Technical solutions to NRM constraints in the charlands context –

a report on project experiences

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Project R8103

Consensus for a Holistic Approach to improve Rural-livelihoods in Riverine-islands of Bangladesh (CHAR)

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Background

The DFID-NRSP funded CHAR project aimed to develop a consensus building process among the char dwellers for better natural resource (soil/crop, water and animal) management to reduce vulnerability and conflicts among various resource user groups. To engage the char people in a socio-institutional process, Participatory Technology Development (PTD) was considered as an entry point in the village to address various livelihood and farming issues. It was also important to develop and activate various interest groups for the consensus building process. The PTD process is mainly about encouraging technical choices by farmers, facilitating farmers innovations, getting technical and related services through a local village expert, linkage building with various service providers and empowering poor producers groups.

Agricultural activities are the main livelihood options of char dwellers. Chilli is a major cash crop of the villagers of Char Nadagari (isolated char), but they were facing many constraints which incurred yield losses. Due to lack of knowledge they were not able to introduce alternative crops. The crop-based problems found in earlier scoping studies revealed that the main cash crop (chilli) is affected with soil borne and seed borne diseases every year. Char dwellers could not make their farming cost effective. Due to lack of technical know-how to solve the existing problems they could not diversify the cropping pattern in the sub-fertile soil. The char people prioritised the need to address this epidemic loss of chilli.

ITDG-B came forward jointly with a government body, the Regional Agriculture Research Station (RARS), to provide technical support and inputs to the farmers. Some maize seed was provided by RARS and the farmers purchased some. Unnayan Sangha, a partner NGO of ITDG-B, also provided some cash support to the poor for seed purchase.

The main objective was to reduce the risk and vulnerability of char dwellers in chilli farming by introducing an appropriate alternative crop: maize.

Process

Some farmers followed mono-cropping of maize to compare against chilli cropping, some followed maize as a border/dyke crop with chilli and the rest followed maize as an intercrop with chilli, where maize was sown in between lines of chilli.

Period of observation: November – March (around 5 months). 56 farmers participated in three situations (mono-cropping 28, border cropping 12, intercropping 16).

Production methods

The Pacific-11 maize variety was selected for production in the *rabi* (October-November) season. RARS provided technical training and seeds for the 56 community selected farmers. The farmers used 8kg of maize seed per acre by line sowing (spacing 8 inch x 18 inch) in their sandy-loam and more elevated land. They initially provided the flood irrigation (2-3 times) in maize plots, but followed furrow irrigation next time. Basal dose of fertiliser and manure varied from farmer to farmer according to their physical and financial capacity. The maize farmers used organic fertiliser (insufficient due to terrain), urea-110kg (1/3 at soil preparation and 2/3 were applied as top dressing in two doses), TSP-70kg and MP-50kg per acre respectively.

Intercultural operations including weeding were completed according to participatory discussion between farmers and ITDG Research Assistants. Cobs with straw colour were harvested in Feb-March 2003 and after harvest maize cobs were sun dried for 2-3 days, then threshed mechanically by hand thresher (supported by RARS).

Result and discussion:

The average production rate was 2.4 tonnes per acre in all three situations. This was a low yield in comparison to standard production rates of other regions in Bangladesh. However, considering the low investment in sub-fertile soil the cost-benefit was reasonable. Maize cultivation appeared viable and valued.

Source of quality seed, access to market and credit support were found to be very important issues.

Mono-cropped maize was less susceptible to disease and less labour intensive in comparison with intercrop situation of maize and chilli. From farmers' opinions, maize dyke crop situation was better than intercrop situation in terms of yield. Therefore, mono-crop and dike-crop were found to be widely adopted by char land farmers.

From farmers' experience, maize cultivation seemed to be profitable compared to other cereal crops like boro rice (gross income Tk3000-4000 per acre), wheat (gross income Tk2500-3000/acre) and millet (gross income Tk1500-2000/acre).

Farmers also proposed changes to the traditional cropping pattern as -

Traditional cropping pattern	**Proposed cropping pattern**
Wheat----Jute-----Chilli	Maize---Aus rice(local)---Amon
Millet---Aus rice/Jute--Chilli	Maize---Jute---Chilli
	Maize---Jute---Boro rice

Constraints

- Lack of consensus, awareness, marketing skills among poor maize producers.
- Due to lack of capital (cash) and technical skills, some farmers did not use the required amount of fertiliser and irrigation water, which affected the production.
- Neighbours picked immature cobs and birds ate tender maize seed, both factor were responsible for reducing the yield.
- At the germination stage "cut worm" damaged some seedling.
- Maize plants require large amounts of fertiliser as a basal dose and top dressing; poor farmers could not maintain the required operational cost.
- Initially some maize farmers faced marketing problems in the local market. Maintaining the quality of maize post-harvest was also a constraint for getting a good price as maize traders raised the question of moisture content on quality. For poultry feed the required moisture content of maize is below 14%, but farmers often could not maintain it as they only depend on sun drying.

Key lessons

- Maize farmers moved from an individual farmer approach to community based maize farming approach to attract service providers in the char areas. Now farmers are becoming more united regarding their issues like - access to inputs, credit and technical knowledge.
- Through this maize intervention, farmers found a voice to talk and participate in other village issues like - building a community house, creating a community based organisation.
- Maize can compensate the losses in chilli farming that arise as a result of disease.

- Maize as dyke/border and intercrop with chilli or other crop is a good option for char dwellers.
- Better yields of maize are developing interest of maize producers in char community. Number of farmers is increasing.
- Maize was treated as a crop for the lean period for char dwellers, and can supplement their lean period food security (family consumption)
- Guest entertainment with new food from maize (flour puff, corn, cake) has social value
- Linkage with research organizations, NGOs and agro business communities to access new information, inputs and marketing support is very important.

Conclusion

The maize farmers group created a platform for discussion of different problems for char dwellers like: sources of seed and credit, market opportunity, linkage with service delivery organisations. This initiative enhanced group dynamics and unity, interaction, bargaining power, social networking in the village. This experience with maize farming sensitised poor char farmers to think on some common issues like - credit, seed and marketing issues in the village.
To sensitise the people for a micro and macro level consensus on any common issue, it is important to engage char dwellers first in a resource issue like maize or goat rearing etc. This creates an opportunity to learn how to interact with other villagers and stakeholders outside the village.

1.2 **Adaptation of winter vegetables in flood prone char lands** (Char Nandina and Char Nadagari)

Annually, char dwellers face floods that threaten their agricultural production strategies. Char villagers are hesitant to adopt improved/semi-commercial vegetable production strategies in adverse flood situations. However, over the period from 2002-2004 around 75% of households in char Nadagari were trained in soil and crop management for improved winter vegetable production. In 2004 there were three floods in the same season and heavy rainfall seriously hampered the vegetable production, but the training ensured that vulnerability was reduced and production could continue.
The producers promoted quick growing and leafy vegetable varieties like radish, red amaranths, white amaranths, spinach and coriander leaves, promoted with zero tillage in silted land (after flood).
Due to the short culture period after flood, villagers raised seedling early in protected high seedbeds within the homestead and high lands of the char village. Seedlings of brinjal (egg plant) and bottle gourd were transplanted into prepared pits within the homestead area.

Farmers in the isolated char made their own choice of vegetable production and shared experience on the following issues -

1. Bottle gourd cultivation using pit cultivation methods
2. Brinjal (Egg plant) cultivation as long term and high value crop
3. Radish production as quick growing vegetable
4. Promotion of cauliflower as a new vegetable in the isolated char (Nadagari).

The number of vegetable producers is increasing due to high market price and access to new skills.

Table 1: Comparison of production cost. and profit in isolated char and attached char

Vegetables	Char Nadagari		Char Nandina		Comments
	Production cost tk/decimal	Profit (Tk./decimal)	Production cost tk/decimal	Profit (Tk./decimal)	
Bottle gourd	300	1857	250	1482	Market price of vegetables was so high in this year. Cauliflower was introduced as a new vegetable in Char Nadagari.
Brinjal	150	837	162	851	
Radish (Leafy)	50	210	53	214	
Cauliflower	100	267	-	-	

Changes observed

On the basis of various group discussions, meetings, individual interviews and feed back from training sessions of a total of 241 participants (F-98, M-143) in two Char villages the following trends were found:

Table 2: Trend in winter vegetable cultivation in both char villages

Location	% of households producing winter veg				Comments
	Before 2002	**2002**	**2003**	**2004**	The data excluded Bottle gourd producers
Char Nadagari	10%	24%	52%	80%	
Char Nandina	<50%	54%	63%	90%	

Table 3: Diversity of winter vegetable cultivation in 2004

Location	% households producing at least:			Comments
	one variety	two varieties	three varieties	Including Bottle gourd producer
Char Nadagari	97%	82%	70%	
Char Nandina	90%	80%	60%	

Change in cropping pattern:

Changes were observed in cropping patterns at Char Nadagari due to gradual improvement of soil quality (structure) day by day. The villagers are maintaining a series of cropping patterns as follows -

1. Jute/Sihattor (Local Aus) rice ------ BR-29/BR rice ---- 14/Gainja (Local Amon) rice ------ Wheat
2. Jute/Sihattor------ Chilli
3. BR-29/BR-14/Gainja ------ Maize ------ Jute/Sihattor
4. Sihattor ------ Garlic
5. BR-29 ------ Onion
6. Gainja ------ Lathyrus
7. Gainja seedling ----- Lentil/Mustard
8. Mustard (Dike cropping) with Chilli

Learning:

1. Char land is suitable to produce quick growing vegetables. After flood, the land is saturated with plant nutrients derived from floodwater. Leafy vegetable production with zero tillage proved a profitable technique.

2. High market prices of vegetables could motivate and accelerate uptake by Char farmers with naturally fertile soil because the production management and/or vegetable cultivation strategies benefit from the flood. Successful adaptation of the production strategies of vegetables and field crops were demonstrated to provide better economic returns for the agriculture sector.
3. Vegetable producers increased their production quantity and quality by linking to extension support for their innovations.
4. Producing more profitable, short duration crops fits with farmer strategies in the char. For example, at least 1 decimal of potatoes is grown by 60% of households in char Nandina.
5. Improved production of vegetables in the homestead (high land) area, for example gourd, is appreciated as a low risk strategy by women.

1.3 Boron fertilizer increasing production of mustard as a high value crop in attached char.

Background

The Char Nadagari under Sharshabari thana of Jamalpur district is a mustard producing area. In past years farmers experienced very poor yields of mustard due to soil sterility and became disheartened with mustard cultivation. The farmers identified the problem during PAPD activities and discussed the problem with DAE (Department of Agricultural Extension), RARS (Regional Agricultural Research Station) and BADC (Bangladesh Agriculture Development Corporation). On the basis of villagers' comments boron (a micronutrient) was identified as the problem. In an attempt to rectify the problem, farmers started to use Boron (Boric Acid) in collaboration with BADC. 15 innovative farmers applied this fertiliser in ten acres of mustard fields at the rate of 1kg per 33 decimal land area in October-December 2003 production season. ITDG-B helped in building linkage and provided follow-up support.
The main purpose of the intervention was to build the awareness of char people to produce mustard (local) using micro nutrient (Boron) and to make a good profit as well as to develop soil structure of the sub-fertile soil in char lands.

Operational process
A total of 15 interested farmers were selected by the community of Char Nandina and provided with technical support during the 2003 production season to observe the impact. The farmers used 2 kg of boric acid for 66 decimal cropping field as a basal dose. Adjacent cropping plots used traditional methods of growing mustard (same variety). The producers and staff of ITDG-Bangladesh followed-up the case.

Results and discussion
The mustard farmers had sown their own preserved seeds and harvested the mustard in December 2003 and provided information in a result sharing discussion. Mustard was harvested at 80% yellowish color of total plants. The average yield of treated mustard was 114 kg per 33 decimal land against 88 kg per 33 decimal in traditional method. The production costs were the same for boron plots and traditional plots. The highest yield was 151kg per 33 decimal land. The market price was Tk750–850 per 40kg mustard in the local market. The pungency of the mustard produced appeared good.
The vegetative growth of mustard plants was vigorous, plant height and flowering were better than in traditional mustard fields. The grain formation was more uniform and there were no false grains or significant infestations observed. The farmers mentioned their positive attitude to use this type of fertiliser themselves in future. Strong linkage was developed between BADC (the

main source of Boron) and the villagers, which generated a common understanding among mustard farmers and exposed them as a group with a strong voice for their problems.
Collaboration with SRDI (Soil research organization) was initiated to test the boron status of soil in two chars. A plan is being developed to conduct field level experiments to test effects of boron on different crops. This is being done in collaboration with BADC, Boron Micro-nutrition in Bangladesh, RARS, Union Trade Impex Limited/HICON and other Private Organisation.

Constraints:
In the production period there were no major constraints. In some cases the farmers hesitated to use the boron fertiliser as a new input, but they solved that hesitation through mini group discussion amongst themselves (mustard farmers). A few mustard-fields were infested by aphids (*Lipaphis spp*.) but it was controlled naturally due to vigorous growth of mustard plants.

Key lessons:
- The farmers learned to reduce the indiscriminate use of NPK and consider essential micro-elements for greater economic benefits from oil seeds and pulse crop as well as other cereal crops.
- The char people have realised the need to test/analyse the soil in their fields to know the soil's nutrient content and fertility status.
- Farmers commented that 'adding boron and irrigating the mustard field once or twice may give a higher yield'.
- Farmers who used boron will exchange knowledge and experience on boron use to enable the whole community to take advantage of improved production.
- When approached, organisations like BADC are keen to offer support.

How it contribute to PAPD :
This type of problem solving effort is crucial to draw the attention of the farmers to educate them for a bigger planning process. This intervention created linkage with various service providers, empowered poor producers to interact with others on their problems and created better unity among mustard producers. It was observed that once they learnt to solve their farming problem within groups they are becoming more capable to handle bigger community issues like - sanitation programme, building roads for their village, building a community based organization to access various services collectively.

2. Market Study Report on Maize (isolated Char)

Introduction:
Maize is considered as an appropriate alternative to *boro* rice in drought and flood affected char areas. It can also be an alternative crop to chilli when farmers experience loss in chilli farming due to disease. Maize is the third most important cereal crop in Bangladesh. The country needs 900,000 metric tonnes per annum for poultry, livestock and fish feed, whereas it is producing only 200,000 metric tonnes per annum. Therefore, there is a big demand for maize, which could be specially grown in char and other dry areas. During the last couple of years maize was introduced mainly by the private service providers to meet the growing demand of poultry feed.

The Tista, Jamuna and Bramahputra river floodplains are the most suitable areas for maize growing. The winter (October-March) is more suitable than summer (Feb- July) (20 to 50% higher production). So, production of maize in char during winter season is very appropriate as it starts just after flood in September. April-May is the lean income period for char dwellers when they can earn cash from maize harvest.
Small and medium category farmers are increasingly engaged in maize farming but there is a serious gap of marketing experience. Private companies and research stations are found to provide seed support to the growers to expand maize farming to fulfil their demand in selected areas, this is an important sign of commercial maize farming.

The purpose of the sub sector study is to explore information on production, post harvest, marketing opportunities and constraints particularly in char areas.

Specific Objective of sub sector study:
- Explore the potential of maize production in char as a new crop.
- Mobilize the small farmers to undertake village/community based maize farming
- Create better linkage with various market actors related to the product
- Share the information with maize farmers to better identify the opportunities and constraints
- How common issues of maize marketing can sensitise the maize growers towards other community issues.

Survey Methodology:
Initially, a half-day orientation session was organised among the staff to understand the context and issues. A focus group discussion was arranged in the char village to select maize producers and other respondents. 15 maize producers (poor 6, medium 8, rich 1) from isolated char and 2 traders from district level market were interviewed using two sets of questionnaires.

Social Setting/context of the investigation:
The farmers of the isolated char were searching for a new crop to use in the sub fertile dry sandy land. And the issue of crop diversification was raised in a discussion and planning meeting by the char people.
Regional Agriculture Research Station (RARS) expressed an their interest in maize production in char in association with CIMMYT (International Maize and Wheat Development Center) and ITDG Char project.
Later on the ITDG-developed Rural Community Extensionist (RCE) played a key role to select the maize farmers' and bringing linkage with other organisations.

Farmers of the study village were influenced by an adjacent upazila, Shariakandi, where maize farming started 4 to 5 years ago. They came to know about higher productivity and low investment rate of maize compared to other cereal crops like wheat and rice. Use of maize cobs as a fuel and leaves as fodder also an influencing factor for the farmers to accept maize as a new crop.
In some areas of greater Jamalpur district (Dewanganj, Nakla) maize farming was found to have started commercially with the assistance of RARS/CIMMY and some NGOs.
However, two farmers in the study village were influenced by their relatives in Bogra district who are maize growers. Villagers also realized that maize is a lean period crop, which can contribute to their household food security and income. It is also less susceptible to disease as they experienced from the neighbour farmers. Maize powder is also found to be used as food to char dwellers (as lean period food in April-June). Some villagers found to collect information on marketing opportunity at Bogra and Sirajganj (Natiapara) - the neighbouring districts - and became aware of the growing demand of maize in Jamalpur and nationally as poultry feed.

Actors	**Role/Problems/comments**
Farmers	Out of 15 surveyed maize farmers (in 2003), 6 were small farmers, 8 medium and rest one was richer category. Average total farm and maize farm size of small, medium and rich farmers were 110 - 25, 250- 27, 900 - 33 decimal respectively. Maize farm size was almost same in all well being categories due to the similar amount of seed distribution, but there is potential for commercial farming. All the farmers found to think of a community based farming approach by many farmers to reduce various risk like marketing, security etc. But the constraints to large-scale farming are poor means of transporting the crop, especially in isolated char.
Dealer/Fertiliser/Pesticide	No specific role yet established to supply the fertiliser locally.
Money Lender	They are the local, easy accessible credit sources with high interest rate (120%). But they may play a role in expansion of maize farming.
Horse cart/local transport	Four horse carts available in the char village, which is gradually increasing. Farmers' interest on maize will increase with increased access to locally available transport.
Cart (Cattle driven transport)	There are carts outside the village that offer transport facility.
Van pullers	Around 15 to 20 van pullers found in the Madarganj river ghat, carrying rice/jute/vegetables to the upazila market. The fare is Tk.1.70/mound(40kg)goods/km. Fare is higher than engine driven trolley(Tk0.70/mound/km) .
Boat Man	In the rainy season char dwellers enjoy easier and comfortable transport by boat frequently within Jamalpur and neighbouring districts. Communication cost by boat to established market link to Bogra and Sirajganj would be easier and farmers can obtain better market price. Farmers need to preserve maize with less moisture and

	good colour
Presence of thrasher machine	Maize farmers have got access to thresher machine from neighbouring districts. Easy access to thresher machine is expected by the villages with the expansion of maize cultivation.
Owner of Shallow Tube Well (STW) for Irrigation	Access to irrigation facility influences the maize farming. At the moment the coverage is very little. Access to hose pipe for irrigation would help to increase the number of maize farmers.
RARS(Regional Agriculture Research Station), Jamalpur	RARS is doing research and extension work on maize. Recently expanding various trials in char areas, considered new agro-ecological ground. Provided hybrid (specific 11) maize seed and training on management of maize farming. Following up the maize fields in char areas and consulting with farmers to improve management. Also arranged farmers exposure visit in their farm to learn seedling production and better management of maize.
Local NGO	Unnayan Sangha, a local NGO provided some loan to small maize growers to reduced the risks of initial investment in such a new crop. This NGO has already invested money to the growers of a different location (Nakla and Dewanganj Upazila) on commercial scale. RARS also provided technical expertise there.
Wholesalers (Outsiders)	Villagers from neighbouring districts found to purchase maize from the study village new farmers.
Beparry/Paiker (Middle man, trader)	As a new crop in the study area, a small number of beparry (small brokers) are found to be involved with maize business. The current role is exploratory with poor producers could be further improved through strengthening the poor producers group.
Aratdar (District Level)/ big city auction /Wholesaler	Locally based aratdar yet to be established. Some local poultry promoters (commercial traders, e.g. Mukti traders of Jamalpur) are looking for good quality local maize. This message already been transferred to char farmers through project intervention increasing the number of maize farmers.
Rural Community Extensionist	ITDG-developed Rural Community Extensionists are providing extension services to the new farmers. They are emphasising collective effort to reduce the risks and for better arrangement of market.
Community Based Organisation (CBO)	Villagers initiated CBO with the help of ITDG in the both char villages. CBO organisers are motivating the farmers to produce maize as a group. Facilitated seed and others input arrangements in village as part of community development. CBO played a positive role to identify farmers from poorer groups to access some external resources.
Commercial bank	No role currently exists. May come forward with NGOs or private companies as a guarantor.

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Opportunities & Constraints to Maize Production:

Opportunities of maize production:

- Number of maize farmers increased to 40 in 2nd year of the project in the attached char, where as it was 16 during 1st year. 16 farmers started maize farming in the isolated char Nadagari. Therefore, potential for expansion of maize is clear.
- Inter cropping (maize & vegetables) and dike cropping (in the chilli field) with maize has potential to reduce the risk of poor farmers. Maize is considered as a drought resistant crop and suitable for char.
- Underutilized land in isolated char can be widely used for maize cultivation through introducing appropriate production methods.
- Small and medium farmers in both the isolated and attached char understand that maize is more suitable than boro rice.
- Many commercial initiators already started large-scale production with char farmers in other areas.
- There is a huge demand for maize both in the regionally and nationally. Research village stands on focal points of Jamalpur and others district of Jamuna river basin. There is a huge potential to gain access to this rising market, which would be offering increasing production year after year.
- Some of the older and more experienced farmers of the attached char previously produced composite variety maize but obtained less production. Now, they are motivated with high yielding seeds.
- Some NGOs already developed contact growers, providing inputs and ensuring market, which is a good sign for commercial expansion of maize production. For instance, Unnayan Sangha and RDSM (the uptake partner of NRSP CHAR project) already working on such arrangements. Mukti Traders - a commercial buyer, having substantial investment on poultry farming in Jamalpur, is supporting large-scale maize farming for their contact growers. They collect maize from local sources to ensure good quality (less 14% moisture). In Northern part of Bangladesh, (Rangpur and Lalmunirhat), National Credit and Commerce Bank Ltd in association with private traders producing maize in huge quantity with contact growers. This arrangement ensures the production and marketing of maize and thus made a massive change in that region for small and marginal farmers.

Constraints:

Production Related

- The lack of timely, local access to quality seed at a reasonable price is a major constraint to the expansion of maize farming.
- Surveyed farmers claimed it requires a big investment for both *boro* rice and maize at the same time and this is a financial constraint for poor and marginal farmers.
- Production of maize by one or two farmers is not always secured in a village.
- Surveyed farmers reported higher price of inorganic fertiliser and sand adulteration problems.
- Lack of sustainable irrigation system for maize.
- Lack of knowledge on fertiliser management and poor financial capacity means they cannot maximise yield.
- All the farmers of the attached char and 50% farmers of isolated char are in favour of producing maize after harvesting of aman (rain fed) rice.

Marketing:

- Number of producers is a factor to establish a healthy marketing chain
- Selling of maize just after harvest is profitable. But it has potential to obtain higher price by preserving and maintaining required moisture (below 14%) for a certain period. But the farmers don't have the required knowledge and experience for that post harvest management.
- The producer has no ownership for growing seed and high price and unavailability of quality seed is a constraint to maize production.
- The market linkage with char dwellers is poor.

Processing:

- Manual threshing is a problem. The mechanical thresher is very costly to hire from other districts to a char area.
- Due to lack of appropriate knowledge the producers could not maintain required moisture and colour of the grain.
- Drying is also a problem.

Strategies and recommendations:

Can poor farmers be better organized?

Land used for maize farming by the poor, medium and rich farmers is 21%, 10% and 3% of their total farmed land respectively in both char areas, which reflects that poor and medium farmers are more interested to introduce new crops like maize. Poor and medium farmers demonstrated good management with production rates of 23.5/decimal/6 months, 20.5 kg/decimal/6 months and 15 kg/decimal/6 months for poor, medium and richer respectively. Therefore, support to poor and medium farmers is important and they can be better organised.

What type of technical intervention and linkage needed?

Spacing/plantation, intercropping, post harvest management (drying/moisture content), growing seedling and seed production are the key technical issues to be addressed.

Farmer cannot produce hybrid seed. Hybrid seed (from RARS and BRAC) is not available in the local market. The farmers are depending on RARS for seed, but the seed channel needs to be sustainable. Farmers have good faith on RARS.

Linkage between new dealers and BRAC, CIMMYT need to be developed. Linkage between RARS – Farmer, Farmer – Seed Dealer (not available now) and farmer-RARS/BRAC-NGO need to be strengthened.

BRAC is more trusted on maize seed than Department of Agricultural Extension at the moment. Seed provided by DAE at post flood stage performed poorly.

Farmers currently use hybrid (Pacific 11, P 60), but are also suggested to use composite variety. How farmers can produce seed themselves is an issue. Mainland and attached char could be a better location for seed production.

What type of marketing strategy do they need?

Community based approach of maize cultivation will ensure better marketing support.

A farmer's planning process and institutional linkage can enhance the production, post harvest and marketing process. Large-scale poultry farms are interested to invest in maize farming and are likely to supply seed and fertiliser. But investor or bank wants guarantor for the farmers for financial assistance. Bank, Agro Farm (guarantor) and farmer could be a

channel for production and marketing. Purchase guarantee can be ensured through a contract grower system. Local NGO, RARS – also can help in marketing. Some entrepreneurs can be developed to support with Power Thresher Machine (12,000 Tk) for char maize farmers.

Issues like seed, credit, institutional support, access to market are becoming common for all crops, which may sensitise the char people to think for other community issues to solve. If the maize farmers are better aware of their own issues and can mobilise themselves to deal with those expected they will contribute similarly in other, greater community issues.

3. Market survey report: Brinjal (Egg plant) – in attached and isolated char context

Introduction:
Brinjal is identified as a potential crop for char dwellers due to its flood free production period. 29,000 hectares of land are being used to produce around 404,000 tonnes of Brinjal in Bangladesh. This area is 15% of the total cultivable land used for vegetables (BBS, 2002). Brinjal is mainly cultivated in two seasons – September-October (Rabi) and Jan-Feb (Kharif) - but due to high demand it is grown round the year. Importantly, the culture period is not seriously affected by flood. This vegetable significantly contributes to production during the off-season for vegetables (late winter, early summer) for household consumption and is a popular cash crop. This is a potential crop in the char areas along with chili, bottle gourd, sweet gourd and potato, with particular significance as a cash crop for small-scale poor char farmers. This is also important to poor char producers for its quick fruiting (within two months) time and long harvesting period (Oct – May).
Brinjal cultivation was found to gradually increase in two study char villages where ITDG has been working to adapt a grassroot planning process around natural resource management for various interest groups in char areas. The project intends to investigate if the planning tool has any significance to mobilise poor char producers to get better access to markets for their produce.

The purpose of this product survey is to look at the opportunities and constraints of brinjal farming in char areas and thereby mobilize/empower poor producers in the market chain as well as in the community.
One of the key question related to this sub-sector study is – Can various actors related to brinjal farming (production, post harvest, marketing) be better mobilised to secure a fair price of brinjal particularly for the poor char farmers?

Specific objectives of the survey –
- Explore information on opportunities and constraints of brinjal farming (production, processing, marketing, actor interest/relationships and conflicts)
- Use the information to better organise the poor brinjal producers in char areas
- Find how dealing with market issues can contribute to a grassroots planning process?

Methodology of the survey:
Information was collected from 6 attached and 8 isolated char producers (of poor, medium and better off categories). 10 traders from Local, Upazila and District level were also surveyed to explore their perspective on brinjal marketing issues.
The survey was conducted between March-April, 2004.

Location	Producers		
	Poor	Medium	Rich
Attached char	3	1	2
Isolated char	4	4	0

Traders	No.
Local(Char)hat	2
Upazila market	4
Dist. market	4

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The survey tool was designed by the ITDG staff and then was piloted in the field prior to final survey.

Social setting of brinjal farming in char:
Brinjal is an Indian sub-continental plant. Many cultivable varieties are available in Bangladesh. Varieties like - Zhumki, Islampuri, Uttara, Kaikka, Bottli, Laffa etc are popular in greater Jamalpur district. Farmers are mostly farming brinjal in their own land but few are growing in leased, sharecropping and mortgage lands. Transportation of goods is a major constraint in the isolated char. Therefore it appears difficult to carry large amount of brinjal to mainland market having no road or suitable transport except boat (before the river dries up) or horse cart. Some small retailers were recently found to purchase brinjal at farm gate which they can carry only by bicycle (around 100kg). Transport is a crucial factor to determine scale of production.
Islampur, Nandina, Laksmir Char – are the high brinjal growing areas in this region not far from the surveyed villages. Brinjal is so popular in some area that villagers call some places as "the brinjal area". Poor farmers used to cultivate it for consumption but both medium and poor farmers recently started to grow it commercially. Brinjal paste/mash, fry, curry is highly popular in Bengali dishes.
Brinjal farming is becoming popular increasingly in the isolated char, because of its long duration income period (Dec – May) and higher yield compared to other vegetables.
Some people believe that brinjal has some medicinal value in case of diabetics and toothache, but may increase dermal disease (allergy). Nutritionally brinjal is as useful as tomato.

Table: Role of different actors in brinjal farming enterprise

Actors	Role/problem/future
Small farmer	Recently small farmers are producing brinjal for selling to earn cash. The small farmers sell their produces at local market and thana market carrying by boat, horse cart.
Crop sharer	Some farmers found to cultivate brinjal in others land providing a share of brinjal to land owner.
Lease land farmer, Mortgage land farmer	Lease value of land in attached char (TK. 1600/33decimal/year) is 0.6 times higher than isolated char. Farmers found to farm brinjal in leased and mortgage lands: this is a sign of its commercial importance.
Van puller	Carry goods (chili, brinjal, mustard, boro rice, jute, foxtail millet etc.) and people, mainly available close to the thana market, not accessible in a isolated char. Approximately 15-20 van pullers are found in a thana market (eg. Madarjong thana markets). Van charges more than engine driven van.
Engine driven van/locally made (Nosimon)	Very popular transport at Thana level. Approximately 80-90 rural engine van found in Madargonnj Thana to carry rural goods. They charge Tk.0.70/km for passengers, Tk 0.56/40kg/km.
Horse cart	Mainly used for transporting of goods at isolated char in the dry season. 4 horse carts found the study isolated char village. A horse cart can carry optimum 350-400 kg. Number is increasing in the isolated char. It charge Tk.1.25/40 kg/km.
Small Retailer	Recently they found to purchase around 80-100 kg of brinjal at farmer's crop field and carry to the thana market using their bicycle.

Local Retailer	In thana level 5/6 large retailers sell brinjal to local retailers (20/22# in one thana) on wholesale basis. The local retailers also collect their goods from farmers and small retailers who come from producer farms and local level. The local retailers collect/puchase brinjal every morning and sell all day long.
Bepary/Wholesaler from Outside	Every week, the brinjal beparies come to local hat/market and farmers cropping land. They come from thana/district level. On average 5-8 beparies purchase brinjal from 10-12 farmers in local market The farmers sell their products in local market at reasonable price to minimise the carrying cost. The beparies carry their purchased brinjal by lorry to district and Dhaka market.
Pesticide/fertiliser trader/dealer	Approximately six fertiliser and pesticide traders found in each thana market. They sell pesticides/fertilizer on basis of farmer's described problems of their crops but the farmers often found inappropriate suggestion. The traders frequently providing only chemical pesticides and growth regulatory hormone which are a health hazard. For brinjal, a farmer used to spray pesticides 2-3 time in a week during fruiting stage. The infestation rate in brinjal is higher in attached char rather than isolated char. And pesticide dealer's role is increasing. In future they could sell organic pesticide for organic farming. Village entrepreneurs or Village Extensionists can play a role in future.
Seed/Seedling seller	Very few farmers purchase brinjal seed. They mainly purchase/collect seedlings from market or relatives. Farmers are sometimes confused with appropriate variety and therefore purchase on faith. They have some preferred seedling retailers. Seedling retailers may collect seedling from other seedling growers or can raise their own. There is a good demand of seedling in the early season (just after flood). Price rate: Tk.12-16/80 seedling. There is potential to sell new high yielding variety.
Boatman	Boat man can only operate between November and May to carry brinjal by small boat when river has got some water to run, but is not flooding fast. Boat fare/transportation cost is less than horse cart for isolated char.
Lorry owner/driver	They provide their transport support from local market (Road side) to thana and Dhaka market.
Big city auction spot/middlemen	The brinjal beparies and middleman selling their goods in different marketing spots in Dhaka city on auction basis fetching higher price than local level.
NGOs	Can help to create market channel, organise small retailers, provide credit, extend technical support
Community Extensionsists	They can support the farmer to provide new knowledge and experiences. Can ensure support for early seedling supply.
Commercial Banks	Can ensure credit
Regional Agricultural Research	Can train farmers/NGOs/local extensionists on new brinjal varieties, seedling rearing and disease control.

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Station	

Opportunities of brinjal farming:

- Farming period is from October to May which is a flood free time. This is a deep-rooted crop requiring less irrigation water (suitable for drought). This is less perishable than other leafy vegetables and requires less post harvest care. This is a more important crop than bottle gourd, sweet gourd and radish in terms of cash income and risk, but not as profitable crop as potato in the attached char. It requires less fertiliser than potato.
- Production is less than demand in the months of November-December and March-April. Price rate also high in those months. Recently commercial production is increasing among poor and medium farmers due to increase access to market.
- This can be grown also in off vegetable season (early summer/March-April) when there is a good demand for it.
- Small scale poor producers are producing 45kg/decimal/season (8 months) which is still below standard production rate of mainland (56kg/decimal/season). Investment rate is around Tk. 57-60/decimal/season which can be affordable by poor farmers.
- Average land holding of surveyed farmers (poor+better off) in isolated char was 212 decimal/farmer and average brinjal farming area was 22 decimal (10.84% of total land). Particularly, average land holding of poor was 124 decimal and average brinjal farm area was 6.25 decimal (5% of the total land) in the isolated char. In attached char, the average landholding is 118 decimal/farmer and the average brinjal farm area is 10 decimal/farmer (10% of total land) (poor) and for richer farmers average landholding 445 decimal/hh and 7 decimal/hh (1.5% of total land) used for brinjal cultivation.
- Jamalpur district is a vegetable growing area and have easy access to large city markets (Dhaka/Chittagong). This area is able to attract large wholesalers.
- Price trend: price is going up compared to last 2-3 years (12-16 Tk/kg now which was 8-10Tk/kg last year). Long duration of flood increases the price. Farmers who learn to mitigate risk of flood in farming will attain higher price.
- Inputs: fertiliser(inorganic + cow dung), seed/seedling, pesticide, irrigation water, labour are the key inputs which farmers can locally access from village market in both attached and isolated char.
- Small producers can make small harvest on weekly basis to carry it to the market without heavy arrangement of transport in char areas.
- It has importance both as a cash crop and food crop.
- Healthy seedling can be raised in high land area (or in their relatives house) or in bamboo case, raft, boat, river dam slope to access it in early season (September/ immediately after flood)
- Farmers start to get income after only two months (November/December) of transplantation which continued over a longer period of 8 months (until May).
- Diversity of cash crop is more limited in isolated char than attached; therefore brinjal could have more prospects in isolated char for small farmers.

Constraints:

- Although brinjal is a drought friendly crop, farmers in charland cannot often transplant seedling in September like mainland as they have to wait till floodwater recedes in September/October.
- Transportation is a crucial issue, which determines the scale of production particularly in isolated char.

- For small producers in isolated char there is no fixed buyer in most cases.
- Competition with mainland production. It has to compete with other char vegetables like - bottle gourd, country bean, radish, tomato in November December and with sweet gourd, late tomato, potato, white amaranth in early summer (March-April).
- Lack of farmers knowledge on other high yielding variety (only "Shingnath" is dominant in both char)
- Continuous brinjal cultivation in a same piece of land resulting high occurrence of pest infestation and poor yield.
- The producers face information gap for market price due to lack of exchange knowledge and skill in brinjal production. The producers are controlled by beparies opinion at local hat (market).
- No community based trader association/channel established in char area though some small traders moved in char area for other cereal crops.
- Practically the poor producers mentioned the following problems -
  1) less access to quality seed/seedling/unknown source /cheated by seed/fertilizer/pesticide dealers
  2) higher price of inorganic fertilizer
  3) inappropriate selection and improper use of pesticide
  4) dependency on credit from money lender with high interest
  5) do not get fair price (less access to market chain)

Future strategies and recommendations:

Can poor farmers be better organized?
There are 50 households (of total 250hh in the village) farming brinjal at semi-commercial level in the isolated char. And there are 40hh (out of 400hh) found to commercially culture brinjal in the attached char. Average farm size is higher in attached char than isolated.
Key problems mentioned by the poor producers are mostly institutional (forward, backward linkage). Therefore, can they form a high value crop grower association /group? Can they arrange a problem solution meeting along with other potential actors? Can they develop a micro plan on brinjal farming for their village? Can they mainstream the current market channel with national/regional channel? Can they invite UP Chairman, NGOs, local agricultural research organisation, bank to help them? Can they discuss how to solve the seedling, pesticide problem? They can proceed with a micro PAPD on the issue.

How they can establish a common sale centre and attract buyers?
Once a producer association is established, a common or better sale centre can be tried depending on supply of product. Respondents expressed that to establish a better pro poor sales centre (arot), assistance from NGOs, UP Chairman/member is essential. A farmer association can be formed who can contribute 2-5% of their sales to run the thana market based centre. Growers can pay some toll for the sale centre. Small harvests from poor producers can be collected from village or from a common place to link with the main sale centre. Retailer will start to bring from the farm gate. This initiative will require strong unity among producers to have better control on the price and other facilities. Conflict may occur with the old wholesalers and will need to be solved.
They also pointed that they need to create new market through advertisement and maintaining quality of their produce. Need to find new buyers. Interest in contract grower system through private sector.

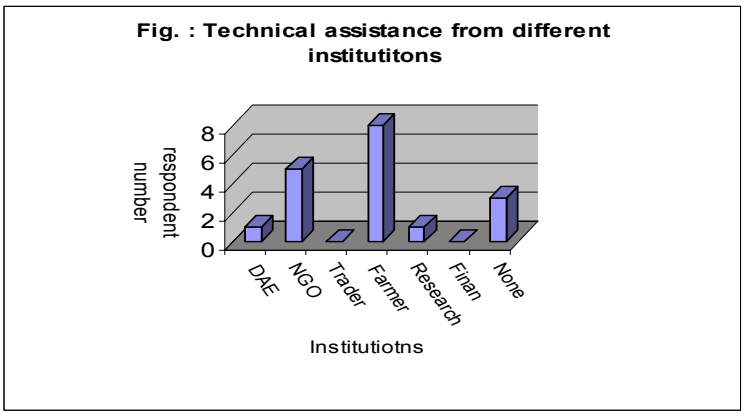
What type of technical interventions they need?
Seedling nursery:
- Advance arrangement to produce seedling in highland site of the char to catch the early season.
- Initiate seedling nurseries at community level and high land that may form seedling seller group.
- Organise training for seedling production technique with field sanitation and soil treatment with Trichodarma (soil treatment agent) for brinjal cultivation
- Raft, boat, river bank slope can be used for seedling raising
- Knowledge on balanced fertiliser use needs to be disseminated as they are using overdose

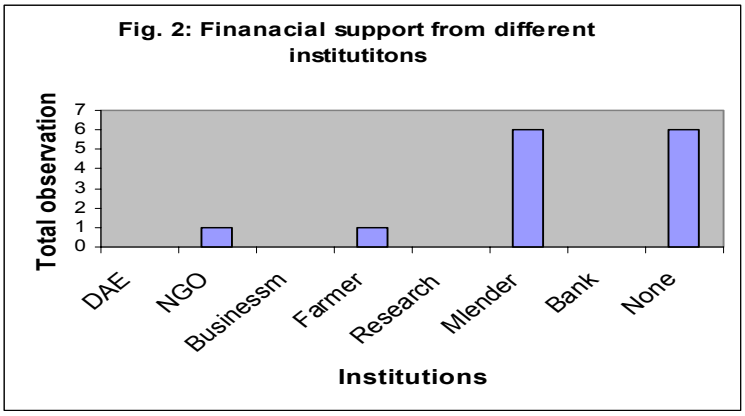
Disease control:
- To control Fruit rot, Foot rot and wilt diseases which are the main problems for brinjal cultivation
- Seed treatment with garlic extract/Pilate to improve seed health and perform highest germination rate (Extract from 1 Kg. Garlic to soak 70 g brinjal seed for 15 minutes to use for 1 acre land area)

Best production period to get better price?
- To produce brinjal in the month of September and January through raising seedlings earlier during flood and harvesting brinjal early winter and beginning summer season.

How they can access seedling in early season (just after flood)?
If farmers cannot manage high land in char areas to grow seedling, some interested farmers with necessary NGO/Govt. department support can raise brinjal seedling in mainlands to supply immediately after flood in char lands. Existing seedling sellers can be mobilised to do this. They can be trained by research stations, Department of Agricultural Extension and NGOs.

Who are the key actors? How can we increase the linkage?





The above figure: 1 suggests that farmer to farmer linkage, farmer –NGO linkage is already in place but linkage with DAE (Department of Agricultural Extension) and Research organisation can be further strengthened for technical assistance.
Fig 2 described that some char farmer get financial assistance mainly from money lenders (with high interest rate) and very few from their relative farmer and NGOs. Role of commercial bank is zero. Banks and NGOs need to play more roles in financial support to the farmers. And there is a big scope to enhance the linkage with DAE, Businessman/whole seller, research organisations, bank, NGO and farmers. Banks and NGOs experienced that the isolated char is a risky area of handling credit (a lot of defaulter) as they cannot extend strong follow up support for its isolation and bad road communication. Special credit with strong technical support is required for isolated char dwellers. Livelihoods diversification also can attract the financial institutions.

References:

Eggplants of Bangladesh,
Integrated Management of Eggplant Cultivation-1: : a technical hand book published by-IPM Laboratory, Department of Plant Pathology, Bangladesh Agricultural University, Bangladesh and USDA, Foreign Agriculture Service, Research and Extension Division, Washington, USA

4. Market Survey on Mustard - in attached Char

Oilseeds like mustard, sesame, groundnut, linseed, sunflower and soybean are being cultivated in Bangladesh. Mustard is considered as a major edible oil crop in respect to farming area and production. Every year mustard covers about 340,000 hectares of land and produces about 246,000 tonnes of seeds. Per hectare yield is about 810kg. It is a cool loving crop, grown between October to February, and can be considered as a post flood period crop. Although mustard is the principal oil crop in Bangladesh its cultivation is much neglected. Total production and per hectare yield of mustard could be increased applying improved production methods. Mustard seeds contain 40-45% oil and 20-25% protein. Using local ghani (oil producing machine) average 33% oil may be extracted. Oil cake is a nutritious item for cattle and fish. Oil cake is a good organic fertliser for crops. Dry mustard plants are used for fuel to cook food in the villages. In this sub-continent three mustard species (*Brassica campestris, Brassica juncea, Brassica napus*) are being cultivated.

In attached char, 60% of farmers are producing mustard Tori-7 variety. It is the most short duration variety of mustard. Mustard is very popular oil seed to farmers of attached char because they can grow boro rice after harvesting mustard. In a flood prone area, the Tori-7 can be broadcast under zero tillage after receding of the flood water. But for the last 5-6 years (1996-2001) the farmers of the attached char were not satisfied with mustard yield (650kg/hectare) and seed quality. The market price has also gone down due to low quality. There is high boron deficiency in the soil of whole Jamalpur district (SRDI, BADC) and all stakeholders are keen to use boron (plant micronutrient) for crop production.
The char people raised the issue to reduce their risk in mustard farming through building linkage with related organisation. They wanted to find out the cause of low yield and poor quality of mustard.

Specific objectives of the survey on mustard:
- To prioritise the mustard marketing issues (Price, linkage, role of actors) on basis of quality.
- To find out sustainable solutions for mustard farming in attached char area.
- To find out how mustard farmers can be united to contribute to other similar issues.

Methodology of the survey:
Firstly a sample questionnaire was tested and the farmers were selected through FGD (Focused Group Discussion) at Char Nandina village. Information was collected from 10 mustard farmers from attached char (poor, medium and better off categories).
Seven mustard traders from local, Upazila (sub-district) and District level were also surveyed to explore their perspective on mustard marketing issues. The survey was conducted between March- April, 2004.

Farmers' category			Traders category		
Poor	Medium	Rich	Local	Upazila	District
4	4	2	2	5	2

The survey tool was designed by the ITDG-B staff and was piloted in the field prior to final survey.

Social setting for mustard cultivation:
The shortage of edible oil is a crucial issue prevailing in Bangladesh over last several decades. The newly independent country has inherited this shortage. In 1972-73, its production was only 54.6 thousand tonnes which could meet 30% of the requirement of 75 million people leaving a

deficiency of 70%. At that time there was no High Yielding Varieties (HYV) or improved technology of oil seeds in the country. So, the traditional varieties of oil seeds were under cultivation. Research emphasis was given to major crop like rice, jute and sugarcane etc. (BARI, 2001). After liberation mustard cultivation was started at the Char Nandina and its adjacent area. Farmers are using mostly Tori-7 variety as a short duration and valuable crop. For mustard cultivation the producers have been using boron fertiliser with ITDG-B's assistance in 2003 and they have linked with BADC (Bangladesh Agriculture Development Corporation) the source of boron fertiliser (subsidised). The next crop, boro rice, is also providing a good yield at Char Nandina area. Mustard can be a profitable crop just after flood in the attached char area. The producers are facing transport problems/hazard to transport mustard to nearest (local) market. Some time the small buyers come to the local market and purchase mustard directly from farmers and retailers. Different actors are playing roles for mustard marketing as follows -

Actors	Role/problems/future plan
Producers/farmers	The producers/farmers are playing the main role to produce mustard in their land or in others land. Some time they faced marketing problem (low price) due to low quality. The poor quality is related to climatic condition, improper use of fertiliser and lack of boron in the soil.
Horse cart	Horse cart is the main transport for mustard transportation from attached char to local market. A horse cart can carry 550-600Kg. mustard per trip. Number of horse cart is increasing in the char. Charge Tk1.25/40kg/km as carrying cost.
BADC	Bangladesh Agriculture Development Corporation (BADC) supplied valuable and pure boron fertiliser to the farmers.
Fertiliser supplier	Traditionally mustard farmers did not use fertiliser but nowadays they are using NPK fertiliser including boron from fertiliser seller. The supplier selling only chemical fertiliser but not advising/selling organic fertiliser. Mustard yield increased 35% in 2003/04 production season due to the use of boron.
Small traders (foria)	They collect more or less dried mustard from farmer in production season. Sometime during financial crisis farmers are forced to sell fresh mustard to avoid the risks of transportation, cleaning, drying etc. The small traders linked with bepari (medium buyer) and whole seller in local and thana market.
Bepari	Basically the beparies purchase and collect mustard from local markets (Shamgonj Kalibari, Koira bazar, Rouha), the nearest market of Char Nandina. One bepary purchase 1200-1600kg. mustard seeds at each market day (weekly market) from small traders and from farmers at the rate of Tk750-900/40kg mustard. They are linked with district and big cities (Dhaka, Chittagong and Khulna) and send the goods by lorry.
Arotdar (middle man)	Arotdar means a fixed shopkeeper at local, thana and district market. He purchases mustard including other agricultural products and they are linked with big cities or supply directly to industries (oil mills)
Engine van puller	It is the most popular vehicle to carry the goods (Chili, brinjal, mustard, jute, rice, foxtail millet etc.) and people. It is mainly available close to thana market and not accessible in attached char due to lack of road communication. Approximately 15-20 van pullers are found a thana market (Sharishabari, Madargonj, Jamalpur sadar).
Irrigation pump owner	Can help the producers through supplying irrigation water to grow mustard. In an average season mustard is irrigated twice.

Proportion of mustard cultivation land in attached char:

Farmers' type	Average Landholding (Acre)	Average mustard cultivated area (Acre)	Percentage of mustard cultivated land	Yield (kg/acre)
Poor	0.92	0.26	28%	400
Medium	4.70	1.17	23%	320
Richer	10.00	1.70	17%	330

The poor farmers used the small area but they get better return from their land due to intensive care in mustard production. The average yield is low among richer than the poor and medium farmers because they have priority for boro rice and chilli for more benefit.

Opportunities for Mustard Farming:

- Mustard is cultivated just after receding flood. It is suitable in jute-cultivated land which was fallow during flood/rainy season. Late October or early November is the perfect time to cultivate mustard when there is little scope for other crops.
- Mustard competes with imported soybean/oil in Bangladesh, but still in village level the mustard oil is so popular.
- For oil extraction, the traditional processing technique is replaced by industries/mills, so, it has a great scope to supply huge amounts of mustard oil through improved cultivation in the whole of Bangladesh.
- As a flood plain area, attached char of Jamalpur district is more suitable to cultivate mustard.
- The community based production of HYV mustard in the fertile land of the riverine flood plain is possible through accessing facilities from Research and Extension Departments.

Constraints:

- Due to availability of imported soybean/oil, the price of mustard and its production affected negatively.
- Performance of new varieties (HYV) is very good at research station, but in the farmers field is not up to the expected yield.
- Lack of knowledge of HYV mustard seeds and use of recommended fertilisers results in low yield.
- Market is captured by Foria (small traders) and mill owners who control market price and the producers are deprived of actual price.
- Market leaseholder always charge high rate of toll and it becomes an extra burden for farmers.
- In char Nandina, there are no GO/NGO facilities for financial support.

What type of technical intervention is needed?

- HYV mustard could be cultivated through community based initiatives.
- Knowledge of fertliser (micro nutrient) management to recover soil fertility, seed treatment for mustard cultivation.
- Local production of good quality seed through community farmers.

Future strategies and recommendations:

- After harvesting early T. amon rice, short duration mustard variety could be cultivated before planting boro rice. In this way large area will come under mustard cultivation.

- Mustard is very responsive to better management practices. So, production of mustard may be increased two fold by improving management practices.
- Yield potentials of newly released varieties of mustard are more than 2 tonnes/hectare. So, production can be increased by replacing the traditional varieties with modern varieties.
- The optimal rate of toll at local market should be monitored. Govt support and control required.
- Permanent shed is required for mustard marketing at local and others market
- Conduct seasonal training to produce quality mustard and to extract mustard oil at village level and mill zone.
- Consider the area wise mustard brand name based on mustard/oil criteria and steps to improve production management.
- Encourage the use of mustard oil cake as high quality organic fertiliser, which may positively influence increased mustard cultivation.

Gender for Mustard farming:
86% respondents mentioned that women were involved with mustard harvesting, threshing, cleaning and drying. Male person are mostly dependent on women to prepare the mustard for marketing. The adolescents also help in mustard production and marketing.

Institutional and financial support:
Farmers, research stations, NGOs and DAE/BADC are playing substantial role to promote mustard (Fig 1). Business man and financial institutions need to play a greater role. Financial support is highly dominated by money lenders, but could be supported by NGOs and banks.

Fig.1: Level of institutional support to maize production and marketing in an attached char

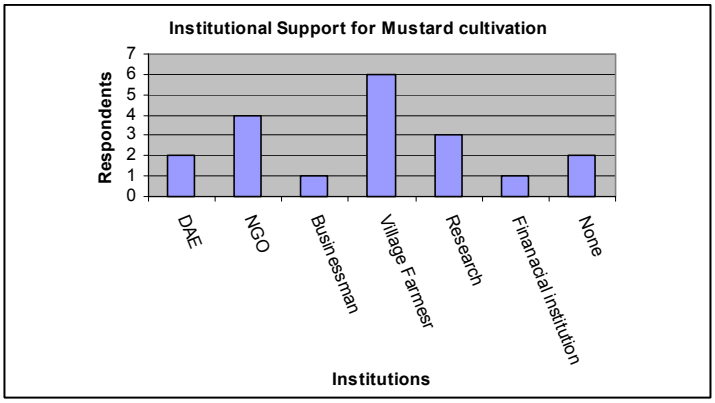
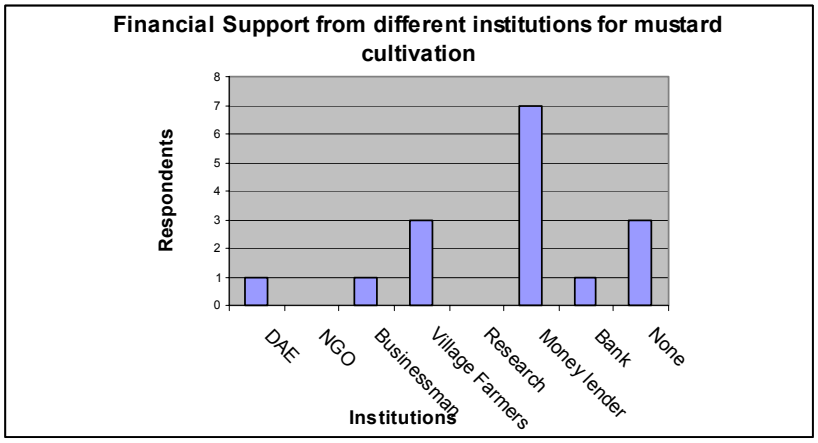


Fig.2: Financial support from different institutions for mustard cultivation in attached char



5. PTD Report: Goat rearing in char areas

1.0 Background:

Traditionally, many char families rear 2-3 goats and sell surplus stock to secure financial support during vulnerable months and to meet any emergency family need. Easy access to fallow grazing lands in isolated char areas encouraged goat rearing by the poor. In the attached chars more intensive crop production limited the scope. It is a potential income generating option for poor women in isolated char.

According to 1983-84 census (BBS, 1994) national goat herd size is 13.5 million. Allowing an annual growth rate of around 8%, the Directorate of Livestock Services (DLS) estimated a goat herd size of 34 million in 1996. However Honhold (2001) suggested an annual growth rate of 2.5% and goat herd size of 20.63 in year 2001. In the char area goat production activities are constrained due to recurring floods as well as drought in some cases. From the practical experience of Faridpur char area it was observed that natural disasters cause not only loss of natural resources, but also negatively affect goat production. Severe feed deficiency and increased disease incidence during flood and drought season are the main constraints in goat production in char areas. ITDG-B/NRSP CHAR Project organised 4 meetings in Char Nadagari and 4 meetings in Char Nandina to discuss improved goat production particularly Black Bengal goat. 160 villagers, mostly poor women, attended the meetings and showed their keen interest in proper management of goat production. 63 women were ready for cooperation with the District/Thana Livestock Department. It was observed that the people of Char Nadagari were more interested in goat rearing rather than Char Nandina, but at the next mass gathering of goat farmers in attached Char (Nandina) 135 goat rearer (Mostly women) attended. The women, including widows, divorced and abandoned, formed 4 groups from 4 corners of the village. They collectively tried to solve the goat rearing problems and to gain access to Govt. Livestock Services. Later on the goat keepers group started by making small financial investments for improved goat rearing.

2.0 Project working process:

During 2003-04 the project facilitated 4 goat rearer group meetings in Char Nadagari (isolated char) and 2 meetings in Char Nandina (attached char) to discuss the potentials and constraints of quality goat production. 160 villagers (mostly poor women) attended the meetings and showed their keen interest to learn improved goat production. Focused group discussions were organized to assess the needs. Major problems identified were as follows –

- Scarcity of feed during flood and drought season
- Number of kid production per kidding gradually reducing
- Low kid birth weight due to malnutrition of doe
- High kid mortality during flood
- Poor breeding buck service in the locality and less opportunity for quality goat breeding due to distant location of breeding buck rearer
- Less potent and diseased buck are reared by buck rearer
- Lack of knowledge of goat disease management during flood specially for PPR (severe goat disease)
- Breeding buck rearing not well accepted for social taboos
- Lack of employment, limited and even no involvement in productive activity
- Lack of suitable credit sources
- Poor or absence of shelter, feed and treatment facility for livestock during flood
- No technical inputs support from the government and private services e.g. knowledge, vaccine, medicine are not available because of disrupted communication from the mainland growth centres.

2.1 Community Livestock Extension worker: Two community-nominated unemployed youths were trained in livestock production by the project, to ensure round the clock services on the farmers door step to bridge the gap between the farmers and the government and private service providers. The Community Extension Workers also attended refresher courses to increase knowledge and practical skills and make them capable of quality service provision. They also involved themselves in monitoring and following up the production activities as needed by the communities. The extension workers are paid by the community for quality service delivery. The Community Livestock Extension Workers also updated their knowledge by maintaining close contact with Upazila and District livestock offices.

2.2 Mass Vaccination Campaign:
During the formal meeting and informal discussion, the vaccination programme for common goat and cattle diseases drew attention of char dwellers as they experienced higher rate of goat mortality due to viral and others infectious diseases.
Research Associate team identified the need of goat keepers and decided on a mass gathering which could widely create awareness among farmers of the importance of primary herd health care among the goat keepers. The exercise also assisted farmers to build functional linkage with the service providers.
The villagers of Char Nadagari decided to organize a mass vaccination campaign with assistance of livestock office Madargonj where 1000 goats were vaccinated against PPR (Deadly viral disease of goat) with cooperation from Deputy Commissioner, Department of Livestock Service (DLS) and other private (medicine) companies. PPR vaccine was supplied by DLS. As a result both goat morbidity and mortality due to specific viral diseases were reduced significantly and the population increased by 33% during 2003-2004.

In this programme, participants again reflected on some real needs as follows -

- Control of disease (PPR) and worms
- Access to vaccines from the line department
- Improved communication networks
- Affordable provision of housing and shelter for improved goat and cattle rearing during annual flood
- Easy access to credit and technical knowledge
- Reduce conflicts within rich and poor people for goat/cattle grazing
- Promote quality breeding buck service in char area to increase genetic potential.

Finally the project collected four quality Breeding Buck from BLRI (Bangladesh Livestock Research Institute), Savar, Dhaka and distributed the bucks among three destitute women (two in Nadagari and one in Nandina). It was arranged in response to community identified need for better breeding service to improve and to increase stock of Black Bengal goat. The fourth was distributed for developing quality parent buck farm. It was observed that those who received breeding services from quality breeding buck produced better quality doe and the number of kid production per kidding increased and also improved the genetic make up of the offspring.

2.3 Development interventions for goat:
There are five components of the goat promotion programme-

1. **Parent Buck Farm:** it was designed by community that this unit should consist of one breeding buck and 20 does. The main purpose was production of genetically improved bucks in Char Nandina, the selected male kids could be distributed in other chars. Farmers constructed affordable hygienic sheds.

2. **Increase in** herd size and survival. The number of doe gradually increased and now it stood to 26. Farmer already got 15 kids (female 11 and male 4).
   Natal mortality was recorded, one doe gave birth 2 dead kids. Reason may be mistreatment or rough handling farmer said. Farmers experienced hardship to arrange required feed for goat during the dry season. So s/he planned to promote grass field to continue supply of green grass. Farmers expressed their happiness with the performance of the goat farms and assumed it can substantially contribute to improving their livelihoods.
3. **Doe Farm**- Four doe farms were established in two chars for quality kid production. Initial plan was each unit would consist of five improved does. Two women farmers started with six does and the rest with five does. One doe died due to pregnancy complications. One farmer got two kids and most of the others are approaching kidding. Does of these farms received breeding support from the project-supported breeding buck, which ensured extension of improved genetic material.
4. **Castrated Goat Farm**- four castrated goat farms in two chars. Forty goats (10 goats in each farm for meat production). Farmers expressed their satisfaction for getting technical and other support from project, DLS and RCEs. They are eager to ensure better health care and feeding management to develop market size before the next Eid (Eid-ul-Azha). Mortality in one goat was recorded (sudden death) although the cause could not be identified.
5. **Breeding Buck for better service**- The bucks were collected from BLRI, Savar, Dhaka. In char Nandina, initially none of was interested to keep breeding buck as service providers. Mr. Rahman, doe farmer (rich with social capital rather than financial/physical), kept both of the bucks. After three months, one very poor woman, Hasina, received one to provide a breeding service. She has received greater social acceptance in the last few months.

Housing, feeding and treatment costs for breeding buck farmers and breeding buck service providers was 50% of their market value. For doe farmers and castrated doe farmers the equivalent costs were 40 and 30% respectively.

3. **Institutional Linkage & support**:

- Department of Livestock Services in Jamalpur extended services in char for goat promotion. Villagers already developed good linkage with Upazila Livestock Office through the community extensionist.
- DLS (Department of Livestock Services) recognise that semi-intensive goat farming in char is viable for poor women/men and they already provided inputs like vaccine and advice on treatment.
- Private veterinary drug companies also availed the opportunity to promote their medicines in the isolated and attached char with minimal profit.

4. Achievements so far:

In general achievements are:

- Farmers established separate house for goat and ensured proper ventilation and hygienic animal keeping.
- Farmer led extension initiated and some farmers already shared experience to start similar improved farming.
- Primary goat health care is being expanded with support from DLS and private service providers.
- Provision of breeding buck services is socially accepted and is an economically viable option for very poor women.

5. Constraints:

- All the farmers did not show interest to construct improved house as suggested by the project for financial inability. 3 farmers did not construct the hygienic shed. Although they agree the benefits of raised platform to cope with flood and prevent mortality due to diseases.
- Grass is very limited in Char Nandina, it could initiate social conflict for stray grazing and crop damage.
- It will take time to create awareness about the benefit of preventive and curative measures for profitable goat production by the marginal farmers.
- Some farmers argue that the RCE-Livestock need to further reduce the cost of his services, high charges may weaken community based extension system.
- Farmers may not be interested to rear a single breeding buck as they do not earn enough money from one quality breeding buck. If supported with 2 or more breeding bucks it could be means of livelihood for a destitute woman or a very poor family.

6. Key learning (so far):

- Castrated goat farms for meat production are more economically viable and profitable than any other type of goat farming.
- Doe producing farm could be good source for quality doe production thus community might have access to genetically improved doe to increase of production.
- Breeding buck farm could produce quality buck as demanded by the adjacent char community.
- Acceptance of breeding buck service with cost is increasing in the society. This was previously constrained by social taboos. Goat population in the village increased in the last year. It is assumed by the community that goat population is increasing due to promotion of quality breeding buck service. If a rearer is supported with 2 or more bucks, she can earn over Tk2,500 per month.
- Vaccination and routine deworming is contributing to reduced goat mortality and improved health. The practice is extending through farmer-to-farmer contact. In future, contact with different service providers needs to be increased to ensure inputs at more competitive prices.
- Framers purchased the Black Bengal goat and also got the service of quality breeding bucks. This has brought a much-needed increase in genetic potential.
- Women and poor families are interested and enthusiastic to expand or start goat farming through farmer led extension.
- Framers realised that *matcha* (platform) is keeping goats in healthy condition and will also help to keep them safe during flood. In Faridpur low lying land the goat keepers make matcha made with bamboo/wood for goat keeping during flood and minimising by disease risk.
- Service availability and line department support is accessible by the char community; it strengthens livelihood diversification of very poor families/women.
- Institutional recognition from higher level and encouragement is obtained by the char community on parent buck and other type of goat farming options from the State Minister of Finance and Planning, District and Upazila administration (DC & UNO). The Minister in Charge of the district and administrative officers are supportive towards successful demonstration and extension of similar activities.
- The government officials have limited experience about this type of goat promotion as presently they are not able to provide minimum extension services to char dwellers. Main constraints identified by the government are distance from Upazila office, disrupted road

and river communication and very difficult to provide extension services for lack of necessary logistic support.

- All over Bangladesh in Char area there is good prospect for improved goat production as it could be ideal location for goat bank/conservation, has a climate conducive for smooth production and indigenous green grass is available which is essential for goat reproduction. But char dwellers face extreme vulnerability during flood months and drought. In that case government has no special policy/plan to support char area to promote goat production, constrained by repeated flooding, and to extend necessary services for their livelihood improvement.

Conclusion:
Farmers were not fully successful due to repeated occurrence of over flooding. But learning could be helpful to improve planning for goat production. Reasonable success has been achieved over a short period. The key learning from goat production activities will contribute to char communities continuing a more pragmatic medium or long-term plan for improved goat production in the next PAPD.

Comments on present situation of goat farms (Char Nandina and Char Nadagari):

Due to flood, 2004:

1. The farmers of goat farms (including breeding buck rearer) have been rearing doe, castrated goat, kid and breeding buck. The farmers mentioned that, out of 10 farm holders, four kids died because of crisis of feed during flood and malnutrition during breeding (4-5 kids).
2. The farmers (who rearer 2-6 goat) sold many goats with 33-50% less value to reserve cash money during flood.
3. Due to catastrophic hit flood than past year and absence of high land at char area specially at Char Nadagari, some farmers saved their goats at their relatives in high land area and it was the matter of hesitation and not cost effective also.
4. During flood period, the goat rearer could not supplied sufficient feed for goat and as a result the goat lost body weight causes to minimum market price.
5. 25% of total goat deceased due to sell/mortality.

Social causes:

1. Create social conflict with due to collect tree-leaves as goat feeds from neighbours trees at flood time and the farmers sold their goats.
2. Undesirable situation created as some farmers carried their goats to nearer flood shelter.

Steps taken before/during flood:

1. Concentrated feed (for goat farm) were supplied.
2. Awareness developed to affordable housing condition for goat at pre flood and post flood time.
3. Treatment (preventive & curative) – PPR vaccination, de-worming were provided.
4. Some goat sheds prepared at household level.

Impacts:

1. The goat farmers lost 33-50% market price against previous year
2. The goat farmers were affected due to high price of concentrated feeds at flood time

3. Huge economic loss by goat farm, the goat rearers hunting alternative income generative activities.
4. Due to high flood-hit the mortality of goat increased.
5. A total of 67 (sixty seven) goats were sold and the farmers earned 76,150.00 (Tk. Seventy thousand one hundred and fifty)

Learning:

- Goat shed must be prepared at high and hygienic place at household
- During flood, the leaves of bamboo plant and mehgoni tree could be used as green feed for goats.
- Concentrated feed is highly effective due to flood
- Same feed is not better for goat long time at flood period.
- The height of goat shed should be increased against flood water.
- Farm holders should be completed vaccination (specially PPR) in time.

Post flood plan:

- Vaccination (PPR, Anthrax, BQ, FMD, Render Pest) campaign
- Deworming
- UMS demonstration
- Concentrated feed support
- Goat/breeding buck support
- Fodder demonstration
- Housing support for goat rearing

ITDG- Bangladesh

NRSP CHAR Project, Jamalpur
Present status of goat farms due to flood, 2004, (August, 2004)

Sl. #	Name of the Farmers (No. of farm)	Village	Starting position				Present status				Sold	
			Doe	Castrated goat.	Kids	B. Buck	Doe	Castrated goat	Kid	B. Buck	Goat No.	Total (Tk.)
01	Abdur Rahman *	Char Nandina	18			01	10		04	01	05	4500.00
02	Aifal Begum	Do	05			01	04	04		01	07	6650.00
03	Golam Mostafa	Do		10			02	01	01		09	7650.00
04	Moslem Uddin	Do		11			02	02	03		09	12,750.00
05	Hasna Begum	Do	5+3				05		07		09	10,200.00
06	Hazera Begum	Do		10			01				10	14,500.00
07	Gole Noor	Char Nadagari	02	10	06		02	02	06		10	13,000.00
08	Momotaj	Do	07	08	06		05	02	04		04	3600,00
09	Khuki Begum	Do	5+1				05	02	05		04	3300.00
10	Ambia **	Do				02				02	-	-
	TOTAL		**46**	**49**	**12**	**04**	**36**	**13**	**30**	**04**	**67**	**76,150.00**

***The farm was affected by PPR, 19 goat died and five goat sold with minimum price.**
****She could not earn during flood period but her income was average 1000.00 per month before flood.**