study would consider all the suggestions coming out of the workshop deliberations in designing the phase II.

Chapter 3

PRELIMINARY ANALYSIS OF RESULTS OF THE HOUSEHOLD AND INSTITUTIONAL SURVEYS

3.1 Introduction

In this chapter an initial analysis of results will be undertaken for the two FAP 14 surveys. Given the wealth of data that has been collected in the two efforts, the current analysis can be only tentative, and a fuller treatment will be presented in the final report. But it should be possible to give a reasonably clear picture of where the overall analysis will be heading in several respects.

3.2 Inquiry Strategy

To begin with, the FAP 14 study essentially asks two questions of the data assembled from the two surveys thus far: What do rural people do in response to floods?; and what do they think institutions at various levels should do to help them cope with floods? Analysis of these questions will lead to recommendations for possible future institutional flood response initiatives and to guidelines for other FAP studies as they develop their own analyses and recommendations.

The first task is to search for patterns in flood response that will enable us to say that x kind of people respond to floods in y ways and desire z improvements to deal with flood problems. There are several distinct possibilities here. First, the x in the analysis could turn out to be types of villages. Information from these different villages could prove that villagers who get flooded every year have quite different flood responses and needs than those living in places that only occasionally get flooded. Or, that people living in villages considered fully protected against floods see matters differently than those in partially protected villages.

Second, it could turn out that the differences in flood conditions are less important than socioeconomic conditions in explaining people's views about flood response. For instance, evaluation of embankments may more closely relate to how much lowland one owns or to household income than to general flood conditions in the village. The x, then, would be type of person, rather than type of village. A third possibility is that differences between the 24 sample villages (with their unions), as such, are greater than those found on any other basis. That is, the situation of each village is so unique that there are no common flood-related patterns to be found among the sample of villages (the first possibility suggested above) or among its sample of people (the second one) that are as meaningful as the differences between all the villages themselves. The x would then be related to each particular village more than to any meaningful groupings of villages.[1]

The current analysis will begin by exploring the first possibility, since the basic assumption of much of

[1]Theoretically, there is a fourth possibility: There may be no significant patterns, and all flood-related phenomena may be completely random. Human nature being what it is, however, chances are good that groups of people do manifest belief and behavior patterns in their response to floods, just as they do in most other spheres of life.

the entire FAP enterprise is that areas can be analytically put into groups such that some are more greatly in need a particular flood response measure, while others are less so. Most of the other FAP studies aim to discern physically meaningful categories of this sort. The basic task of FAP 14 is to discern the human component of flood response by asking if people in certain areas act and think differently about floods and flood response than people in other areas. The second, or socioeconomic explanation will also be taken up, exploring the wealth of data FAP 14 has collected on income, landholding size and the like. The third, *sui generis* hypothesis will be the residual explanation if the first two fail.

The responses to be analyzed in this preliminary inquiry will be those dealing with people's evaluations of and desires for various flood measures, both infrastructural and service-related. The data comes from the Institutional and Household Surveys. The current inquiry will examine only a portion of the total data that will eventually be included in the FAP 14 study. The substantial information collected, for example, on household flood response, the cropping cycle and its relation to flood problems, and household food surplus/deficit will not be considered here. Likewise, the upazila and district level information collected in the Institutional Survey will not be considered, nor will the case study material that was put together by the institutional surveyors. Nor will data be included from the additional six villages that were added to the FAP 14 study in its second phase (coding and data entry were still in process at the time of writing). And finally, material from the ongoing Gender Survey will not be taken up here. It is hoped, however, that this initial effort will be indicative of what the final report will contain.

On the other hand, this first analysis will concentrate on those issues where the Household and Institutional Surveys most distinctly intersect with each other. Householders were asked a battery of questions about various infrastructural and service-related flood measures, as well as a number of open-ended queries about what measures they thought should be undertaken at the different levels of government. At the same time, the institutional surveyors spoke with a large but informal cross-section of people at village and union levels about what time flood measures had been implemented in the past and what they would like to see done in the future. These field personnel also gathered information along similar lines from about 40 additional villages, each in a union different from the original 24 villages/unions. Thus there are four sources on institutional flood response when trying to assess rural people's perceptions. The four sources are:

- Household Survey questions evaluating specific flood measures.
- Household Survey open-ended queries on observation of and preference for flood measures specified by respondents.
- Institutional Survey data on measures taken and wanted in the 24 original villages as well as their respective unions and upazilas.
- Somewhat less comprehensive Institutional Survey material on an expanded group of 41 additional villages, all located in unions not previously surveyed (though located within the same 12 upazilas).

3.3 Villages Protection and Experience as Predictors

As noted above, the type of flood most often experienced will be analyzed to determine how they relate to people's views on flood response. After experimenting with the data collected, two principal measures

were chosen as alternatives: flood protection and flood experience. People living in areas protected against floods are presumed to have different perceptions about flood response than those living in areas not so blessed. On the other hand, people who have experienced floods every year for the past decade might be expected to think differently from those who suffered only in the severe flood years of 1987 and 1988. There is certainly a similarity between these two classifications, but they are not the same, as should be clear from Tables 3 and 4.

Table 3
Flood Protection and Flood Experience in the 24-Village Sample

Protection	Never Floods	Floods Rarely	Floods Frequently	Floods Annually	Total
Flood Free	Kismat				1
Fully Protected		Panchthupi Shanakoir Paschim Durgapur Goalpota Bakchara			5
Partially Protected		Kamaldia Rukuni Budhal	Baraitali Bararia Pakisha Goalbathan		7
Not Protected		Shibsen Shingjala Lalua Uttar Shankibhanga	Chhoto Bashalia Bhitidaudpur Rampur Chatipara Auliapukur	Muradpur Fenibeel	11
Total	1	12	9	2	24

Gamma = .740

Table 3 shows that for the original sample of 24 villages there is considerable overlap between flood protection and flood frequency—as indeed one would hope if past efforts at flood control have been of any efficacy—but the relationship is by no means complete.[2] Some villages without any protection suffer floods every year, but other unprotected villages get inundated only sometimes (three to seven times over

[2]FAP 14 defined "flood" as anything greater than 20 percent crop loss or the equivalent degree of inundation. It might seem that a higher degree of loss should be used, but it seemed best to take the commonly used definition. A village that is fully protected has structures (embankments, polders, etc.) to protect it from flooding, although the system can fail because of breaches, drainage congestion, and waterlogging. A village that is not protected is completely without flood control structures, and a partly protected village is somewhere in between. The flood-free village is unprotected, but also does not need protection; the other unprotected villages are vulnerable to floods.

the past decade) and some only in severe floods.[3] At the same time, some of those villages occasionally flooded do have at least partial protection, while other such villages have no protection at all. In sum, although there is a high degree of connection between flood protection and flood experience, the match is not perfect.

Table 4
Flood Protection and Flood Experience in the 65-Village Sample

Protection	Never Floods	Floods Rarely	Floods Frequently	Floods Annually	Total
Flood Free	1				1
Fully Protected		12	1	15	13
Partially Protected		5	16	1	22
Not Protected		9	15	5	29
Total	1	26	32	6	65

Source: Institutional Survey

Gamma = .589

Looking at Table 3 in more detail, we find that in the original 24 villages the gamma statistic measures .740, meaning that there is roughly a 75 percent congruence between the two measures.[4] This is a high relationship statistically, but it is the other 25 percent that will be the basis of much of the analysis to come later. It is precisely this difference that helps determine which factor has a greater relationship with people's views about institutional flood response. Table 4 presents the same data for the expanded sample of 65 villages that was taken up in the Institutional Survey. The degree of congruence between the two classification schemes is less here than for the original 24 villages (gamma = .584), thus facilitating a somewhat better comparison between them.

Finally, Table 5 offers a similar picture for the 1,852 respondents in the Household Survey, according to which villages they live in. The fit here is tighter (gamma = .806), though not greatly different from the .740 observed for Table 3.[5]

[3]The rarely flooded villages flooded at least twice between 1980 and 1990, usually in 1987 and 1988. A few were flooded in 1987 or 1988 and an additional year. This is unsurprising, since flooding patterns nationally vary from year to year. The frequently flooded villages incurred floods three to seven times during the 1980s, and those that were always flooded had nine (one case) or 10 (all the others) floods over the period.

[4]See footnote 17 for more on the gamma statistic and its interpretation.

[5]Table 5 can be thought of as a weighted version of Table 3, since each village (one observation in Table 3) is multiplied by its number of respondents to yield the data in Table 5. There was no Household Survey for the expanded 65-village sample.

Table 5
Flood Protection and Flood Experience in the 24-Village Sample

Protection	Never Floods	Floods Rarely	Floods Frequently	Floods Annually	Total
Flood Free	86				86
Fully Protected	Not Protected	455		380	455
Partially Protected	Not Protected	248	279	380	527
Not Protected	Not Protected	263	380	141	784
Total	86	966	659	141	1852

Source: Household Survey

Gamma = .806

The correlation matrix presented in Table 6 offers the same story from a different statistical perspective. Here it will be seen that the zero-order correlation between flood protection and flood experience is .591 for villages, highly significant in the statistical sense, but accounting for only about 35 percent of the variance (r^2 = .349) in terms of statistical explanation. When the correlations are done for respondents according to their village, as in the lower part of Table 6, the relationship between flood protection and experience is somewhat higher (r = .636 and r^2 = .404), but the same pattern prevails.[6] For informational purposes, several other measures pertaining to flood vulnerability are included in Table 6 as well, but none appeared to be as fruitful for analysis as the two chosen. Altogether then, two related but still distinctly different measures are employed in the analysis that follows.

Table 6
Correlations for Flood Vulnerability Variables

	Flood Experience	No. of Floods 1980-1990	Percent of Land F3	Percent of Land F2-3-4
By Village (n=24)				
Flood Protection	.591#	.490#	.523#	.411
Flood Experience	.889*	.151	.155	
No. of Floods 1980-1990	.122	.077		
Percent of Land F3	.937*			
By Respondent (n=1852)				
Flood Protection	.636*	.532*	.634*	.513*
Flood Experience	.892*	.317*	.284*	
No. of Floods 1980-1990	.298*	.221*		
Percent of Land F3	.936*			

One tailed significance # = <.01, * = <.001-

[6]The lower part of Table 6 can be considered a weighted version of the upper part. For the expanded 65-village sample, the correlation was somewhat lower between flood protection and experience (r = .478 and r^2 = 228), just as the gamma statistic was lower for the expanded than for the original village sample in Tables 4 and 3.

3.3 Flood Protection/Experience and Desires

Which tells more about how rural people view flood protection measures: the physical protection they enjoy in terms of infrastructure such as embankments and elevated roads, or their actual experience of floods irrespective of how much protection they are supposedly benefiting from? Based on the partial analysis done to date, it appears that the answer depends on what kind of flood response measure is being considered. To anticipate the findings that will emerge from Tables 7 and 8, it can be said that people's attitudes about infrastructural measures seem to be more related to their current level of flood protection, while their views on service delivery flood response measures are more connected to their actual flood experience. On the other hand, when determining which villagers generally are more enthusiastic about both infrastructural and service delivery measures, experience is the determinate. Also, though, those most in favor of infrastructural measures tend to live in villages that get flooded yearly, a finding that makes sense. But those most in favor of service delivery improvements tend to live in villages that get flooded frequently, but not every year.

Table 7 presents summary results regarding preferences for infrastructural flood measures, grouping respondents according to the degree of flood protection and flood experience over the past decade. The Household Survey asked each respondent how he or she evaluated a number of specific flood response measures on a scale of 1 (very helpful) to 5 (very harmful). Thus, the lower the mean score for a group, the more favorable the response for the group on average.

3.4 Evaluation of Infrastructural Flood Response Measures

Table 7 shows that the entire sample[7] has an average answer of 1.83 when evaluating an embankment between the respondent's dwelling and the major source of flooding. When the sample is divided into three groups according to flood protection level, those living in the five fully protected villages average 1.75 in their answers, while those in the partially protected villages have a mean score of 1.98. Finally, respondents from completely unprotected villages average 1.55 in their answers, making them the group most favorably inclined toward this flood response measure. This seems reasonable, as those with the least protection currently would want an embankment for flood protection.

At the same time, those now enjoying full flood protection think that embankments are somewhat more valuable than those who currently are only partially protected. Again, this seems logical, for those who are now fully protected are most likely happy with their complete, adequate embankments, while those who are only partly protected may attribute unreliable protection to embankments that are not always effective. Although they favor embankments in general (the mean score of 1.98 is considerably lower than the neutral response of 3), they are not as convinced of embankment protection as those who live in fully protected villages. When considering flood experience, those most in favor of full protection embankments are respondents living in areas that get flooded every year (mean score = 1.28). In fact, this is the most enthusiastic group to be found whichever grouping scheme is used. Again, this makes sense, for those most exposed to flooding are expected to want embankments.

[7]That is, the all of those who answered the question. In this case, 1,768 answered and 84 did not (1768 + 84 = 1852).

Table 7
Evaluation of Response Measures
by Flood Protection and Flood Experience

Response Measure	Entire Sample*		Flood-Free Village	Flood Protection				Flood Experience 1980-1990			
	Number	Mean		Full	Partial	None	F	Severe	Frequent	Annual	F
Structure											
Embankment:											
Between house and flood	1786	1.83	3.75	1.75	1.98	1.55	24.6	1.75	1.82	1.28	15.4
Behind house	1475	2.56	3.64	2.27	3.19	2.11	81.7	2.49	2.62	1.74	11.9
Surrounding village	1838	1.77	3.93	1.79	1.87	1.47	25.7	1.67	1.78	1.11	23.0
Submersible	1841	1.87	2.59	2.21	1.96	1.53	117.1	2.04	1.62	1.50	65.7
Elevated road	1850	1.19	1.26	1.21	1.12	1.13	1.3	1.20	1.20	1.03	11.2
Public high ground	1848	1.30	2.08	1.13	1.18	1.40	48.3	1.19	1.36	1.33	22.4
Improved drainage	1848	1.45	1.24	1.23	1.45	1.60	57.2	1.32	1.48	2.35	219.2
Metalled road	1849	1.09	1.17	1.12	1.12	1.07	3.6	1.10	1.10	1.02	3.7
Metalled road/embankment	1825	1.42	3.01	1.54	1.41	1.19	49.7	1.48	1.18	1.23	49.5
Service											
Storm warning	1249	1.64	1.23	1.69	1.68	1.62	2.8	1.73	1.50	1.93	57.7
Breach warning	1831	1.77	3.01	1.63	1.79	1.71	6.9	1.84	1.44	2.14	113.1
Domestic tubewell	1847	1.17	1.35	1.26	1.14	1.12	16.9	1.17	1.18	1.08	2.8
Village grain storage facility	1847	1.86	2.50	1.75	1.88	1.85	4.9	1.89	1.73	1.89	10.9
Grain drying facility	1840	1.93	2.41	1.88	1.96	1.88	2.0	2.10	1.72	1.38	88.3

*One flood-free village is included in the sample, but it is excluded from the three flood protection groups in the ANOVA statistics. The varying figures in this column reflect a lack of response by some households.

In Table 7, the F statistic listed for each set of groups results from an analysis of variance (one-way ANOVA) performed for them. The F is significant at the .0001 level for both sets, meaning that there is a 99.99 percent chance that for both flood protection groups and flood experience groups there is a real difference between the mean values for the three groups in the set.[8]

But use of the F test in the current context is not so much for its value in showing whether a statistically significant difference exists among the means of the groups (though this use will come into play at times), as it is as a way of telling which two measures more closely relates to respondents' evaluations of specific flood measures. In this particular case, flood protection (F = 24.6) is more strongly related to desire for embankment protection than is flood experience (F = 15.4).[9]

Also in Table 7, respondents were asked to evaluate an embankment that stood on the far side of the source of flooding. There was some interest (overall mean = 2.56), but it was considerably less than for an embankment between the respondent and the flood source. The group most interested in far-side embankments are again those who get yearly floods (mean = 1.74), while the group least interested are those partially protected from floods (mean = 3.19). The level of current flood protection also was more highly related (F = 81.7) to interest in embankments than is flood experience (F = 11.9).

The remaining entries in this section of the table proceed in similar fashion. Surrounding embankments or polder schemes are again favored most highly by those who are flooded every year. This same group also favors submersible embankments and those located on elevated roads. Interest in submersible embankments is highly related to flood protection (F = 117.1), though it also relates closely to flood experience (F = 65.7). Both those who are less protected and those who have experienced the most problems with flooding are most impressed with submersible embankments.
Everyone seems to like embankments on elevated roads. The group means when arrayed by flood protection level are all just about the same and the F test (F = 1.3) is not statistically significant at all (p = .28). When dividing respondents by flood experience, there is some difference between those who get flooded each year (mean = 1.03) and everyone else (mean = 1.20 for the other two groups). Although it is statistically significant (F = 11.2), the difference between the means for the three groups is rather less than what emerges for most of the other flood measures.

There are a number of other infrastructural measures covered as well in the Household Survey. When asked about public high ground, those who already have some degree of security against normal floods and annual inundation are most concerned about this measure. Those who already have full flood protection are more enthusiastic about public high ground (mean = 1.13) than those who are not protected (mean = 1.40, and F = 48.3). For the groups based on flood experience, the differences are parallel if less pronounced. Along similar lines, an improved drainage system is most favored by those

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[8]The ANOVA in all cases reported in Tables 7 and 8 applies only to the three groups that experienced flooding. Kismat, which is flood-free, is omitted although it is included in the sample mean for the entire population.

[9]It could be argued that regression/correlation analysis would be a better measure, but using ANOVA permits an assessment of the values (i.e., the means) for each group, as well as the effect of the groups as a whole. ANOVA also facilitates comparison and interpretation for the intended users of this report.

Interpreting the F statistic here is relatively simple. In Table 7, the lower the F value, the lower the chance that there is any difference between the compared groups. The real value of F in the present context is an indicator of how much difference there is between the groups. Thus, there is a more difference between how the three groups evaluate submersible embankments (F = 117.1) than in how they assess metalled roads (F = 3.6). In other words, all respondents tend to agree on the value of metalled roads, regardless of their flood protection, but they disagree about the value of submersible embankments.

best situated already who can, perhaps, get another crop planted if they can drain their fields quickly.[10] On the other hand, those more exposed to floods may be less concerned with draining areas that are likely to be covered in water for several months anyway.

The last two infrastructural measures relate to roads. Respondents were asked about a metalled road connecting their village to the nearest main road (irrespective of whether the road was on an embankment[11]), and then about a connecting metalled road specifically on an embankment. The nonspecific metalled road elicited a higher level of interest than the road/embankment (average mean for the entire sample = 1.09 vs. 1.42). This is perhaps because respondents thought in terms of geographical direction: a metalled road is almost always desirable, while an embankment leading in the wrong direction (where, for instance, it might block natural drainage while offering no protection) might be worse than no embankment at all.

3.5 Evaluation Patterns

Several patterns emerge from an examination of people's evaluations of infrastructural flood measures. First, there are substantial differences in enthusiasm for various measures depending on what degree of flood protection they already enjoy and on what their previous experiences of flooding has been. Second, attitudes toward embankments are more closely related to flood protection level than to experience, while for the other measures the patterns are less clear. The single group most highly disposed toward embankments overall, though, are those who get flooded every year.

Third, and perhaps most important, while flood protection tells more about enthusiasm for embankments than does flood experience, the connection between protection level and embankment interest is not straightforward. That is, the level of interest grows directly as protection level increases. Instead, those with no protection tend to be most interested, those partially protected are least interested, and those with most protection fall in the middle.

Why should those who are partially protected show the least concern for embankments? Perhaps, as suggested above, those who were only partly protected were less impressed with the efficacy of infrastructural flood control measures than those who were either fully or not at all protected. The next step here is to examine the particular villages that manifest this disinterest in embankments.

Finally, while there was considerable interest in embankments, the general level of enthusiasm was considerably higher for metalled roads, as can be seen by comparing the overall means for the various measures for the entire sample population. Only the embankment on an elevated road compares with the interest in roads, probably for the obvious reason that the existence of a road is part of the question

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[10]The agricultural analysis for the Household Survey shows that a shorter flooding period often permits an extra crop, sometimes a foodgrain crop.

[11]The first question originally asked about a metalled road specifically not on an embankment, but it was changed.

itself.[12] Public high ground and improved drainage systems also find more overall favor than embankments per se. People like embankments, in short, but there are other infrastructural measures they like more, irrespective of the degree of flood protection or the amount of flood experience.

3.6 Evaluation of Service Delivery Measures

Table 7 also presents a number of service delivery measures. Storm and breach warnings were assessed by respondents. There is not much distinction among flood protection groups (F = 2.8) on storm warning systems, but there is a great difference in how the flood experience groups view this measure. Understandably, those who suffer from frequent floods are more in favor (group mean = 1.50) than those dealing either with rare floods (mean = 1.73) or those faced with yearly flood problems (mean = 1.93).

The pattern is much the same for breach warning systems. The frequently flooded villagers are more enthusiastic (mean = 1.44) than those in the other two groups (means = 1.84 and 2.14), presumably for the same reasons that would explain the evaluations of flood warning systems. The differences are reflected in the high F value (F = 113.1) for the ANOVA exercise (compared with a F of only 6.9 for the flood protection groups).

Domestic tubewells for drinking water were favored by all groups, but were evaluated most highly by villagers who get flooded every year (group mean = 1.08). This same group are likely most interested in safe water supplies for household consumption. In this case, there is a somewhat greater relationship with flood protection level (F = 16.9) than with flood experience (F = 2.8, not statistically significant at the five percent level). The differences are not great by either grouping, however, when compared to what emerges for some other measures.

All groups valued a village grain storage facility within a range of 1.73 to 1.89. Community grain drying facilities (which would charge a fee), on the other hand, are assessed similarly when respondents are grouped according to flood protection level (means around 1.9, F = 2.0, not significant even at 14 percent), but a large difference emerges when people are categorized according to their flood experience. Those dealing with yearly floods are more enthusiastic for grain drying facilities (mean = 1.38) than the other two groups, with a high F (= 88.3).

In an overall sense, flood experience has a stronger relationship with people's evaluation of service delivery measures (higher F values), while flood protection relates more strongly to infrastructural measures. The implication, then, is that when infrastructural measures are proposed for an area, the current flood protection level is the first thing to consider. But, when service delivery schemes are suggested, people's previous flood experience should be considered first in deciding what specific measures might be most appropriate.

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[12]The two questions about roads and embankments may cause some confusion. The first deals with a road on an embankment between the respondent's dwelling and the major flood source. The second asks about a road on an embankment leading from the respondent's village to the nearest main road.

3.7 Identifying People's Desires

In addition to asking for respondents' evaluations of specific flood response measures, the Household Survey also asked open-ended questions about what flood response measures they would like to see implemented at neighborhood/union/upazila/NGO levels, both as flood preparation activity and during post-flood efforts. This constitutes the second source of information noted at the beginning of this chapter.

These open-ended questions elicited a wide range of answers. Not surprisingly the measures suggested followed the patterns seen so far in this analysis, clustered into infrastructural and service delivery types. Table 8 illustrates the data collected, focusing on future preflood measures that Household Survey respondents wanted at the union level.[13] Respondents were asked what measures, if any, they would like to see undertaken to prepare for floods.

It should be noted that these data differ from those reported in Table 7 on two counts. First, they are open-ended. While classifying the answers for coding, 12 categories were developed for preflood measures at the union level plus one other category containing 25 answers from among the 1,577 respondents. Second, for these questions, people were asked initially what the union parishad had done to prepare for floods. Then they were asked to evaluate the measures taken, name needed other measures, and suggest additional measures (Table 8). Only a small number of respondents reported any preflood activity at any level.[14] In Table 8, only 24 of the 1,852 respondents said the union had done anything at all to prepare for floods. Fully 1,577 people had ideas about what should be done, however. This wealth of ideas should be kept in mind when it comes time to develop strategies for improving institutional flood response.

The patterns that show up in Table 8 in many ways confirm those that emerged in the discussion of Table 7. It is clear that people differ in their perception of what flood preparation measures they desire, both according to the flood protection and flood experience. Water drainage and canal excavation measures were the most popular, with almost a quarter (24.4 percent) mentioning such activities. But people's interest varied depending on where they lived. A bit less than half (45.7 percent) of those in fully protected villages suggested these infrastructural measures, while about a fifth (19.7 percent) of those in unprotected places and only a tenth (10.2 percent) of the partially protected respondents liked this approach. As noted earlier, it may well be that people who are only partially secure from floods are more skeptical about the effectiveness of infrastructural measures than those enjoying full protection or those completely lacking in protection.

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[13]Altogether there are 10 sets of open-ended queries, the data presented in Table 8 represents just one set. Respondents were asked what measures were taken before, during, and after floods at the four levels, and then what special measures were taken at each level in connection with the 1988 floods.

[14]When asked what the Union Parishad had done during and after the 1988 flood, 1,296 people named at least one activity. The Institutional Survey found similar patterns of local inactivity before floods.

Table 8
Preparatory Measures Desired from the Union

	Total sample (%)*	Flood protection (%)			Flood experience 1980-90 (%)		
		Full	Partial	None	Rare	Frequent	Annual
Water drainage and canal excavation	24.4	45.7	10.2	19.3	28.6	21.2	11.5
Constructing flood shelters	19.6	15.5	22.1	20.7	23.9	15.0	11.5
Constructing and repairing roads	18.8	42.1	16.6	5.9	26.3	8.3	14.3
Flood forecasting and warning	16.8	10.6	11.2	23.7	14.8	23.9	0.7
Build small embankments	15.1	13.1	23.3	11.8	14.1	17.7	10.8
Communication and transport	9.3	5.4	15.1	8.6	11.3	6.3	9.4
Prepare to give loans	5.8	0.2	13.4	4.9	1.3	12.2	7.2
Protecting crops	4.8	1.6	5.5	6.4	2.1	7.1	12.9
Total responding (number)	1577	444	403	730	872	566	139
Total sample (number)	1852	455	527	784	966	659	141
Total villages (number)	24	5	7	11	12	9	2

*The total sample includes the flood-free village, but it is excluded from the flood protection and flood experience groups.

Interest in constructing flood shelters by contrast appears to be more evenly spread across flood protection types, although roughly twice as many people experiencing rare floods (23.9 percent) like the idea as those undergoing yearly floods (11.5 percent). As for flood warning systems, suggestions came most often (23.9 percent) from people frequently flooded, rather than from those rarely or always flooded.

Also similar to Table 7, flood protection seems to be more closely related to suggestions such as drainage, excavation, and roads, while flood experience accounts for more of the difference concerning shelters and warning systems.

The patterns discernable from asking open-ended questions, in short, are in many ways like those stemming from asking about specific flood measures. But there also are a number of differences that will materially aid FAP 14's overall effort. For example, it should be noted that while people were asked specifically for their evaluation of storm warning and breach warning systems, they often suggested measures relating to flood forecasting and warning systems, which is different. This distinction could explain why, for the second set of questions, people in unprotected villages show the most interest in flood forecasting/warning systems (23.7 percent in Table 8), while respondents exhibit little difference in their answers about storm warning systems when grouped by level of flood protection ($F = 2.8$ in

Table 7).[15]

Attitudes about roads offers a second example. Metalled roads were favored by everyone, whereas constructing and repairing roads at the union level (which presumably refers to the dirt roads undertaken by FFW projects) was suggested more often (42.1 percent) in fully protected villages than in the other two types (16.6 and 5.9 percent).

In both examples, answers are different to what seem, at first, to be similar items. But in each case, closer examination reveals that there are clear distinctions to be made: storm warnings and flood warnings are not the same, and neither are metalled roads and FFW roads. It would have been desirable to include specific questions about flood warning and FFW roads in the questionnaire design as it would have allowed more precise statistical analysis. Inevitably there will be items left out of any survey design. But, by including some open-ended items it is possible to pull in unanticipated yet valuable information. Careful study along the lines charted in the preceding paragraphs will prove most useful to FAP 14's final report.

3.8 The Institutional Survey

Thus far in this chapter, attention has been devoted almost exclusively to the Household Survey. Its sister enterprise, the Institutional Survey, was conducted in tandem. As mentioned earlier, the Institutional Survey has two components: the original 24-village survey and the expanded 65-village version. The 41 additional villages were selected in unions other than those of the original 24 villages for more diversity.[16]

The criteria used to select the expanded set of villages were in many cases different from those used to choose the original group of 24. The first group were picked so as to include one low and one high village in each upazila. A secondary criterion was that one (usually the lower village) should be remote from the upazila headquarters and the other (generally the higher one) be close. For the expanded set of villages, some were chosen to provide a better variety of occupational categories, waterlogging problems, erosion patterns, and so on. In other words, the expanded group of villages were not chosen to duplicate or proportionally enlarge the kinds of places included in the original set. Nor were they selected randomly. This combination of factors should have a depressant effect on any similarity between the two sets. Thus if the patterns found in the original group of villages are, in fact, replicated in the enlarged set, there is all the more reason to think such patterns may well reflect an underlying reality in all flood prone areas of Bangladesh.

Two more preliminary points are in order. The first is that, just as the earlier analysis centered on which flood response measures people wanted rather than what they already had, this analysis centers on desire rather than activity. The Institutional Survey gathered much information on flood response action, along lines similar to those pursued by the household survey, but in this initial evaluation report our analysis will be restricted to the former.

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[15]Since Table 8 shows only what percent of people suggested an activity, an ANOVA test like that used in Table 7 (reporting scores on a scale of 1-to-5) would not be feasible here, where only the presence or absence of a suggestion is reported.

[16]Two villages were surveyed in one union. For three of the unions in the expanded survey, the data collected was insufficient to allow detailed analysis, so the total size of the union sample is 61.

The second point is that information on people's attitudes about the neighborhood/village/upazila levels was collected mainly at the village level, while information on what is wanted at the union level comes both from the study villages and from talking at length with many people at the union headquarters itself.

In a number of ways, the patterns that emerge from the Institutional Survey reinforce those found in the Household Survey. In particular, flood protection and flood experience appear to have much to do with what people want in the way of institutional flood response measures. Table 9 shows the number of unions in which an interest was expressed in canal excavation through the FFW program. For the original 24 sample unions, the relationship is strong between desire for such activity and flood protection level. All three of the fully protected unions expressed interest in canal excavation, about half of the partially protected unions did, and only two of the 10 unprotected unions did. The gamma statistic resulting is quite high at .794.[17]

When considering the expanded set of unions, the basic pattern still holds: all seven fully protected unions are interested in canal excavation, more than half the partially protected ones are, and only eight of the 22 unprotected areas are. The proportion of unprotected unions expressing interest is higher than that observed for the unprotected unions, however (eight of 22, as against only two of 10 in the original sample), so the overall relationship between the two variables is not as great for the 61 unions as for the 24. This difference is reflected in the lower gamma statistic (.628 vs. .794).

Flood experience is also somewhat related to interest in canal excavation, but the connection is not as strong as for flood protection. This lower relationship is reflected in the lower gamma statistics for these two contingency tables as compared with the first two in Table 9.

Other flood response measures do relate more strongly with flood experience, as is evident in Table 10. Here we find that there is no connection at all at the union level between interest in small embankment construction under the FFW program and flood protection (gamma = .000 for both original and expanded samples), but there is a strong connection when we look at flood experience (gamma = .798 and .637).

Table 9
Desire for Union-Initiated Food for Work Canal Excavation

		Protection				Experience			
		Full	Partial	None	Total	Rare	Frequent	Annual	Total
24-Village	Yes	3	6	2	11	4	7	0	11
Sample	No	0	5	8	13	4	6	3	13
	Total	3	11	10	24	8	13	3	24
65-Village	Yes	7	19	8	34	12	19	3	34
Sample	No	0	13	14	27	6	14	7	27
	Total	7	32	22	61	18	33	10	61

Tables 9 and 10 indicate that some of the findings from the Institutional Survey support and reinforce

[17]The gamma statistic is a convenient measure of association between the two items being analyzed. It varies from 0 (no connection) and 1 or -1 (complete connection, given the marginals). Therefore, there is a somewhat stronger association between flood protection and interest in canal excavation for the 24-village sample (gamma = .794) than for the expanded sample (gamma = .628).

those emerging from the Household Survey, while others do so only weakly or not at all. Given that the samples were drawn differently for different purposes, it is not surprising that the findings do not all point in the same direction. It makes the impact all the more effective when they do so.

Table 10
Desire for Union-Initiated Food for Work Construction of Small Embankments

		Protection				Experience			
		Full	Partial	None	Total	Rare	Frequent	Annual	Total
24-Village Sample	Yes	0	2	1	3	0	2	1	3
	No	3	9	9	21	8	11	2	21
	Total	3	11	10	24	8	13	3	24
65-Village Sample	Yes	1	12	6	19	1	13	5	19
	No	6	20	16	42	17	20	5	42
	Total	7	32	22	61	18	33	10	61

Table 9 also reinforces some of the conclusions drawn earlier about canal excavation, which was seen to be more appealing to those in fully protected areas and in places rarely experiencing floods than to people living in more vulnerable localities (see Table 8). Table 10 shows some feeble support for the findings of Table 8, in that there is a slightly greater tendency for partially protected unions to want small embankment construction (two of nine in the original sample, and 12 of 32 in the expanded sample) than for fully protected (zero of three and one of six) or unprotected (one of nine and six of 22) unions. And, unlike the findings in Table 8, there are no signs in Table 10 that frequently flooded unions favor embankments more than anyone else.[18]

Flood forecasting also was a concern noted among the household respondents as discussed previously in connection with Table 8. Then it was noted that people in unprotected villages and with frequent flood experience expressed the most interest in flood warning systems. Table 11 shows that while there is interest in the unprotected unions (eight of 10 in the original sample and 10 of 22 in the expanded set), proportionally, warning systems were more appealing in the partially protected unions, at least for the original sample. But it would appear that the caution expressed earlier about the expanded sample, not necessarily being similar to the original one, were justified. On the other hand, as far as flood experience is concerned, the frequently flooded areas show considerably more interest in such systems than the other two groups.

[18]Keeping in mind that the Institutional Survey data reflects the thinking of union officials, and that they Household Survey data reflects the thoughts of villagers, it is more noteworthy that Tables 8 and 9 reinforce each other than that Tables 8 and 10 do not.

Table 11
Desire for Flood Warning System from the Union Parishad

		Protection				Experience			
		Full	Partial	None	Total	Rare	Frequent	Annual	Total
24-Village Sample	Yes	1	9	8	18	6	10	2	18
	No	2	2	2	6	2	3	1	6
	Total	3	11	10	24	8	13	3	24
65-Village Sample	Yes	1	18	10	29	8	17	4	29
	No	6	14	12	32	10	16	6	32
	Total	7	32	22	61	18	33	10	61

This pattern of the expanded sample is not similar to the original one in terms of flood protection, but quite like it when villages are grouped in terms of flood experience. This reappears in Table 12 which shows desire expressed for drinking water provision from the upazila level. Here the relative proportions of the two samples at the bottom of the table are almost alike (whence the similar gamma indices of -.481 and -.468).[19]

Why should the two samples be alike with respect to flood experience but unalike when it comes to flood protection? At this point in the analysis it is only possible to speculate,[20] but further analysis and interpretation of the Institutional Survey findings should lead to more definite answers here.

In the meantime, this brief presentation of some of the Institutional Survey findings should give a idea of how this data resource can enrich and extend (and at times perhaps even call into question) the Household Survey results. Together the two studies will offer a depth and richness that neither alone could provide.

Table 12
Desire for Provision of Drinking Water by Upazila Parishad

		Protection				Experience			
		Full	Partial	None	Total	Rare	Frequent	Annual	Total
24-Village Sample	Yes	2	3	7	12	5	5	2	12
	No	3	4	4	11	7	4	0	11
	Total	5	7	11	23	12	9	2	23
65-Village Sample	Yes	4	14	12	30	8	18	4	30
	No	9	8	17	34	18	14	2	34
	Total	13	22	29	64	26	32	6	64

[19]The gamma statistic is positive when most of the cases are in the cells running along the diagonal from upper left to lower right. It is negative when they are on the opposite diagonal, as is the case at the bottom of Table 12.

[20]One's objective estimation of flood protection, for example, is easily overshadowed by more immediate realities. Flood experience, on the other hand, is so much a part of one's personal history that other circumstances may seem relatively trivial.

3.9 Socioeconomic Conditions

The physical flood environment, both objective and subjective, plays an important role in how people deal with floods and what improvements they would like to see in their ability to do so. But these are far from the only factors at play in rural Bangladesh. Social and economic conditions always have been powerful forces in many issues and is so for flood response issues as well.

In addition to the immense material that FAP 14 has assembled on flood response and aspirations for better flood response, considerable data also has been acquired on socioeconomic characteristics of the people interviewed and the areas in which they live. Thus far the study's efforts have been devoted largely to the more immediate task of finding meaningful patterns in flood response itself and relating those patterns to the flood environment in which people live. Some initial work has been launched into the socioeconomic sphere as well,[21] and some preliminary indications can be presented as to where that effort is headed. The principal socioeconomic measures gathered in the Household Survey were identified and collected as part of the original 100 percent survey of all 6,685 households in the 24 selected survey villages. Indeed, these data formed a significant part of the basis for choosing the final sample of 1,852 households. The major indicators dealt with household income/expenditure, occupational and landholding patterns (including rented land), household possessions (principally buildings, animals and equipment), educational levels, and household food budgets.

Table 13 gives some idea of the direction of future analysis with these data. Two measures were chosen for evaluation as dependent variables: an improved field drainage facility and a community grain drying facility. It was considered that a socioeconomic component would more likely emerge from these two variables than from other flood response measures such as flood warning systems. Five predictors were chosen for this multiple regression exercise, balanced between socioeconomic measures (monthly household expenditure,[22] farm size and household head's educational level) and two flood-related indicators (the flood protection and flood experience variables that have been employed thus far in this chapter).

The improved drainage facility found a respectable multiple correlation (adjusted $R^2 = .177$ or about 18 percent) of the variance explained collectively by the predictors.[23] As can be seen in the presentation of the standardized (beta weight) coefficients, however, flood experience is carrying most of the freight. Education and expenditures pick up some, and farm size (which might have been expected to be the most powerful predictor of interest in a facility that would presumably benefit people in direct proportion to the area they farm) accounted for less. Flood protection, on the other hand, did not even get included in

[21]See the discussion in the Household Survey section of this chapter.

[22]Experience elsewhere has shown that rural households tend to find it easier to estimate expenditures than income.

[23]The most easily interpreted regression analysis statistic is the "adjusted R square," which expresses the variance in the dependent variable as a percent. The four predictors in the final equation statistically account for about 18 percent of the variance in the evaluation of an improved drainage facility by the 1,762 households that replied to the question. The R square statistic also varies between zero (no explanatory value) and unity (indicating an identity between predictors and the variable being predicted). The respective values of the betas or standardized coefficients indicate how much each contributes to the regression; in this case, flood experience (beta = .408) is the largest contributor.

the regression before the limit for exclusion had been reached.[24]

The second exercise considered diminishing enthusiasm for a community grain drying facility on the same five independent variables. It also was expected, *ex ante,* to show a strong relationship with socioeconomic predictors, especially farm size in view of the presumed beneficiaries of such a facility. The results in Table 13, however, are distinctly unimpressive, with less than eight percent of variance accounted for (adjusted R^2 = .076). This time both flood experience and flood protection get included in the regression equation, but neither has the power observed in the first multiple regression.

3.10 Village Level Analysis

Thus far the analysis has concentrated on finding patterns in the study area as a whole, contrasting villages and unions with each other in terms of flood protection or flood experience. This effort has been useful in discovering that different flood response measures appeal to different localities. In general terms, for instance, Table 7 shows that people who live in fully protected villages or totally unprotected villages are more in favor of embankments than those who live in partially protected villages. People who live in fully or partially protected villages consider high ground public areas more important than do those who have no flood protection. And people who experience frequent floods value storm and breach warning systems more highly than those who contend with only rare flooding.

But why does one fully protected village put a higher or lower value on embankments or public high ground than another? And why does one frequently flooded village consider warning systems more important than another? Furthermore, when looking at a given partially protected village, is everyone unimpressed with embankments or only those with, say, lowland? If institutional efforts are going to improve people's capacity to respond to floods, then their wishes must be considered and such questions must be asked.

To start with the examples above, two of seven such partially protected villages stand out in terms of low evaluations for full protection embankments: Pakisha in Singra Upazila (mean = 2.74); and Rukuni in Madhukhali Upazila (mean = 3.82). What makes respondents in these two villages relatively unimpressed with the value of embankments? Pakisha, located inside the Chalan Beel polder, suffered much distress in both the 1987 and 1988 floods. They were forced to breach the embankment to relieve the water congestion inside the polder scheme. It makes sense, then, that residents there are less confident about embankments as protection against flood problems. Rukuni is a relatively remote village that has not suffered much from floods in the past, although it is only partly protected from them. In 1988 embankments failed completely and 85 percent of the standing crop was heavily damaged. Thus, the people there find embankments of little use when they need them, even if they do not need them very often.

Three of nine villages subject to frequent flooding gave breach warning systems high evaluations: Pakisha in Singra Upazila (mean = 1.08), Rampur in Nasirnagar Upazila (mean = 1.10), and Auliapukur in Chirirbandar Upazila (a perfect village score of 1.00). Why should these places be so enthusiastic about breach warning systems? Quite likely, Pakisha's inhabitants are interested in such systems because Pakisha suffered before the Chalan Beel polder was breached in both the 1987 and 1988 floods. On those

[24]Table 7 shows that flood experience had a much greater relation to assessment of improved drainage systems (F = 219) than flood experience (F = 57).

occasions the breaching was seen as a salvation, but in the future it could be harmful to the village. In any event, people there are conscious of problems leading to embankment breaching and deem it highly important to find out quickly when a breach has occurred.

Auliapukur Village also was badly flooded in 1987 and 1988, when a breach in the area's railway embankment would have helped alleviate their water problems. But government authorities were worried about a breach washing away the railway line and so posted police pickets to prevent such an act. As a result, no breach occurred, but many local residents thought it would have been a good idea. Consequently, high on the residents' list of institutional priorities is more culverts under the railway track to relieve future flood congestion. People clearly are aware of the significance of breaches, and so it stands to reason that there would be much support for a breach warning system.

Rampur Village is more difficult to explain in this connection. It is located in a haor area where inundation is a perennial problem, so much so that cultivators there raise only a boro rice crop. In effect, there are no embankments to offer any kind of flood protection, therefore, there should be little concern about breaching embankments. In this case, it will be necessary to review the field data assembled there, perhaps even to visit the study site at some point, to explain for the anomaly.

The FAP 14 survey offers many opportunities to probe within village level data sets for further explanation. For the villages analyzed in the preceding paragraphs, the following information provides an opening for such an inquiry.

Table 13
Selected Embankment and Breach Warning Evaluations

Measure Evaluated	Village	Mean	Std. Dev	Cases
Embankment	Pakisha	2.74	1.48	73
	Rukuni	3.82	0.89	92
Breach Warning	Pakisha	1.08	0.32	72
	Rampur	1.01	0.11	79
	Auliapukur	1.00	0.00	52

In Pakisha there were reservations about embankments, but there was much disagreement about them as reflected in the relatively large standard deviation of 1.48 around the mean value of 2.74. In Rukuni, on the other hand, there was considerably more distrust of embankments (mean = 3.82). The standard deviation of 0.89 indicated that there was rather less disagreement about what people felt on this issue. On the breach warning system question, Pakisha showed a much higher degree of consensus with a standard deviation of only 0.32 around the mean value. For Rampur disagreement was even less, and for Auliapukur there was apparently a complete unanimity on the value of a breach warning system, with everyone agreeing it would be very helpful.[25]

[25]The standard deviation is a measure of dispersion around a mean, such that (assuming a normal or bell-shaped distribution) about two-thirds of the cases will fall within one standard deviation above or below the mean. For Pakisha, then, two-thirds of the respondents gave answers between (2.74-1.48=) 1.26 and (2.74+1.48=) 4.22, with the remaining third being less than 1.26 or more than 4.22.

In Pakisha, some people evidently considered embankments more helpful than others, whereas in Rukuni there was less disagreement on the matter. The reason for a lack of consensus in Pakisha might be occupation, as people with crops to lose might see things differently from those whose major concern was a safe place for their families. With a breach warning system, people might be less divided by occupation as the warning would presumably affect everyone similarly.

Table 14
Multiple Regressions for Two Flood Response Evaluations

Evaluation of quick drainage facility

Multiple R	.423	
R square	.179	n=1762
Adjusted R square	.177	

Predictor Variables	Beta	T	T signif.
Flood Experience	.408	18.86	<.0001
Educational Level	-.082	-3.65	.0003
Monthly Expenditure	.073	3.16	.0016
Farm Size	-.051	-2.27	.0232

Evaluation of community grain drying facility

Multiple R	.280	
R square	.079	n=1754
Adjusted R square	.076	

Predictor Variables	Beta	T	T signif.
Flood Experience	-.282	10.23	<.0001
Farm Size	-.143	-6.20	<.0001
Flood Protection	.148	5.39	<.0001
Educational Level	-.073	-3.16	.0016

Table 15 pursues this conjecture by dividing occupations into three categories and matching them against the evaluation scores on embankments and breach warning systems.[26] Here we find self cultivators and day laborers divided on embankments, with clusters in both the "moderately helpful" and the "moderately harmful" columns. Households with other occupations, on the contrary, think much more favorably of embankments, with fully half the group answering "very helpful". What is bad for some farmers and laborers is apparently good for others, as well as for nonfarming households generally. When it comes to warning about breaches, however, almost everyone (67 out of 72 households) is positive about the

For Rukuni, two-thirds were between (3.82-0.89=) 2.93 and (3.82+0.89=) 4.71. In Auliapukur, everyone rank a warning system as one, so the standard deviation was zero.

[26]Because occupation cannot be ranked (or at least not easily), the gamma statistic, which assumes some ranking among categories, is inappropriate.

idea.

Table 15
Flood Measure Evaluation and Occupation in Pakisha

		Evaluation Score					
	Occupation	Very helpful	Helpful	Neutral	Harmful	Very Helpful	Total
Embankment Between House and Flood	Self Cultivator	5	10	1	9	1	26
	Day Laborer	2	6	0	8	4	20
	All Others	13	4	0	4	5	26
	Total	20	20	1	21	10	72
Breach Warning System	Self Cultivator	23	2	1	0	0	26
	Day Laborer	19	1	0	0	0	20
	All Others	25	1	0	0	0	26
	Total	67	4	1	0	0	72

A possibility for deeper analysis here is offered by the socioeconomic data collected in the survey. Table 16 shows a pattern between embankment evaluation and size of landholding for self-cultivators.

Table 16
Embankment Evaluations and Landholding Size

Embankment Evaluation Score	Mean Size of Landholding (decimals)	Cases
1	568	5
2	440	10
3	533	1
4	266	9
5	528	1

Except for the two farmers who answered with a "3" value on this survey question, there is a distinct relationship between landholding size and enthusiasm for embankments. Larger farmers like them while smaller landholders do not. There appears to be some class difference at work. A possible explanation is that the real distinction is land level, but, in fact, some 98 percent of all land in Pakisha is low and so is not a factor in embankment interest. Household monthly expenditure patterns offer confirming evidence here for the class explanation as shown in Table 17.

Table 17
Embankment Evaluations and Monthly Expenditures

Embankment Evaluation Score	Mean Household Monthly Spending (Taka)	Cases
1	2,925	20
2	2,285	20
3	3,000	1
4	1,580	21
5	2,080	10

Except in a few cases, interest in embankments varies negatively with household expenditure level.[27]

3.11 Conclusions

Though its findings are tentative, this chapter has attempted to show the scope of interpretative analysis that will be undertaken as FAP 14 moves toward conclusion in the summer 1992. It seems evident at this point that people's attitudes about flood response is not a simple matter of wanting more and bigger institutional activity than they have seen to date. Rather they are quite selective in what they think will be useful. For example, those who face uncertainty in the flooding regime value flood response measures differently from those who get inundated either rarely or yearly. They would prefer breach warning systems over embankments, for example, while people who are already protected against ordinary floods would rather have secure ground for refuge against extraordinary floods than more embankments. On the other hand, people who have no current protection prefer embankments to warning systems.

The FAP 14 analysis is under way, but the scope for interpretative work is immense. The opportunity is an important one. A flood response measure that is valued more highly by farmers than nonfarmers, or more by food-surplus families than food-deficit families will, affect some groups or classes differently from others. A full and accurate analysis of the data collected in the FAP 14 surveys should be of material assistance in pointing out particular groups of people who favor or disfavor various responses, who stand to be benefitted or harmed by them, and whose active participation should be solicited in planning and implementing any serious institutional flood response measures. Those who plan flood response efforts for the Bangladesh government and international donors would be well advised to take such preferences seriously into account when launching activities aimed at ameliorating flood conditions.

This chapter has served as an introduction to the kind of analysis and interpretation that can be expected to come out of the FAP 14 Household and Institutional Surveys. If what has emerged so far is any indication, the FAP 14 study should be of great use to those hoping to map out strategies to improve the flood-coping capability of rural people.

[27]The zero-order correlation between embankment evaluation and household expenditure is -.256, while the correlation between embankment evaluation and total landholding is -.290, offering further confirmation of the class hypothesis (not surprisingly, the correlation between the two predictors here is a very high .846). As noted elsewhere in this report, reported monthly household expenditure was thought to be a better measure of affluence than recollection of income.

Chapter 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

In relation to the TOR, part of the assigned task is completed and part is not. There is a system for making quantitative comparisons of various types of flood interventions in terms of the relative priority that people place on them and in terms of the numbers and characteristics of those people. The measures chosen are easy to interpret and have clear policy implications. The main parameters of disagreement in evaluations are by village or, more broadly, locality. Within a locality, agreement on desirable interventions is relatively high, across all social classes, and agreement is most favorable on infrastructural changes that will be accessible to all.

In about half the communities, there is interest in embankments of some sort, but there also are recognized problems with drainage. In virtually all communities there is support for public high ground and interest for improved water and fuel supplies, communication (warnings and transport), and security. And finally, the kinds of locally controlled and institutional measures that seem to be preferred also are likely to be relatively cheap and cost effective. Probably the most important result of the study so far is the idea of focussing flood relief efforts on public high ground in the center of populated areas, rather than on embankments at their peripheries. The Bangladesh floodplain presents inescapable dilemmas: water brings life and death, health and sickness, land and erosion. People want the normal inundations, but not the severe floods. They want protection, but not interference with drainage. Embankments represent one approach, one set of compromises. A strategy centering on public high ground as a refuge and local infrastructural base ought to be regarded as another approach, one which has wider public support and interest.

What has not yet been done was not an explicit requirement of the TOR, but was implied as a desirable end. That is to go beyond quantitative assessment and summary of priorities to the creation of a genuine planning model, one that could be used for "what if" exercises. This has not been done, largely because the most crucial data is that which describes household agricultural and economic activities, and, under press of the project schedule, this has not yet been fully developed.

It seems impossible to avoid concluding that planning for physical interventions should be undertaken as part of a larger package of physical and institutional changes under substantial local control. If only roads and high ground are involved, the control may be at the village or union level. If embankments are contemplated, there must be some way to effectively aggregate villages to the project level and the level of those surrounding the project boundaries that also would be affected.

4.2 New Research Possibilities

The following suggestions reflect the discussions during and after the August workshop. They would be undertaken parallel to continuing work with the Household and Institutional Surveys, and should be considered as part of an effort to develop further possible interventions beyond those included in the original survey. The aim of developing such interventions is dual: to include them as models in future

planning efforts between the GOB and the donor community, and to include them in future studies like the Household and Institutional Surveys which should become part of the normal project preparation procedure in Bangladesh. This should be at least until such time as strong and representative local government is developed that could supplant as a way of assessing and articulating the interests of the intended beneficiaries of development programs.

4.2.1 NGOs

A suggested study of NGOs would look at their current activities to identify their accomplishments and constraints. It also would consider their expertise for making recommendations for local institutional adjustments to either facilitate government activities or allow such activities to be taken over by more regular and locally grounded organizations (unless the NGO itself meets this description, as some do). For the short run, the study also could recommend how to facilitate the activities of NGOs themselves, consistent with the general aim of enhancing indigenous response capabilities.

The study should begin in the villages where NGO activity was reported in the sample. Overall, less than two percent of respondents mentioned them. Those mentioned were: CARE, Save the Children, and *Unnayan Sahajogi* Team (UST). The first step will be to collect all descriptions and evaluations that might not be coded in the computer files. Next, surveyors should go to the villages to get more explanation and expansion, and to identify local people who were important in the activities but who may not have been in the sample. Once local NGO activities are identified and evaluated, the NGO itself should be interviewed. This will document what they tried to do, the limiting or facilitating conditions that allowed them to do what local people liked or prevented them from doing it, and the modifications they would suggest for the situation in which they worked. These modifications might be infrastructural, institutional, educational, or legal. For example, an NGO may suggest that village voluntary groups be allowed to hold or manage properties that might be needed for small clinics, storage facilities, or meeting places. These accounts of NGO activities and recommendations will be taken back to the villages for reaction. And finally, follow-up activities that more fully illustrate what could be accomplished should be undertaken. This, however, should be undertaken with the same critical attention as the first studies: seeking independent assessments of a representative and broad sample of householders, and relating their assessments to their socioeconomic interests and position. Some substantial version of the Household Survey should be filled out for each person interviewed in depth, to get a baseline comparison to relate those who are active in such organizations to the general sample.

Recommendations which appear to be mutually acceptable and promising to both NGOs and villagers should be subject to a legal review. The recommendations should be precise for any new regulations or legislation that would give voluntary associations, either local or national, the necessary autonomy to act and draft internal regulations to assure local control. They must be accompanied by appropriate guarantees that such regulations, once agreed upon, will be recognized and respected by governmental authorities. Local groups should be able to form and organize themselves according to their own ideas, and to disband just as readily, by a procedure much simpler than in the cooperative and societies acts.

4.2.2 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. The groups were generally described as either: volunteers, J. Sangha, J.Y. Sangha, Krishi, or Islamic groups. The study should determine exactly what these groups are and what they do, with extended evaluations of their activity both from those in the

villages where they have been reported and from those in the villages who did the work. Some of the other villages where such groups were not reported should be revisited to determine why the groups are not there. Was there no need, or did some other agency do the work? Or were there local circumstances, such as factional rivalry, working against this type of civic action?

This village level enquiry should determine whether these groups were purely spontaneous or if they followed some established custom or tradition. Was there some national or international leadership? The question of regional support needs to be handled carefully with the jaiba sangha and islamic groups. It is an easy jump from finding a few links between villages to speaking as though there is a national organization. Particulars about the groups should be determined: Does it have officers? How are they selected? Who are they? Does it have a budget? Where does it comes from and how is it allocated? Does it publish literature? How does it make its views known? Is the leadership provided only in idea, example, or educational program, or was there also some form of material support or incentive? Does the organization exist prior to, and apart from, the activity in which it engages? If volunteers conducted three activities during the 1988 flood, did the same people work on all three?

If the organization is ephemeral and task oriented, as they seem mostly to be, would those who participated like to see them take on a more formal structure? If so, what would that structure be? Why does it not have such a structure already? For example, are there legal powers it should have, but often lacks, such as: the ability to deposit money in a bank or cooperative, pool property for a common purpose, or be granted the attention of government officers such as extension workers.

The final aim, as with NGOs, is to identify how these groups could be strengthened to do whatever is considered useful.

4.2.3 Water, Fuel, and Related Needs

The Household Survey indicated that storing and gathering water and fuel are more commonly reported as flood related concerns than storing or obtaining food or fodder. Both are closely related to each other and to health. Because fuel mainly is used for cooking and the water for drinking, the burden of providing falls on women. Accordingly, it is logical to investigate women's issues in the flood context generally, and as health problems.

The aim of this activity will be to recommend measures to improve the flood responses generally by facilitating the work that women do, and reducing their time and drudgery. Recommendations should include considerations of the time and effort that are currently spent on these activities, and should reflect critical consideration of how these efforts might be reduced. How much time is spent gathering water in person-days per family in ordinary times and in flood? How might improved water supplies reduce this, and what could be done with the time instead? Would this provide a clear incentive that would overweigh whatever cost was involved? Similarly questions could be asked concerning fuel and minor medical support.

It seems likely that it will be possible to recommend actions that can be carried out on local initiative, at low cost.

The study should begin with a review the existing data, then extensively interview a sample of the households drawn proportionally from those that do and not report measures concerned with fuel and water. The interview should ask about the kinds of water and fuel used, the sources, the costs, the time

involved in getting them, and the reasons for which they are obtained. These questions should be asked in context of similar questions about other things which women do. Then the questions should ask if women are helped 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 more affected by such changes or improvements.

4.2.4 Agricultural Adjustment

Surprisingly, responses to questions involving crop damage generally did not include action regarding the damaged crops as much as alterations in crop planning. After identifying relatively long fallow periods, the study should explore ways in which to provide farmers with additional options such as suggesting new crops to try, or providing better extension programs or better input supplies. Again, the aim will be to frame recommendations for possible action. The study should determine which crops are involved, when they are grown, and what damage they sustain? Then a few farmers should be selected who grow these crops each time and have had each type of damage. Once the cases are identified, it is desirable to go back to the field quickly for further questions, because memory of the details that affect a crop choice fades fast.

Much information of this sort was collected in Dr. Brammer's study for the Food and Agriculture Organization (FAO), beginning in the mid 1960s and updated in 1982. The district soil surveys and Volume 2 of the FAO series should be reviewed in the light of this study's results. Then more comments and explanation should be obtained in the field. Are the crop choices described as of 1982 still the dominant ones, or have the choices changed (for example, because of the spread of water pumps and tillers)? In any case, what does the change or lack of change up to now suggest as promising areas for future development? What services and physical materials are most needed, and what can be done to make them more accessible? For example, if extension advice would be useful, can there be a better way of organizing it than through television? If there were groups of farmers in the village organized for some purpose (such as flood emergency planning), could such a group be the focus of extension visits that might impart useful and timely advice to reduce flood damage or hasten recovery?

4.2.5 Flood Season Income

Households did not indicate a general practice of seeking a second job or leaving their homes in search of work during the flood season. A few respondents living in deeply flooded areas did report such action, but usually people appear to stay in place during floods and struggle by on reduced incomes and work opportunities. After analysis, additional research will be done to more fully document 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 important not to plot actual work hours per day as in most rural settings the distinction between work and nonwork is almost meaningless. It is better to focus on the peoples' own conceptions of slack time, identify times they could do more, and try to explain both.

An important preliminary computer exercise could be done to look at the frequencies of those who report a second occupation by villages, and determine if higher frequencies seem to correspond to longer inundation periods or more deeply flooded areas. Data on average inundation length can be obtained from the plot data base, but that will be more complicated. It would require averaging the flood start month and the flood end month for each village, and for each land level.

4.2.6 Local Level Planning and Involvement

In the Household Survey, the flood preparation and protection measures which received the highest evaluations were those, that, on technical grounds, ought to be carried out at a local level or at least a substantial component of local involvement in planning and operation. It also 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.

More research will be conducted to document the current constraints on local formulation and implementation of desired programs at the village and union parishad level. Then, further studies should be done to develop 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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