

Visit to Bangladesh to continue work on project on the improvement of the storage of crop residues, 16 to 24 May 2001

NRI PROJECT CODE A0981 (R7859); VISIT NO VO8281

C D Wood

File number, office and name:

4745, *Natural Resources Management*. Improvement of the storage of crop residues in Bangladesh

Separate copies to:

Prof. Ali Akbar (and Dr Islam, Dr Shajalal through Prof Akbar), BAU
 Prof. Mosihuzzaman (BCSIR), Dr Khan (and Mr Rahim, Ms Begum through Dr Khan), IFST
 Prof Coker, Dr Wareing, Mr Nagler, Dr D Thomas, NRI.
 Dr Wyn Richards, NRIL (with Q1 2001/02 Report)
 Ms Stubblefield, DFID Field Management Support Office, Bangladesh

Summary of key points

Project implementation has been severely delayed due to delays in the banking system during the transfer of funds to the Bangladesh Agricultural University. However, the funds are now available and the project is progressing. Four demonstration stores have been constructed and the sampling and analysis of rice straw is underway. No hazardous levels of mycotoxins were detected in the first batch of straw samples collected in February (dry season). The PRA survey will be started shortly. Initial responses from the farmers to the roofed stores have been positive, although the cost should be reduced. The first stores appear excessively large due to the influence of the farmers, and would have been appreciable cheaper had they been built to the original specification.

Background

1. This project started formally on 1 January 2001, and this was the second visit by Dr Wood to Bangladesh under this project.
2. Feed shortages are a major constraint to animal production in Bangladesh. Farmers depend on rice straw as feed, but wet weather leads to serious losses in the quantity and quality of the feed available. Feeding mouldy straw, which may be contaminated with mycotoxins, has adverse effects on animals and consumers of milk. Mycotoxins can inhibit animal performance and be carried over into milk, where they can be hazardous to consumers. The project will evaluate the effects of current practices on the quality of rice straw, and (subject to approval of phase 2) develop methods to improve its availability, nutritive value and safety as an animal feed. Cost-effective interventions to reduce losses and prevent fungal attack will be identified and tested on-farm in a farmer-participatory manner. The wider promotion of successful techniques will be facilitated.

Objectives

3. The objectives of this visit were:

- (1) To review progress to date and discuss the next steps of the project.
- (2) Familiarisation with the handling and storage of boro rice straw.

Activities

Meeting at BAU, 18 May

4. Prof. Ali Akbar and Dr Shahjalal (BAU) met with Dr Wood. After a very considerable delay, Prof. Akbar now has the funds from the first advance to BAU. Dr Wood brought the second advance in travellers cheques which were converted to a bankers draft in favour of The Director BAURES. This was done at the American Express Bank in Dhaka.

5. Vehicle purchase is being done via the BAU purchase committee and should be completed on 22 May. NRI will need a copy of the associated paperwork together with details of the vehicle (make and model, serial numbers, purchase price and date). It was noted that the vehicle will have to be re-insured during the gap in the project between phases 1 and 2. This will be discussed further in December. If the project does not have funds available, the Livestock Production Programme Manager will be approached to fund this and continuing maintenance as appropriate.

6. Four roofed stores have been built at Mutagacha, but delays in getting access to funds has meant that the stores in Trishal have not been constructed yet. The stores cost more than expected, about Tk 12,000 per store (about £160). Straw from the roofed stores and control traditional stacks was sampled on 14 May. Samples have been labelled with the farmers name, village and date.

7. Repairs to the dryer have been discussed and could start shortly now that funds are available. A new dryer will be purchased. Funds will be covered by a grant from the PRS survey. Part of meters and balances are available in Dhaka. The PRS survey will be initiated when the vehicle is available.

8. For the next sampling of straw from the roofed stores and the control traditional stacks, an estimate of the amount of spoiled straw must be made. A by-eye judgement, and farmers' opinions will probably be best for the total % losses due to spoilage as the initial weight of straw is not known. BINA, Mymensingh, have a freeze dryer which can be used to dry the milk samples.

9. The use of urea treatment as a short term storage technique for boro straw, to be investigated in phase 2, was discussed. There is a shortage of labour during the boro straw harvest, so farmers will not adopt a laborious labour intensive technique. Small stacks treated with solid urea and covered in plastic sheeting appears to be a more attractive approach than filling plastic sacks which may be too labour requiring.

10. Recent press articles have identified aflatoxin being a particular problem for poultry farmers in Bangladesh.

Visit to Muktagacha Thana, 19 May 2001

Rajpur village

Rustam Ali's farm (small sized farm)

11. Boro straw was being harvested and dried in the sun spread out on the village track. Some well dried boro straw was being stacked, spoiled boro straw was in small heaps. In Bangladesh in May it is usual to have rain storms, before the monsoon rains start in July. This year, however, there had been little rain by mid-May. The stems are cut fairly high up the plant when the boro rice is harvested, leaving a relatively long stubble and a good quality straw compared to the aman straw. The stubble and weeds in the fields are grazed when there is no water in the fields, and then ploughed into the soil.

12. The demonstration roofed stores have been built much higher than suggested during the January visit, and appear to have a capacity of up to twice that required. They are similar in size to the mark 1 stores constructed in Zimbabwe. They have 8, 3.6m (actually 12 ft) long concrete pillars for supports, 4 on each side. The roof is of galvanised corrugated iron sheeting supported on a bamboo frame. Stores are about 3.6m wide, 5.4m long, 3m high at the side and 4.2 m high at the apex. The overhang of the roof is only about 0.3m. Farmers asked for the largest possible store, but the high roof gives less protection to the straw than a lower roof would if rain is blown in from the sides. The roof was simply put over the existing stack on Rustam Ali's farm. The base will be built up by 20 to 30 cm and a low bamboo platform put in above this to keep the straw off the ground. There had been no time to construct the base due to delays in getting construction started. The farmer thought that the store will give good protection to the straw. Bamboo matting will be inserted from the roof to narrow the gaps at the sides of the store. The store cost about Tk12,000 but would have been about Tk8,000 to 9,000 had it been built in a more suitable size.

13. The farmer had completed about 75% of the boro harvest, in 10 days it will be completed. The harvest was good this year, and as there had not been much rain there had been few problems in drying the straw. Two to three consecutive days rain a few days before the visit had led to some straw being attacked by mould. The farmer will use this as compost, others may dry spoiled straw for use as fuel. Some 20% of the boro straw was spoiled, 55% dried well for use as feed, plus 25% still to be harvested. In a bad year, when there is little straw, mouldy straw may be fed to livestock, but this year there was plenty of straw following a generally good aman crop and good drying conditions for boro straw. At the time of the visit the harvested rice was being stacked prior to threshing. It is often stacked for two to three days to allow the rice grain to dry and making threshing easier. Rice can also be threshed immediately after harvest. It depends on labour availability, weather and other conditions. Boro straw is preferred by animals, probably because it is usually cut further up the stem than aman straw, avoiding the thicker stem material which is not very palatable.

14. There is no experience of urea treatment of straw at either village, so any work on this will have to start with some demonstrations of the technique.

Chiranjana Das' farm (medium sized farm)

15. Aman straw was being stored in the roofed store. The farmer has shaded area for a calf, also used for chopping straw and other activities, but not for storage. It is about 2 m wide x 3 m long, bamboo poles and roof frame, with corrugated iron roof. The bamboo pillars have to be replaced every two to three years, the roof frame every eight to nine years. The farmer expects the new stores to last at least 30 years. This farmer's boro harvest was about 70% complete, with about 15% of the straw so far lost to spoilage.

Garaikuti village

16. Maltipur had been dropped as a site for the demonstration stores and survey due to poor collaboration from the villagers, who were suspicious of the project. Garaikuti village has been selected as its replacement. It is a short walk from Rajpur village, with closely similar cropping systems.

Yusef Ali's farm (small farm)

17. On this farm, boro straw was being put into the covered store rather than aman straw as planned by the project. The boro straw had been sampled for the first sampling time, therefore it was decided that on this farm it would be the storage of boro straw which would be monitored. (For the other three stores, aman straw was in the new store as planned.) The aman straw was in a traditional stack beside the covered store. The farmer did not have time to transfer the aman straw to the covered store because he was busy with the boro harvest. May is a busy time for farmers. The boro straw was stacked right to the edge of the covered store in spite of the fact that it was largely empty. A raised earth base and platform will be added when time permits and the boro straw restacked into the covered store.

18. This farmer has completed about 60% of the boro harvest, which was delayed due to sickness. About 40% of the harvested straw was spoiled by rain (darkened). This is mainly dried for fuel, some used as compost or to cover emerging potato plants (used to retain moisture for the potatoes).

Fanindra Das' farm (medium sized farm)

19. The roof had been constructed over an existing straw stack. The capacity of the store was probably about 30% more than required. The farmer regarded the store as very useful but expensive, and local farmers have come to see the store and expressed a similar opinion. The aman straw will run out in November. But there has been only about 20% of the boro straw lost due to spoilage this year, with the harvest almost complete.

20. Another farmer in this village has a small covered store for straw which he constructed with his own resources some eight years ago. The covered area is also used to chop straw and store chopped feed, as well as to store straw. It has bamboo pillars and roof frame, and a roof of thatched rice straw. It is about 1.5 m wide and 2.5 m long with a raised earth base about 30cm high. It cost about Tk 2,000 to build. The rice straw roof has to be replaced each year (using

aman straw), the bamboo has to be replaced every three or four years. Its small size is due to lack of funds. The farmer also has a traditional stack alongside the store which contains the majority of his straw (which is being sampled for comparison with the new roofed stores). Straw from the stack is used first as this is most vulnerable to damage. The straw in the store will last about two months if used to feed his two cattle (1 cow + 1 calf), but as there is plenty of straw this year the straw in the store may be kept until next year.

Visit to Trishal Thana, 19 May 2001

Motbari village

Karim Mandal's farm (medium sized farm)

21. Located just behind the school on the main road to Dhaka, this is one of the farms selected for a roofed store but earlier delays have meant that none of the four stores in Trishal have yet been constructed. The farmer has some aman straw left and a separate traditional stack of boro straw. Only about 30% of the boro crop had so far been harvested on this farm, with no spoilage of straw so far. This farmer will use up all the aman straw (not much left at time of visit) before using the boro straw, which did not appear to be a common practice. The farmer said that practices did vary, with some finishing the aman straw before starting to use boro straw and others using boro straw as soon as it became available and keeping aman straw until later. The aman straw will be used up by mid June to feed his two cattle, and the boro straw will be stored until the next aman crop is available. This is a storage period of up to six months, far longer than some other farmers had indicated as the longest possible storage period for boro straw.

22. The farmer has a good boro harvest as water from nearby fish ponds is drained onto the rice fields when the fish are harvested, providing fertiliser for the rice. As with Muktagacha there was no experience here of urea treatment of straw.

Bharadova village

23. Located amongst fish ponds, some farmers had cross bred dairy cows (including Holstein Fresian crosses). Aman straw was partly used up. The new boro straw was stacked directly on top of the aman straw in the traditional stacks. The boro straw is used first, and when this is finished the aman straw is exposed again and used. This is a common practice in this village and elsewhere. About 10 to 15% of the boro straw has been lost due to spoilage.

Analysis and conclusions from field trips

24. While some farmers store aman and boro straw in separate stacks, this is by no means the practice on all farms. In Trishal it is common to stack boro straw on top of the residual aman straw, then use the boro straw before finishing the aman straw. For the baseline mycotoxin sampling the straw must be collected with care, making sure that the correct type of straw is collected in the sample. It appears that, contrary to earlier impressions, there are no fundamental reasons why boro straw cannot be stored for an extended period as long as it can be well dried.

25. The demonstration roofed stores in Muktagacha are too tall and bigger than they need to be. The concrete support pillars should be no longer than 8 feet so that the roof is about a man's height at its lowest point (say 0.75 to 0.8m). The overhang of the roof should be about 0.8m. It was agreed that the stores in Trishal would be built in this way.

26. It was interesting that a second farmer with a straw store was observed (one had also been seen in Charalgae village, Ishwargarj Thana during the January visit). This supports the idea that improved stores have real potential to help small holder farmers in Bangladesh. It may also indicate that bamboo pillars may be more appropriate than concrete, and rice straw thatch more appropriate than corrugated iron sheeting, to reduce the initial capital cost (but with a large increase in maintenance costs and labour required in the longer term).

27. There is apparently no previous experience of the urea treatment of straw in the project field sites, so any future work on its use for storage will have to start with practical demonstrations of the approach to farmers.

Workshop

28. This may be timed for early December 2001 (although Ramadan runs from 16 November to 15 December 2001, so the timing will be reviewed) and be of one day duration. Participants should include: DFID staff (from Field Support Office, LPP manager), NGOs (BRAC, Proshika), Government extension services, Thana livestock officials, as well as staff from NRI, BAU and IFST. Farmers would attend and contribute to the afternoon session. It was anticipated that there would be about 36 people in attendance.

Content

Introductory session

Introduction to farming system and role of livestock
Feed shortages and storage
Introduction to mycotoxins

Technical session

PRA survey – Dr Islam
Mycotoxin baseline study
Roofed stores, design and performance
Farmers perspectives on roofed stores

Discussion and conclusions

(which can be fed into the design of phase 2)

Practicalities

The venue should accommodate 40+ participants. It is suggested that the workshop should start at about 10.00, so that people travelling from Dhaka could come that morning. There should be a social event, e.g. dinner, in the evening after the workshop. However, these suggestions will need to be reviewed if the workshop takes place during Ramadan. On the following morning

there should be an optional field visit to see some of the covered stores and have the opportunity to discuss them further with farmers.

29. The project has no specific budget for the workshop due to budget cuts imposed during the approval procedure, and therefore cannot cover any travel or subsistence costs, but there will be no charge for attendance. It is anticipated that the majority of participants will be based in the Mymensingh area.

Socio-economic survey, meeting at BAU, 20 May

30. Dr Islam, Prof Ali Akbar and Dr Wood discussed the conduct of the survey. A list of the farms involved is given in Appendix 1. A proposal for the survey and budget, drafted by Dr Islam, is presented in Appendix 2. Some funding will be diverted from the capital equipment budget to ensure that the survey is adequately funded. A draft questionnaire for the survey, also prepared by Dr Islam, is given in Appendix 3. It was agreed that farmers should also be asked about long term trends in numbers of livestock owned (cattle, goats, poultry), trends in feed availability (grazing, rice straw), trends in farm sizes.

31. The survey has been delayed due to the lack of transport, a problem which should be solved when vehicle purchase is completed on 22 May. The survey field work should take about 10 to 12 working days to complete. However, university exams in mid June and the boro rice harvest limit the availability of student assistants and the farmers. It is planned to get one area surveyed in late May as long as the boro harvest is complete in time. In any case, the survey should be complete by the end of June, before the onset of the monsoon rains.

Meeting at IFST, 22 May

32. Dr Khan, Director of IFST, Ms Begum, Mr Rahim and Dr Wood discussed progress and administrative matters on the project. The equipment purchased for IFST by NRI was delivered and reports on the analysis of the first batch of samples (taken on 4 March in Muktagacha and 11 March in Trishal) were exchanged. No hazardous levels of mycotoxin were detected in any of the samples analysed by IFST and NRI. The second advance of funds to IFST has now been received. Dr Dawlatana has taken up a one year post doctoral position in South Korea, and so will no longer be working on phase 1 of the project. Mr Rahim will now be the co-ordinator/contact person for IFST inputs. It was noted that all collaborators need to be informed if there are changes in personnel working on the project. The SP TLC equipment at IFST has now been repaired and is working well.

33. Due to the tight budget, BAU have requested that IFST provide fuel for trips by IFST staff between Dhaka and Mymensingh. The project vehicle, being purchased today, will be available for these trips. IFST agreed that they can pay for this fuel. There will be savings in the IFST budget now that Dr Dawlatana is no longer working on the project and it was agreed that these savings could be used to cover the additional travel costs.

34. Sampling of the traditional stacks must be done with care as some of the stacks will contain aman straw at the base and boro straw on the upper parts of the stack. Farmers must be consulted

when the samples are taken to ensure the appropriate type of straw is taken. It was noted that one of the roofed stores contains boro straw rather than aman straw; both aman and boro straw samples are required for the June and August samplings as specified in the sampling schedule. The next sampling of straw is due in late June, by which time the dryer at BAU will have been repaired. Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh, have a freeze dryer which can be used to dry the milk samples, also due for collection in June. The freeze dryer should be checked to work out the practicalities of getting the milk samples dried before sampling itself starts.

35. Aflatoxin in poultry feed has been an issue which has received attention in the Bangladeshi press in recent weeks. Dr Khan raised the question of whether aflatoxin in eggs would be degraded on cooking or whether it represented a health risk to consumers. Dr Wood undertook to pass the enquiry on to Prof Coker for an informed response.

Phone conversation with Leigh Stubblefield, DFID Field Management Support Office

36. Ms Stubblefield is the Natural Resources Field Manager in Bangladesh and covers a range of projects on agricultural livelihoods. Progress on the project was reviewed briefly. Any proposals on mycotoxin in poultry feed in Bangladesh should be copied to Ms Stubblefield. Ms Stubblefield also requested copies of the Project Memorandum and visit report. The end of phase 1 workshop was discussed. The proposed timing of early December will fall within Ramadan. Whilst not ruling out this period, care would be required so that activities ended by about 2 pm to allow time for prayer etc. Early November or January should be reconsidered, 1 and 2 November are public holidays in Bangladesh. Ms Stubblefield or a colleague will be able to attend the workshop. Mike Devries of CARE should also be contacted in view of his interest in livestock work (devries@carebangladesh.org).

Other

37. An Action Plan for the coming months is presented in Appendix 4.

Appendix 1 List of collaborating farms

Not available yet.

Appendix 2 Proposal for Conducting Participatory Rural Appraisal (PRA) Studies in Rural Areas of Mymensingh District

Project Title: Improvement of the quality and availability of crop residues to better rural livelihood in Bangladesh.

Background

The present on-going NRI-BAURES collaborative research project 'Improvement of the quality and availability of crop residues to better rural livelihood in Bangladesh (phase 1)' has started in conducting study since January, 2001. In Mymensingh district, small and medium farmers owning at least two cattle have been selected to examine the storage practices for utilization of rice straw for cattle aiming to determine the constraints of production and storing of animal feed in respective area. Before conducting in-depth study, PRA will be conducted to explore the opportunity for improving feed quality and availability of animal feed in some rural areas of Mymensingh district.

Objectives of PRA

- To record and evaluate the current cropping and harvesting, and storage practices for utilization of rice straw for cattle.
- ii. To determine feeding practices and storage facilities of animal feed specially rice straw.
- iii. To identify the constraints to the production and safe storage of animal feed.
- iv. To explore opportunity for improving feed quality and availability.

Methodology

3.1 Study area and target group selection

Table 1. Villagewise participation in the PRA

PRA conducted in villages	No. of participants in each group of PRA								Total
	Muktagacha				Trishal				
	Small farm households		Medium farm households		Small farm households		Medium farm households		
	Farmers	Women (wives of farmers)	Farmers	Women (wives of farmers)	Farmers	Women (wives of farmers)	Farmers	Women (wives of farmers)	
Village 1	8	8	8	8	8	8	8	8	64
Village 2	8	8	8	8	8	8	8	8	64
Total No. of PRA participants	16	16	16	16	16	16	16	16	128

3.2 Study team

a. Team members

Team members	No.
PIs of the Research Project	2
Research Assistance of the project	2
Facilitators, Male (2) and Female (2)	4
Block Supervisor/Fieldman	1
Total	9

- b TAO, TLO and other concerned officials in respective areas may be requested to provide assistance and cooperation for conducting PRA.

PRA Session: 4-5 sessions with the target groups will be conducted in each village. In total at least 16 PRA sessions (4 villages x 4 groups) will be conducted for four groups of participants in four villages of the study areas.

Budget for Conducting PRA

<u>Line items</u>	<u>Estimated Cost,</u> <u>Tk</u>
Honorarium and other services for experienced PRA facilitators and team members	52000
2. PRA Participants:	
8 participants in each session and 16 sessions will be conducted	
▪ wage or allowance for the participants 128	18000
▪ Food for the participants	12300
3. Transportation (vehicle rental and fuel cost)	11000
4. PRA materials (Expendable supplies)	1000
5. PRA Report (data processing, report typing, photo copy and printing)	9000
Total	103300

Details of item I

Experts and other people to be involved in PRA

a	Honorarium	
	Facilitator 2 (Trained in PRA)	Tk 4000
2	Girl students 2 (M.S. in Ag. Econ. and Trained in PRA)	Tk 8000
3	Concerned Block Supervisor/Field man	Tk 3000
4	Project Team Members involved in PRA (PIs and ROs)	Tk 30000
	Sub-total	Tk 45000
b.	Meal and other services	Tk 7000
	Total	Tk 52000

Proposed by

Dr. M. Serajul Islam
PI, Socioeconomic Component

Signed by

Dr. M. Ali Akbar
Project Leader
Improvement of the quality and availability of
crop residues to better rural livelihood in
Bangladesh

**Improvement of the quality and availability of crop residues
to better rural livelihood in Bangladesh**

Budget for Socioeconomic Component, 2001

Year 1: Budget for 8 months, January to August 2001

		<u>Estimated budget for 8 months</u>
1	Office supplies and services	
	▪ Stationaries	6500
	▪ Typing, photocopy, reporting printing	6500
	▪ Utilities (blocks, reports and journals)	1950
	▪ Computer with necessary accessories	32600
	▪ Scientific calculator (2)	650
	▪ Furniture	4550
2	Travel and transportation (TA & DA for enumerator and team members)	7150
3.	Salary and allowances	
	▪ Research Fellow – 1, @ Tk 4000/month	32000
	▪ Principal Investigator – 1 (Honorarium @ Tk 6000/months)	48000
4	Contingencies	7800
Total		147600

Note: Total budgeted expenditure for socioeconomic component is Tk 253000. Since 65% of total project money has been received, accordingly 65% of submitted budget money for economic component i.e., Tk 164450 may be provided against the line items and rest 35% of budgeted money (Tk 88550) will be provided after receiving money from NRI.

Proposed by

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Appendix 3 Improvement of Storage of Crop Residues in Bangladesh

PRA Checklist

Timelines

Year of adoption of modern technologies

<u>Technologies/Events</u>	<u>Technologies adopted/events occurred (year)</u>	
<u>HYV</u>		
<u>Boro</u>		
<u>T. Aman</u>		
<u>Aus</u>		
<u>Irrigation</u>		
<u>DTW</u>		
<u>STW</u>		
<u>Power tiller/Tractor</u>		
<u>Weeder</u>		
<u>Thresher</u>		
<u>Paddle thresher</u>		
<u>Open drum power thresher</u>		
<u>Power thresher</u>		
<u>Winnower</u>		
<u>Rice dryer</u>		
<u>Rice mill/Flower mill (portable)</u>		
<u>Chopper</u>		
<u>Other tools and equipment used in cultural operation and post-harvesting (seed drill) reaper etc.</u>		
<u>Transportation</u>		
<u>PT operated trolley</u>		
<u>Bullock cart</u>		
<u>Van</u>		
<u>Rickshaw</u>		
<u>Straw storage system</u>		
<u>Open store</u>		
<u>Roofed store</u>		
<u>Rainfall continued for longer period and destroyed straw</u>		
<u>Short supply of straw</u>		
<u>Outbreak of cattle disease</u>		
<u>Cyclone</u>		
<u>Flood</u>		
<u>Drought</u>		
<u>Famine</u>		

Social mapping of village

Information needed:

Village map (prepared by participants) indicating

- No. of households,, Muslim%, Hindu%.
- No. of farm households - - - - % household owned livestock
- No. of small farm households - - - - % household owned livestock
- No. of medium farm households - - - - % household owned livestock
- No. of large farm households - - - - % household owned livestock
- No. of landless farm households - - - - % household owned livestock
- No. of PT
- No. of STW
- No. of DTW
- No. of thresher
- No. of sprayer
- No. of mosque
- No. of Church/Mondir
- Roads passed through the village
- School (No.)

Primary

High school

Madrasha

- College/Institute
- % of people educated: Male %, Female _%
- Market
- Others (if any)

(a) Seasonal calendar of major task for all seasons (all groups)

- List all major agricultural task by Bengali months.

Plot the number of days of farmers and women undertaken in each months (bar chart) (ask labourer to plot if appropriate).

- Plot with a different colour pen the days of work before and after introducing HYV of rice.

4. Gender analysis of labour involvement (all groups)

Rice cultivation

Activities	% of involvement	
	Male	Female
<u>Seed bed preparation</u>		
<u>Land preparation</u>		
<u>Uprooting and transplanting</u>		
<u>Weeding</u>		
<u>Top dressing</u>		
<u>Irrigation</u>		
<u>Pest control</u>		
<u>Harvesting and carrying</u>		
<u>Threshing</u>		
<u>Winnowing and drying</u>		
<u>Storing</u>		

ii. Home based activities (women group)

Activities	% of involvement	
	Male	Female
<u>Poultry rearing</u>		
<u>Cattle rearing</u>		
<u>Goat rearing</u>		
<u>Stall feeding of cattle</u>		
<u>Straw processing (drying) and storing</u>		
<u>Milking</u>		
<u>Homestead vegetable production</u>		
<u>Sewing (Katha, embroidery</u>		
<u>Bamboo works</u>		
<u>Other income generating activities</u>		

7. Target group characteristics

Sociodemographic profile and food security

Name of respondent	Farmer		Family members No.		Working members No. (16-60 yrs)		Food production (kg)		H.H. requirement (kg)		Food (kg)
		Educa-tion	Male	Female	Male	Female	Rice	Other crops	Rice	Other crops	Food surplus/purchased
2											
3											
4											
5											
6											
7											
8											

Do you have food for your family throughout the year ?
 If not, State coping strategy in stress condition

Do you make any difference for food preference and allocation between male and female members in your family ? If yes, why and how ?

9. Present cropping pattern and farming system (Small and medium farmers)

Cropping pattern	Production period		% of residue (Straw) stored in good condition				
	From	To	1997	1998	1999	2000	2001
Boro							
T. Aman							
Aus							
Pulses and oil seed							
Vegetables							

10. Causes of straw losses (All groups)

Crops	% losses suffered from			
	Continuous raining	Less sun shine	Termite	Others
Boro				
T. Aman				
Aus				
Pulses				

What did you do with spoil straw?

11 Preference ranking of cattle owners for rearing livestock (Small and medium farmers)

Types of cattle	Draught	Milk		Meat ¹		Cash/savings	Manure	Replacement
		Consumption	Sale	Consumption	Sale			
Bulls/Bullocks								
Cows								
Bull calves								
Heifers								

Note: Total score is 10 for each purpose.

1 Ritual Slaughter for Id is consumption.

12. **What problems did you experience during Boro and Aman season in 2000-2001? Did they affect the quantity and quality of straw you stored**

(a) Boro rice

(b) Aman rice

13 Have you heard about roofed stores? Yes/No why have you not built roofed store?

14. Did you use urea/salt or any other substance to stored crop risidues this season? Describe:

5 During which months did you feed straw from the store?

Straw	Months stored	Feeding months	Crises period
Boro straw			
Aman straw			
Aus straw			

20. Sources of household income, 2000-2001

Name of respondent	Annual gross income							
	Crops	Vegetable	Pond fish	Poultry	Livestock	Labour selling	Trade	Service
1.								
2.								
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21. Casual diagram of problem and constraints in
- a. straw storing and preservation
 - b. Rearing livestock
22. Flow diagram of
- a. introducing HYV rice
 - b. decreasing number of livestock

Note: Farm activities

Farm activities

1. Land clearing
2. Land preparation
3. Seedlings
4. Transplanting
5. Weeding
6. Harvesting and carrying
7. Threshing
8. Winnowing
9. Straw drying and storing
10. Cattle stall feeding
11. Milking

1. Earth work
2. Construction
3. Rickshaw driving
4. Small trading
5. Others (if any)

2. Non-farm activities

19. Supply of animal feed (straw), 1990-91 and 1999-2000

Name of respondent	1990-91							% of straw damaged	2000-2001							% of straw damaged
	Rice cultivated (Dec)	No. of cattle	Straw production, kg		Surplus/ Deficit	Pur-chased			Rice cultivated (Dec)	No. of cattle	Straw production, kg					
			Pro-duce d	Requi-reme nt		Kg	Value				Pro-duce d	Requi-reme nt	Surplu s/ deficit	Pur-chased		
														Kg	Valu e	
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How do you cope up in stress condition in getting animal feed.

Appendix 4 Action plan for next activities in project

1. The four demonstration roofed stores will be constructed in Trishal by the end of the first week in June.
2. The PRA survey field work will be started in late May if the farmers are available, and will be completed by the end of June.
3. The mechanical dryer will be repaired by 20 June in the existing facility so that it can be used to dry the June and August straw samples.
4. The June straw samples will be collected late in June, when the dryer is available.
5. Vehicle purchase will be completed by 22 May.
6. The straw chopper will not be purchased as an existing course chopper works adequately. Funds saved will be used to help fund the survey work. Prof. Akbar will review the requirement and budget for the PC, immersion heater, vacuum pump, pH meter and top pan balance when the survey and vehicle purchase have been completed to ensure the project stays within budget and the funds are used optimally. Dr Wood will be informed of any proposed reallocation of funds so that permission can be obtained from the LPP manager.
7. A one day, end of phase 1 workshop will be held at BAU in early December 2001 (timing subject to further discussion).