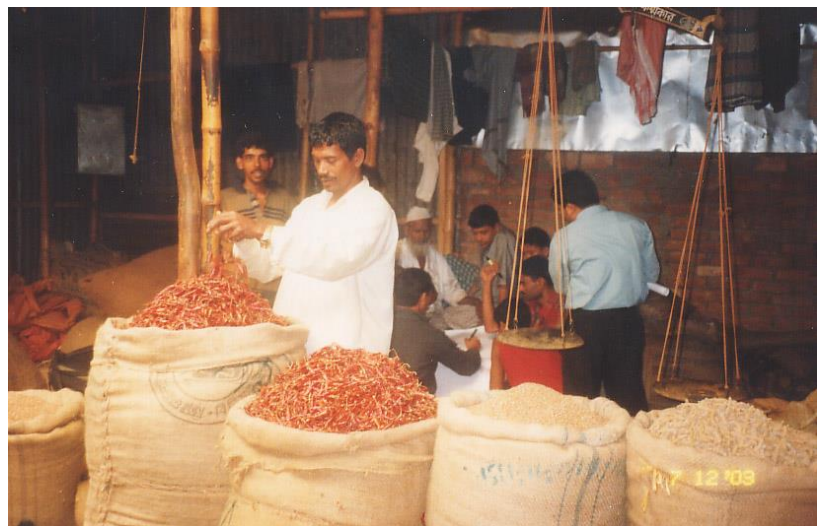


An Actor Oriented Analysis of Chilli and Beef Production in the Jamalpur Chars of Bangladesh



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On the logistics side, many thanks to the Jamuna Fertiliser Company Ltd, for providing accommodation for our team in their guest house at Tarakandi.

This study is just the beginning! As we move into the next phase, DEW looks forward to continuing to build productive partnerships to increase opportunities for char based producers.

¹ In the case studies included in this report we have used pseudonyms to conserve the privacy of those who worked with us.

Glossary of Local terms and abbreviations

Abbreviations

ASIRP – Agricultural services Innovation and Reform Project.

BARI – Bangladesh Agricultural research institute

BCIC – Bangladesh Chemical Industries Corporation

BFLLFEA - Bangladesh finished leather, leather goods and footwear exporters association

BLRI – Bangladesh Livestock Research Institute

BRRI – Bangladesh rice research institute

BS – Block supervisor

CPHP – Crop Post Harvest Programme (DFID)

DAE – Department of Agricultural extension

DFID – Department for International Development (UK)

DLS – Department of livestock services

Hortex – The Horticultural Export Development foundation.

NGO – non government organisation

NRI – Natural Resources Institute, UK.

SAIP – small agriculture improvement project.

SRC – Spices Research Centre

SRDI – Soil Research and Development Institute

UAECC – Upazila Agricultural extension coordination committee

ULO – upazila livestock officer

VFA – veterinary field assistant

Local Terms

Arotdar – wholesaler. Buys from middlemen and stores produce. Takes a commission from buyers and sellers.

Bari – homestead, which may contain several household units known as ‘ghor’.

Bepari – large middleman who shifts goods from one market to another.

Bigha – 0.134 hectares

Borga – contract livestock rearing arrangement. The owner and manager share profits when the animal is sold.

Dalal – middleman

Faria – smallest scale middleman. May be employed by ‘arotdars’ to purchase to farmers. Located in upazila markets and on chars.

Fatra – poor quality chilli

Ghor – household unit

Goyal – hindu traditional healer from Jessore.

Hat – village market

Innovation system – the system of all major social actors affecting the revealing, acknowledgement, generation and diffusion of technical and institutional knowledge over time.

Khaisha – *Saccharum spontaneum*, tall grass growing on the char, used for fodder, firewood and construction.

Kobiraj – traditional healer (people and animals)

Marisch – chilli

Mohajon – large middleman (livestock)

Paikar – small middleman based in chars and upazila markets.

Samaj – social grouping based mainly on attendance of the same mosque. Samaj leaders play a patronage role to samaj members as well as solving local disputes.

Samity – organisation

Soj – aniseed.

Union – sub upazila administrative unit. Location of DAE block supervisors.

Upazila – sub district administrative unit, location of DAE and DLS offices.

SECTION 1. INTRODUCTION, RESEARCH AREA AND METHODS

1.1 Introduction

This research was initiated in November 2002 and completed in May 2004. Funded by the UK Department for International Development (DFID)'s Crop Post Harvest Research Programme, the research was hosted by a Bangladeshi NGO, Development Wheel (DEW)² and comprised a core 'coalition research team' which includes members of DEW, Business Advisory Services Centre (BASC)³ working together with Dr Zahir Ahmed⁴, Associate Professor, Department of Anthropology, Jahangirnagar University, Harriet Matsuert⁵, research coordinator and research assistants: Noushin Islam and Faruk Hossein.

The research aimed to develop actor oriented tools and approaches to improve institutional analysis and partnership building in project appraisal and planning⁶. Within this framework, our specific research outputs were:-

- 1. Research and action coalitions identify (and act on) opportunities to strengthen pro poor post harvest innovation systems for char dwellers.**
- 2. The research team develop and share useful actor oriented tools for analysis of innovation systems and planning, monitoring and evaluating interventions.**
- 3. The research team document and share institutional learning gained in the development of research and action coalitions.**

In response to demand by the people of the Sarishabari chars we widened our study to look at livestock fattening as well as crop production. The final study also looks broadly at two innovation systems rather than focusing exclusively on post harvest issues.

This was an 'action research' study and analysis led to the identification of interventions to support existing strong and effective links, build new links where there were significant and critical gaps or to address problematic links. The emphasis was on identifying existing strengths and opportunities: how things work, rather than how they should work. This, we have found has led to the

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⁶ The research contributes to CPHP's goal: '**National crop post harvest innovation systems respond more effectively to the needs of the poor**'.

The purpose of this research project was for '**Researchers and development actors to apply and promote lessons in the use of collaborative research and actor oriented approaches in post harvest innovation systems**'.

identification of innovative interventions which are particularly appropriate to the unique situation of char dwellers.

1.2 Description of Study Location – the Jamalpur Chars

See figure 1 showing map of study location.

The Jamuna chars are shortly to be the focus of a major DFID livelihoods development project. Our research objectives were developed through discussion between the research team, CPHP and the DFID Bangladesh team with the intention that the findings of the study would provide useful information and suggested interventions for the forthcoming programme⁷.

The Jamuna river is the 258km lower course of the Brahmaputra river, and is typically braided with multiple channels. Chars are 'islands' created by river sediment and are in a constant state of formation and erosion. A continuous threat of riverbank erosion and flooding, combined with a lack of physical infrastructure, poor access to essential services and employment opportunities in the chars means that char dwellers are amongst the most vulnerable people in Bangladesh⁸.

The survey was carried out in two chars in Sharishabari Upazila of Jamalpur. The first, Kulpal char, was already a project site for Development Wheel (DEW), who had been working there since 1998, giving credit and training to groups of women. Kulpal is located very close to Puratanghat market near to Tarakandi and can be classified as an 'attached char'. Though the char dwellers were extremely poor, links with the mainland were good. On the advice of the Upazila agricultural staff, we selected a second, more isolated char, Nolshunda. This is located across the river from Pingna bazaar. DEW did not have any programme on this char. The general information given here comes from DEW baseline studies and our own PRA and household surveys.

The populations of Kulpal and Nolshunda char are divided into a number of '*samaj*' social groups who have been based on the chars for many years. '*Samaj*' groups move together as chars erode and reform. Most of the people interviewed in the study had moved several times in their lives. Movements are coordinated by *samaj* leaders, with pioneer households settling in new areas before the rest of the *samaj* members follow. There can be conflict between *samaj* factions at this time, but on the whole land settlement is much more peacefully arranged than in the coastal chars⁹.

⁷ The chars livelihood project is due to begin in July 2004.

⁸ See reference section for useful literature on the Bangladeshi chars.

⁹ Nolshunda and Kulpal char have both been above water for the last thirty years. During the study period, a neighbouring char, Ghumcha, was reforming and we observed the relocation of 'Ghumcha' *samaj* members from Kulpal back to this char. Conflict between two powerful faction leaders was resolved by a meeting of *samaj* elders.

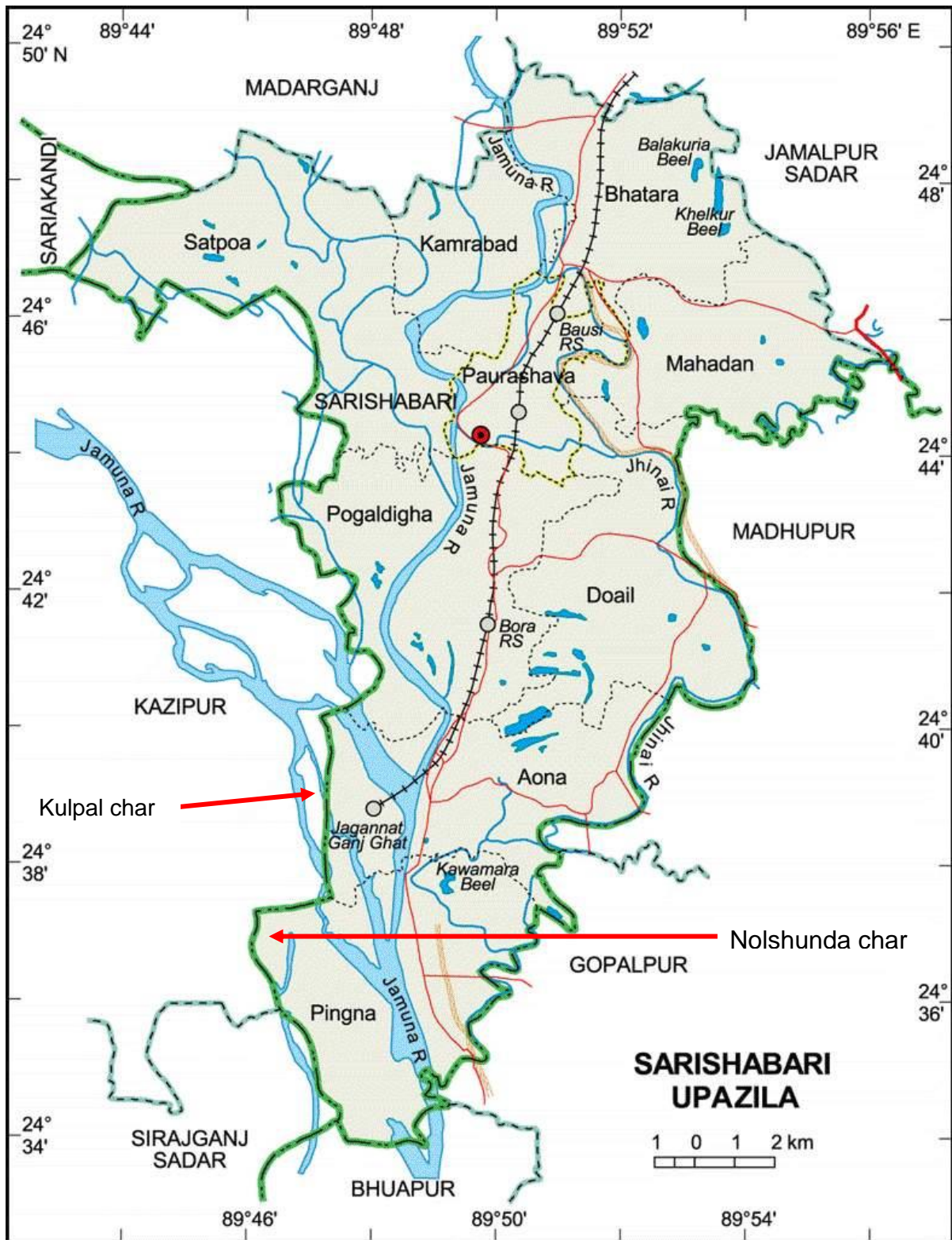


Figure 1: Research Location

Household Livelihood Strategies on the Chars

Household livelihood strategies on the char are a combination of agricultural production, livestock rearing, day labour, longer term migration and business enterprises. Wealthier households (based on our wealth ranking exercise) are more likely to be involved in a wider range of enterprises. Most have local businesses e.g shop, ferry boat, share in local markets, and often have household members working in full time employment away from the chars and sending remittances back. These wealthier households are also more likely to be involved in commercial crop production as they have access to the best quality land.

Case Study – Anowara

Anowara's father lived in Kumar char which has since totally eroded. Anowara's husband died in 1988. For some time after his death she lived in her father in law's house, but it was difficult for her to manage without his income. She survived through rearing ducks, chicken and cattle. With the help of her husband's elder brother she got access to some 'khash' land (newly risen from the river and unclaimed), from government in Char Kulpal. She moved there with her mother, two daughters and brother. Here they now live in a couple of small corrugated iron houses. The household cultivate crops and rear livestock. Red chilli is an important crop. Anowara stores this and sells when she needs cash for the household or to invest in further cultivation. Anowara's daughter migrated to Dhaka and worked in the garments factory before her marriage. Anowara arranged a marriage with a mainlander for her second daughter.

Char dwellers in the study area see their natural resource base as their greatest asset compared with the mainland. Of those households covered by the study¹⁰, 82% were involved in cultivation, and 79% own cattle (93% have poultry and 37% have goats). Land, and particularly grazing area, were felt to be plentiful compared to the mainland¹¹. The main crops grown are rice, chilli and onion, pulses, jute, sugar cane, egg plant, foxtail millet and household vegetables (mainly cucurbits). Many households are involved in some commercial crop production (particularly chilli, onion and sugarcane) which can yield high profits. Natural resource based enterprises are a key way of generating capital and improving livelihood status. However profits are variable and production risks are high¹².

Resource poor households are more likely to have access to sandy soil and have less opportunity for commercial crop production. However, all household levels were found to be involved in livestock production, and beef fattening is seen as a good opportunity for cash generation by all households. Wealthier households

¹⁰ Our quantitative household survey covered 155 households in Kulpal and 153 households in Nolshunda.

¹¹ The FAP Jamalpur Project refinement study (1997) found average land size in this area to be 1.13 ha or 8.4 bighas, compared to an average of 0.76 ha or 5.7 bighas in mainland Jamalpur. Our household survey found that in Kulpal 30% have no land, 46% cultivate less than 4 bighas and 24% cultivate more than 4 bighas. In Nolshunda 16% don't cultivate, 33% cultivate up to 4 bighas, and 51% cultivate more than 4 bighas.

¹² The FAP Jamalpur Project refinement study (1997) found that farm based incomes were not sufficient for 62% of char households in this area.

own their own livestock and may hire labour to manage these, resource poor households access livestock through a 'borga' contract rearing agreement.

Balanced against the opportunities for natural resource based enterprises is the risk of losing land to the river which floods between May/June and September/October each year. An additional risk, even when land is not eroded is caused by the variability of soil deposits by the river. Sandy deposits leave the land uncultivable in the coming year.

Case Study: Abdul

In his childhood, Abdul's family left Kulpal when the char became submerged. They migrated to another char in the neighbouring upazila, where they stayed for 15 years. When the land began to emerge again, the family returned to Kulpal, but their house and land was again eroded away by the 1988 flood. Since then Abdul and his brothers have purchased 1 bigha of land, but this too is currently submerged. In the past, Abdul cultivated some land as a share cropper but this year he has left the char to work as a migrant labourer in Haluaghat. Two sons have also migrated to the mainland. One is working in a ceramic factory, the second is a mason. They send money back to support the family.

While Abdul is absent his wife maintains the household and manages the cattle. His fifteen year old son assists by collecting fodder. A second son raises some additional income through fishing with his uncle

Compounding the problems of high risk from natural disasters is the lack of physical infrastructure and services on the chars.

Char dwellers told us they feel their livelihoods opportunities are constrained by:

- lack of roads/transportation problems
- no phone or electricity
- lack of storage facilities (especially for vegetables and milk)
- lack of flood shelter
- no health facilities
- lack of credit facilities

Because the chars are relatively isolated and hard to reach – a visit entailing a boat trip and long walk across sand in the dry season, the chars are rarely visited by government staff and other service providers. Low literacy rates (between 20 – 30% in the unions covered) mean that char dwellers cannot easily access printed information. Use of radio is more common (67% of households in Kulpal and 27% in Nolshunda had radios).

In terms of social capital, the strong *samaj* units provide support and protection to individual households. Other local organisations include youth groups and women's NGO groups¹³. These play a particularly important role for household

¹³ NGOs are less common on the chars than on the mainland. However, we found 4 NGOs had got members on the study chars (DEW, BRAC, Buro Tangail and Symbiosis Bangladesh).

savings and credit. Interhousehold relations are extremely strong, with neighbours and family members providing the main source of information, financial support, labour and other services. However, these links are not used to present a united char identity with respect to the mainland. There are no strong char based lobby groups, or representation of char interests at the union or upazila level. Individual relations with mainland households are maintained through regular intermarriage. Mainlanders are an important source of shelter during the flood period.

1.3 Selection of Chilli and Beef Fattening as Focus Innovation Systems

The focus enterprises for this study were not decided when the research proposal was developed. Our intention was to select focus commodities based on discussions with char dwellers in our initial PRA activity.

The criteria for selecting these enterprises was:-

- Importance to char livelihoods and particularly to the resource poor.
- Relative advantage of char based production
- Opportunities for pro-poor innovations.

We wanted to select innovation systems which were dynamic and where new opportunities (e.g new technologies and markets) were laying the ground for innovation. The role of our study would then be to look at how, within these dynamic systems, the benefits for char dwellers, and particularly the resource poor, could be maximised.

Chilli

- char dwellers of all wealth categories ranked this as a key enterprise in PRA exercises.
- Reasons for high ranking was high demand, local markets, high profits for red chilli, and ability to sell green or red.
- Relative advantage in chars which are known to produce the best quality chilli in Bangladesh
- Opportunities for innovations: quality of product (reduce post harvest losses), soil fertility management, pest and disease management, affordable irrigation, credit, access to information, relations with middlemen, storage of green chilli, new markets.

Livestock

- char dwellers of all wealth categories, and particularly women, ranked cattle as a key enterprise.
- High ranking because: accessible to even the poorest households (through shared rearing arrangements), high involvement of women, good market opportunities and high profits (particularly at Qurbani Eid).
- Relative advantage in chars because of plentiful grazing and fodder.

- Opportunities for innovations: animal health and nutrition, utilisation of char fodder species, access to information, new market channels for beef, develop leather marketing channels.

1.4 Introduction to the actor oriented approach

Innovation systems (such as the chilli and livestock production systems we focus on in this research) are made up of a range of actors involved in the generation and use of new knowledge, technologies, management practices, marketing processes and institutional relationships.

Our research is based on the premise that a healthy and effective 'innovation system' is one where there are strong flows of information and useful partnership coalitions between key actors over time. This view has been strongly supported by studies of innovation processes (see for example Douthwaite B 2002, Enabling Innovations¹⁴).

The importance of partnership in development interventions is widely accepted by those working in development. However, it is our experience that, in practice, the issue of building strong links and partnerships is often neglected. One of the reasons for this is the lack of tools to allow development actors to analyse actor links and to plan, monitor and evaluate interventions which relate specifically to this aspect of their work.

The actor oriented approach followed in this research, focuses on identifying the key actors in a system, mapping the links and information flows between them and looking at how these support or inhibit pro poor innovations. The actor oriented tools described below have been designed specifically to assist development actors to integrate "linkage and partnership" issues more fully into their work.

These tools are drawn from a wide range of sources. These include social anthropological and social network research techniques (see Long and Long 1992, Lewis 1998), stakeholder analysis (see Grimble and Wellard 1997), agricultural information knowledge systems (see Roling and Jiggins 1997) and process monitoring and documentation (see Mosse et al 1998)¹⁵.

The actor oriented tools used in this research are described in detail in our companion report: Matsuert et al 2004 Actor Oriented Tools for Analysis of Innovation Systems. The tools used and their objectives were:-

¹⁴ Douthwaite's 'archeology of innovations' ranging from case studies of agricultural mechanisations to computer software development show the clear association between effective and successful innovations and strong links between users and 'innovators' from an early stage.

¹⁵ For examples of use by others in NR innovation systems see Ramirez 1997 Understanding Farmers Communication Networks (IIED Gatekeeper 66), and other related work which can be found on www.isglink.org.

Table 1: Actor Oriented Tools

| Tool | Brief Description | Objective |
|---|---|---|
| 1. Actor Time Line | Similar to PRA time line, but focuses on key actors and innovations. | To understand the dynamics of an innovation system and identify key actors. |
| 2. Actor Linkage Maps | Hand drawn or computer generated maps showing links between key actors. | To visualise the links between key actors. Used in group discussions to generate information, and to summarise findings. |
| 3. Actor Linkage Matrices | Links between key actors plotted onto an excel matrix. | To summarise and analyse findings. For planning, monitoring and evaluating change. |
| 4. Determinants Diagram | Group exercise for detailed examination critical links identified in maps and matrices. | Look at quality of link. Identify action plans to improve the effectiveness of the link. |
| 5. Learning and Action analysis (proactive monitoring) | Participatory monitoring exercise carried out by the research team on a quarterly basis | Used to identify new findings or research context and respond to this. |

For examples of these tools see research findings in section 2 and 3.

Using the actor oriented approach, this research planned to look at how, in the absence of strong formal links, char dwellers get access to the information which they need to develop their natural resource base enterprises. What were the key actor links in char based innovation systems? Given the lack of formal support services on the chars, transport problems and poor communication, the char situation appeared to provide a very suitable subject for an actor oriented analysis which might point the way to some 'non traditional' development interventions suited to this unique social and physical environment.

1.5 The research process

The research process has consisted of a number of discrete phases through which we have tried to maintain an actor oriented theme. The tools have been used in a PRA type situation, in individual interviews, group discussions and the approach guided the design of our quantitative household survey.

Table 2 The Research Process

| Date | ACTIVITY | Description | Objective |
|-----------------------|--------------------------------------|--|---|
| Jan – April 2002 | Project preparation | Research coalition formed. Partners developed research objectives together with CPHP and DFIDB. | To develop a research proposal, which combined CPHP, aims with DFIDB's national programme and the goals of the research partners. |
| Dec 2002 | Char based PRA survey | 10 day survey involving core research group and other potential partners (chardwellers, research, extension, local leaders and NGOs) | To better understand char based livelihoods. To identify focus enterprises for the study (see section 1.3). To begin building partnerships between key actors. |
| Jan 2003 | Wider network survey | Survey of key actors in chilli production at district and national level. | To identify key actors at the regional and national level for the focus enterprises. To begin to build relationships with these actors. To select case study actors. |
| Feb 2003 | Quantitative household survey | House to house survey used to get basic baseline information in the two study chars. | Used to - quantify findings and fill gaps in information after the PRA survey. - Get a better understanding of household resources and wealth differentials to select case study actors. - To introduce ourselves and explain our study to all households. |
| March 2003 – Feb 2004 | Case study monitoring | 9 rounds of interviews with key actors at char, district and national level over a 12 month period. | To map links between key actors, key events and locations over an agricultural year. |

| Date | ACTIVITY | Description | Objective |
|------------------|--|---|--|
| | | Included 40 char based households of different resource status. ¹⁶ (See appendix 1 for notes on case study selection). | To get detailed information on opportunities and constraints in the focus enterprises for chardwellers. |
| Oct/Nov 2003 | Preliminary analysis of actor links | Team analysed findings to date and identified critical links. | To set agenda for focus group discussions: which links should be discussed in more detail. |
| Jan – March 2004 | Focus group discussions. | Group discussions with members of key actor groups ¹⁷ . | To confirm case study findings. To analyse key links in detail. To generate ideas for interventions to strengthen, change or build new links. |
| March – May 2004 | Data analysis and report writing. | Initial writing up by team. Findings were shared and modified with other actors through workshops held at union, district and national level. | Draw together key findings, realistic interventions and policy recommendations. To build coalitions to move into an 'action' phase. |

For further discussion of the methodology see section 4. See also appendix 1 for examples of questionnaire and checklists used by the team, and notes on case study selection.

¹⁶ Households were selected to represent the different wealth categories identified in our quantitative survey. For chilli four wealth groups were based on area of land cultivated (>2, 2-4, 4-6 and >6 bigha) , for livestock the four groupings were based on number of cattle owned (1-2, 3 – 5, 6 – 8 and >8).

¹⁷ Some actor groups e.g BADC were found to be unimportant to the innovation system and were not involved in group discussions.

SECTION 2 : RESEARCH FINDINGS : CHILLI

2.1 Chilli Production in Bangladesh¹⁸

See figure 2. Chilli innovation system Timeline.

See figure 3. subsector map of chilli production in Bangladesh

Chilli, or red pepper, is cultivated as one of the most important cash crops in Bangladesh. Area of cultivation is approximately 175.23 thousand hectares (winter and summer season) with a dry chilli production of 142.06 thousand metric tones (1998 – 99 season) (Bangladesh bureau of statistics 2001).

This is mainly a winter (rabi) crop, but there is some limited summer (kharif) season production. Chilli is marketed both green and red.

Production is still below national consumption levels and demand and price is high¹⁹. Bangladeshi chilli production is supplemented by imports from India and Myanmar.

2.2 Chilli Production in the Chars

(See cost benefit analysis in appendix 3)

In Jamalpur district, chilli (winter and summer) is cultivated on 9492.9 ha of land with a dried chilli production of 8480 metric tones (Bangladesh Bureau of Statistics 2001).

Chilli middlemen told us that the best quality chilli comes from the char areas. The traditional Bogra varieties are particularly popular with consumers because they are very hot and tasty.

Chilli is produced in small scale household plots (ranging from 0.3 – 5 bighas, or characteristically up to 20% of a household's land).

Finance

Chilli is a high input crop. The finances for inputs are obtained through sale of previous year's crop, sale of livestock, loans from relatives or neighbours, remittances or through loans obtained from NGOs by female household members. Farmers experience problem getting timely and suitable loans e.g in 2003 as there had been great losses in jute production, many farmers were unable to raise the finances to plant chilli.

¹⁸Information on chilli production comes largely from our spice research colleagues at BARI.

¹⁹ Average price of chilli in 2000 – 2001 was 54 tk/kg (wholesale) and 63.7 tk/kg (retail). In 2004 the farmgate price in Sarishbari rose as high as 93tk/kg for red chilli.

Figure 2. Time Line. Chilli Innovation System

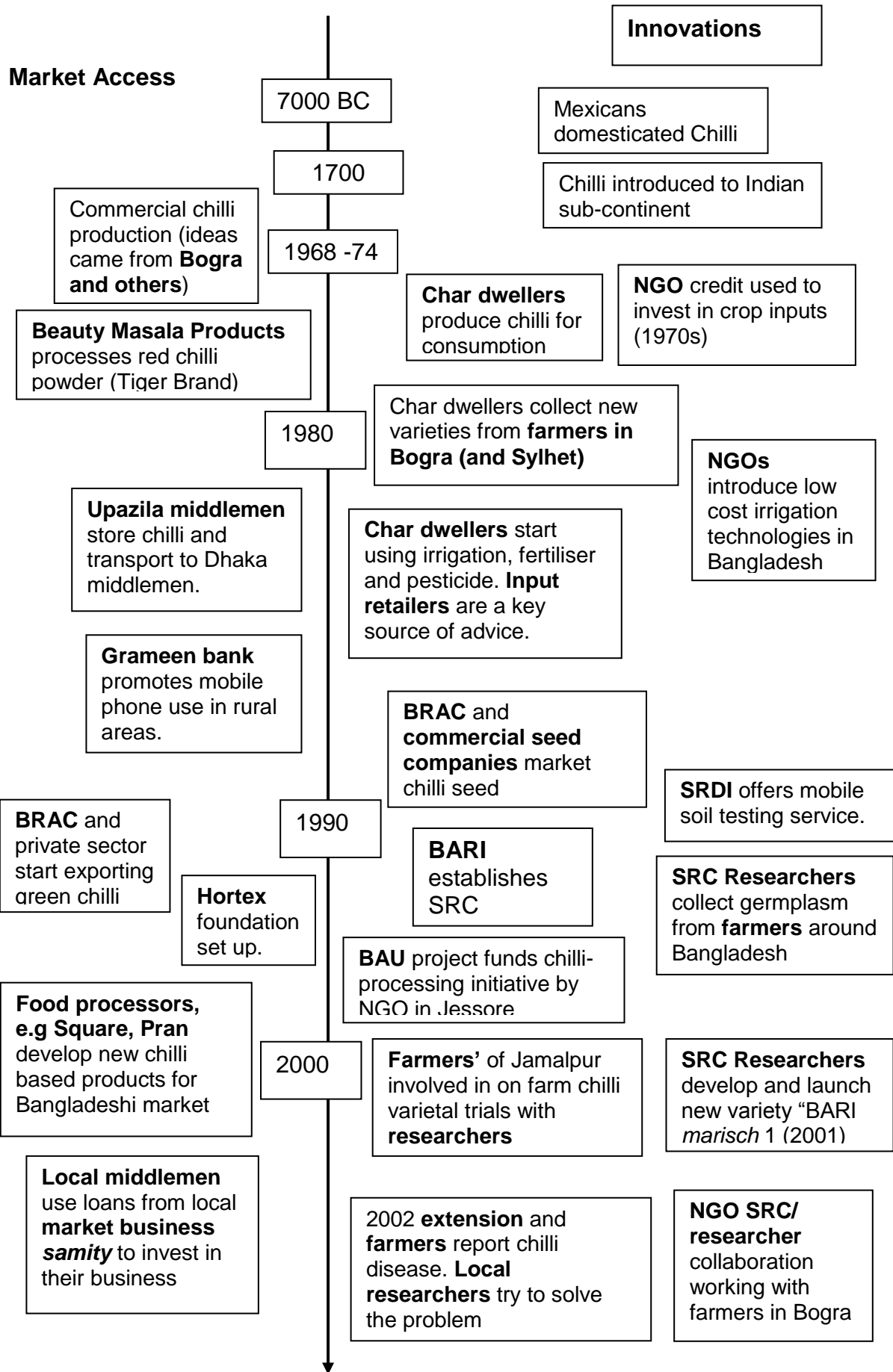
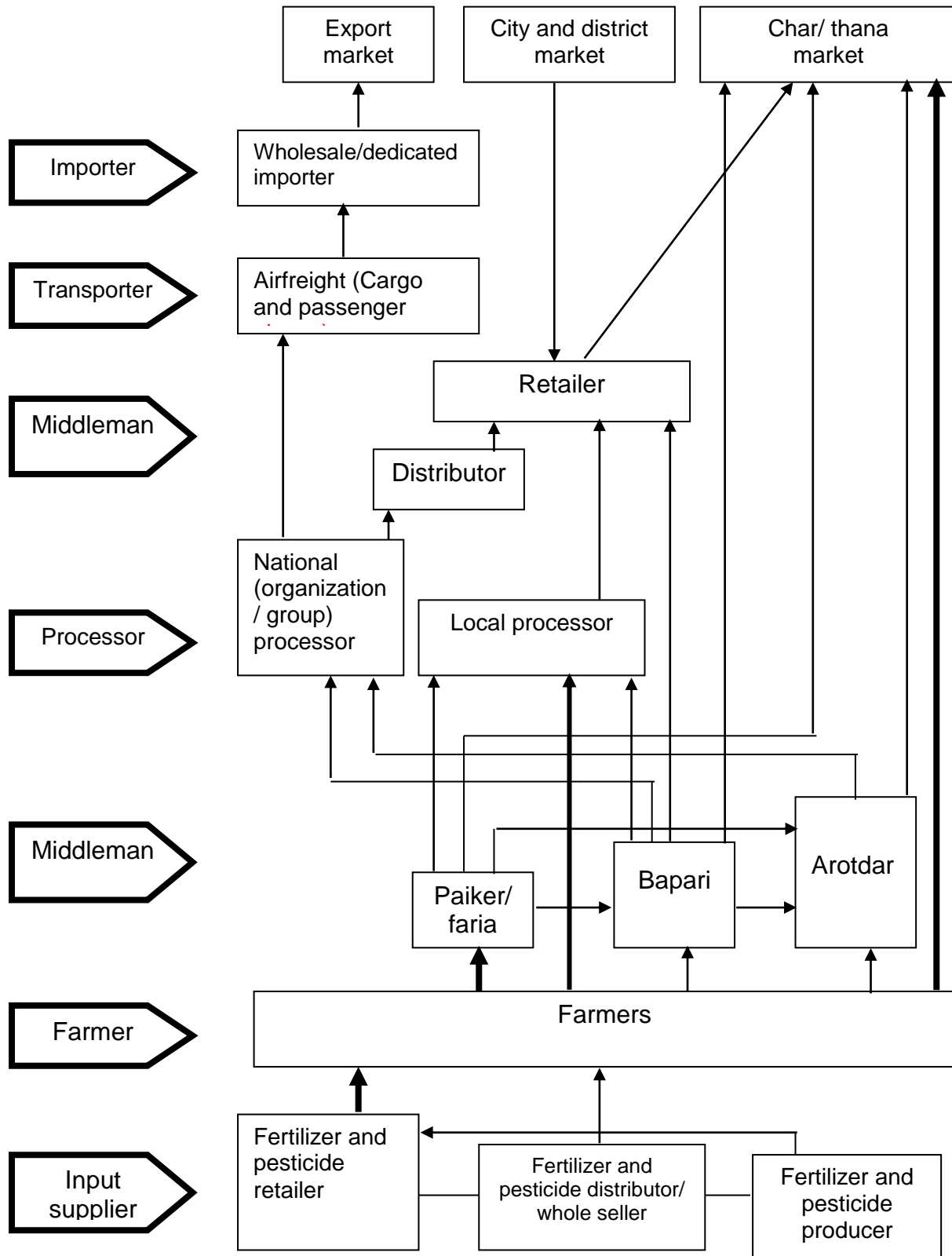


Figure 3. Red Chilli Subsector Map – showing key market linkages for chilli production in 2003



Photos of Actors and Locations involved in Chilli Production – insert.

Crop Management practices

Farmers prepare their land using ox plough and power tiller. In most cases they plough their land 3 times but it may be increased or decreased depending on field conditions. This work is carried out by men only. If there is no male present in the household, then male labour will be hired for this job. Commonly a power tiller is used primary cultivation with final preparation with ox plough.

Chilli is generally rotated with jute, though we also found cases of rotation with *sesbania sesban* (dhuncha) and with sugar cane.

All farmers monitored used fertilizer. They purchased this from retailers in the local market. We observed that fertilizer use does not follow current government recommendations (quantities used are higher, current recommendations to use DAP rather than TSP have not been taken up).

Seeds are purchased from other farmers at local markets²⁰. New varieties have been introduced by farmer-to-farmer exchange and sale from char to char and farmers migrate to other parts of the country.

Planting practices and density are again quite different from BARI recommendations. The conditions of the char require late planting and so no preliminary seedbed stage is used. Instead farmers have developed a method of pregerminating seed and planting directly onto the field...

Farmers use irrigation on all chilli plots. Some households now own shallow pumps and hire these out to others. Lack of irrigation facilities is the reason given by many households who don't grow chilli.

Farmers follow a number of indigenous pest control measures e.g application of ash for leaf diseases (see appendix 2) but increasingly are turning to dealers for advice on pest and disease control. In the last few years, a foliar blight disease has destroyed many chilli plants. There is currently no recommended solution, but farmers from Jamalpur chars have approached researchers in Jamalpur who have responded by setting up on farm research to investigate the best solution. They believe that they should have some recommendations by next year.

Harvesting and processing are carried out mainly by women. BARI researchers who visited the study site noted high levels of chilli damage (discoloured and broken pods, loose seeds etc) due to sub optimal harvesting and drying processes. Large quantities of damaged chilli 'fatra' are sold at a reduced price.

Wealthier households maintain and hire labour for field activities, including harvesting. Resource poor households are more likely to pool or exchange labour.

Marketing (see figure 3, subsector map)

Chardwellers sell their chilli to middlemen on the char, or preferably at local markets. Farmers are satisfied with the red chilli market. No case study farmers

²⁰ Varieties grown in the study area are: *balijhuri*, *behari*, *deshal* and *dhainna*

mentioned problems in finding a buyer or obtaining a fair price for red chilli. In fact, for those who can store red chilli and sell when supply is low, the profits can be enormous.

Case study. Rohim builds a house with his chilli profits.

Rohim settled in Nolshunda char after shifting residence three times because of river erosion. He farms a five bigha area together with his brothers and cultivates chilli, aniseed, pulses, rice, jute and sugar cane. This year Rohim sold his chilli field in advance and used the profits to build a new house.

However, the green chilli market is problematic for farmers. Price is very variable, and when supply is high can drop dramatically. Unlike red chilli, farmers cannot store green chilli and are forced to accept the going price on the day they go to market. They often feel exploited by middlemen who they feel take advantage of their powerlessness. They lack important market information (e.g when BRAC buyers are coming, what current price is) which could help them harvest at the right time.

Wealthier households tend to avoid selling green chilli (particularly at the peak supply time). In fact all households plant with the intention of selling chilli red. Green chilli sales are normally 'distress sales' made by resource poor farmers with pressing cash needs.

Innovations

In the formal government sector, the Spice Research Centre (SRC) of BARI (Bangladesh Agricultural Research Institute) is responsible for chilli research and development. To date, scientists have been engaged mainly in varietal testing. They have collected exotic and local chilli varieties and have developed an 'improved variety 'Bari Morich 1' (Bangla Lanka), which is a short season and pest resistant variety. Unfortunately this variety has not yet been released, as the organization responsible, BADC (Bangladesh Agricultural Development Corporation) is currently focusing on grain crops only. There has also been some research on intercropping chilli with other crops e.g maize and on a variety of crop diseases²¹.

In Jamalpur, BARI staff are engaged in on farm research to find a solution to the foliar blight (choanophara cucubitarum) which has caused heavy losses in this area. This research is in direct response to requests by local farmers.

Since the 1990s an NGO (BRAC) and the private sector have marketed chilli seed. This is mainly hybrid seed. It does not appear to have been adopted at a large scale level. Most farmers are still growing local varieties.

²¹ mosaic, leaf curl, bacterial spot, anthracnose, fusarium wilt and fruit rot (information from SRC).

With regard to marketing, a recent innovation has been the export by private sector and an NGO (BRAC) of chilli to the middle East and Europe. In 2003 PRAN exported 150 tons and BRAC 120 tons of green chilli. There is also an increase in chilli processing and sale of chilli based products in the national market.

At the char level, considerable innovation has occurred in chilli production since this crop began to be grown commercially. Key innovations noted by chardwellers are:-

- Larger areas cultivated than in the past (now 0.5 – 3 bighas compared to less than 0.2 bighas in the past).
- Use of irrigation²²
- Use of fertilizers and pesticide
- Horse cart for transport
- Cooperative labour arrangements
- New varieties obtained from Bogra and other chars.
- Increased use of mobile phones by middlemen to check market price and demand.

Sources of these innovations are primarily farmer to farmer, new information being gained when people migrate to different areas. Local dealers are responsible for introducing new pest control and soil fertility inputs.

It should be noted that farmers in the study areas have not heard of BARI's improved chilli variety, nor do they purchase seed from BRAC or the private sector.

Opportunities and Constraints faced by Chardwellers

In focus group discussions, our key actors noted the following strengths and weaknesses in current chilli production systems.

Table 3 Opportunities and Constraints faced by chardwellers

| | Strengths | Weaknesses |
|------------------|---|--|
| Technical | <ul style="list-style-type: none"> • Annual deposits from the river mean char soil is rich enough to grow chilli. • Red chilli can be stored and marketed easily. | <ul style="list-style-type: none"> • Chilli is damaged each year by different diseases. • High inputs required (problem for resource poor households to invest). • Resource poor households can't access affordable irrigation technologies. • Late recession of flood forces late planting. • High level of chilli damage during harvest and drying. |

²² The FAP Jamalpur Project Refinement study (1997) noted an increase of 38% in irrigation from 1992 – 1997, and estimated that 50% of char land in Sarishabari was now under irrigation.

| | Strengths | Weaknesses |
|-------------------------|---|--|
| Support services | <ul style="list-style-type: none"> • Farmer to farmer information exchange. • NGOs provide loans which are used for chilli production • Soil testing service available • Dealers provide important information on pest control and soil fertility. They are more accessible than government staff. • Agricultural officer in every union • Researchers have responded to local requests for research into foliar blight. • Private sector provide training and information to retailers. | <ul style="list-style-type: none"> • Resource poor households in particular don't trust dealers' advice and products (wrong or profit motivated). • DAE and research staff (e.g soil testers) are hard to access. • Jamalpur researchers don't have budget to respond to local needs. • Poor coordination between service providers. • No organic products available e.g compost. • No suitable credit package for chilli production and problem getting access to any credit. |
| Market | <ul style="list-style-type: none"> • Some chardwellers have good relations with middlemen • Demand for chilli is high • Farmers can store red chilli and sell at the optimum time. | <ul style="list-style-type: none"> • Resource poor farmers are forced to sell green chilli early because of cash flow problems. • Green chilli price falls very low when supply is high. • Resource poor farmers (particularly those selling green chilli) feel cheated by middlemen. • No local storage facilities for green chilli. • Lack of market information for char dwellers e.g when buyers are coming. What current price is. |

2.3 Key Actors in Chilli Production

In our initial surveys we identified the following to be the key actors in the chilli innovation system. Our team selected case studies in each actor group and visited them regularly over a twelve month period. The descriptions below and analysis of links are based on this case study monitoring period.

Char Based Actors

1. Male Chardwellers

Char dwellers, particularly men, are actively seeking out new technologies, varieties, discussing and trying new methods. One fertiliser dealer made the comment "char dwellers are mad 'pagol' to improve their chilli production". Key

interests are : getting access to irrigation, pest control, correct fertiliser application, new varieties, improved market access.

Links (see figure 4 showing number of interactions recorded over the case study period with other key actors).

The strongest links recorded were between char dwellers and their family members (on char and mainland) and neighbours. These links are used for information sharing, source of innovation (e.g new chilli varieties), access to inputs (plough hire, seeds, irrigation equipment), services (labour, loans) and even marketing (through char based middlemen).

The next most common interaction was with the local dealers or retailers. Char based men visit the local mainland market on a daily basis (to make small sales and purchases and to chat in the tea stalls) and regularly visit retailers. Contact with formal extension providers (DAE) also occurs but less frequently (In total our 40 case study households recorded 17 interactions with DAE staff over the year, compared to 90 interactions with retailers). DAE staff rarely visit the char, but are often found on the mainland markets where char dwellers occasionally approach them for advice. In one case a group of farmers visited the DAE office in Sarishabari to request advice on managing foliar blight in chilli.

Char dwellers in the study location have access to three weekly chilli markets: Rupsha (char based market), Pingna, Boira and Puratanghat bazaar (daily market) and have a strong and regular interaction with upazila based middlemen over the marketing season. As with the relationship with the dealer, larger and wealthier farmers have a better relationship than smaller resource poor farmers. Resource poor farmers are more likely to be cheated and misinformed. This is related to the fact that they often sell chilli green (see notes under marketing above).

Links with national actors are minimal though, on rare occasions, char dwellers or char based middlemen have sold directly to national middlemen. Char dwellers are interested in developing links with national middlemen for direct marketing and with banks to access capital to increase production.

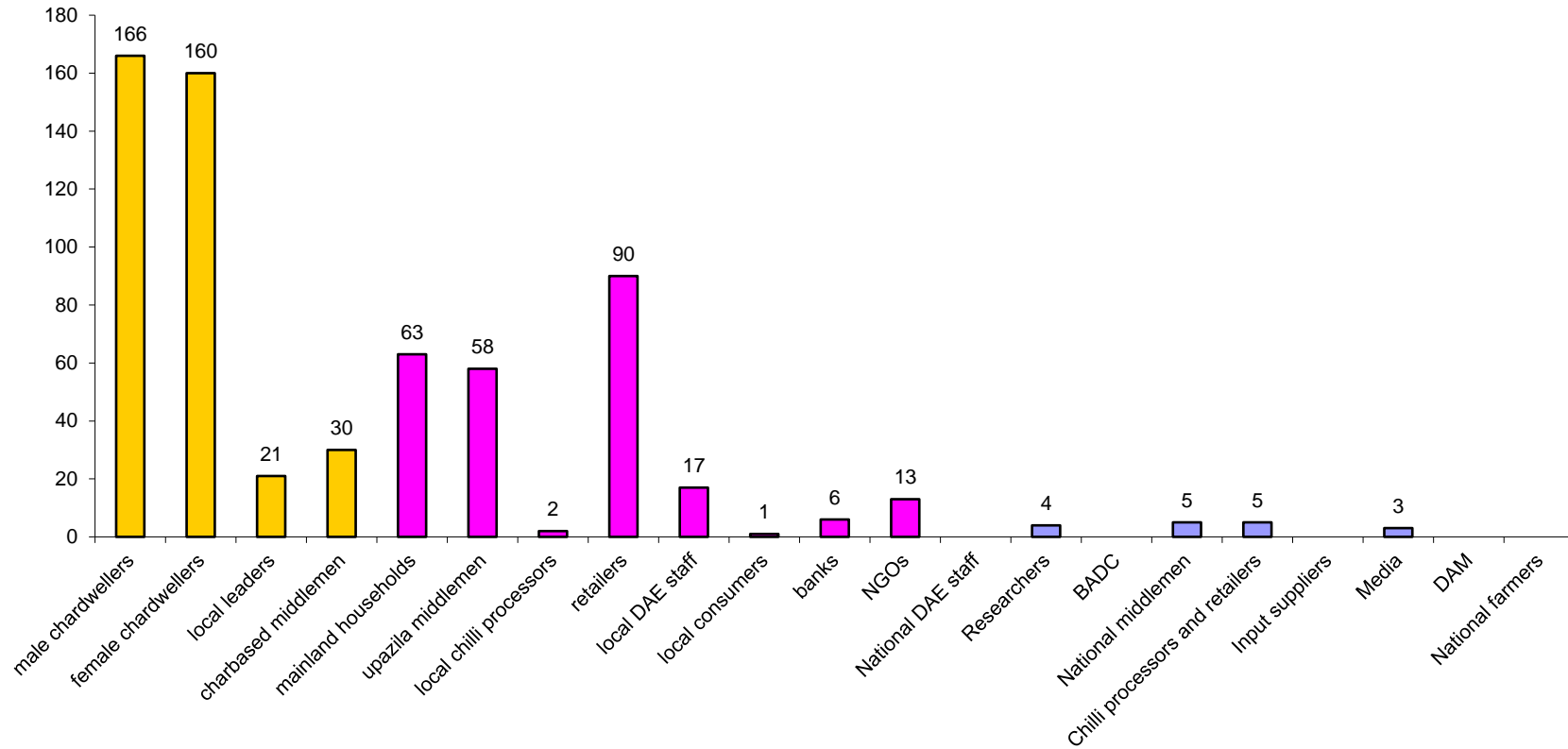


Figure 4. Chardweller interactions with other actors for chilli production over the 12 month monitoring period (based on monitoring of 20 households)

● Chars based actor
 ● Upazila based actor
 ● National based actor

Links to DAE staff and national actor are higher than usual because of meeting held organised by the research team

2. Female chardwellers

While men carry out land preparation, planting and weeding, women are responsible for harvesting and processing chilli. They also play a vital role in accessing credit, through NGO membership, which may be used for chilli inputs. Women and men regularly discuss crop management strategies over the season.

Links

As char women are much less mobile than men, and are restricted from interacting with unknown men, they have no direct links to information providers or market actors with the exception of char based middlemen and NGOs. They do have links to some other households on the mainland and other chars through family connections.

This means that women cannot directly access inputs or advice or make sales outside the char. She must act through a relative or middleman. The significance of NGO membership in this context is very important. Social leaders and male kin now accept womens' participation in NGO meetings (probably because of the vital credit connection) and women told us that NGO membership has significantly increased their mobility and access to outside information. They would like NGOs to provide them with more information and training, more appropriate credit packages etc.

Another potentially significant source of information for women is the radio. 67% of households in Kulpal and 27% in Nolshunda have radios, and in group discussions women told us that they would like to receive more information through this medium. (see discussion under media below)

3. Local leaders

While local leaders play a vital role in conflict management and local organisational issues, we found that they are not involved in chilli production issues. In other parts of Jamalpur however, local leaders have been known to act as intermediaries, contact extension and research about problems faced by farmers (observation by Jamalpur researchers).

4. Char Based Middlemen

This is often a seasonal and opportunistic business activity carried out by char dwellers. Char middlemen buy and sell produce and seed at local and regional markets. On the whole producers prefer to sell direct to upazila middlemen. However the char based middlemen provide an important service to those who cannot deal directly with the upazila middlemen e.g women headed households.

Upazila Based Actors

5. Mainland Households

There are many links between char and mainland households, mainly through marriage. There is regular information exchange at the local market and frequent visits between char and mainland families. Mainland households may provide financial support to chilli producers. Some own land on the chars which they cultivate through share cropping arrangements.

6. Upazila Middlemen

Middlemen (known as '*faria*', '*paikars*' and '*beparis*') are located in all the upazila markets. They purchase directly from farmers and generally sell on to larger middlemen known as '*Arotdars*'. (see glossary for description of terms).

Markets are mainly held in the afternoon. At night groups of *bepari* hire trucks and send their purchases to the main national markets in Dhaka and other parts of the country. The main green chilli market is Karwanbazaar in Dhaka, while red chilli goes mainly to Shyambazaar in Dhaka.

Upazila middlemen, particularly *beparis*, are more mobile than the char based middlemen. They occasionally visit large markets such as Bhuapur, Tangail, and Dhaka to manage their links with *arotdars* there. Using mobile phones they are constantly updated on national chilli prices and demand.

7. Upazila Level chilli and soj processors and retailers

These upazila level actors purchase red chilli, grind and package it for sale to local consumers. They mainly purchase low quality '*fatra*' chilli for this purpose. They also provide a grinding service to local producers and consumers.

Prices of locally processed chilli are lower than the national brand name chilli powders, but the local processors complain that they are losing their market to new branded products.

Links are primarily with local producers and consumers. We found no significant links between local processors or between local and national processors.

8. Crop Input Retailers

Input retailers are present in all local markets²³. Some are licensed by BCIC as official retailers of fertiliser. DAE has a role in monitoring their sales and staff frequently visit their shops.

Other retailers may be registered with national input suppliers (Syngenta for example has 10,500 registered retailers in the country) from whom they may receive training and information.

Larger retailers (particularly BCIC registered) are invited by the DAE to attend local events such as the UAECC meetings.

As well as selling inputs to farmers, retailers provide a number of additional or 'embedded' services. These include: advice on product selection and use, loan of sprayers and links to input supplier for training activities. Retailers also use their contacts with DAE to act as intermediaries for farmers when a particular problem occurs in the area.

²³ Upazila DAE figures show 43 registered seed retailers, 77 pesticide retailers and 192 registered fertiliser retailers in 2004.

Links

Retailers have strong links with char dwellers, DAE staff, input suppliers and with the banks who provide them with credit for their businesses. Most dealers have mobile phones and regularly communicate with upazila and national actors.

Case Study – Fertiliser retailer in Puratanghat

Md. Uddin is one of the top four fertiliser retailers in Puratanghat market. From a corrugated iron shed close to the ferry ghat, he sells agro-chemicals (pesticide and insecticide etc) and fertilisers. He has a good relationship with char dwellers and is himself a char farmer, having inherited 64 bighas of land in char kulpal which he farms on a share-cropping basis.

Md Uddin has a good relationship with the DAE block supervisor (who we met sitting in the shop) and with private sector crop input suppliers. Based on the information he gets from DAE and input suppliers he provides guidance to farmers. In cases of major problems such as unidentified diseases, he volunteers to take up the issue with the local DAE office on behalf of farmers.

He has attended a few trainings on fertiliser and agro-chemicals (given by BADC and DAE) and continuously seeks advice from technical persons/sales representatives of different agro-chemical companies. In future he plans to take some farmers to company 'demonstration plots' in different places. This initiative he believes will be mutually beneficial: farmers will gain more practical insights on use/application of agro-chemicals, best farming practices etc. On his part he will have more business.

9. Upazila Government Staff (Local Extension staff)

The Department of Agricultural Extension (DAE) local office is located in Sarishabari with agricultural block supervisors stationed in each union. There are weekly meetings between block supervisors and upazila level agricultural officers for planning and monitoring work.

As well as their key role of advising farmers and training farmer groups, block supervisors have other administrative responsibilities e.g monitoring fertiliser retailers. They may also be used by other ministries for administrative tasks such as organising local elections.

The recently formed Upazila Agricultural Extension Coordination Committee (UAECC) aims to coordinate DAE activities with those of other key extension providers. Members of this committee include local NGOs, banks, retailers and other government departments e.g DLS, youth development and women's affairs.

Upazila staff interact regularly with regional research staff and use them for advice and inputs. For example requesting research into the current chilli foliar blight problem.

Links

There are strong links between DAE staff and other local service providers particularly at the Upazila office. However, direct links with char dwellers are weak.

Block supervisors visit the chars infrequently because of the inconvenience of having to take boat transport or walk long distances in the dry season. During case study monitoring, we observed initiatives by char dwellers to make contact by approaching the block supervisor directly in the market place or by sending delegates to the Upazila office. In focus group discussions they indicated that they would like to further build links and even to play a monitoring role in assessing the local block supervisor's performance.

10. Local consumers

There is a good local market for chilli due to the large number of employees in the local Tarakandi fertiliser factor. Restaurants use large quantities of green chilli, as this is generally served with onion at the beginning of a meal. Local individuals and restaurant owners purchase directly from farmers in the local market.

11. Banks

There are both government and private banks in Tarakandi, Puratanghat bazaar and Pingna bazaar. These are Agrani bank, Janata bank, Sonali and Islami bank (private).

The banks play an important role in providing capital to upazila level businesses. At present there are no or very few loans to char dwellers. Though, on the part of char dwellers there is an enormous demand for seasonal and specialised credit packages for chilli production.

In other parts of the country banks are beginning to give specialised credit for farmers. For example in Lalmonhirat the National Credit and Commerce Bank (NCC) has joined hands with Doel Agro Industrial Complex Ltd to give loans for maize production. Farmers here have entered into a contract farming relationship with Doel. Doel provides seeds and farmers sell to Doel at an agreed price. (Daily Star, March 30th 2004)

12. NGOs

NGOs, based in the mainland markets, provide credit, training, education, health and sanitation services to their members. Most of the activities of NGOs are limited to the mainland. But, in the study area, DEW, BRAC, Buro Tangail and Symbiosis Bangladesh are all active on the chars.

In the unions covered none of these NGOs was doing any work specifically related to chilli (or crop production), however in other parts of Sarishabari, BRAC is providing training in chilli production and is purchasing chilli from local markets for export.

Links

An important feature of NGOs is that they can legitimately work with women on the chars. At the upazila level, NGOs generally have good links with local leaders and government staff. The largest NGOs are invited to be part of the DAE's UAECC. NGO/NGO links are supported through a Jamalpur NGO forum, but not all NGOs working in Sarishabari are members of this. Coordination of NGOs at the upazila level is minimal.

Nationally based NGOs often have good links with national research and extensions staff, and there are a number of collaborative projects. BRAC in particular also has links with private sector actors as it is involved in purchase and marketing of chilli.

National Actors

13. National Government staff

DAE has its central office in Farmgate Dhaka with local offices in every upazila in Bangladesh. The DAE works through agricultural officers at district and upazila level and through block supervisors at union level. There are also a number of specialised projects, for example the recently completed Agricultural Services Innovation and Reform project (ASIRP) and current Small agriculture improvement project (SAIP).

Links

There are strong links with research, donors and some NGOs for specific projects. There are also strong and regular links with the media.

14. Researchers

The Bangladesh Agricultural Research Institute (BARI) has its main office in Gazipur and regional stations around the country. The national spice research centre (SRC) is located in Bogra. Newly developed technologies are tested through the on farm research and development division. Final products and technologies are disseminated by DAE but in the case of seeds BADC has responsibility to multiply and sell to farmers. SRDI also conduct research at the village level and provided soil tests to farmers at subsidised rates. BARI has a well set up regional station in Jamalpur where researchers are working with farmers directly.

BARI is the source of many new innovations in chilli e.g disease management (RARS Jamalpur), collecting and testing indigenous varieties (BARI Bogra), work on intercropping (chilli and maize) BARI farming systems team, chilli processing (BAU), soil fertility management (SRDI) (BAU farming systems team).

Links

RARS Jamalpur have good contact with via extension. Based on demands from extension and local people, researchers have initiated some on farm research with chilli to address the current foliar blight problem.

Annual regional and national research meetings are used to review progress and plan research for the coming year. These meetings are attended by extension representatives.

Outreach to farmers is mainly through leaflets and extension. There are regular meetings with Agricultural Information services to disseminate new advice.

15. BADC

We included this organisation as an actor because of their official role as multiplier and distributor of new seed varieties. However we found that BADC do not multiply or distribute chilli seed. The new BARI chilli variety was released 10 years ago but is not yet available to farmers.

BADC does have strong links with research, extension, some input suppliers (for training) and with some national farmers (contract seed production). But there are currently no links with regard to chilli production.

16. National Middlemen

Green chilli is transported from the Upazila markets in the evening to *arotdar* wholesale units in Karwan and Shyambazaar. Here, large groups of middlemen gather before midnight to purchase chilli from the *arotdars*. People from other Dhaka markets e.g Mohammedpur, Mirpur, Jatrabari come to purchase from these two big Dhaka markets. By morning buying and selling has been completed.

Arotdars have their own space in the big wholesale markets (Shyam and Karwan bazaar). They charge commission from both buyers and sellers. They invest and transact huge money in this business. They have contact with many *bepari* in the chilli growing zones where their supplies come from. Most *arotdars* visit these areas occasionally to monitor price, availability, quality and to maintain relations with their suppliers. The main areas are Faridpur, Shariatpur, Comilla, Jamalpur, Sirajgonj and Bogra.

17. National Chilli/soj processors and retailers

National companies such as Square and Pran are developing new local and export markets for green chilli and processed red chilli (powder). PRAN is exporting 150 tons/ year and BRAC 300 tons/ year of green chilli (2003 figures). Square is currently exporting to South Korea and hopes to start exporting to Italy soon.

National processors and retailers purchase chilli mainly from Shyam and Karwan bazaar in Dhaka. Some companies e.g BRAC, purchase directly from Upazila level *arotdars*. Companies such as Square have shown an interest in contract farming and developing direct links with producers. In other parts of the country large processing companies have successfully set up contract farming relations with producers (see Lalmonhirat example above under banks).

Case Study: BRAC Chilli Export.

BRAC purchase green chilli from several markets both in the char and mainland. BRAC has listed middlemen who facilitate buying from local market. After collecting green chilli BRAC transport it to Tongi with their covered van at night. In Tongi, green chilli is sorted and graded and carried to airport early in the morning. Chilli is exported mainly to the Middle East and Europe.

18. Input Suppliers

These are organisations which manufacture and market fertiliser, pesticides and other inputs. Companies supply their products to local retailers/ input retailers and have marketing representatives all over the country, working from regional centres. Market representatives also provide advice and even training activities.

Seed input suppliers work with contract farmers to produce seed. They also import seed from Japan, South Korea and India. Companies commonly have their own demonstration plots, run by farmers or retailers.

Case Study – Syngenta

This company has the largest share in the crop protection market in Bangladesh (around 40% of the market). The main office has 22 staff. There are 4 regional offices and 400 distributors (stockists) who sell to 10,500 retailers all over the country. These retailers have been carefully selected by Syngenta (from an estimated 30,000 retailers nationwide) on the basis of their good reputation and credibility with farmers. Syngenta estimate that 50% of customers ask advice from retailers about what to buy.

Syngenta employs 100 marketing agents as well as marketing assistants and market organisers. Market agents conduct three meetings daily with farmers. These are topic specific, depending on the season and the main crop grown in the area. The market organiser talks to the local retailer and gets the name of suitable farmers. The meeting is informal, held in one farmer's field or homestead. Retailers also attend these meetings.

In Syngenta's experience it takes 3 seasons to convince people about a new technology. In the first season they tell people about the technology and set up a demonstration plot. In the second people try out the technology on a small plot in their land, and in the third they will adopt larger scale.

Syngenta have signed memorandi of understanding with BARI and BRRI. They have also just completed a collaborative research project with NRI, UK. They are currently organising a 3 day training programme for retailers, co funded by a business development support project.

19. Media: telephone, radio, newspaper and television

The mobile phone has been an important innovation in rural communication systems. Introduced in the 1990s, mobile phones are now readily accessible in the mainland markets. They provide a vital way for all actors to access information. They are particularly used by businessmen to make contact with big centres re: price and commodity demand. In some cases, char dwellers also used the mobiles to find out about price from contacts in other areas, though this is still uncommon and there is no formal information service they can phone.

Media correspondents collect information from all areas of Bangladesh. Krishi Biplob (newspaper) gets agricultural information and news from block supervisors and agricultural officers in each upazila. The Agricultural information services meet with researchers on a quarterly basis to get information on new technologies or seasonal recommendations.

Radio, television and newspaper are potentially important sources of new innovations. Char dwellers rarely make use of television and newspaper (due to low literacy and very few TVs on the chars), but they do listen to the radio. Many char dwellers listen to the radio for entertainment (ownership was 67% in Kulpal and 27% in Nolshunda). However, none said they had ever heard any useful information on farming. Most farming programmes are directed towards mainland households who have very different farming conditions from the chars. For example, recommendations (from BARI) for mainland farmers suggest that chilli should be planted in two seedbeds before transferring to the field. In the chars the late recession of flood means that farmers practice is to sow directly onto the field (often pre germinated seed). Late planting is an issue that concerns char dwellers but is not so often a problem in the mainland. Similarly, with char soils being regularly covered with new deposits, soil fertility management recommendations should be very different to the mainland. Char dwellers complain that most programmes are about mainland crops and practices and not about things which are of interest to them.

At present there are no local radio stations, which provide area specific information. In group discussions, char women told us they would like to see the development of radio based information provision, as this media is very accessible to them.

20. Department of Agricultural Marketing

DAM is responsible for monitoring prices in the different wholesale markets. Information is provided to the Bangladesh bureau of statistics and to the media. In our case study monitoring, we found no cases of actor accessing and using this information.

21. National Farmers (farmers outside the research area)

Many innovations in chilli production e.g new varieties, commercial production are said to have come from farmers in other areas of the country. These links are mainly made through men migrating to other areas for work (particularly to Bogra). Currently farmers in other areas are carrying out on farm research with BARI staff into new chilli varieties and management practices. There are no links between these farmers and farmers on the chars.

Key Locations and Events

Through our case study monitoring, we observed a number of important locations and events in chilli innovation systems. These are places and events which bring actors together and where significant interaction occurs.

1. Local and national markets

Information sharing and price negotiation between farmers and middlemen

2. Tea stall

Important location for exchange of information between charwellers and mainlanders.

3. Cell phone shop

Information exchange between upazila and national middlemen. Used occasionally by char dwellers.

4. Retailers shops

Information exchange between farmers and dealers. Block supervisor is often found here. Visited by input retailers.

5. NGO meetings

Opportunity for women to exchange information and to hear from outsiders. Access to credit

6. DAE office and UAEECC meetings

Information sharing between upazila and district level actors.

7. Annual research planning workshops (regional and national).

Research priorities set for the year ahead. Attended by research and extension staff.

2.5 Critical Links in Chilli Production

A summary of the key links between the actors in chilli innovation systems are shown in figures 5 and 6.

The maps and matrices the show level of interaction between actors over the twelve month case study monitoring period on a qualitative scale:

0 – no interaction

1 – interaction but not regarding chilli production

2 – interaction has occurred but inconsistent

3 – regular and strong interaction.

Note that the strength of the linkage does not give an indication of whether this is a positive or negative linkage for resource poor char dwellers. Nor can our maps or matrix give information about power relations or control of links. These issues were discussed, for key links, in actor focus group meetings, and are described in the text below.

Figure 5. Actor Linkage Matrix for Char Based Chilli Production

Figure 6. Map showing Actor links for Chilli Production

2.5.1 General Overview of Links between char, upazila and national level actors

Char/char links

These are generally very good, with frequent communication and information exchange between and within families. Links between char dwellers are used for access to inputs (seeds, irrigation, tillage etc), labour, credit and marketing. In Kulpal cooperative labour arrangements are becoming increasingly popular.

Char/Upazila links

These are mainly through the retailer and crop middlemen (though information is also exchanged with mainlanders and other char dwellers at the local market).

NGOs provide a critical link to women on the chars.

Char/National Links

No established links, though there are occasional links between a char producer and a national middleman.

Upazila/Upazila Links

Retailers and businessmen linked through market business associations. DAE, NGO, banks and retailers linked through UAECC meetings hosted DAE. Fertiliser dealers and DAE staff have strong links because of fertiliser monitoring requirements.

Upazila/National Links

Good links between middlemen at upazila and national level. Input suppliers have a strong link to retailers. Banks provide credit to local retailers and middlemen. National retailer's products sell to upazila level consumers.

National to upazila links are good for marketing agricultural inputs and also chilli products.

National/National Links

Quite strong links at this level between DAE staff and researchers, national middlemen and national chilli processors, and between input suppliers and research (in the case of Syngenta, though this could be developed further).

2.5.2 Wealth and Gender Issues

We selected households from different wealth categories for case study monitoring (including a woman headed household in each char) to allow us to develop an understanding of the different opportunities and constraints faced by different household types (see appendix 1). We held discussions with both male and female household members.

We found that women within char households have few links with other key actors compared to men. They lack access to information on post harvest practices. This results in high losses through sub optimal harvesting and drying practices.

As far as wealth is concerned, we found that resource poor households are less likely to be involved in chilli production, even if they have suitable land, because of problems accessing capital or credit for initial inputs, and because of the lack of low cost irrigation facilities. When problems in chilli production occur e.g pest attack, they are less likely to be able to generate finances to purchase additional inputs, and are more likely to have to abandon the crop.

We found that both resource poor and wealthier household types, who did produce chilli, had the same level of links with other key actors. The difference lay in the quality of these links e.g in issues of power and control. Richer households tended to have good relationships with retailers and middlemen, while resource poor households were more likely to feel unhappy with the relationship feeling that they were being cheated or given false information. Resource poor households were more likely to sell chilli green in order to meet immediate cash needs. The green chilli market fluctuates more and sellers have less control than for red chilli (see discussion under relationship with middlemen in section 2.5.3 below).

2.5.3 Detailed Descriptions of Key Links and Ideas for Action to enhance these

Detailed analysis of these links is based on our observations through case study monitoring and on focus group discussions with the key actors (using the determinants diagram described in section 2). In this exercise, actors identified 'action plans' or interventions, which could be developed to make these links work better for pro poor chilli innovations. Action plans were compiled and shared with a mixed group of actors at our final workshops²⁴.

We start by looking at links that we found to be particularly strong and effective in the char based chilli innovation system. After this we turn to links which are currently weak but potentially very important.

Links targeted for interventions are shown in our actor linkage matrix (figure 5).

Actor links which are particularly strong in the chars

1. CHARDWELLER/CHARDWELLER LINKS: Key role of char dwellers in innovation, service provision and marketing

Chardwellers most important links in this innovation system are with each other. Our monitoring found that family members, relatives, neighbours and friends turn to each other for advise, source of inputs (particularly seeds), services (labour, irrigation), and even marketing (char based middlemen).

These links are mainly informal through house to house visits, talking in fields and for men discussion at tea shops in the local markets. Some more formal links exist through women's NGO membership and young men's youth clubs.

²⁴ At the union based workshop, held at Tarakandi, findings and action plans were presented by the research team. Participants then broke into small groups to confirm or reject findings.

Though farmer to farmer links are strong, the lack of formal farmer organisations means that representation by char dwellers to actors outside the char does not exist with regard to chilli production.

Action Plans (developed by key actors) to enhance this link

1. Forming farmer chilli producer groups to link farmers with other key actors. This could be a new group or a sub group of one of the existing NGO, youth or savings groups. The role of these groups would include:

- Actively requesting services, training and specialist advice from research, extension and other actors.
- representing farmer's interests to research, extension, NGOs, input suppliers and banks.
- selecting representative to be trained in key skills (including women's representative for issues of particular interest to women).
- Joint action for developing low cost irrigation, marketing and credit initiatives.

2. Alternatively representation of farmers might be achieved through developing the role of local leaders (as seen in other locations).

3. Farmer to farmer exchange visits to innovative farmers in other areas (e.g those working in Bogra with SRC) to build on the farmer to farmer information exchange process.

2. CHARDWELLER/ INPUT RETAILER LINKS: Access to innovations in soil fertility and pest management

Through case study monitoring we found the link between male char dwellers and retailers (by which we mean retailers of pesticides and fertilisers) to be extremely strong and effective. Retailer's shops are located in the riverside markets which are visited almost daily by male chardwellers. Shops are also visited regularly by extension staff (particularly fertiliser shops which must be inspected monthly) and by input manufacturer's marketing agents. Retailers are regularly invited to extension and input suppliers training and meetings.

Because of their strong links both to the char dwellers as well as to upazila level extension staff and national level input suppliers, retailers act as a critical bridge in providing information to char dwellers on input use. They take a pride in this role and we heard of several cases of retailers going to extension to ask about issues which were troubling farmers, also facilitating farmer training, demonstrations or field trips (provided by input suppliers). Retailers also appear to be more aware of publicity and information presented in the media than chardwellers (more likely to be literate and read newspapers). For char dwellers the link with retailers comes second to the link with fellow char dwellers as the key source of information and advice.

The relationship has some problems, particularly for resource poor char dwellers because of the retailer's virtual monopoly on information about new technologies. Some char dwellers told us they don't entirely trust the advice they receive from retailers, wishing that they could receive information from a more neutral party.

Retailers also indicated that they would like to be better trained and updated on new technologies.

Action Plans (suggested by key actors) to enhance this link

1. Training for retailers on technical issues (and providing 'choice' for consumers by training a range of retailers).
2. Farmers groups motivate retailers to carry out socially responsible practices by honouring good practice.
3. Extension providers to work together with input suppliers who are already providing support services to retailers.
4. Extension, NGOs and input suppliers to help retailers to expand the range of services they provide e.g soil testing, new seed varieties, low cost irrigation equipment.
5. Extension and NGOs to support the development of other options for accessing information e.g organic network, NGO training and advice.
6. Block supervisor to sit in retailers shop at a fixed time every week, so that farmers can locate him.

3. CHAR WOMEN/NGO LINK: Making information and services accessible to women

A look at our actor map or matrix will highlight how few links women on the chars have compared to men. Key links are with other char dwellers, mainland and NGOs.

For women the NGO link is the only non kin link which allows access to information and services from outside the char. As such it is seen as a very positive one. As well as providing loans, NGOs also provide some training programmes. Women appreciate the opportunity it gives them to meet together formally on a regular basis "women are united now" and the fact that their mobility has been increased by membership. Women can now legitimately visit the NGO office on the mainland and interact with outsiders as a group. Something which was not possible before, with women very much restricted to interaction with neighbours and kin.

Action Plans (suggested by key actors) to enhance this link

1. Women NGO members form chilli producers interest groups to discuss and study chilli production issues.
2. NGOs to work with BARI to develop training course on post harvest issues for women.
3. NGOs to improve coordination at the local level to share resources and provide a better service to women.

4. FARMER/MIDDLEMEN LINKS: market access

Char dwellers have strong links with middlemen at the upazila and char markets. There is a high demand for both red and green chilli. The marketing system is dynamic and well organised, consisting of a large number of local and national middlemen, and few large companies and one NGO who are exporting and processing red and green chilli.

Larger scale producers in particular have good relations with particular upazila middlemen. They can afford to keep their chilli and to sell at the optimal price, and on the whole are happy with the relationship.

In contrast, resource poor farmers, who are more likely to be selling chilli green, find the link with middlemen more problematic. They complain of being treated unfairly, observing that “*retailers can afford to stop buying, but farmers can't afford to stop selling*”. These farmers complain of being cheated and paid low prices.

Farmers are interested in developing a new link with national chilli processors and retailers such as Pran, Square, Arku, Sepid, BD food or BRAC.

Another reason farmers may have to sell for low price is due to the high level of post harvest damage resulting in large quantities of ‘fatra’ or low quality red chilli.

Action Plans (suggested by key actors) to enhance this link

1. Extension and NGOs to provide char women with advice and training in post harvest technology to improve quality of product.
2. Farmers (through groups) to develop links with national char processors and retailers for direct marketing.
3. NGOs, extension, cottage industries or youth development to provide support to local chilli processors and retailers to improve product and marketing.
4. Facilitate links to organic farming associations
5. Farmer chilli producer groups to develop joint marketing strategy and lobby government.
6. Farmers groups to develop links to get access to information on chilli market e.g. when green chilli buyers are coming to the area, what market price is etc. to help them make informed decisions on when to harvest.

5. BANK/ LOCAL BUSINESSMEN LINKS: Credit support to local industry

Loans from banks to retailers and middlemen help support the development of dynamic input supply services and markets for chilli.

At the producer level, NGO loans are used for chilli production. However the current packages are not ideally suited to crop production. Timing and payback are a problem. In the 2003 – 2004 season we saw char dwellers struggling with a number of strategies to release cash for chilli inputs. Strategies included selling livestock and taking loans from relatives. Many farmers did not produce chilli this season because of lack of capital to invest after the failure of the jute harvest in 2003.

Action Plans (suggested by key actors) to enhance this link

1. NGOs and banks to develop suitable credit packages for chilli production.
2. Farmers make contract production with chilli processors who provide necessary credit for inputs (or facilitate access from the banks).

Actor Links which are currently weak but potentially important

1. CHAR DWELLERS/ EXTENSION STAFF LINK: Providing access to formal research innovations, recommendations, subsidies and government support

Though the day to day links between char dwellers and extension staff are not great, this link is a critical one in bridging the link between the formal innovators (agricultural researchers) and policy makers and char dwellers.

With a block supervisor in every union, agricultural extension has a crucial role to play in this innovation system. In our case study monitoring we found that visits by the block supervisor to the chars are rare – due to lack of manpower, cost and time consuming transport needs. However, it was promising to see that in times of critical need farmers did travel to the Upazila headquarters to request support from extension staff. This was observed in the case of ‘pocha moinna’ (foliar leaf blight) disease of chilli and also in the case of a coconut tree disease. On both occasions the extension staff responded to these requests. In fact in response to the demand for help on pocha moinna disease (which came from farmers throughout the chars), extension staff approached the local Regional agricultural research station in Jamalpur. Researchers, despite lack of funds for chilli research, responded by carrying out local research and are currently doing final on farm tested of a promising fungicide.

BARI research staff also told us that they receive and respond to requests from local farmers (though not directly from our research area). We also found this to be the case for BLRI in our livestock case study.

Action Plans (suggested by key actors) to enhance this link

1. Extension and NGOs to raise farmers awareness of the services extension and research can provide
2. Farmers groups representatives to attend Extension coordination meetings (UAECC) and to evaluate extension and research performance.
3. Farmers groups to play a proactive role in requesting services from extension.

2. CHARDWELLERS /MEDIA LINK: Information about innovations in other areas

Mobile phones already provide an important opportunity for char based farmers to access information from the national level, but there are currently no formal information services which can be accessed by phone.

Char dwellers frequently listen to the radio, and would like to hear programmes on char specific agricultural issues.

Action Plans (suggested by key actors) to enhance this link

1. Radio, char dwellers, BARI and NGOs develop radio bulletins on specific char issues.
2. Extension or DAM provide phone based market information services.

SECTION 3: RESEARCH FINDINGS: BEEF PRODUCTION

3.2 Beef Production in Bangladesh

There is a high demand for beef in Bangladesh, with consumption being higher than national production. In the past beef slaughter was heavily restricted (banned on alternate days) to protect the national herd and conserve enough animals for draft power. However, with increased use of the power tiller for cultivation this rule has now been relaxed with Sundays only preserved as a slaughter free day. However, the majority of beef consumed in the country is still from aged, Indian cows. Local cattle are sold for a premium over the imported as they tend to be younger and in better condition. Current estimates of the national herd are a total of 21,572,140 animals.

The demand for beef, and particularly for indigenous cattle, peaks at the annual Qurbani Eid celebration when many households purchase bulls for ceremonial slaughter. Marketing, slaughter and sales are conducted by a large number of small scale entrepreneurs²⁵ at every level. There are no major large scale actors comparable to the large companies involved in chilli processing and retailing. However, recently, some large supermarkets have begun to sell specialised cuts of beef. This is carried out through making arrangement with specific slaughter houses for high quality produce.

Leather production in Bangladesh

Bangladesh is well known for its high quality leather processing. Its relative advantage in the global market comes from its pool of cheap labour and supply of high quality goat and cattle hides. There are currently more than 250 tanneries in the country. Most hides used in production are from Bangladesh. The annual supply of hides is 187 million square feet²⁶ (45% of all skins are produced in Qurbani Eid). Of this only 10% is used for local consumption (mainly for footwear). The rest is exported, making leather Bangladesh's third biggest export. In 2002 – 2003 the export earnings from leather were US\$238 million. Dixie (2002) estimates that this industry employs over 60,000 people and earns over 250 million US per annum.

The BFLLEA (Bangladesh finished leather, leather goods and footwear exporters association), estimate that exports could be increased to US \$800 million if proper steps are taken to convert raw leather into finished leather and leather products.

Until 1990 exports were mainly of 'wet blue' leather. However in 1990 a ban was put on wet blue export and nowadays crust leather, finished leather and leather products are exported. The leather industry is now capable of processing 255 million sq ft crust leather, 130 million sq ft finished leather, 32 million pairs of footwear and 3.5 million pieces of leather goods per annum. In 1998 there were 15 large scale modern shoe factories, 2500 small footwear units and 50 manufacturers producing items for export.

²⁵ Though there are six designated slaughter houses in Dhaka, these do not appear to be currently operational (see Daily Star report 'How safe is the meat we eat?' October 26, 2003)

²⁶ Dixie estimates 130 million hides at 20 sq ft per cow which is much higher.

Figure 7 . Timeline for beef fattening

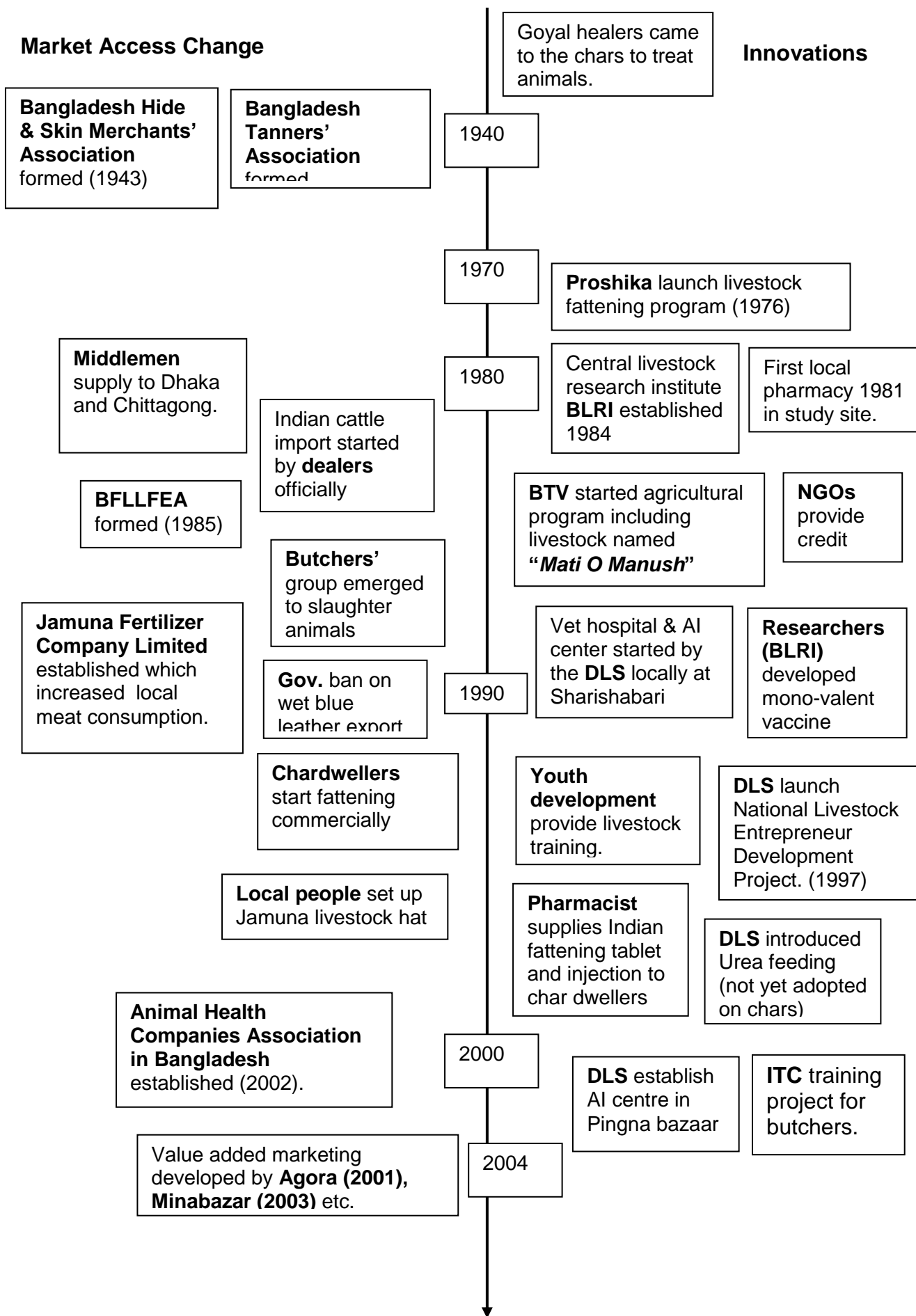
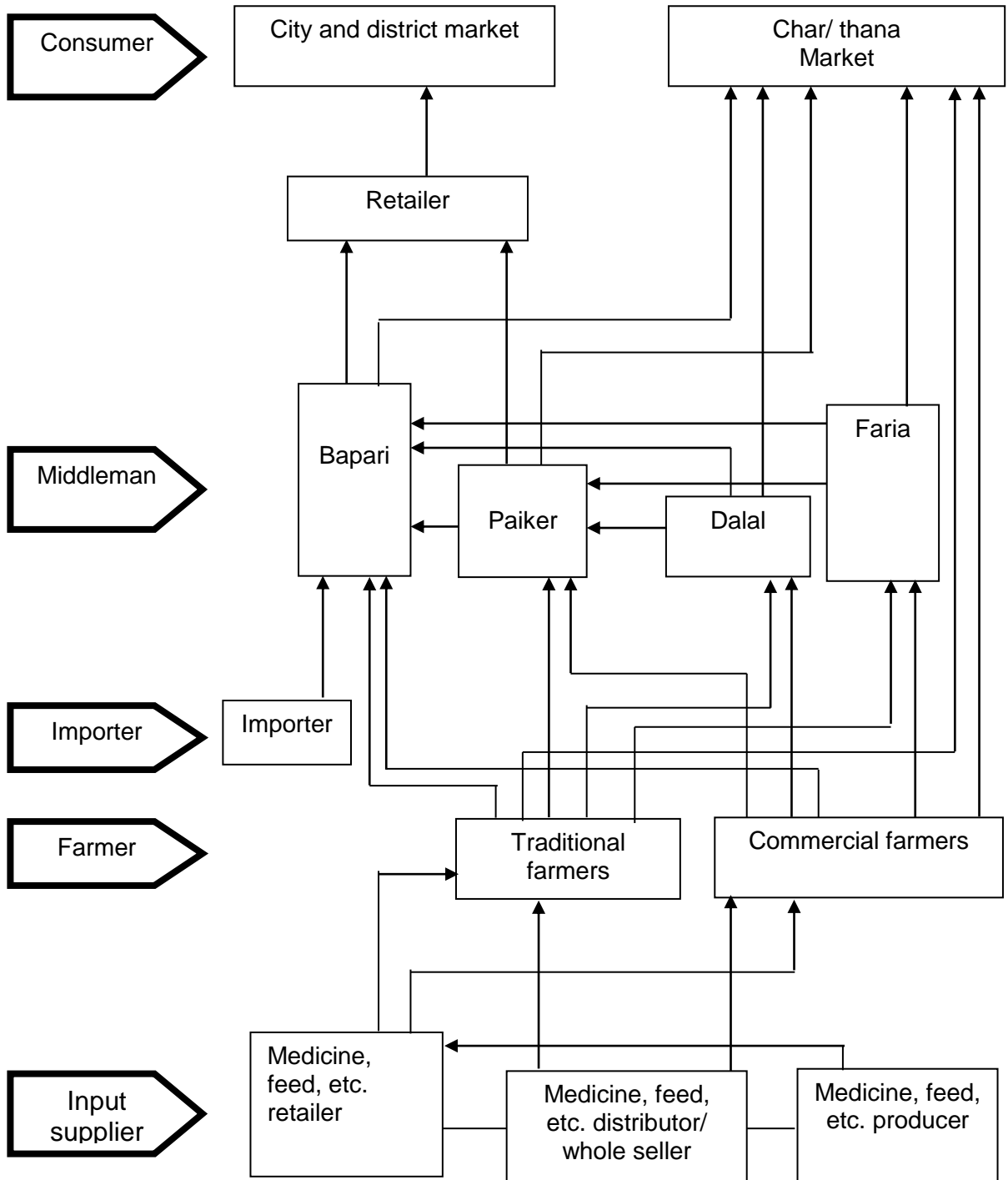


Figure 8 Livestock sub sector map showing key market linkages for beef production



Insert photos of actors involved in Beef Production here.

At present 70 – 75% of hides are exported in the form of crust leather (an intermediary stage of leather production). The government is supporting initiatives to add value to leather production in country. Recent initiatives include the setting up of a College of leather technology and the setting up of new leather industrial zone in Savar. Efforts are also being made to reduce the environmental hazards involved in the tanning process.

Support Services

The Bangladesh livestock research institute (BLRI) established in 1984, has developed a number of new recommendations for animal selection management, feed and health care for more efficient beef production.

The Department of Livestock Services (DLS) provides local advice and veterinary support to farmers.

Increased number of pharmacists (particularly since the 1980s) have made livestock drugs more readily available to farmers.

The Bangladesh Hide and Skin Merchants Association and Bangladesh Tanners association support the development of the leather trade.

The Animal Health companies association coordinate the activities of pharmaceutical companies producing animal drugs in Bangladesh.

3.3 Livestock Fattening on the Chars

(see appendix 3 for cost benefit analysis of livestock fattening).

In Kulpal 81% and in Nolshunda 78% of households are involved in cattle rearing²⁷. Commercial fattening started in the 1990s and is becoming more popular. Those households who cannot afford to purchase livestock carry out contract rearing through the 'borga' system where livestock owner and rearer take 50% share of profits. Livestock owners may be other char dwellers or mainland households.

Poorer households and women rated livestock production more highly than crop production in our initial household surveys. Advantages included:-

- flexibility. Can buy and sell at any time
- Can sell milk for all year income
- Can consume milk
- Can use cattle for ploughing
- High profits in livestock fattening. Cost benefit analysis (see appendix 3) found gross margin for beef fattening (a three month operation to be) 4075 - 5879 taka per animal (representing a benefit cost ration of 1.51 – 1.64). (NB this does not include human labour cost).
- Abundance of grazing land.

²⁷ In Nolshunda most households own between 3 and 5 cattle, and in Kulpal between 1 and 2 cattle.

Management Practices

Char dwellers may breed their own cattle but also commonly purchase bulls for fattening at the local markets. Indigenous animals are preferred because they are hardy and easy to rear.

Animals are grazed with no supplementary feed until 4 months before the Qurbani Eid festival. At this point supplementary feeding begins. The main feed is wheat husk, but some also give oil cake, molasses, salt and even banana, eggs and potatoes. Vitamin supplements and fattening injections are also becoming common. Our BLRI colleagues, who visited the study site, saw enormous potential to develop feeding technologies making use of char based resources e.g pulse and sugar cane residue, banana leaves and through processing Khaisha grass.

During the flood period, animals are fed with *khaisha* grass (*Saccharum spontaneous*) and *dhuncha* (*sesbania*), which is harvested from areas remaining above the water, or even under water. In times of extreme flood, animals may need to be moved to the mainland. Where possible char dwellers seek shelter with mainland relatives. Where this is not possible they experience security problems and may lose livestock.

Aside from supplementary feed in the months before Eid, inputs to livestock production are kept to the minimum. De worming is occasionally carried out and vaccinations given (total amount spent on health inputs is an average of 25tk per animal) compared to 1900 – 3000 for feed supplements.

Cattle are washed daily in the river.

Cattle on the char are inflicted by a range of diseases. These include diarrhoea, foot and mouth, poisoning from young grass, liver flukes, parasitic infection and dysentery. Particular problems are experienced in the period directly after the floods. Char dwellers mainly turn to private vets and indigenous healers to assist them in dealing with these problems. They also make use of a number of indigenous remedies. For example crushed ginger, aniseed and leaves or root of 'depart plant are used to treat stomach ailments, mustard oil used to treat colds. (see Appendix 2).

BLRI researchers who visited the study site observed that livestock productivity could be enormously increased through improving feeding and health management practices and inputs.

Case Study – Mamun

Mamun is a relatively wealthy farmer owning three oxen, four cows, four calves and four goats at the start of case study monitoring (in Kulpal most households own between 1 and 2 cattle). The four calves have been 'shared out' to other households under the 'borga arrangement, Seven cattle are managed by the family. During the case study monitoring period two new calves were born. Mamun is the head of a large extended family consisting of his wife, three sons and their wives and children. Milk production is an important source of regular income through the year. Every morning a male family member travels to Purantanghat market to sell milk.

Mamun believes that the livestock fattening business is very profitable. This year Mamun he reared two bulls to sell at Eid. These were fattened by supplementing grazing with wheat bran and oil cake during Ramadan. Unlike other char dwellers, he didn't vaccinate his animals. The two bulls were sold before Eid for 11,500 and 13,000 taka.

Marketing

There are weekly local livestock markets on the mainland which are easily accessible to the chars in the study area. In the vicinity of Kulpal char, the market for beef is always good due to the large population in Tarakandi fertiliser factory. However, the best market prices and the target for most producers is Qurbani Eid.

Farmers prefer not to deal with local butchers who are perceived as cruel and dishonest. When sales are necessary, a char based middleman usually acts as an intermediary.

Gender roles

Men, women and children are involved in managing livestock. Generally, women, who are at home in the day are responsible for day to day management, taking the animal for grazing and feeding. Young men or children have the responsibility of cutting fodder and washing animals. In larger, wealthier households a cow boy or 'rakhal' may be hired to do this work. Purchase of inputs and marketing is carried out by men. Women headed households must make use of male relatives or char based middlemen to do this work.

Innovations

- Introduction of new high quality beef cuts in Dhaka supermarkets
- National regulations on leather export.
- National regulations on livestock slaughter
- Introduction of artificial insemination services
- Co projects between BLRI and private sector e.g Milk Vita to support dairy production. (Could provide a model for further cooperation).
- BLRI promotion of new fodder varieties and feeding strategies

Char level innovations:

Use of external inputs, drugs and vitamin pills (some dangerous to animal and human health).
 Joint marketing of livestock by Nolshunda char dwellers in 2002.
 Indigenous healers beginning to treat with allopathic drugs.

Table 4. Opportunities and Constraints faced by Char dwellers in Livestock Production

| | Strengths | Weaknesses |
|------------------|--|---|
| Technical | <ul style="list-style-type: none"> • Plentiful natural resources for livestock production. Few inputs needed. • Potential to develop char specific feeding options. • Indigenous cattle highly valued | <ul style="list-style-type: none"> • High level of parasite infestation in cattle • Many diseases particularly after flood. • Poor cattle nutrition. • Insecurity at flood time. • Farmers and butchers don't preserve skin properly. • Use of harmful drugs to fatten livestock. |
| Services | <ul style="list-style-type: none"> • Credit from NGOs • NGO and youth directorate training programme. • Bank loans for butchers and middlemen • New AI centre in Pingna • Private vets available. • Indigenous healers 'goyals' visit at peak disease period. • Pharmacists provide advice and medicine. • Livestock training courses provided by Youth development directorate. | <ul style="list-style-type: none"> • Government vet unable to visit char frequently • No regular vaccination regime. • Private/indigenous healer may give the wrong treatment. • Pharmacists not trained in veterinary drugs. May give wrong advice. • Researcher's new messages haven't reached chars. • Lack of credit to develop this enterprise (particularly for resource poor households). • No specific technologies developed for chars. |
| Market | <ul style="list-style-type: none"> • Transport to market not a problem because of waterways. • Young people involved in skin business over Eid. • Good demand for livestock throughout the year. • Lots of good markets in the area. | <ul style="list-style-type: none"> • lack of credit for marketing e.g bulk buying of skin. • Farmers lack knowledge of correct price (especially for skin). |

3.4 Key Actors involved in Livestock Production

Twenty four key actors were identified in this innovation system.

1. Male char dwellers

See figure 9, showing level of interaction with other actors over the case study period.

Decision makers in livestock production are older men and women. Hands on management is the responsibility of young men and women and often children.

Links

More wealthy households often have some market interest in the hat (for example one is a market leasee), and have better access to information and contacts than resource poor households. They also visit the market frequently and can afford to buy and sell at the optimum time to maximise profits.

Compared to Nolshunda, Kulpal people visit the livestock market more often as its located very close to them. Because of the proximity to the mainland, butchers hear when animals have died and come to collect the skin.

2. Female char dwellers

Women often play the major role in day to day management and decision making in livestock production. Assisted by their children, they carry out most daily tasks such as feeding, taking animals to graze, milking and washing livestock and must take key decisions in the absence of male family members who are often absent during the day or for longer periods working in other areas.

Despite their key role as livestock managers, women have minimal links with external service providers and market actors, as it is not acceptable for them to interact with unknown men.

Char women can interact with local vets, NGOs, neighbours and char based middlemen (see further discussion under gender issues below).

3. Local leaders

Local leaders in the study location do not play a large part in livestock management issues. Upazila level organisations do contact and inform local

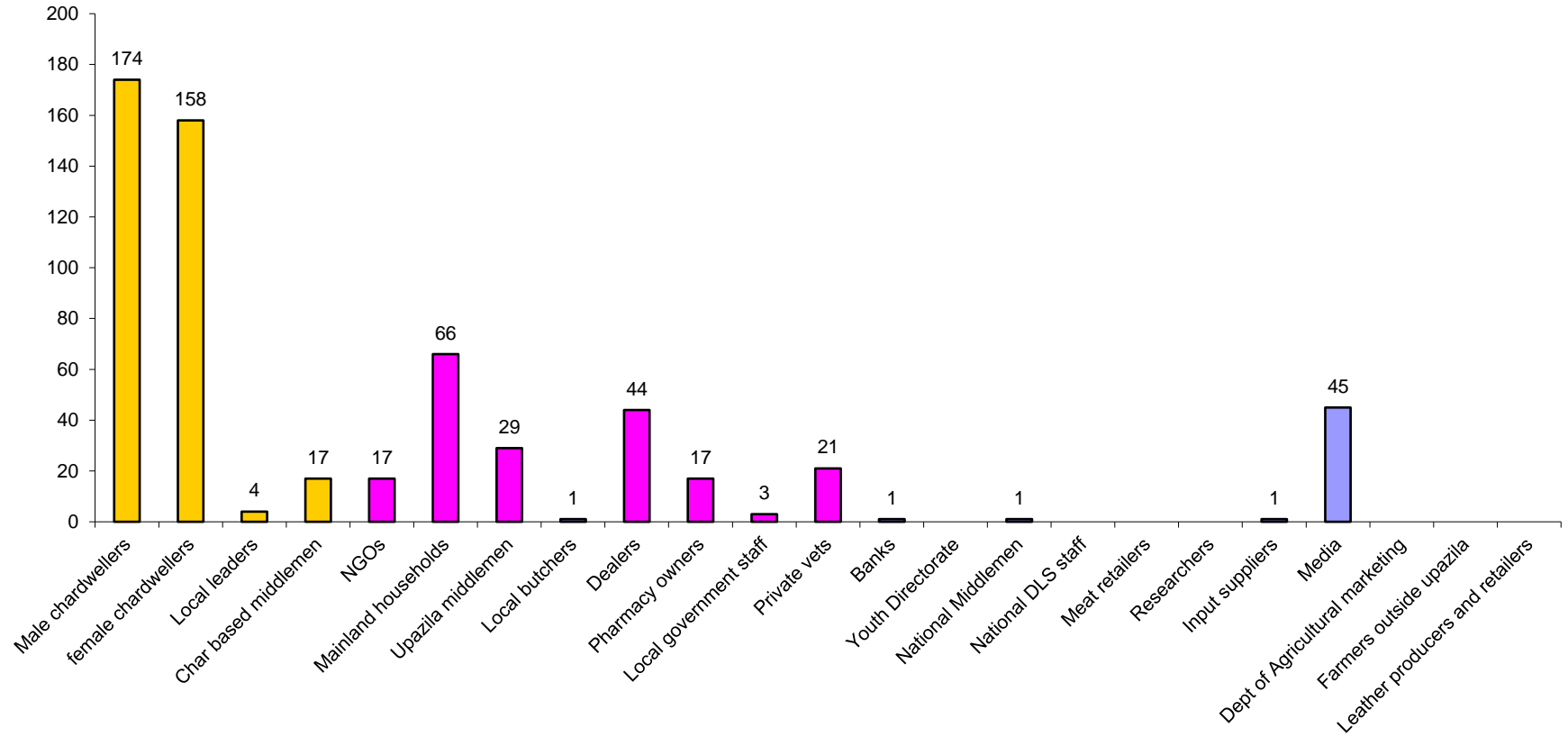


Figure 9. Chardweller interactions with other actors for beef fattening over the 12 month monitoring period (based on monitoring of 20 households)

● Char based actor ● Upazila based actor ● National based actor

leaders of their activities. However char dwellers did not indicate that they received much important information from local leaders.

4. Char Middlemen

Some char dwellers specialise in acting as intermediaries for livestock transactions. For market sales most char dwellers prefer to deal directly with upazila level middlemen at the market. However, for sales to the local butcher a char level middleman is often used as an intermediary.

Upazila level Actors

5. NGOs

Several NGOs work in the study area: DEW, BRAC and Symbiosis, Buro Tangail were found to have members on the chars.

National and international NGOs like BRAC, Proshika, ITDG provide training on improved livestock management practices through their grass root level officers. Proshika and BRAC have both collaborated with BLRI on livestock development projects. However there were no activities recorded in the study location over the case study monitoring period.

At the upazila level NGOs have strong links with Youth Directorate and collaborate on their livestock training programme.

6. Mainland Households

There are strong links between mainland and char household, through kin relations and interactions at the mainland markets. Many mainland households have cattle on the char, managed by the 'borga' share management system. Mainland households also provide shelter to char based kin and their livestock in times of severe flood.

7. Upazila level middlemen

Primarily *bepari* type middlemen, who purchase livestock and transport them to larger markets.

Mohajon middlemen purchase skins from local butchers.

Case Study – Sayeed, Upazila Middleman

Sayeed is both a farmer and a seasonal businessman selling livestock, jute, paddy and pulses. Livestock trading is the most profitable and is can be carried out throughout the year. His main role is a 'paikar' mediating between other paikars, farmers and the beparis and mohajons who transport livestock to other markets.

Sayeed and a number of his family members have formed an association called 'Farmers Cooperative Society'. The society collects contributions from members which are used to fund business at peak times such as Qurbani Eid.

8. Local Butchers

Groups or 'parties' of local butchers purchase and slaughter livestock together. Each party consists of up to 15 people. At Tarakandi fertiliser factory, close to Kulpal char, four butcher's parties alternate selling, each taking 2 days.

Mobility is limited to the local area, except for Qurbani Eid when butchers may become livestock middlemen. Butchers purchase from local producers and middlemen. Skins are sold to 'mohajon' middlemen.

9. Feed Retailers

Feed retailers operate from small shops in the local markets. Livestock feed: wheat and rice husk, is normally sold together with a wide range of other household 'grocery items' e.g oil and rice. Some larger scale 'dealers' purchase feed in bulk from mills in Bogra and Sirajganj and sell on to smaller scale retailers.

Links are mainly with households and input suppliers. Unlike crop input retailers, these feed retailers offer no specialist advice.

10. Pharmacy owners

In the local markets covered by this study, over half the pharmacists supply veterinary drugs. Pharmacists also provide advice on drug selection. Most work together with 'private vets' who provide consultation and will make home visits. The pharmacists receive supplies from pharmaceutical firms. Unlike the case of crop input retailers, we found no cases of these input suppliers providing extra training or information.

Again, unlike the case of crop retailers, we found no strong links with the government support staff – DLS.

Case Study – Mojid, Pharmacist

Mojid's pharmacy is a small open fronted shop in the middle of Purantanghat market. It was established by his father in the 1980s (after completing a one year training course (lower medical assistance and family planning) and was the first pharmacy to be established in Purantanghat.

The pharmacy sells both human and veterinary medicines. A well known para vet operates in a room that adjoins the main shop. Mojid also arranges visits by specialist doctors to attract more customers. These visits are advertised by a rickshaw with microphone. Medical representatives visit frequently to supply drugs. Occasionally Mojid visits Tangail to purchase drugs himself.

11. Local Government staff

The Upazila Livestock Office deals with treatment, advice, vaccination and overall supervision of livestock activities under the upazila. A livestock officer (ULO), along with one veterinary officer assisted by veterinary field assistants covers the whole upazila. He attends district level meetings, upazila co-ordination meetings and other meetings and workshops. He works with farmers, researchers, NGOs and big farmers providing suggestion and advice and government services.

In his work the Upazila livestock officer has occasional links with the Union Parishad Chairman, member, and secretary and village police (Choukidar as well as private vets.

The outreach of the ULO and his team is limited by lack of sufficient manpower.

12. Private vets and traditional healers

In the absence of sufficient coverage by government vets, private vets play an important role in livestock health care²⁸. Some private vets are ex DLS staff, others have received a short training from the Youth Directorate. There are also a number of 'traditional healers'. These include the 'goyals', a Hindu group from Jessore who have been visiting the chars and treating animals for over a hundred years.

Case Study - Traditional Healer/Goyal

Ali Ghosh has worked as a goyal for more than 60 years. He lives in Jessore district where he his father and grandfather have practiced traditional treatment of various diseases for both people and animals. He learned about these practices from an early age. He collects the medicinal plants required to prepare his medicines from the nearest forest or village market. These are processed and prepared as medicines before he sets out. In the winter season he and his fellow goyals travel to various areas such as Bogra, Dinajpur, Rangpur and Pabna to provide kobiraj treatment to rural people. Each goyal has a fixed location which he returns to each year. He receives a contractual fee of around 50tk per household with additional service fees paid in cash or food. The cattle diseases he treats include intestinal parasitic diseases, skin abscesses, cough, swelling of stomach and aversion to water. He provides ayurvedic medicine only (though some goyals are also beginning to provide allopathic remedies which they obtain from local pharmacies). If other treatment is needed he suggests the farmer calls a vet.

There are some links between ex DLS and Youth Directorate trained private vets with DLS staff, for example in implementing vaccination programmes. However, there does not appear to be a formal way of integrating or involving private vets in animal health promotion planning activities.

Traditional healers are disapproved of by DLS staff in the study area and there are no links here. However they do have some links with pharmacists and are increasingly prescribing allopathic medicines.

Char based private vets and traditional healers are accepted members of the community and, as such, can interact with female livestock managers.

²⁸ Figure 9 compares the level of interaction with government and private vets. Over the twelve month period, only 3 interactions were recorded with government staff, compared to 21 with private vets and traditional healers (by 20 case study households).

Case Study - Paravet

Mafiz is a paravet providing livestock treatment and advice in the vicinity of Nolshunda char. Before doing this he was a jute worker in Narayanganj. After being laid off in the late 1980s he became unemployed and returned home.

Mafiz' brother is a para vet based in Pingna, he also has a cousin who was a livestock officer for DLS. This cousin suggested Mafiz should receive training and set up as a para vet. Mafiz took a three month course at the Youth Development centre in Jamalpur. After this he started practicing in the chars. He soon became popular with local people including women and children. Recently he has set up a partnership with a local healer who treats human diseases. When he needs advice Mafiz visits his cousin in Tangail.

13. Banks

There are both government and private banks in the Upazila. These play an important role in providing credit to Upazila level actors: pharmacists, middlemen, butchers etc. There is also a high demand by char dwellers for credit to invest in beef fattening. However, we found no cases where char dwellers had succeeded in getting bank loans.

14. Youth Directorate

The local office consists of one youth development officer, three credit supervisors and office assistant. They are responsible for providing training to youths including male and female on poultry, livestock rearing and treatment, handicrafts etc. Staff work mainly in the mainland, though they told us they sometimes visit the chars to provide training. Staff members attend the upazila co-ordination meeting every month.

At the national level Youth Directorate has strong links with BLRI, whose office is next door to their national office. At the upazila level, the office has strong links with DAE, DLS, local NGOs, pharmacists and private vets.

National Level

15. National Middlemen

The largest national cattle markets are found at Shirajganj, Pabna, Shagorika and Bibirhat of Chittagong, Gobindashi (Bhuapur, Tangail), Meherpur, Godagari (Rajshahi), Faridpur and Gaptali market in Dhaka.

At the national level the key middlemen are:

Beparis

These are more or less full time merchants or traders. Most work in a group of 2 – 4 people. One or two will visit local markets to purchase cattle which are sent to district or national markets where they are sold to butchers or directly to consumers at the Qurbani Eid festival.

Importer: These are full time traders and invest a huge amount of money. Generally they import cows from India and they have to take license/ approval from govt. to do so. They take their imported cattle to the certain zonal wholesale market from where they are distributed to downstream markets. Beparis are the only buyer of their cattle.

16. National level government staff

The Department of Livestock services (DLS) provides veterinary services and livestock production advice to farmers throughout the country. It also plays a monitoring role over pharmaceutical and input suppliers and butchers. DLS has a number of projects conducted in collaboration with NGOs, banks, and BLRI. One example is the 'National Livestock Enterprise Development Project.'

17. Meat Retailers

The beef retail market is characterised by small scale retailers. Slaughter houses do not buy in bulk, but are used by individual butchers who pay a set fee for each animal slaughtered.

Recently a number of larger retailers have emerged e.g Agora, Nondon, Mina bazaar, Harvest reach who are developing new, value added meat products e.g special cuts and organic beef. One of these, Agora, has given financial support for a number of slaughter houses to be set up to prepare these special cuts. Some of these have storage and freezing facilities.

The activities of these retailers is expanding the market for indigenous beef and adding value.

18. Researchers

The Bangladesh Livestock Research Institute (BLRI) is located in the Ministry of Fisheries and Livestock. Established in 1984 as a project, and as a government institution in 1996, its key role is to support livestock production in the country by addressing problems and developing new technologies and in supporting government in creating a national strategy.

Scientists are based in the main office in Savar with a number of regional stations and on farm trial sites.

Since its formation, BLRI has developed a large number of new technologies and 'packages' for farmers. These include a 'beef fattening package' which claims to increase farmer's profits threefold.

BLRI has strong and regular links with DLS. Other strong links are with national farmers. Often representatives from farmers associations (particularly dairy and poultry) come to BLRI for advice and information. BLRI has had a number of joint projects with NGOs (particularly BRAC and Proshika). Staff have close links to Youth Development for the development of training programmes. There are regular meetings with Agricultural information services to disseminate new findings. Occasionally staff work with pharmaceutical firms and input suppliers to test new products.

19. Input suppliers

Pharmaceutical Company

These companies are involved in the production, formulation and import of the medicine for the domestic market. Company's representatives supply to local pharmacies from where farmers get access to purchase. Sometimes they organize workshop, training, seminar etc. for relevant persons.

Suppliers whose goods can be found in the research area include ACME, Renata, Techno Drugs, Novartis, ACI and Square. Medical representatives visit Pingna and Purangtanghai markets from Tangail and Gopalpur.

Besides wheat and rice husk, we found no 'brand name' livestock feed inputs in the study area.

20. Media

The mobile phone is extremely important in linking upazila and national actors. It is frequently used by business and middlemen to check on prices and market demand. In one case we were informed of a chardweller who used the mobile to check prices for livestock before selling her animal. On discovering that the Dhaka price was much higher than at the local market, she arranged to have her animal transported and sold in Dhaka, earning herself several thousand taka extra profit.

The biweekly magazine "Krishi Biplob" publishes news and reports on agricultural issues including livestock problem and opportunities, current situation etc. Reporters collect information from all over the Bangladesh through local block supervisors, agricultural officers, and their representatives. Agricultural information services hold regular meetings with research and DLS staff.

As discussed in the chilli section, radio is the most common media used in the chars. However, chardwellers feel that current agricultural programmes are not relevant to them.

21. Department of Agricultural Marketing

These national actors' are involved with monitoring prices of different markets where they have control. We were not able to identify any links back to users of market information.

22. National farmers (outside upazila)

In other areas of the country, farmers associations have been formed, particularly by milk and poultry producers. These organizations successfully liaise with BLRI to assist them with particular technical issues.

In the chars of Sirajganj, Milk Vita has been working with farmer's milk producing associations. These farmers are very active and have adopted many new management practices. Milk production cooperatives regularly lobby BLRI for information or advice. There are currently no links between these farmers and char dwellers in the study area.

23. Leather processors and retailers.

Bangladesh Hides and Skin Merchants Association (BHSMA), tanneries, leather processing industries like Bata, Apex etc., Bangladesh Finished Leather and Leather Goods Export Association (BFLLGEA) collect leather from district and local level through middlemen.

Key Events and Locations

Key events

1. Qurbani and Roza Eid

Peak sales of livestock. Most char dwellers aim to sell at Qurbani Eid.

2. Flood

Time when livestock may have to be moved from the chars, causing insecurity problems. High levels of disease after the flood. DLS teams try to visit all areas at this time. Goyal healers arrive at the chars to provide treatment.

3. BLRI annual workshop

Prioritisation of research and training for next year. Attended by DLS, BLRI and NGOs.

4. Annual vaccination campaigns

Organised by DLS staff with volunteers. Mainly on the mainland.

Key Locations

1. Livestock Hat

Price negotiation between producers and middlemen

2. Ferry ghat, tea shop

Information exchange between char dwellers and mainlanders

3. Pharmacist shop

Paravet located here.

4. Upazila Livestock Office in Sarishabari

Location of government staff. (Possibility of more local Artificial insemination centre to be set up in Pingna market soon).

5. Cell phone shops

Links between char and upazila actors with national actors.

3.5 Critical Links in Beef Fattening

The matrix and map shown in figures 10 and 11 show level of interaction between actors recorded over the 12 month monitoring period on a qualitative scale:

0 – no interaction

1 – interaction but not regarding livestock fattening production

2 – interaction has occurred but inconsistent

3 – regular and strong interaction.

Note that the strength of the linkage does not give an indication of whether this is a positive or negative linkage for resource poor char dwellers. Nor can our maps or matrix give information about power relations or control of links. These issues were discussed, for key links, in actor focus group meetings, and are described below.

Figure 10. Actor Linkage Matrix for Char Based Beef Production

**Figure 11. Actor Linkage Map for Char Based Beef Production.
Char/National**

3.5.1 General Overview of Links between char, upazila and national level actors

Char/char

Strong and effective links between char dwellers used for information exchange, credit, access to labour and marketing.

Char/Upazila

The key bridges here are the private vets and traditional healers providing health care and advice, feed retailers providing supplementary inputs and char middlemen who mediate marketing transactions.

Links between char dwellers and mainland households are very strong (based on kin relations). Use for sharing information, source of credit, shared livestock rearing (through Borga system), and shelter for char livestock during flood period.

The only link recorded is occasional visits by national middlemen to the char to purchase livestock before Qurbani Eid.

Upazila/Upazila

Strong links between pharmacists and local vets who often operate together from pharmacies.

Little coordination between NGOs is a problem for developing a coherent strategy for providing information.

Youth development plays an important linking role between upazila level actors: farmers, private vets, NGOs and DLO.

Upazila/National

Pharmacists are key bridge between input suppliers and farmers (though one way flow of information).

Feed retailers deal with national feed input suppliers but currently don't deal in specialist cattle fattening products or channel advice or information.

NGOs are also a potential bridge (BRAC does link farmers and BLRI). Could be further developed.

DLO is a critical bridge between the upazila and national innovations and policy change.

For marketing there are strong links between upazila and national middlemen.

National/ National

Strong links between DLS and BLRI.

BLRI has joint programmes with some NGOs.

Links between BLRI and national farmers (particularly through associations)

Links between BLRI, DLS and national media.

Links between BLRI and youth directorate at national level.

Some interaction between input suppliers and BLRI (testing new drugs and feed products).

Strong links between national middlemen and meat and leather processors and retailers.

3.5.2 Wealth and Gender Issues

We selected households from different wealth categories for case study monitoring (including a woman headed household in each char) to allow us to develop an understanding of the different opportunities and constraints faced by different household types (see appendix 1). We held discussions with both male and female household members.

While women play the major role in day to day livestock management, analysis of our actor links shows women are largely dependent on their link to male char dwellers to get access to any outside information or services.

However, there are a number of exceptions to this.

- Private vets and traditional healers are well known and accepted on the chars and it is acceptable for women to interact with them. They are an important source of advice and assistance for animal health care.
- NGOs are now accepted in the chars and provide a key link with the outside world. NGO credit, directed primarily at women, provides capital for livestock production.
- Kin relations with mainland households allow women to share information with this group.
- Youth development is targeting women for training.

Case Study – Lalon and Amita

Lalon works in government service (Railway mail) in Mymensingh. As he is absent most of the time, his wife, Amita, with the help of her young son and daughters, manages day to day crop and livestock management. Lalon's three brothers also share in cultivating their 10 bighas of land. At the start of case study monitoring the family owned two cows and one bull.

This year the couple's eldest daughter was married and the family agreed to pay a dowry of 60,000tk (£600). In order to begin payments, Lalon sold the family's two cows for 10,000 tk. Amita talked of this incident with tears in her eyes: "I told my husband not to sell those two cows, because if they gave birth we could rear the calves and sell those. But my husband didn't listen to my advice. One day when I went to visit my sister, my husband brought the buyer to the house and sold the two cows".

We found that women are interested in getting access to training, and in getting more control of the marketing process, for example through encouraging middlemen to come to the char to purchase, and by using the mobile phone to get information on price (see example under media above).

In terms of wealth, we found that more wealthy households are more likely to have businesses in the mainland markets. As a result they have better access to

market information and also better relations with other market actors. As in the case with crops, there tend to be differences in the 'quality' of the linkage depending on wealth status. Resource poor farmers are more likely to feel unhappy with relationship with external actors and to feel they have been cheated or wrongly advised.

Resource poor farmers tend to manage livestock under the 'borga' share holding system. They are often dissatisfied with this, as the owner of the livestock may chose to sell at an inconvenient time, or when profits are low (see Habib's case study). These households are particularly interested in obtaining credit to allow them to purchase their own animals.

Case Study – Habib

Habib is a farmer. He also has a small grocery shop selling basic necessities (biscuits, soap, cigarettes etc) on the char. This year Habib reared two cattle both of which had been shared out to him by relatives under the borga system. He planned to sell these at Eid, but one animal was sold by the owner, who had a cash crisis, some months before Eid. Because the price was low, Habib only received 100tk after rearing the animal for a year.

This year the family are cultivating chilli and plan to purchase their own bull with the profits. This way they won't have to worry about interference from a shareholder.

3.5.3 Detailed Descriptions of Key Links and Ideas for Action to enhance these

Detailed analysis of these links is based on our observations through case study monitoring and on focus group discussions with the key actors (using the determinants diagram described in section 2). In this exercise, actors identified 'action plans' or interventions, which could be developed to make these links work better for pro poor beef fattening innovations. Action plans were compiled and shared with a mixed group of actors at our final workshops²⁹.

We start by looking at links that we found to be particularly strong and effective in the char based chilli innovation system. After this we turn to links which are currently weak but potentially very important.

Links targeted for interventions are shown in the livestock linkage matrix (figure 10).

²⁹ At the union based workshop, held at Tarakandi, findings and action plans were presented by the research team. Participants then broke into small groups to confirm or reject findings.

Actor links which are particularly strong in the chars

1. CHARDWELLER/ CHARDWELLER links: strong local support systems.

As in our analysis of chilli production we found that the strongest links were from char dweller to char dweller and char dweller to mainland household. These links are not formalized but based on kin relations, samaj membership and friendship.

Links are used as:

- primary source of advice and information
- source of credit (loans for livestock purchase, *borga* share production arrangements)
- inputs (fodder purchase)
- labour
- access to breeding stock
- medical services (char based paravets and traditional healers)
- marketing (char based middlemen mediate sales particularly with butchers, youth groups market skins at Qurbani Eid, group marketing at Nolshunda in Qurbani Eid)

The lack of formal groups and representation (local leaders don't currently play an important role as intermediaries with outside actors) means that farmer links with other actors are on an informal and one to one basis. Farmers complain that because of this they don't get the access to information, services, credit and market which they would like.

Our discussions with BLRI showed us that there is considerable innovation by livestock farmers around the country (including char based dairy farmers in Sirajganj). However there are no specific links between these farmers and char dwellers.

Action Plans (suggested by key actors) to enhance this link

1. Forming farmer livestock producer groups to link farmers with other key actors. This could be a new group or a sub group of one of the existing NGO, youth or savings groups. The role of these groups would include:

- Actively requesting services, training and specialist advice from research, extension and other actors.
- representing farmer's interests to research, extension, NGOs, input suppliers and banks.
- selecting representative to be trained in key skills (including women's representative for issues of particular interest to women).

2. Alternatively representation of farmers might be achieved through developing the role of local leaders (as seen in other locations).

3. Farmer to farmer exchange visits to innovative farmers in other areas (e.g milk producers in Sirajganj) to build on the farmer to farmer information exchange process.

2. CHARDWELLERS/PHARMACISTS, PRIVATE VETS and TRADITIONAL HEALERS LINKS: Access to health advice and care

Due to manpower shortages in the DLS, it is difficult for char dwellers to access government veterinary staff on a regular basis for day to day advice and services. In our monitoring we found that DLO's role is being supported by the work of pharmacists, local vets and traditional healers.

The first pharmacy was set up in the local mainland market in the 1980s. There are now several pharmacies at both Purangtanghat and Pingna bazaars. Chardwellers visit these frequently and ask for advice from the pharmacist. Private vets often work together with the pharmacist, operating from the pharmacies.

Input suppliers visit the pharmacist and provide him with information and advice about new products. He is an important bridge between the Upazila and national innovations.

On the whole char dwellers are very satisfied with their relationship with pharmacists and local vets. However, there have been some cases of abuse where vets and pharmacists take advantage of low literacy levels and alternative information sources in the chars by selling outdated drugs. Pharmacists are also supplying dangerous hormonal 'Indian' fattening vitamins and injections before Qurbani Eid.

Pharmacist links with DLS staff are few considering their vital role in advice and service provision.

As we discussed above private vets and traditional healers are well accepted in local communities and are some of the few 'outsiders' who can legitimately interact with women on the chars. This means that they are an enormously important source of information for women.

Currently youth development works involves private vets, involving them in training. DLO also involves private vets in its vaccination campaigns. However, DLS staff currently have no links with traditional healers.

Though they currently have no links with traditional healers, staff at BLRI are initiating a research project to look at traditional livestock remedies in Bangladesh. The critical role of these healers is beginning to be recognized.

Action Plans (developed by key actors) to enhance this link

1. DLS, BLRI and NGOs to provide training and information updates for traditional healers and private vets.
2. DLS to develop links with pharmacists, private vets and traditional healers for health promotion planning.
3. Farmers groups to encourage good practice by honouring private sector providers who do a good job.

3. CHARDWELLER/ YOUTH DEVELOPMENT LINK: Access to new information and technologies on livestock

In our monitoring we found the local Youth development team to be very proactive in providing local people with training in new technologies. Not only do they provide regular training to farmers (particularly mainlanders) but they have strong links with local vets, NGOs, DLO staff, local leaders and involve these in publicizing and conducting training activities. At the national level, the youth directorate have strong links with BLRI, whose main research station is next door to the YD headquarters.

Training in livestock production is also provided by local NGOs e.g BRAC. The role of these training providers is much valued by DLS who don't have the resources to carry out a large scale training programme themselves.

In their visit to the char area, BLRI staff noted that there is potential to develop special technology options for the char. They noted particularly that fodder resources on the char are quite different from the mainland and there is potential to develop new feeding interventions.

Action Plans (developed by key actors) to enhance this link.

1. Researchers work with chardwellers to develop char specific technologies and with Youth Development and NGOs to disseminate these.

4. CHAR WOMEN/NGO/YOUTH DIRECTORATE/PRIVATE VET LINKS: Support Women's Access to information on Livestock Production

Our monitoring has shown the key role women play in livestock production. Most day to day management is in their hands, and with men often absent in paid labour, women have to take responsibility for key decisions on management and veterinary care.

Despite this being the situation, women have very little access to good quality information and services for livestock production. Social norms on the chars prevent them being able to interact with outsiders (DLS staff and others) who come to the char, or to visit service providers at the local markets. Our observation of number of actor interactions show that char women have only 2 significant links outside the char compared to 6 for men. These were with NGOs and private vets.

In this context, as actors who bridge the Upazila national divide NGOs and Youth directorate (media is discussed below) have a vital role to play in supporting women's role in livestock innovations by giving them access to new information.

At present NGOs also play an extremely valued role as the only credit provider for livestock production on the chars. There has been some training on livestock production given to women but this has mainly been on poultry rearing and has mainly been directed at mainland women.

Action Plans (developed by key actors) to enhance this link.

1. NGOs and Youth Development develop special training packages for women.
2. NGOs support the development of women's livestock producer groups (or sub groups within existing NGO groups), to link with outside actors, and actively request information and services.

5. FARMER/ MIDDLEMAN LINKS: Good Market Access.

The main reason char dwellers become involved in livestock fattening is because it is very profitable and the market is extremely good. There are large numbers of upazila and national based middlemen involved in the livestock market and demand for beef is high throughout the year. At Qurbani Eid prices and profits rise.

Regular local livestock markets provide an outlet for cattle. Char based middlemen also make purchases on the char, and liaise between butchers and farmers (as some farmers don't like to sell their animals direct to butchers). At peak demand (just before Qurbani Eid) national middlemen will come to the chars to try and buy directly from char dwellers.

At the national level, some meat retailers are adding value to beef production through selling specialist cuts of high quality beef and providing organic meat (not yet certified). If char dwellers could link directly with these there could be additional profits.

Lack of credit to develop the livestock business is also a key constraint mentioned by farmers.

Marketing of skins is usually carried out by local butchers. At Eid time youth groups take on the marketing role.

Farmers regret that lack of credit before Eid prevents them from storing and selling skins. There is an interest in carrying some basic skin processing and adding value to their skin sales. Lack of knowledge of the correct price of skin is a problem.

At the national level, the tanneries association, regret that many skins are poor quality (estimated 20% of all production) due to incorrect skinning practices. Local butchers are interested in developing improved methods.

Action Plans (developed by key actors) to enhance this link.

1. Local butchers groups to link with local leather processing actors for training
2. NGOs and local banks to develop credit packages for char dwellers
3. Livestock producer groups to link with new style national retailers to create new market opportunities.
4. NGOs, YD and DLS to support livestock producer groups in developing new marketing strategies: e.g new products (skins, organic production etc).

Actor Links which are currently weak but potentially important

1. CHARDWELLER/FEED RETAILER LINK: Access to new inputs and advice for livestock nutrition.

The link between char dwellers and feed retailers is a strong and regular one. However at this time it is used purely to access wheat husk for fattening. Feed retailers sell many other inputs and do not specialise in livestock feeds.

However, given their regular interaction with livestock producers, there may be a potential to develop this role.

Action Plans (suggested by key actors) to enhance this link

1. Feed producers, DLS, BLRI and NGOs to provide feed retailers with advice and information.
2. Youth Development, NGOs or DLS to invite feed retailers to attend training on livestock nutrition.

2. CHARDWELLER/MEDIA LINK: Information about innovations in other areas

From our case study monitoring, links from key national innovators and policy makers: DLS and BLRI to media are formalised and regular. But on the receiving end farmers and other key actors: pharmacists, private vets etc find that information provided by the key media is not relevant to their livestock production activities. They would be interested in programmes which are more relevant to beef fattening and to the situation in the chars.

The mobile phone is very accessible to both chardwellers and upazila level actors. At present there are no formal contacts which chardwellers can use to get information to market or other information.

Action Plans (suggested by key actors) to enhance this link.

1. Researchers, chardwellers and media work together to produce char specific information bulletins.
2. DLS, DAM or private sector actors to provide phone based information services.

SECTION 4: DISCUSSION OF COALITION RESEARCH AND ACTOR ORIENTED APPROACH

4.1 Building coalitions for action research – experience and recommendations

Why a Coalition Approach?

The Crop Post Harvest Programme, have changed their approach in the last years for a 'linear research model' (in which research moves from innovator, to extension to farmer) to an 'innovations systems model'. This model stresses the importance of the way that researchers, institutions and others relate to each throughout the whole process of innovation (in fact that institutional innovation is critical to technical innovation). Innovation systems theory highlights the importance of effective relationships and flows of information in the generation and uptake of new knowledge and behaviour.

Following the innovations systems model, CPHP encourages its research partners to follow a coalition approach. This means identifying key actors and involving them as partners in the research process, so that the research not only focuses on a give issue, but also on developing the institutional context within which that issue could be addressed³⁰.

The process of coalition building

The initial group of interested partners came together in early 2002. Each had a particular interest in either the methodology to be developed, or in the study location. We developed the research proposal together as a group. The core group was made up of: -

| Organisation/Individual | Interest in this Research | Skills brought to team |
|--|--|--|
| Development Wheel | Working in the Jamuna chars since 1997. Interested to continue developing appropriate support services for its client group. | Local knowledge and contacts. |
| Business Advisory Services Centre. | Interest in developing private extension services for farmers. | Business and economic skills. |
| Zahir Ahmed, Department of Anthropology, Jahangirnagar University. | Developing ongoing interested in knowledge systems in the chars (subject of PhD thesis) | Specific knowledge of chars. Qualitative research methodologies. |
| Harriet Matsuert, freelance Social | Developing interest in actor oriented tools | Knowledge and experience of working with |

³⁰ Biggs and Underwood 2001 Review of the Crop Post Harvest Research Programme: Partnerships and Innovation Systems.

| Organisation/Individual | Interest in this Research | Skills brought to team |
|---------------------------------------|---------------------------|---|
| Anthropologist/Agricultural Engineer. | | actor oriented tools in the natural resources sector. |

The team worked very much as a coalition of equal partners. All research partners were involved in developing the project objectives, regular monitoring activities and in preparing this report.

After the initial selection of focus enterprises, the team identified additional key stakeholders who were divided into potential '*research and action coalition*' members: people who might become directly involved in interventions identified by the research, and '*wider learning community*': those who were potentially interested in the methodology, though not directly involved in working in the chars.

Potential research and action coalition members:

Char dwellers
Crop and livestock research and extension staff
Local input retailers
Local butchers
Pharmacists
Vets
Middlemen, local and national
NGOs working in the upazila.
Media
Local political leaders
Youth directorate
Banks
Crop and livestock processors and retailers

These potential '*research and action coalition*' members were also key actors in the innovation systems studied and, as such, their roles and interactions with each other were monitored over the research period.

Throughout the research period we attempted to involve these research and action coalition members actively in our research activities. This was done through:-

- inviting their participation in the PRA survey
- through regular meetings for case study monitoring and focus group discussions (analysing findings together).
- by inviting them to meetings with other key actors
- by making presentations about our work to them (e.g to extension, research and academic community).

Our '*wider learning community*' members identified were:-

DFID crop post harvest programme (our funders)
Forthcoming DFID chars livelihood development programme staff.
Research and development personnel (particularly those working in natural resources)
Bangladeshi research institutes e.g BIDS, CDS

National and international NGOs e.g IDE, BRAC, Proshika, Grameen
 Bangladesh anthropologists
 Bangladesh participatory practitioners group.

We tried to keep research and action coalition members and wider learning community actors briefed on our activities through initial briefings in Dhaka and Jamalpur and through regular update bulletins. During the research period we have also published three papers and some guidelines on actor oriented tools and refer interested people to the DEW website where these papers were posted³¹.

Monitoring Coalitions

We have monitored our success in running a collaborative research project through quarterly '*proactive monitoring meetings*' using a 'learning and action approach'. In these meetings the team members noted positive and negative changes which have occurred in meeting the projects 4 key impact domains³². As opportunities and problems were identified the team would brainstorm on how to adapt the research process to respond to these. Some examples of issues addressed in this process are shown in the following table.

Table 5: Learning and Action in Monitoring our Coalition

| Issue | Action taken |
|--|---|
| Char dweller request we look at livestock as well as crops (because these enterprises were more accessible to resource poor households and had more involvement of women). | Requested CPHP to allow us to look at beef fattening as one of our focus innovation systems. |
| Low turnout at char based meetings during PRA phase. | Find natural meeting places e.g outside mosque after Friday prayer Meetings with samaj leaders to explain project clearly. Household survey used to tell people about our work. |
| Midway through the research project, team members felt we were not having enough dialogue with our wider learning community. | Bulletins and website on our activities. Presentations to BAU, Anthropology Department, BLRI and extension. Papers in Agren newsletter Team members encouraged to write bulletins for local media. |
| More technical information needed to understand more clearly the nature of constraints and opportunities (and to quantify potential benefits and losses). | Invite BARI, BLRI and SRDI staff to field site to allow them to talk to chardwellers and other actors and to give us a view of technical issues. |
| Presentation of tools to the Upazila | Need to think more carefully about |

³¹ See www.developmentwheel.org

³² Research impact domains: 1. Opportunities to strengthen pro – poor post harvest innovation systems for char dwellers identified and action taken. 2. Actor oriented tools developed and shared. 3. Dialogue with wider learning community. 4. Development of research and action coalitions.

| Issue | Action taken |
|--|--|
| extension committee highlighted their political nature (negative reaction of extension staff when the matrix showed weak links between extension and char dwellers). | presenting actor linkage maps and matrices. Stress time bound nature of the data. Try to draw up matrices with consensus from actors involved. Move towards 'appreciative enquiry' approach. |
| Interest by NGO staff and others in our methodology | Post some simple guidelines to actor oriented tools on our website. Invited interested persons to visit our field site and attend presentations. Workshop on actor oriented tools at the end of the research period. Paper on actor oriented tools for Anthropology conference. |

The team also used actor linkage maps to monitor their links with other members of the research and action coalition.

Implications of Collaborative Research in our work

Following the coalition approach had a number of important implications for the way that we worked.

1. Changing power relations

The research was hosted and managed by a small Bangladeshi NGO. This was very different from the many natural resource based research projects which are commonly managed, with funds controlled, by an overseas Institution, using in country collaborators.

2. New working arrangements to promote partnership

Building a true coalition meant radically changing the way research partners worked together. Instead of having a lead researcher with assistants or collaborators, our project had four equal partners in the core team. Research design, monitoring, evaluation and key decisions were made by all partners together. Partners had to get used to this new way of working, taking on new responsibilities or relinquishing areas of control.

3. Collaborative production of the research findings

Beyond the core research team, we were concerned with building partnership with our wider research and action coalition members. The implication of this was that we wanted to involve them not only in the collection of data but also in the analysis of its implications. In order to do this we adopted an iterative process, using participatory tools and frequent meetings to report and discuss findings as went along, so that our research partners could be involved in the interpretation of our findings and in generating action plans

Advantages of Collaborative Research

The experience of working in a research coalition has been challenging but extremely rewarding. Some of the key advantages we have found are:-

1. Increased flexibility and responsiveness to the local environment

Involving all partners in regular proactive monitoring meant we were quickly alerted to constraints and opportunities in our working environment (see description of proactive monitoring above). Group brainstorming was useful in helping us to make the appropriate response. Having all partners in country gave us additional flexibility, for example to meet and react quickly when a new situation occurred.

2. New Insights from working in a multidisciplinary team

Our team bridged the NGO, business and academic sectors. Team members had very different backgrounds, experience, ideas about development and expectations from the research. While these did cause problems at times, it was also a very creative force, encouraging each of us to look again and question our approaches. Each of us learned new things from the experience.

3. Increasing links with other key stakeholders

As each of the core team came from different 'worlds', we all had different contacts which different types of stakeholder (business, NGO, academic and donor community), which helped us to draw these into the research coalition, and in trying to ensure that our research products were accessible to actors in all these sectors.

4. Linking research To action

Involving key actors in research has helped us to make the transition from research into action plans and we hope into the next stage of practical interventions. Interventions have been developed in a collaborative way and we are now developing joint proposals for action with our core team and wider research and action coalition partners.

Problems experienced

Implementing a coalition project has inevitably created some problems. Arguably these are issues which any research project, coalition or not would have to deal with at some point in order to take research forward into action.

1. Power relations and tensions between actors

Trying to build partnership between actors of different 'status' is inevitably problematic. In the wider research and action coalition, we found it difficult to overcome the traditional status difference between farmers and outsiders. Inevitably chairs would be placed for us to sit on, while farmers sat on the ground for meetings. And while we were treated as powerful outsiders by chardwellers, with government agencies the problem was often the reverse. Here being linked to a small, relatively powerless NGO, meant we sometimes had problems getting people's collaboration or serious interest in our work. This is discussed in more detail with reference to using actor oriented tools in section 4.2.

2. Team Management problems

Managing a team of equal partners can be extremely difficult, particularly as the funds were controlled by one partner. Too many 'chiefs' and no 'Indians' meant that making decisions and managing the team created headaches for the designated 'research manager'.

Recommendations for effective collaborative research projects

From our experiences we have a number of recommendations for others embarking on a coalition project:-

1. Importance of selecting the right partner

Initial partner selection is vital to the success of the project. Failing to involve a key or powerful stakeholder may mean that they are reluctant to join at a later stage, or to listen to, or react to research findings. Stakeholder analysis is an important starting up exercise in developing a coalition project.

2. Building trust between partners is essential.

Our initial PRA field exercise was very useful in doing this. It took all team members and some research and coalition members away from their normal working environment for 10 days. During the study we worked extremely hard, spent long hours in discussion, ate together, socialised together etc. By the end of the process some strong bonds had been formed which helped us to work together in the coming months. Later, when we experienced problems with building partnerships with key actors, we would invite them to join us for shorter field trips. Usually being together on a field trip helped to build a better relationship and enhanced collaboration in research activities.

3. Clearly defined roles and procedures.

A team leader with good interpersonal skills is needed to maintain good relations between team members and other coalition actors. Establishing very clear rules for communication, reporting, data storage etc from the start also helps avoid misunderstanding later on.

4. Regular monitoring and space for dialogue

As discussed above, regular monitoring was crucial to the team in dealing with problems before they became unmanageable, and in responding to opportunities. Creating space and opportunity for regular dialogue, both within the team, through regular monitoring exercises, and with other research partners was important. We found the actor linkage matrix useful to keep track of our dialogue with our research and action coalition members over the project life.

5. Identifying local 'champions'.

In building relations with key actors, and particularly with large, powerful and not very friendly organisations, we found we had to actively seek out 'champions', or people who were open to our ideas and enthusiastic. These people could then act as ambassadors for the research within their organisation.

4.2 Using an actor oriented approach – experience and recommendations

Discussion of Methodology Used

We have found the actor oriented tools useful, enlightening and productive in the analysis of innovation systems. As we reviewed the methodology, particular strengths observed by the team were:-

- The actor oriented approach is holistic, linking the local, district and national level actors. Other anthropological tools often fail to do this.
- The actor oriented approach is pro poor as actor groups can be disaggregated to focus on different resource levels, gender etc.
- The tools make issues around actor links visible, for example highlighting gaps and showing innovative links.
- As well as being used to map an existing innovation system, we found the tools useful for evaluating individual events (who was linked to who) and for planning interventions.
- The combination of individual case study monitoring and focus group discussions was useful. Individual discussions gave us rich detail and allowed us to discuss sensitive information and to get in depth information. Focus group discussions were useful for cross checking, consensus building and for developing ideas for interventions.
- Participation of actors was very good, particularly in group settings. People enjoyed using the actor oriented tools. They generate much animated discussion.

PRA, Household Interviews, Case Study Monitoring, Focus Group discussions. How do approaches complement each other and where are they useful.

We found that the combination of research styles was very effective. Our initial PRA exercise raised actor's awareness of our work and definitely helped build a good working relationship between the coalition team members. However, in the Bangladeshi rural context we found the PRA had some limitations. At the end of the exercise we did not feel we had adequately met our aims of understanding livelihoods and building support for the study. This was due to the problem getting large and representative group meetings because men tended to be absent at work during the day, and women felt constrained from attending a meeting in a public space or in another household's compound. As a result there was a tendency for meetings to be dominated by one household. This made us unsure of the representativeness of our findings, and made it hard to understand and categorise different household and livelihood types.

In order to get a better understanding of household livelihoods we followed the PRA with a quantitative household survey. In this we visited each household in the two study areas. The survey helped us to get a better feeling for the differentiation between households and to ensure that the case study monitoring stage included a range of household types.

For detailed information and building an understanding of innovation processes, individual case studies were extremely valuable. Building on these, focus group discussion helped us to confirm the relevance of findings, to build consensus on key issues and to take analysis forward into action planning.

In a shorter exercise, actor identification, case studies and focus group work are probably the most critical exercises to get a good picture of actor links in an innovation system.

Subsector mapping and Actor Linkage maps: similarities and differences

In this study we used both subsector mapping and actor oriented maps. Our research team members from BASC frequently use subsector maps when carrying out business analysis. They found that the Actor oriented map gives a different perspective in analysing innovation systems for a number of reasons. See table below.

| Subsector map | Actor linkage map |
|---|---|
| Looks at movement of goods in the market chain. | Looks at flows of information and goods. Not only what happens to the product, but how producers get access to information. |
| Focuses on economic interactions | Looks at social and political as well as economic interactions. |
| Seeks to identify weak points in the existing market chain and ways to support these. | Seeks to identify alternatives to the traditional or mainstream linkages. Looks for potential for enhancing system through developing new links. |

Our BASC team members felt that the actor linkage matrix was complementary to the subsector maps, with both having a role to play in project planning. Actor oriented analysis seems to be more suited to situations where there are a wide range of actors, with complementary skills or products, and where there are potential for new innovations to come from building links between these.

Long Term versus Short Term Analysis

In this research project we spent 12 month monitoring the links of our case study actors. This gave us the advantage of being able to identify key events and locations which bring actors together over the agricultural year. A second advantage of a long term analysis phase was that it gave us time to develop relationships and build coalitions with our key actors to take us into the action planning stage.

On the negative side, we had some problems keeping some of our actors interested in what we were doing over a 12 month period. Some, particularly on the private sector side would have liked to have seen us move into action soon.

Most development actors do not have the luxury of a 12 or 18 month project preparation stage. We believe that the actor oriented tools and approach followed here could be carried out over a shorter time period, using one off interviews or

case studies and group discussions rather than longitudinal case study monitoring. This would be particularly the case if good relationships with key actors have already been established or by including representatives of key actor groups in the core research team.³³

Political Issues around presenting actor linkage information

One problem we encountered in our work concerned the political nature of the information revealed by our study. In some cases our findings on links contradicted the 'officially accepted' understanding of how things work. For example, our finding that DAE block supervisors are rarely seen on the char contradicted DAE's image as the ministry which reaches every corner of the country.

Presenting information that contradicts an organisation's self image, particularly when, as in this case, it was presented by a small NGO to a large powerful organisation, is very problematic. Our findings were met with hostility and disbelief.

We soon realised that there was a contradiction within our own project aims of 1) critically analysing the current institutional environment, and 2) building partnerships to improve it.

As the research project progressed we moved away from 'critical and judgemental' analysis that might alienate our research and coalition members, turning instead to a more 'appreciative enquiry' approach (see Magruder et al 2001). This does not mean we ignore weak links or pretend they don't exist. However, rather than focusing on them we look instead for positive links and ways forward. For example, looking at the chardweller/ DAE relationship we found cases of farmers actively seeking out the block supervisor or even visiting the DAE upazila office and receiving the advice and services they required. Building on this, and exploring how to develop this (still rare) linkage initiative is more constructive than dwelling on the fact that a low paid government employee, such as a block supervisor, is (and probably will always be) reluctant to make the long and tiresome journey to the chars.

Another change we have made is to move away from 'quantitative valuation of links' which can also give an impression of judgement. Instead we use a colour coded system showing relative strength of links.

We believe that changing the manner in which we approach our analysis does not lessen its effectiveness. In fact it is a more realistic and constructive way of ensuring that our analysis results in changes in the behaviour of key actors, and moves from the theoretical to the practical.

³³ Following the completion of this research project, some members of the research team will be involved in implementing a shorter term study of a business innovation system. This study is being carried out as a pilot for Katalyst, a Bangladesh business development programme.

Maps and Matrices – how useful are they in visualising and analysing actor links?

In our research work we found maps to be most useful for group discussions, plotting out links together with actors and for presenting back findings. However maps soon get very complex and web like and it's easy to miss particular links. For systematic analysis, ensuring all links are considered and for planning, monitoring and evaluating impact on particular links we found that the actor linkage matrix is a more useful tool.

We have experimented with the use of an actor linkage board³⁴, as an alternative to the excel spreadsheet, to make the matrix more accessible for group use, but still find that a group prefers to revert to maps and finds these easier to work with. A matrix board might be useful as an office tool, to be used regularly with a small team to monitor progress in managing links³⁵.

During the research period we were introduced to the UCINET software (Borgatti, S.P., M.G.Everett and L.C. Freeman 1999. UCINET 5.0 Version 1.00 Natick. Analytic Technologies). This can be used to translate matrices into maps. The maps can then easily be manipulated to show, for example, only the strongest links, or links for one actor. We've found them an extremely useful complementary tool to the matrix.

One short coming we have found with the map and matrix is the difficulty in representing the 'quality' of a linkage. In our current use, maps and matrices show relative strength of links but cannot express issues such as the balance of power and control in a relationship (though separate arrows and cells do represent the direction of information flow). To actually analyse the quality of a link we have found the determinants diagram group discussion exercise very effective. Currently, this analysis is summarised in a text description of key links. It would be interesting to explore ways of visually representing this.

³⁴ This is a matrix drawn onto a board, with hooks in each square on which counters can be hung to represent the strength of a linkage.

³⁵ DEW plan to use matrix boards in their field office to monitor progress in developing proposed interventions.

SECTION 5: RESEARCH OUTCOMES

This section looks at the impact of this research project in terms of our three outputs:

- identifying (and acting on) opportunities for pro poor interventions for chilli and livestock fattening innovation systems in the Jamalpur chars.
- Developing and sharing useful actor oriented tools.
- Developing and sharing experiences of using a coalition approach.

5.1 Outcomes for Char dwellers

For char dwellers in the study area, the project has had a number of positive outcomes:

1. Opportunities to meet together to discuss, and tools to analyse current production systems.

The research process gave char dwellers, and particularly women, the chance to critically analyse their current production systems. Participation in group discussions was often animated with ideas being shared, and new ideas developed. Members of group discussion groups suggested that they should continue to meet regularly in groups to discuss chilli and livestock production, study training guidebooks and address important issues.

2. Meetings with other actors in the innovation system has raised char dweller's awareness of key actors and of services available to them.

During the research process, we held a number of meetings and workshops which brought char dwellers together with other key actors in the innovation system. Some of these they did not know about before, and some they had heard of but hadn't met.

New actors met through the research process included:-

Upazila agricultural extension officer
Block supervisor (new to some farmers)
BARI researchers
BLRI researchers
Square chilli buyer
Soil Research and Development Institute
Other NGO staff e.g ITDG

In these meetings char dwellers became aware of the services which these individuals or organisations could provide to them. In some cases they have already begun to make use of these services. For example SRDI has carried out soil sampling for farmers, BARI researchers gave out new varieties for testing. Farmers also told us that they plan to follow up contacts made e.g plan to liaise with Square buyer to arrange chilli sales.

3. Meetings with other actors gave char dwellers an opportunity to voice their needs.

As well as farmers becoming more aware of other actors, the meetings and research activities have raised the awareness of other key actors of issues faced

by char dwellers. After visiting the chars, both BARI and BLRI researcher felt that there was important work to be done to develop specific technology options to suit the particular environment of the chars e.g fodder species, late planting due to flood etc

In our final national workshop, participants noted that char issues do not get enough publicity or attention. A representative from Bangladesh Radio asked us to advise how to work more closely with char dwellers. The director general of BARI expressed an interest in developing char specific research.

4. Focus group discussions and final workshops generated action plans

In the focus group discussions we used determinant diagrams to analyse key linkages and to look at action which could be taken to strengthen these or make them more pro- poor. These actions are summarised later in this section. Many of the ideas came from char dwellers. We hope that this research has set up the motivation amongst the participant char dwellers to take positive action to further develop their chilli and livestock production.

5. Extension staff began to visit the chars more frequently.

Early in the research process, we presented local extension staff with preliminary maps and matrices which showed that the link between the block supervisor and farmers was very weak. Since this time the block supervisor has visited the project chars much more regularly. Farmers are excited by this and suggested that they should continue to monitor and report on the block supervisor's performance in the future.

5.2 Outcome for other Research and Coalition Members

Our research and coalition members (see section 4) included local leaders, government and NGO staff and private sector actors. During the research process a number of outcomes have been noted as result of their participation in the research.

1. DEVELOPMENT OF ACTION PLANS

Through focus group discussions with research and action coalition members the following ideas for action have been developed:-

CHILLI

Building on existing links

1. Farmers to form chilli producer groups and cooperatives which will link with other actors to: request services, represent farmers interests, work cooperatively to develop irrigation, marketing and credit facilities.
2. DAE and NGOs to support crop input retailers by providing training and information.
3. DAE to involve retailers as partners in extension planning
4. DAE and NGOs to support retailers in expanding the range of services provided

5. Extension and NGOs to raise farmers awareness of the services available from extension
6. NGOs provide training for women in post harvest chilli management.
7. NGOs to work in a more coordinated way to provide better support on key local issues such as chilli production.
8. NGOs to develop credit package tailored to crop production
9. DAE, BARI, NGOs and char farmers to work with media to develop messages specifically tailored to char conditions.

Interventions which change existing links to make them more pro poor

1. Farmers groups to motivate dealers to carry out socially responsible practice e.g through honouring good practice.
2. DAE to invite farmer group representatives to play a role in extension planning, monitoring and evaluation.
3. Farmers groups to develop new marketing strategies for green chilli (to give more control over the relationship with middlemen). (supported by NGOs).

Interventions which build new links

1. Farmer to farmer exchange visits and links to national associations e.g organic farming associations.
2. Local leaders become more active in approaching upazila and national actors to represent chilli producer's interests.
3. DAE and NGOs to support development of alternative channels (to retailer) for accessing information on crop inputs e.g NGO training and advice, organic network.
4. Farmers groups to form links for marketing with national chilli processors (to provide alternative market channels).
5. NGOs to support local chilli processors and retailers to improve production and marketing of chilli based products (alternative market channels).
6. Banks to provide specialised loans for chilli production (possibly combined with contract with chilli processors).

LIVESTOCK

Interventions which build on existing links

1. Farmers to form livestock producers group (men and women's)
2. Local leaders to play more active role as intermediaries between livestock producers and other actors.
3. DAE, BLRI, DLS, NGOs and char based producers to use existing media, especially radio, to share char specific technology and management recommendations.
4. NGOs to provide training for women on beef fattening.
5. NGOs to develop appropriate credit for beef fattening.

Interventions which change existing links to make them more pro poor

1. Farmers groups to motivate private sector providers to maintain high standards e.g through honouring good practice.
2. Farmers groups to form links with national retailers to develop new market channels and opportunities.

Interventions which build new links

1. Farmers groups to link with other key actors.
2. DLS and NGOs to provide training and build links for ongoing information sharing with traditional healers e.g goyal group.
3. DLS to develop links with pharmacists, private vets and traditional healers for information sharing and health promotion planning.
4. Researchers and char dwellers to work together to develop char specific technology options.
5. Butchers groups link with 'leather associations' for training in improved processing of hides.
6. Banks to provide special credit packages for beef fattening.
7. Input suppliers and DLS to use feed retailers to channel information to livestock producers.

General Recommendations for extension providers in the chars

1. Recognise and facilitate the key role of farmers in natural resource based innovation systems.
2. Encourage farmers to exert a demand pull on government extension and other service providers.
3. Funding mechanism should allow local and regional initiatives to respond to farmers needs.
4. Recognise and facilitate the role of private sector actors e.g retailers, middlemen, pharmacists, private vets, traditional healers and butchers.
5. Improve standard of practices and accountability of private sector actors to consumers through introduction of consumer accreditation, awards for good business practices etc.
6. Use NGOs and private sector to provide complementary sources of information and support services (but encourage coordination of these activities).
7. Help link producer groups in different parts of the country
8. Assist farmers in accessing market information to allow them to develop more effective marketing strategies.
9. Extension can play a key role in acting as a broker to link farmers groups to other key actors e.g media, and private sector.
10. Support the development of appropriate credit packages for crop and livestock production.

2. Interest in actor oriented tools

During the research period our research and coalition partners have shown an interest in learning more about the actor oriented tools and in using them in their own organisations. We responded to these requests by producing some guidelines on the tools and by holding a one day 'hands on ' actor oriented tools workshop. Seven NGOs, the participatory research promoter's group, BARI and a business development project sent staff members to this workshop. There was much lively debate about how to adapt the tools to

different contexts and for different organisational needs. We hope to continue to exchange experiences on this.

3. New Partnerships and Awareness raising

Meetings such as the June 2003 meeting on Kulpal char brought diverse actors together. In these meetings they had the opportunity to give short presentations on their current work plans and the services they provide. We found that in some cases they had not been aware of each other's work. For example, NGOs working in close proximity did not know about each other's activities, training and support programmes re: chilli production. After meeting and sharing information the NGO members made a plan to meet and communicate more regularly. SRDI had not been aware of retailer's key role as information providers on soil fertility to farmers. After hearing this, SRDI researcher agreed that it could be useful to provide training and leaflets to dealers.

4. Extension form linkage subcommittee

After our initial presentation to the Sarishabari extension UAECC (upazila agricultural extension committee), the committee decided to form a sub group to look at linkages in their work. This sub group was invited to attend a meeting with char dwellers in June 2003. DEW hopes to continue to work with the sub group in developing the action plans above.

4. Purchase of Chilli from Sarishabari

After visiting the project site, the Square chilli buyer told us that he now plans to use this location as a chilli purchase point. A PRAN dairy buyer is also considering setting up a milk collection point in this area.

5.3 Outcomes for the Core Research Team

1. Research Partners continue to make use of new tools

After working with and adapting actor oriented tools, members of the team are continuing to use them in other aspects of their work. Dr Ahmed has already been using actor oriented tools in two other ongoing research projects, and has given training sessions on the tools to his students and colleagues. Harriet Malsaert, Noushin Islam and Faruqe Hussain are currently developing the tools to be used for a short term project planning exercise to analyse a business cluster and identify potential interventions. DEW plan to use the tools to continue to monitor and evaluate their impact on char based innovation systems. BASC researchers believe the actor linkage maps can provide a useful complementary tool to subsector analysis. They are also interested in developing the PRA tools used at the beginning of our study and adapting these for business analysis.

2. DEW has developed action plans to work with its client group

The research process has generated a whole list of 'action ideas' for DEW to carry forward in its ongoing work in Kulpal and Nolshunda char. In the short term DEW plans to develop the following activities:

- Initiate a coordination body for NGO activity in the Sarishabari chars to share information, develop joint proposals and coordinate activities.

- Support the formation of farmer interest groups for chilli and livestock production on Kulpal and Nolshunda char.
- Facilitate farmer to farmer exchange visits to chilli and livestock producers in other areas (to BARI and BLRI on farm groups and other NGOs)
- Develop a marketing course for char based producers (with ITDG, BASC and Traidcraft)
- Develop a char specific training package on chilli and livestock (particularly focusing on women's information needs). (with BARI and BLRI staff, and disseminated through NGO network and radio)
- Set up a chars information resource centre at the Tarakandi office (accessible to all interested NGO, government staff and private individuals).

3. DEW has formed new partnerships to take action plans forward

Close relationships formed with other 'research and coalition actors' during our regular case study monitoring visits, meetings and field visits, have provided a strong base for ongoing collaboration. DEW has signed Memorandum of Understanding (MOU) with both BARI and BLRI, and has developed relationships with specific researchers who are interested in developing char specific technologies and training packages. DEW also has a strong relationship with local extension staff and with local and national NGOs. There have also been some discussions and provisional plans with private sector actors. For example Syngenta have offered to provide training to farmers groups on pest management for chilli production. Square and Pran have expressed interest in developing contract farming arrangements with char based farmers. These ideas need to be further developed.

5.4 Outcomes for Wider Learning Community Members

Our wider community members (see section 4) include national research institutes, natural resources researchers in other areas, national and international NGOs, Bangladeshi anthropologists, and the DFIDB Chars Livelihood Development Programme.

Through the research process, two key outcomes have been (and we hope will be):-

1. Development of dialogue and learning on actor oriented approaches.

Through the research process we have had ongoing dialogue with others both in and outside Bangladesh, who have been interested in the approach we are using³⁶.

³⁶ These have included: In Bangladesh:- Bangladesh Agricultural University (participants in workshop on farming systems approach), Steps to Development – interested in actor tools for monitoring and evaluation. ITDG – interested in actor oriented tools. Jahangirnagar and other Anthropology departments – relevance of tools in applied anthropology. Katalyst business development project – interest in tools for business cluster analysis. Participatory practioners support group – interest in tools to complement PRA tools.

Internationally:- Steven Biggs, University of East Anglia – development of actor tools. Andy Hall, CPHP – development of coalition approach. Rick Davies, Monitoring and Evaluation expert – network analysis. Ricardo Ramirez – interest in actor oriented approaches for working with

Our experiences, and guidelines on tools are making a contribution to the ongoing dialogue and learning on these new tools. At the end of the project we will continue to share our findings through producing a paper for publication in Bangladesh and internationally, and by continuing to make our information sheet on actor oriented tools available to interested parties.

2. INPUT TO DFID CHARS LIVELIHOOD PROGRAMME

Though our study was carried out only in two chars and focused on two specific commodities, we believe that our findings on information flows between the chars and the mainland have implications beyond our direct research area. We are keen that this research is read and used by the forthcoming Chars Livelihood Development Project.

The research project was developed in consultation with the DFIDB livelihoods adviser and chars livelihood programme 'preparation' team. Since then there has been a change in personnel at the DFIDB office, and the project preparation team have finished their work, to be replaced shortly with a new 'project implementation' team. This discontinuity in personnel has made coalition building and information sharing difficult. However, the research team are committed to sharing their findings with the team as they begin their work later this year.

farmers. David Gibbon, freelance consultant – interest in use of tools for water management catchment planning.

REFERENCES

- Ahmed, Z and Matsaert, H. (2004) "Developing Actor oriented tools to enhance development interventions: a challenge for social anthropologists". Paper presented to the Chittagong Varsity Conference, "Anthropology in the 21st Century", January 25th – 27th 2004. Proceedings to be published.
- Appreciative Enquiry
- Biggs and Matsaert 1999 "*An Actor Oriented approach for Strengthening research and development capabilities in natural resource systems*". (*Public Administration and Development* 19 pp 231 – 262).
- Biggs and Underwood 2001 Review of the Crop Post Harvest Research Programme: Partnerships and Innovation Systems.
- Biggs, S. and Matsaert, H. (2004): "Strengthening poverty reduction programmes using an actor oriented approach: examples from natural resources innovation systems". Agren Network Paper no. 134. January 2004 ISBN 0850037042.
- Borgatti, S.P., M.G.Everett and L.C. Freeman 1999. UCINET 5.0 Version 1.00 Natick. Analytic Technologies.
- Dixie G 2002 Study of Leather Subsector in Bangladesh (unpublished, BASC).
- Douthwaite B 2002 Enabling Innovation. A practical guide to understanding and fostering technological change (Zed books).
- Grimble, R. and Wellard, K. (1997) Stakeholder methodologies in natural resource management: A review of principles, contexts, experiences and opportunities. *Agricultural systems*, Vol 55, No. 2 pp 173 – 193.
- Lewis, DJ (1998) Partnership as process: Building an institutional ethnography of an inter-agency aquaculture project in Bangladesh' in D. Mosse J. Farrington and A Drew (eds). *Development as a process: Concepts and methods for working with complexity*. London: Overseas Development Institute and New York: Routledge.
- Long, N and Long, A (1992) *Battlefields of Knowledge*. London. Routledge
- Magruder Watkins, J. Mohr, B. 2001 *Appreciative Enquiry. Change at the Speed of Imagination*. (Jossey – Bass/Pfeiffer) ISBN 0-7879-5179-X
- Matsaert, H, Ahmed Z, Islam N, Hussein F. 2004. Actor Oriented Tools for Analysis of Innovation Systems. Some guidelines from experience of analysing natural resource based innovation systems in Bangladesh (available on DEW website. www.dewbd.org)

Matsaert, H. (2003): "An Actor Oriented Analysis of Innovation Systems: a case study from the char lands of Bangladesh". Agren Newsletter no. 48 ISSN 0951 – 1865.

Mosse, D, J. Farrington and A Drew (eds). (1998) Development as a process: Concepts and methods for working with complexity. London: Overseas Development Institute and New York: Routledge.

Project Progress report – March 2003 (available from DEW website www.dewbd.org).

Project Progress report – September 2003 (available from DEW website www.dewbd.org).

Ramirez, R 1997 Understanding Farmers' Communication Networks: Combining PRA with Agricultural knowledge systems analysis. (IIED Gatekeeper 66).

Roling N 1988 Extension Science: Information Systems in Agricultural Development (Cambridge University Press).

Roling, N and Jiggins, J (1998) the ecological knowledge System' in N. Roling and A. Wagemakers (eds) Facilitating sustainable agriculture. Participatory learning and adaptive management in times of environmental uncertainty. Cambridge: Cambridge University Press.

Literature on the Chars

Ashley *et al* 2000 The Chars livelihood assistance scoping study: final report (DFID).

Baqee A 1998 Peopling in the Land of Allah Jaane.

Haque, CE and MQ Zaman, 1989 Coping with Riverbank Erosion Hazard and Displacement in Bangladesh – Survival Strategies and Adjustments, Disasters. Vol 13. No. 4 pp 300 – 314.

Helen Keller Worldwide 2003 Life in the chars in Bangladesh (Nutritional Surveillance Project. Bulletin no. 14).

Jamalpur Project Refinement Study (FAP 3.1) (1997) Final Project Refinement and EIA report – R3, Annex C Agriculture.

Schmuck- Widman H 2001 Facing the Jamuna river (Indigenous and Engineering Knowledge in Bangladesh) (Bangladesh resource centre for indigenous knowledge).

Schmuck-Widmann 1996 Living with floods. Survival strategies of char dwellers in Bangladesh (FDCL).

Thompson P 2000 Bangladesh Char lands: a review of assets and change (prepared for DfID Bangladesh).