



Identifying Pro-Poor Economic Activities

Improvised Value Chain Analysis of Selected Goods & Services in Coastal Southwest Bangladesh

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1. Introduction and Objective

Providing livelihood options to rural poor has been the major concern amongst development practitioners engaged in poverty alleviation programs. It has been so amongst the early actors in microcredit who tried to lock credit with income generating assets. Similar philosophy prevails amongst those keen on transferring assets to the extreme poor free of cost with the intention to improve their livelihood. All such initiatives continue to be largely confined to self-employment activities, which are known to have greater potential in areas better connected with growth centers and/or have vibrant local markets. Large parts of coastal south lack both these attributes – the communication is slow and the local habitats are sparsely distributed, often distanced by unfriendly rivers. And the frequent devastations caused by the cyclones raise the risk of investment. Moreover, the closest urban centers (such as, Khulna) have been financially stagnant or on decline over a decade or more; and Bagerhat and Satkhira hardly picked up¹. The coastal areas have however experienced major transformation to cash economy with significant increases in demand for fish cultivated or captured in the area in both domestic urban and export markets. Thus, in spite of early social resistance, shrimp cultivation has shaped the physical, financial and social canvass of the area over more than last two decades. The villages facing the *Sundarban* have also been influenced by the various legal and extra-legal options of livelihood through extraction of forest and mangrove resources.

The present paper, second in the sequel,² attempts to identify economic activities that have potential for beneficiary level supports; and hold prospects for increasing employment and income of the poor, particularly of extreme poor. The most commonly observed practice amongst sponsors and NGO/INGO community has been one of beneficiary level transfers, even though there is wider recognition of the limits to such micro-level initiatives set by meso and macro parameters. At a conceptual level, it is helpful to structure the various activities in some meaningful ways; and this is done in the following section. It also lays out the approach taken in the empirical search for activities. Potential activities as reflected in current practices, under the Shiree-EEP project of SCUK, as well as those revealed in the activity-specific employment reported by people in extreme poor households in the area, are summarized in Section 3. The fourth section lists a good number of activities grouped into pre-set categories; and describes the

¹ Since the study focuses on the area covered by the Shiree/EEP project of the Save the Children, UK, we confine to Khulna and Bagerhat districts with occasional reference to Satkhira – greater Barisal is left out in this exercise.

² The first paper had reviewed the various issues in identifying extreme poor (see Zohir 2010a).

technology and institutional canvass pertaining to these activities to assess potential entry points for pro-poor income and employment generation. For most such activities, numerical illustrations are provided for the field-level practitioners to localize the content for effective use in decision-making. The concluding section summarizes the findings and makes several recommendations to the Save the Children UK, much of which remain relevant for all development practitioners and policymakers keen on promoting employment and income of poor (particularly, extreme poor) households in the coastal southwest of Bangladesh.

2. General Concepts and the Empirical Approach

As mentioned above, development agencies are often in dilemmas while deciding on the specific activities or projects where assistance to beneficiaries may be extended. A lending agency, including microfinance institutions (MFIs), may receive proposals from potential lenders, scrutinize those with standard tools (such as, calculation of internal rate of return and risks), assess credit worthiness of the clients, and finally decide on loan approval. Moreover, once the loan is approved, the lending agency normally follows up to ensure that the loan money is used on purposes for which it was taken. A development agency often needs to develop such proposals for subsidized resource transfers, recognizing the possibilities of rent-seeking motives amongst clients as well as amongst its staffs. This section describes the basic concepts and empirical approach that may guide the process of identifying the pro-poor activities and subsequently to probe into their viability.

2.1 Selected Concepts

Several key concepts are involved in the exercise. These include, ‘economic activities’, ‘pro-poor’³, and ‘value chain analysis’. Economic activities involve addition of value that corresponds to factor payments in the process of producing and/or distributing goods & services. Thus, only income-earning activities are considered; and the paper excludes expenditure-saving activities as well as all labor activities considered under reproductive economy⁴. Reference to ‘pro-poor’ economic activities is made when the latter creates opportunities for income-earning by members of poor households. Such income may come in the form of factor payments – wage, rent or profit⁵. It may also come from increased returns from the sales of resources owned by poor households due to promotion

³ All references to ‘poor’ in this paper essentially mean ‘extreme poor’.

⁴ Collection of fuel-wood from forest to save expenditure on cooking fuel is an example of expenditure-saving activity; and there may be justifications to support some kinds of expenditure-saving activities, particularly the ones that prevent major expenses. Taking care of the children, or cooking for household members are considered activities in the reproductive economy.

⁵ It is important to recognize that wage payment is implicit in returns from self-employed activities as well.

of certain other activities. In the former case, returns to the poor are considered directly from the sponsored activities, while it is indirect in the latter case. The focus of the current study is primarily on the directly sponsored activities.⁶

Above discussion presumes a fixed income without any probabilistic outcome. In reality, engagement in economic activity does not only involve prospects of income, but may involve risks in investment as well. There are uncertainties involved in wage (or, salaried) employments, but no risk from the perspective of the worker (employee). This is not true in cases of self-employment, which involves productive assets enabling employment and returns to labor feasible. Whether such assets are given to a person (household) free of cost or the person (household) buys it with own money, there may be risks to be borne by her/him⁷; and the sources of such risks are generally from production and marketing⁸. Thus, choice of activities needs to take into cognizance both expected income change and the additional risk involved in these activities. Development agencies would like to increase the average income of extreme poor; reduce risks associated with earning of that income; and address the sources of uncertainties (eliminate/prevent, or mitigate). At field levels, expected income is emphasized with inadequate appreciation for the various kinds of risks involved; some aspects of which will be discussed while illustrating case studies in Section 4.⁹

Value chain analysis is a systematic approach to examine competitive advantage that a good (product) or service may have. The chain consists of a series of activities that create (and add) value. It is a method for accounting and presenting the value that is created in a product or service as it is transformed from raw inputs to a final product consumed by end users.¹⁰ The tools of VCA are more popular and widely used in cases of internationally traded goods, and basic information on VCA is provided in Annex 1. Case studies of potential pro-poor activities reported in current undertaking are mixtures of VCA and market studies. It is however important to note that the accounting part in

⁶ Self-employment in van-driving and earthwork with assured employment for the poor are examples of the former. Supporting better cargo transport, cost reduction technology in storage or facilitating new technology (all of which would be under trade or market facilitation in international trade) may indirectly raise returns to producers.

⁷ A beneficiary receiving a van at no cost may not face any risk since from her/his perspective, investment is zero. More importantly, labor of members need not be committed to running the van on a 'sunk-cost' basis – the option to fall back on the alternative wage market may be available at no additional cost. The same does not apply to cow fattening even when a cow is provided at no cost. In the latter case, the beneficiary has to incur cost on feed and upbringing, including labor for caring. There are risks involved since the costs on those factors have been made (sunk cost) and the returns may vary widely with fluctuation in market prices.

⁸ Risks in production may originate from natural shocks and/or mishaps in input markets; while output market, including the post-production cargo movement, is commonly the source of marketing shocks.

⁹ As a first step, activities will be categorized in terms of wage (no risk) and self-employment (positive risk). A third category, migration, is introduced as an example under activity with indirect support.

¹⁰ Three broad types of transformations are involved: processing into a new product/service; change in location; and storing current goods for future sales/consumption.

VCA, which provides estimates on value added at various segments in the total chain, is specific to location. Since the same activity may be worth undertaking in one place and not in another location, the findings in this study are meant to illustrate the methods and should not be taken as the unique truth. It is emphasized that various elements of market analysis also ought to be incorporated for viability assessment.

2.2 Empirical Approach

It was recognized at the inception that no ‘cookbook’ is in the pipeline; and yet, SCUK’s Shiree project needed some sort of guidelines on where to put their resources – that is, which economic activities proposed by listed beneficiary extreme poor households deserved to be supported. The research thus had to pretend of actually undertaking the action; and the steps followed largely account for that simulated reality. This sub-section describes those steps.

Step 0: Reviewing information available within the organization - There was a ‘micro plan’, listing all the proposed activities that the field staff considered worth supporting. This was made available to the research team half way through, and the information has been used in identifying activities whose market potentials deserved to be assessed. In a way, the ‘micro-plans’ revealed information on the demand side, with possible biases arising from zero price offer to the listed households.

Step 1: Zoning of an operation area – In the present case, upazilas are considered as basic operation areas; and it needs not be so in other cases. There may be wide variations within a upazila in terms of resource endowments (labor, land, water, etc.) and connectivity (with markets). In the coastal southwest, habitats located across *Sundarban* may face significantly different choices when compared with another habitat located north of the same polder. Quite naturally, labor choices vary and feasibility as well as economic viability of activities will vary within the same upazila. It is therefore important to zone each operation areas such that activity options within each zone are similar while those vary significantly across zones.

Step 2: Selection of a zone (union) – Since secondary data are more likely to be available at union levels and not at lower tiers, various data on land use and resource availability may be compiled at union levels as a part of the zoning exercise. Thus, practical consideration of data availability forces one to consider unions as the basic units for zoning exercise; which need not be the case if alternative data are available. For the purpose of the current exercise with limited resources, a union was chosen for illustration where there are reportedly large concentrations of extreme poor households.

Step 3: *Activity calendar* – Identify all laboring activities undertaken in the area and identify the months where concentration of these activities are observed. Such a calendar would also include a crop calendar that identifies month-wise activities undertaken for each crop.

Step 4: *Labor use pattern* – Identify one or more villages and then few clusters of households in that (those) village(s) with concentrations of extreme poor households; and administer a questionnaire to assess the kind of laboring activities household members of various demographic groups are engaged in during various months in a normal year.

Step 5: *Prepare a short list of activities for undertaking VCA* – The listing of activities was prepared under broad heads of self-employment and wage employment¹¹. In addition, activities to facilitate temporary migration of extreme poor to avail opportunities in distant markets were considered. Beyond information on current pattern of employment and remunerative engagement by the poor in the area as revealed in ‘micro plans’ and reported activity-specific labor use patterns, several groups of stakeholders were consulted for identifying the goods and services. The stakeholders included, poor households; business people in the locality; agents in the local market; MFIs and banks engaged in lending operations; NGO/INGO staffs; responsible people in civil administration and elected bodies; and trade and business bodies in nearby towns/upazila headquarters and in district towns.

Step 6: *Undertake the assessment* - Each individual study attempts to track the flow of the goods and services, various agents involved in different tiers, and the value additions at each tier. As mentioned, market assessment gets primacy in most cases, which called for cost & returns for each activity. Once a general picture on distribution of prices across vertically linked tiers was arrived at, further consultation was done on the finding for validation.

It needs repeating that the study was not meant to generate estimates representative of the whole population; and thus, administering questionnaire survey on a pre-determined (representative) sample was not an issue. Yet, numbers had to be obtained; and these are best guesses of persons involved in the respective subject obtained from FGD and bilateral consultations. The same method was also sought to identify meso and community level issues which are perceived to enhance average (expected) net earning and for reducing risk; and to identify activities that are not currently observed but hold potential for pro-poor engagements.

¹¹ Given the nature of SCUK engagement under Shiree/EEP project, instances of wage employment have not been considered in the current exercise.

3. Findings on current practices

This section presents findings on laboring activities currently prevalent in five of the six upazilas in Khulna and Bagerhat districts.¹² The scope of the study allowed consultations with different stakeholders; but generating statistically reliable estimate of population statistic was not feasible. The concluding part of this section draws upon empirical query and from consultations with relevant stakeholders to identify a list of goods & services revealed to be important to extreme poor.

3.1 Observations on Micro Plans

Summary observations from input delivery plans of Prodipan (for Khulna) and CODEC (Bagerhat) are presented in Table 1. In terms of coverage, greater diversity is observed

Table 1
Some of the Important Economic Activities supported by SCUK-Shiree Project

Activity	Dacope	Koyra	Paikgacha	Mongla	Morelganj	Rampal
Coconut nursery					√	
Poultry rearing	√				√	√
Goat rearing	√	√	√	√	√	√
Cow rearing		√			√	√
Crab culture		√				√
Fish culture				√	√	√
Boat				√	√	
Net/fishing					√	√
Van & accessories	√	√	√	√	√	√
Bamboo craft					√	
Carpentry					√	
Sewing machine		√			√	
Tea stall				√	√	√
Shop, grocery						√
Coconut oil making						√
<i>Petty trade in</i>						
Rice		√	√			
Saree/cloth	√	√	√		√	
Vegetable	√	√	√		√	√
Fish				√	√	√
Betel/fruits						√

Note: There were asset transfers for cobbling, handicrafts, saloon, petty trade in firewood and lime, as well. Information compiled in this Table needs continuous updating since new proposals have been approved. For example, crab culture (fattening), fish culture and bamboo craft are now supported in several other upazilas.

Source: Compiled from SCUK-Shiree Input Delivery Plan.

¹² Initial field visits revealed the widespread devastation caused by *Aila*; and most parts of Koyra upazila remained exposed to river/sea water. Since normal economic activities were beyond the means of *Aila*-affected people, no query on VCA of such activities could be undertaken.

in Morelganj and Rampal. One would expect the same in Paikgacha since the three upazilas are **relatively** away from the vagaries of the sea and Aila. It is however possible that the private agencies are well-established in Paikgacha, leaving little room for minor activities (by extreme poor) around fish production and trade. Of the several activities more commonly observed across the southwest, goat rearing, van-pulling, and petty trade in saree/cloth (fabric) and in vegetables are worth noting. There was one instance of crab trade in Koyra, even though one would expect crab culture in cages to surface significantly once life returns to some degree of normalcy.

3.2 Activity Calendar and Labor Use Pattern of EP Households

This section summarizes findings from two sources – (i) activities reported at upazila levels, details of which are presented in Annex 4 and the summary information are presented in Table 2; and (ii) activities reported by individuals in selected clusters of extreme poor households in selected unions in the study area, some aspects of which are summarized in Table 3. It is worth noting that the information is not exhaustive given the limited sample choice, particularly when one compares across upazilas.

Several observations from the two sets are worth noting:

- When it comes to laboring activities, society generally does not view some of the self-employment activities (such as, goat & cow rearing) as worth mentioning. Such perception normally suggests that those activities may at most provide supplementary income.
- Other than some items of trade; catching fish, prawn larva or crab from places close to residence; weaving nets; van-pulling; and bamboo crafts; most other activities essentially engage the extreme poor as laborers under different contractual arrangements. This aspect will be further illustrated in Section 4.
- Competent adult males of EP households cannot afford to sit idle and therefore their work pattern will normally reveal employment round the year; more often, mixing several activities over the year. There is however no unique pattern in mixing these activities (Table 3). Due to close proximity to the sea and the *Sundarban*, some of short period activities, such as, *Golpata* harvest, fishing with a trawler group and honey collection, are sufficiently lucrative compared to regular laboring activities. There may also be an added attraction of these activities in the form of adventures relished by the young people in the community, often perceived essential for attaining adulthood.
- Van pulling is an important part of many of the activity patterns observed. There are some who engage in van-pulling for hardly 10 days a month, to supplement income

from other sources. There are others who are full time during part of the year, abstaining from van-pulling during months of lucrative earnings from harvesting in other districts (Gopalganj is a favorite destination), or gathering honey from Sundarban, or going fishing in the sea.

Table 2
List of Activities Reported in Upazila-level Consultation

Activities	Dacope	Mongla	Morelganj	Paikgacha	Rampal
Wood Logging	x	x	x	x	x
Grocery (incl. vegetable trade)	x	x	x	x	x
Honey Collection	x	x			
Golpata Collection	x				
House Repairing	x	x	x	x	
Wood worker			x		
Catching fish(White fish)	x	x	x	x	
Catch/sell Crab	x	x			x
Catch Prawn Larva (Bagda)	x	x		x	
Earth work	x	x	x		x
Earth work(at Gher)				x	
Van Pulling	x	x	x	x	
Work as Moidservent	x	x	x	x	
Weaving Net	x	x		x	x
Weaving <i>Pati</i>			x		
Weaving <i>Katha</i>			x		
Fishing at Sea	x	x			
Cultivating vegetables	x	x		x	
Cultivating water-melon	x				
Motor-bike service	x				
Repairing van/Cycle	x	x		x	
Day Labor		x		x	x
Cultivating & Paddy harvest		x		x	x
Tea Stall		x		x	x
Fishing, Sundarban/river		x			x
Cleaning water-hyacinth				x	
Work for Jute Cultivation				x	
Work in Tally Making				x	
Work in Brick-Field			x	x	
Singing & Fluting					x
Cloth business					x
Business of Prawn (Bagda)					x
Sell white fish					x
Work in Fish Depot					x
Middlemen (Faria)					x
Bamboo craft				x	x
Sell water					x

Note: See Annex 4 for details on time spread of these activities.
Source: Own compilation based on upazila level consultations.

- Women working in the area contribute much less towards household income.¹³ Mixing domestic help and catching prawn larva (in Falgoon-Kartik) is quite common in Dacope and Mongla. Women labor force has traditionally been more active in Paikgacha – many of them work in shrimp farms (gher) during Jaisthya-Kartik; and providing labor in field crops during Poush – Jaisthya. There are other more enterprising ones, selling saree and other fabric round the year. A good deal of diversity is observed in Rampal as well. Some weave fishing nets (Magh-Falgun, Jaisthya-Aswin), participate in earth work¹⁴, stitch Kanthas during Kartik-Falgun, work in shrimp depots (for processing), and those with specialized skill engage in bamboo crafts. Participation as domestic helper by the very poor women is reported in all upazilas.

Table 3
Selected Activity Pattern of Adult Male Workers, Extreme Poor Households

Activity pattern	Dacope	Mongla	Morelganj	Paikgacha	Rampal
Earth work - Day labor	√	√			
Van pulling – field agriculture/harvest	√	√			√
Van pulling – fishing/larva – day labor	√	√ ¹			√
Van – earth work					√ ⁶
Van pulling	√	√		√	
Van – honey collection		√ ²			
Van – catch prawn larva		√ ³			
Day labor - fishing		√ ⁴			
Fishing in Sundarban – day labor		√ ⁵			
Earth work – fishing (white)				√ ⁶	
Work in Gher (shrimp farm)				√	
Catch shrimp in gher – paddy harvest					√
Net weaving – paddy harvest					√
Net weaving-paddy harvest-earth work					√
Catch white fish				√	
Micro trade					√
Bamboo craft					√

Notes: (1) Van pulling is for fall-back situation when alternative work is not available. Day labor + Van during Ashwin-Chaitra; and Catch white fish + van during Baishakh-Vadro. (2) More earning (associated with higher risk) in honey collection during Falgun-Ashar. (3) Both activities are done round the year. (4) Fishing is done almost every day for few hours. Day labor is done several days a month round the year. (5) Fishing in Sundarban gives more return (Tk. 200/day), which is not possible during two months (Ashar-Srabon) when day labor is sought. (6) Earth work was availed during three months, Poush-Falgun. For Rampal, no earth work during Ashar-Bhadro.

¹³ There are however pockets in the southwest, such as, parts of Rampal and Morelganj, where many women migrate to Dhaka and Chittagong to work in the RMG sector.

¹⁴ With the introduction of 100 days employment program, women participation in earth work has increased in the study area.

3.3 Summary – a list of activities

A comprehensive list of economic activities, reported from various sources and deemed to be ‘pro-poor’, is presented in Table 4. These are grouped under various heads that take into account the following factors:

(i) *micro/household-targeted versus meso-level initiatives*: The three activities listed under meso-level linkages demand promotion of agencies in respective areas. Some activities listed under land or water body lease for agriculture may require supporting groups or organizations rather than individual households.

(ii) *Activities requiring land or water body*: Generally, such activities are not advocated for extreme poor. However, TUP program of Brac set examples of land lease arrangements favoring extreme poor households; and proved to be successful in ensuring sustained benefits for the latter. Several agriculture activities, applicable for coastal poor, are grouped under ‘land/water body lease for agriculture’.

(iii) *Activities perceived to provide supplementary income*: Raising cattle and poultry has been the most frequently sought and negotiated activity for which supports have been provided. One ought to note that these activities are rarely identified by EP households as ‘laboring activities’ since these are undertaken by secondary labor available in the family.

(iv) *‘Petty-trade’* is another broad activity type receiving much attention in MFI lending and NGO supports. Trade in three major products - vegetable, fish and fabric/saree, are considered important in the coastal south.

(v) *Extractions from nature*: Initial encounters with coastal life draw one’s attention to activities that extract resources from nature, such as, honey collection, fishing, harvesting Golpata, catching crabs, and most importantly, catching prawn/shrimp larva. As will be discussed, there are constraints to supporting such activities; and they hold lot less prospects than one gets in the first impression.

(vi) *Transport*: Various modes of transports had traditionally received much attention of initiatives promoting self-employment. Both boats and rickshaw vans occupy important space in this regard. Given inadequate road network and seasonal variation in the quality of those that exist, motorbikes and bi-cycles are often used to carry passengers and goods.

(vii) *Skill-based activities*: Four different types are considered: (1) operating agricultural machinery requires skill, but right to operate is generally ensured through ownership of expensive machines; (2) several non-agriculture activities which are generally carried out on homesteads but require special skills; (3) certain specialized skills are required to run a mechanic/repair shop; but shop-based activities mostly involve self-labor, occasionally

employing hired labor; (4) some activities require larger engagement in terms of both capital and labor – grouped under a common category called ‘factory-based’ activities.¹⁵

Table 4
Short-listing of Activities

Activities/Groups		Activities/Groups		Activities/Groups	
<i>Land/water body lease for agriculture</i>		<i>Extraction from nature</i>		<i>Interventions at meso level/linkages</i>	Y
Coconut nursery		Golpata	x	Nursing/M	
Watermelon	x	Honey collection	x	Domestic helpers/M	
Mangrove nursery		Fire-wood		Security guards/M	
Vegetable gardening		Crab		Spatial linkages, trade	
Pen/fish culture	x	Fishing			
Hogla		Shrimp larva	x	<i>Transport</i>	
Crab culture	x			Vans	X
Floating garden	y	Miking/advertisement		Motorbike service	
				Boat	X
Skill-based Activities					
<i>Cattle & Poultry</i>		<i>Agr machinery</i>		<i>Shop-based</i>	
Cow rearing	x	Engine operator	y	Food/Tea stall	
Duck rearing	y	Threshing machine	y	Repair shop	X
Poultry rearing	y			Tailoring	
Pig rearing	x	<i>Home-based, non-agri</i>			
Goat rearing	x	Sewing machine	y	<i>Factory-based</i>	
		Net making	y	Wood-based products	
<i>Petty Trading</i>		Weaving (Hogla) Pati	x	Tally making	X
Vegetable trade	x	Bamboo craft	x	Coir industry	X
Fish trading	x	Cobbler	x		
Sharee/fabric trading	y	Coconut oil making			

Note: x = those addressed in some details; y = have been briefly discussed.

¹⁵ Activities under (3) are undertaken in places where the produced goods/services are sold at the same premise. In contrast, production/processing activities under (4) are generally performed in premises separate from those where these are sold.

4. Prospects of some selected products

4.1 A note on the approach

VCAs are essentially meant to assess the efficiency of production (processing) and distribution chains through which values are added at different points and the margin between the consumers' price and the producers' price is distributed across various agents. The purpose may be one or both of the two sides of a coin – find ways to reduce intermediaries and reduce the cost of processing and/or transfers so that (i) the goods & services may be more competitive at the end market, and (ii) given a consumer price, greater benefits to the producers of those goods & services are ensured.¹⁶ Thus VCA does not explicitly address the problem faced by development practitioners in choosing projects that are viable for the extreme poor. It only partially does so if either (i) the EP households produce the goods & services with the ability to retain the whole of farm gate price, or (ii) increases in producer prices lead to increased benefit to EP households by way of indirect transmission of prices. For the EP households, the former case arises mostly under self-employment activities, while the latter arises under wage employment.

The central concern of development practitioners is rather the rate of return from investments on assets and potential risks involved in such undertakings – thus, the urge is to assess viability of projects that are being promoted. Asset transfers normally enable EP households to produce goods & services; and there is a need to assess the market(s) where these goods & services will be sold. Such an assessment ought to look into alternative opportunities of labor as well as into competing goods & services and other agencies already engaged in those markets. Thus, all the illustrations presented in this section involve a mix of VCA and market assessment along with opportunities foregone.

In assessing returns to an investment, an entrepreneur relying on hired labor would factor in the opportunity cost his/her time as well as the opportunities foregone by tying funds to a specific project. The former is generally proxied by prevailing market rates of remuneration to comparable labor and the latter is equated with returns to bank deposits considered a risk-free asset. For members of extreme poor households, activities under consideration are essentially promoted (through free transfer of assets by SCUK or any other INGO/NGO) to raise returns to their labor – both in terms of raising its daily return and ensuring longer periods of employment. Thus, net returns presented in most cases do not factor in opportunity costs. In a way, figures thus obtained may be easily compared with alternative earning opportunity of targeted EP members.

4.2 Land lease for agriculture

Leasing land for extreme poor households did not surface in any discussion with SCUK, nor is there a mention of it in Shiree documents. Yet, such transactions are implicit in

¹⁶ If P_c and P_p are respectively the prices paid by consumers and prices received by producers, $M = P_c - P_p$ is the margin. If M is reduced, P_c may be reduced to make the good/service more competitive, or, P_p may be increased to ensure greater benefit to the producers.

many of the project supports that are often mentioned in the context of pro-poor asset transfers. For example, activities such as coconut nursery, watermelon cultivation, mangrove nursery, vegetable gardening, pen/fish culture, crab culture, etc. requires user right over a piece of land or water body over a minimum length of time. Where members of EP households with requisite knowledge of farming practices exist¹⁷, asset transfers may take the form of land lease with supplementary supports.

4.2.1 Watermelon

In Bajua, almost 90 percent people are directly or indirectly engaged with the cultivation and transportation of watermelon. Cultivation of watermelon came of significance since last 3 to 4 years. There are two possible entry points for EP households to benefit from watermelon cultivation in the area – as producers on leased land, and/or in trading of watermelon most of which is marketed in or through Khulna markets. The assessment in this section presents preliminary findings on both production and marketing of watermelon in Bajua.

Table 5
Cost and Return from Watermelon Cultivation (1.5 bigha = 50 decimal)

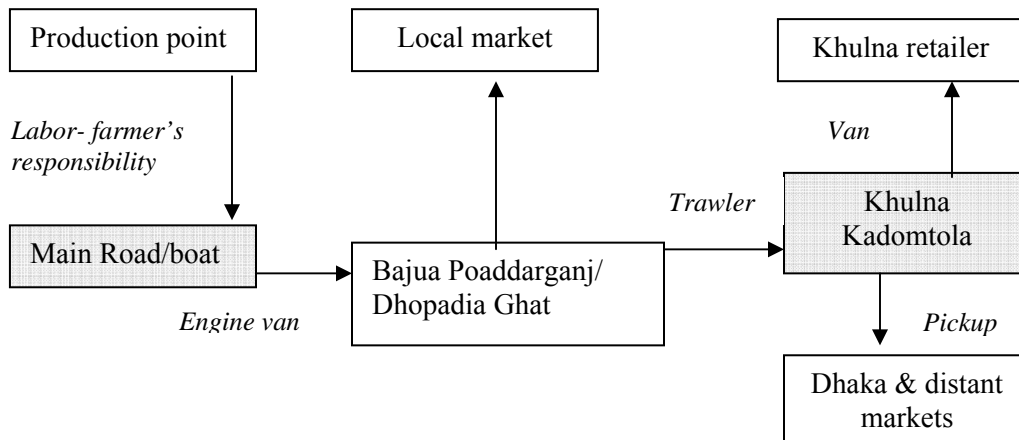
Item		Cost (Taka)
Land lease = Tk. 2000/bigha		3000
Medicine		200
Seed (100g)		1300
Fertilizer	T.S.P (1.5 sack)	2250
	Urea (2 sack)	1200
	Gypsum/potash/khoil	500
Labor	Land preparation	900
	Fertilizer	750
	Harvesting	1000
Transport		200
Total Cost		11300

Size	Number (pcs)	Farm gate Price (Tk/pc)	Revenue (Tk)
Large	400	30	12000
Medium	600	16	9600
Small	400	9	3600
Total Revenue			25200
Net Return (Revenue – Cost)			13,900

Note: Daily wage rate is assumed to be Tk. 150/day even though there are reports of lower wage rates during some seasons. Transportation involves carrying watermelon from fields to nearest road or water routes.

¹⁷ Generally, such instances arise when erstwhile farming households slid below poverty and lost their land either to river erosion or due to forced sale.

Figure 1: Marketing Channel of Watermelon produced in Bajua, Dacope



As shown in Table 5, current farm gate prices of watermelon ensure a return of more than 100 percent within a period of five months. Advances for land lease may however have to be made few months ahead of the sowing season. Hypothetically, one may thus probe into the prospect of engaging EP households in land lease with additional supports for undertaking the cultivation. Since risks are involved in production as well as in marketing, appropriate contracts – if necessary, a tripartite involving the sponsoring NGO – may be worked out to ensure long term sustenance of lease contract and assured returns to EP households beyond wage payments.

Laboring households with basic skills in accounting and the ability to engage with outside world may also be encouraged to engage in the role of ‘Farias’ and ‘Beparis’ who buy a watermelon field and send the produce to the Arats in Khulna (and elsewhere in the country). In such instances local EP households will be replacing, in the value chain, the buyers coming from Khulna, Dhaka, Barisal, Bagerhat, Patuakhali, Noakhali and elsewhere. This may reduce the cost in the chain, make Bajua watermelon more competitive and generate additional employment for Bajua’s EP households. The marketing channels described in Figure 2 show the basic routes and transport modes availed in each route. Table 6 below presents the cost and returns to a Beparis selling Bajua watermelon in Khulna’s arats. The return is almost 20 percent over a period of a week, without adjusting for the opportunity cost of time and other travel/food expenses of the traders involved. The study did not probe into the practice of credit sale at Arats and at farm gates; whose presence may add to the uncertainty in return and thereby increase the risk in investment.

Since EP households are otherwise dependent on laboring activities, any initiative to engage them in self-employed activities needs to cross-check with the opportunities they have to forego. In case of Bajua watermelon, it was found that the timing of trading in watermelon conflicts with earth work where there is risk-less earning of Tk. 1000.

Table 6
Cost and Returns to Watermelon Bepari

Items/Description	Unit	Price (Tk/unit)	quantity	Cost (Taka)
Engine van	Engine van	45	3	135
Ghat toll	Engine van	6	3	18
Trawler (to Khulna)		1000	1	1,000
Labor for unloading	Tk/pc	0.3	1400	420
Purchase price	1400 pcs	25200	1	25,200
Total Cost				26,773
Revenue				
Large	Tk/pc	50	400	19,600
Medium	Tk/pc	18	600	10,584
Small	Tk/pc	11	400	4,312
Total Receipt				34,496
Net Return				7,723

Note: Prices are in Khulna Arat. Each bag carries 8 to 10 big watermelons. Thus, roughly 45 bags will require 3 engine vans. The route covers pacca road nearest to the fields, to Poddarganj/Dhopadia Ghat on engine vans, to Khulna Kadamtala Ghat in Khulna by trawler, unloaded and carried to arats. At arats, the storage time is insignificant if local buyers buy and take them on vans. It is longer in instances of purchases made for carrying watermelon to distant markets (by pickups). Thus, the arat commission is double in case of the latter.

4.2.2 Pen Culture – not a viable option

A ‘Pen’ is defined as “a fixed enclosure in which the bottom is the bed of a water body”. Pen is to be distinguished from the ‘Cage’ which is defined as “an enclosure with bottom and sides of netting or bamboo etc., whether floating at the surface or totally submerged.” In depth consultations with local people and with experts in the field were undertaken to assess the viability of pen or cage culture, where Tilapia is most commonly sought variety. It is understood that Tilapias cannot generally survive as salinity levels 10 ppt or above. If nurturing is done at (say) 9 ppt, it may survive at a maximum of 14 (=9+5) ppt salinity levels. Thus, pen/cage culture of Tilapia is not a feasible option in the coastal belt where rain water ought to be harvested in ponds (sweet water) set aside for drinking. However, during rainy season, for almost six months in a year, some rivers carry sweet water, and if diverted with protection, pen culture may be feasible. The risk is however enormous in the coastal belt; and post-*Aila* apprehension of such risks may have gone up by manifolds.

The above conclusion was borne out by the finding that the remote haat-bazaars of coastal south was being served by Pangas cultured in closed water bodies in the neighborhood of (north) Khulna!

4.2.3 Crab culture

Capturing crab (particularly, the mud crab variety) and culturing them over a period of roughly two weeks is an important activity in the coastal southwest. Almost 90 percent of

these crabs are reported to be exported via Dhaka and contribute towards nation's export earning; and provide supplementary employment and income to many. The activity calendars also reveal that crabs are widely available from nature in Dacope, Mongla (and Koira); while crab culture is practiced in all the six upazilas where SCUK-Shiree program is undertaken.¹⁸ Annexure 7 presents excerpts from Ferdoushi et al (2010), apparently a study done with Sushilan, which reviews existing literature and presents findings from a field survey on the state of crab economy in the southwest region. This sub-section therefore summarizes findings on marketing channel (Figure 2) and costs & returns to crab culture.

Catching crab is a fortnightly activity that goes for few days during full and new moon¹⁹ (twice a month) when crabs are caught from rivers of Sundarbans and nearby *Ghers*. Some may choose to sell these to the depots, but most nurture these crabs in their house pond for two to three weeks where natural conditions support the biological growth ('fattening') of the crabs and there not much additional costs are involved. After fattening crab weight goes just 10-15 gram higher but their gonad becomes filled up which is examined through 'light-checking' process. These are sold to the depots, who act on behalf of exporters/buyers in Dhaka and few other major urban centers retaining a margin or act as independent marketing agent in the chain bearing risk as well.²⁰

Several alternative livelihoods for the extreme poor are associated with crab catching/fishing, crab culture and crab-trading: (i) spend twice a month in the rivers of Sundarban, except during two months of extremely unfriendly weather, to catch/fish crabs that are sold to the depot (or, raised on own ponds/hatchery); (ii) buy baby crabs without gonad, culture those in small water bodies (pen or cage culture) for two to three weeks, and sell those to the depot; and (iii) go around the shores to collect crabs from individual catchers and sell those to the depot. Since the activities beyond the local depot normally involve bigger trading partners and require large amount of finance, those are left out of the discussion.

Sushilan tried with a group of ten households who jointly leased in 10 decimals of water body. After initial hiccups associated with group activities and a consequent high mortality rates, the group now earns a net Tk. 2,500 (approx.) in each cycle. Drawing upon some of their observations and information collected independently, the cost and returns to crab culture is summarized in Table 7. The findings indicate the return per cycle to be higher than that reported. Allowing for an initial investment on land lease and land improvement recovered over periods of 1 and 2 years respectively, average monthly return to recurrent capital is estimated to be 60 percent or more. An important aspect to note is absence of labor cost in realizing such high returns. A commercial venture hiring labor to do the daily chores will fail under the current price regime; and sharing of labor

¹⁸ Crab culture has the least presence in Morelganj.

¹⁹ In local language, it is called "goane" – times of very high (or low) tides. From 16th may, 2010; crabs under 130 g is totally banned by government. But this is rarely paid heed to in the market - people continue to sell F3 (mainly 120g-149g).

²⁰ Destinations include Khulna, Jessore, and Kolkata. Those to Dhaka largely end up in Chinese and other East and Southeast Asian markets.

amongst EP households can ensure supplementary income to the participating households.

Figure 2
Marketing Chain of Crab at Coastal region

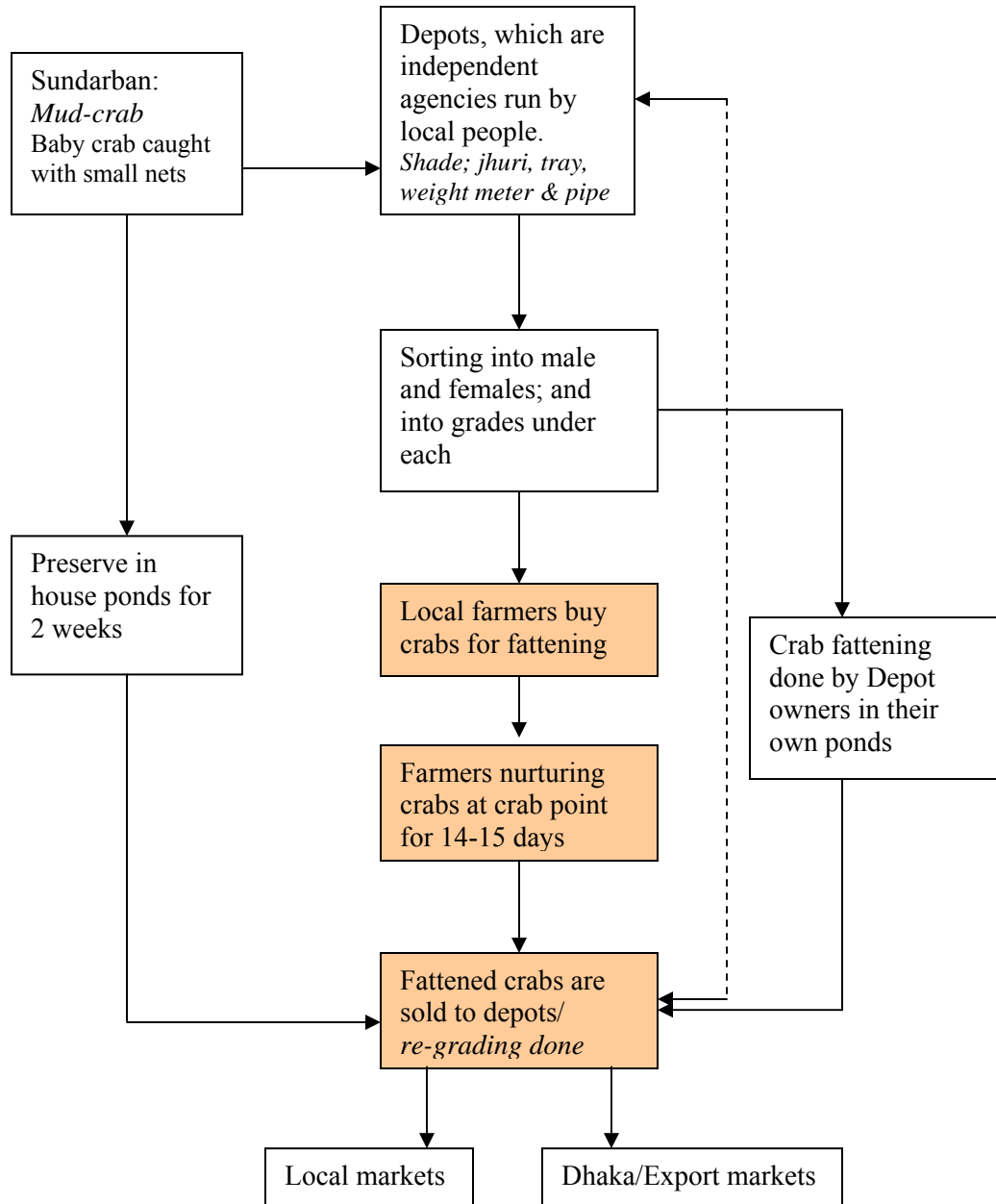


Table 7
Returns from Crabs Culture with Group Effort, per cycle (2 times a month)

		Input			Output		
		Q-kg	P-Tk/kg	Cost	Q-kg	P-Tk/kg	Revenue
Female	KS1 (180) to F1	10.25	250	2562.5	8.2	400	3280
	KS3 (130-179) to F2/F3	83.7	70	5859	66.96	160	10714
Male to	XXLP (500)				1.712	400	684.8
	XLP (400 gm)	10.7	70	749	1.712	350	599.2
	LP (300 gm)				1.712	300	513.6
	MPX (250 gm)				1.712	200	342.4
	SM (200 gm)				1.712	190	325.28
	Total crab inputs			9170.5			
Other costs/ inputs	Land lease			158			
	Feed for crab fattening			2650			
	Transport cost			100			
	Land/pond improvement			450			
	Gross Cost/Revenue			12528			16459

Note:

Q = quantity; P = Price; Tk = Bangladesh Taka; Kg = kilogramme.

Even though there are reports of marginal weight gain during the 2 weeks period of crab culture, we assume zero weight gain. An average mortality of 15 percent is assumed.

Male crabs may grow at different paces and their grades are determined only at the stage of selling. We assume the input to be equally distributed to all five grades, which may vary.

Land lease values vary across villages. We assume a case where it is Tk. 10,000 per bigha (33 decimals); and assume an annualized interest payment of 25 percent. The cost is distributed to 24 cycles in a year.

10 kg feed per day is required for first five days; and 7 kg/day during the last 8 days. The cost of feed is Tk. 22.50/kg.

In a recent Sushilan venture of similar nature, around Tk. 18,000 had to be spent on excavation, bank improvement, pata, jhuri, etc. It is assumed that the investment will last for two years; thus, the cost is distributed between 48 cycles.

No cost is added on account labour to guard the pond. It is assumed that members of ten households share labour required for feeding the crabs, guard the pond and for marketing.

4.3 Trading in Goods

Petty trading has been an important self-employment activity that attracted microcredit as well as the attention of (financial) asset transfer programs. Field visits in the six upazilas in the southwest and consultations with beneficiaries of the SCUK-Shiree project revealed three major product areas where such self-employment activities are significant. These are, as noted in Table 4, are vegetables, fish and trading in saree/fabric. We recognized that irrespective of program interventions, such activities prevailed and agents at the retailer levels (from whom the beneficiary groups are identified) are linked with traders/shopkeepers/wholesalers in larger markets in the neighborhood (or away), normally located in urban centers. Thus, the very first attempt was to trace the spatial flows of these goods in the area, which was possible by interviewing stakeholders in the

Table 8
Summary Information on Commodity Flows from Khulna Wholesale Markets

Item	Reference market	Source market	Destination market	Price margins	Remarks
Saree	Railway market	Narsingdi-Baburhat, Shajahadpur, Tangail, Flying parties	Mostly Khulna. To Bagerhat, Satkhira, Mongla as well	Tk 30 -40 margin	Bring by Truck. Partial credit to known customers. Mostly cotton sarees. Shiuli, Parag, Pakiza, Jonny and Sadia: 200-650.
Local onion	Barobazar	Khushtia, Pangsha, Rajbari	Kushkhali, Patharghata, Morelganj, Bagerhat, Satkhira, Comilla	Tk.030-0.50 per kg	Parties bring by truck; and buyers also pay for their transports. Claim of a maximum Tk.1 margin/kg
Indian onion		India: Sona masjid, Benapole, Vomra			
Garlic	Barobazar	Natore	As above	As above	
Imp Garlic		China, India	As above	As above	
Dom Ginger	Barobazar	Jaldhaka, Manikganj, Demra	As above	Tk. 0.50-0.70/kg	
Indian ginger	Barobazar	Border	As above		
Turmeric	Barobazar	Patkelghata, Kapilmuni, Dashuria, Kaliganj (Jessore), Chittagong belt	As above	Tk. 0.40-0.50/kg	Previously via Ghat paying a toll of Tk. 1.50 per bag. Labor tagged to arats, Tk. 6 per bag (<=50kg) and Tk. 10 per bag (50-80 kg). Now by road transport.
Potato	Barobazar	Shantahar, Bogra, Rangpur, Bhairab	As above	Tk. 0.30 per kg	
Sea fish	Gallamari	Patharghata			
Pangas	Local pen culture	Mymensingh, Satkhira, Batiaghata	Different markets in Khulna and Bagerhat	Tk. 100 margin on Tk. 3100 ($\approx 3\%$)	While retailers buy, 44kg = 1 md; and sell at 40 kg = 1 md.
Vegetable-Lau, bitter gourd, hybrid cucumber, beans	Sonadanga truck terminal	Dumuria, Keshabpur, KrishnaNagar, Batiaghata – by Vans during days. Huts in neighboring areas; Growers in nearby areas in morning; Chuadanga, Iswardi, Veramara – train at nights	Dhaka, Madaripur, Barisal, Morelganj, Bagerhat;	Tk. 16 per maund for unripe; Tk. 100 per 1000 pieces of ripe fruits	Local, by vans; distant by trains

Source: Own compilation.

terminal as well as in the immediate source markets. For example, a vendor saree trader/retailer at the village level (say, Paikgacha or Koira) has a counterpart in the saree shops/traders in Tala or in Khulna. Similarly, a fish or vegetable retailer in Rampal had to procure the fish/vegetable from markets elsewhere (in Khulna). With end markets located in the six upazilas, every attempt was made to locate the source markets; and search for the latter was made by visiting Bagerhat market by the river bank, three markets in Khulna (Baro Bazar in the old part by the river Bhairab, Gallamari, Sandhyo Bazar, the Bazaar outside the New Market, and the Rupsha market), and central markets in Tala and Mongla were visited. Summary information in Table 8 reveal insights gained from the source markets, which often act as a hub connected with several more specialized hubs. The information also reveals that markets in Khulna city continue to act as the hub in vegetables and fish (Pangas) markets.

4.3.1 Trade in Vegetable and Fish

As an illustration, daily business of a vendor in Rampal local bazaar is considered and the returns to his engagement are summarized in Table 9. It is just a calculation of one vendor who purchases vegetables from Khulna and sell them in Rampal Local Bazar. The person travels to Khulna three (or more) times a week to procure vegetables that he sells in local Rampal market. He uses his bicycle to travel for two and a quarter hours to reach Khulna Truck Terminal market by 6:15 in the morning. The purchase requires hardly 45 minutes; and he bikes back to Rampal by 9:15 am. Without accounting for his labor and travel time, an average purchase of Tk. 1,340 gives him a return of Tk. 590. Frequency of such trips depends on market situation. There are days when the grocery is sold out in one market day; and at times, he needs to carry the old stuff into the following day and concede by lowering sell price. The average monthly earning from the engagement is around Tk. 6,000.

Table 9
Cash Requirement and Returns to Petty Trades in Vegetables

Name of Vegetables	Amount (kg)	Buying price (Tk/kg)	Sell price Tk/kg	Total Expenses, Tk	Total Receipt, Tk
Kakrol	20	18	25	360	500
Hog-plum/Amra	15	12	20	180	300
Green Chilli	10	42	60	420	600
Patal	15	12	20	180	300
Brinjal	10	20	23	200	230
Total				1340	1930

Note: No cost is added on account of travel, food expenses in Khulna and transportation of cargo.
Source: Own compilation.

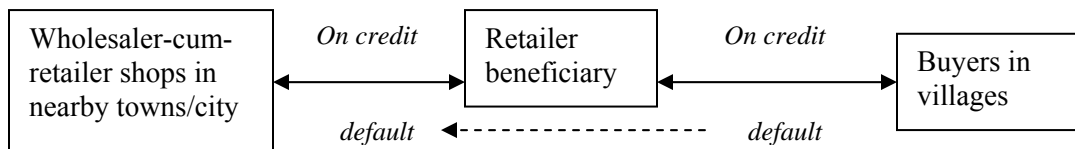
We also looked into trade in fish. A trader in Rampal market bought 10 maunds of Pangas and 6 maunds of Tilapia fish from Khulna market at a price of respectively Tk. 3100 and Tk. 3200 per maund. These were sold at Tk. 3800 per maund (for Pangas) and Tk. 4000 per maund in different haats in the area. Transport cost was Tk. 100/md for a pick-up and additional ice had to be bought from the area to sell two such procurements

over a period of one week. Thus, net return was Tk. 7000+ for the period, which is equivalent to a weekly return of around 15% on cash capital.

4.3.2 Trade in Sharee/fabric

There have been several transfers of fund to beneficiaries on account of undertaking retailer business in saree and other fabric materials²¹. Traditionally, the said retailing activity is run on credit at both ends of the retailer. The latter gets the merchandise on partial credit from the wholesalers/shop-keepers and sells those to clients on credit; and the activity is undertaken by a relatively ‘low-caste’ group with enough ‘nuisance-creating’ strength (such as, the *Hizrās*) to ensure repayment at the client ends. Our probing into repayments, with the wholesalers in several markets, gave the impression of declining trust because of major defaults by village vendors. At the same time, we understand that the free transfers of funds for retailing by SCUK is known to most other villagers, who therefore feel less obliged to pay for the saree they reportedly bought from the beneficiary. Thus, there is a major problem with defaults that the retail business is now facing.²² In addition, the trade generally faces undercutting by unfair competitors who cheat on type and size of saree or fabric materials. Since the practice is passed on down the marketing chain, the reaction in the form of non-repayment is more likely (and justified!) up the chain originating from the clients at the bottom.

Figure 3
Marketing Chain of Saree/Fabric Retailing



4.4 Cattle and Poultry rearing

4.4.1 Cow Rearing

Prospect of an economic activity is often revealed by the presence or absence of activities that are forward or backwardly linked with the one under study. In case of cow rearing, presence of Aarong or Milk Vita Chilling plant is one such indication. Anticipated markets of two interlinked products, milk and meat, influence the investment decision on cow rearing. Of the three varieties of cow sought for such investments, Frizium variety is chosen for milk, Shahial is chosen for meat, and mixed breed is chosen for both meat and

²¹ On papers, the return to saree trading appears to be lucrative. For example, a Shiuli saree bought in Khulna at a price of Tk. 200 per piece can be sold at Tk. 300 or more in a village – 50% margin!

²² Most positive reports at project level are based on sales, not sale proceeds actually received.

milk²³. While there is no data to draw firm inference, there are reasons to believe that uncertainties associated with the two markets (reflected in deviations of prices from trend path) are uncorrelated. Thus, a risk-averse choice is for a mixed breed, which will ensure a minimum meat price in case the milk market collapses and vice versa.

Cow rearing is not always a lucrative venture in the southwest for several reasons. These are: (i) There is little room for fodder production in a landscape shaped by shrimp cultivation and saline water. Thus, cattle feed has to be procured from the market, which makes the venture quite expensive. (ii) Saline environment reduces the milk productivity. It is also alleged to raise the probability of death. (iii) With dwindling social fabric, allegedly caused by 'commercialization' associated with 'Gher culture', risk of theft is high. There are some parts of the project area, such as, Kashimnagar bazaar, Kapilmuni, parts of Paikgacha, and large parts of Morelganj, where the landscape still permits rearing cows. Brac/Aarong's chilling plant in the fringe of Paikgacha clearly tells of the prospect. In the presence of such actors on the forward-linked market, it is worth finding the niche in consultation with the actor to assure marketing of milk. Our preliminary calculations show very high returns in the hinterland of the chilling plant provided there is no death or theft. However, the size of capital requirement is large (Tk. 30,000 plus the expenses on account of a year's feed). Safekeeping of such asset is unlikely to be assured in an EP household. Under the circumstance, the only alternative is to provide support to several EP households whose female members may oversee the upkeep of the cattle, and it is worth experimenting with.

In pockets where sweet water is available and field is available to grow Napier grass, rearing local variety of cow would require less investment and fetch a high return. A case from Sushilan in Barguna area may be cited. A cow cost Tk. 8,500 was fed with Napier grass and the usual left-over from household meals. In 8 months time, she gave birth to a calf and could fetch a market value of Tk. 15,000 because of the milk she could now deliver. It is important to note that the weekly return on capital is hardly 3 percent!

4.4.2 Duck rearing

Raising poultries, including ducks, had been a common practice in the southern villages. With increasing encroachment of the shrimp cultivation, often reaching the doorsteps of human habitats, and salinity in the air, it is no more so. Most nutritious sources of food for ducks are the sweet water ponds and rivers, where snails and clams can be found. This has however declined substantially with the encroachment of saline water and use of land and water bodies for shrimp cultivation. With the loss in cheap sources of duck feed, rearing ducks is feasible only in protected environment and relying upon market sources of costly feed; and such ventures are beyond the reach of EP households. We talked at length with a woman of well-off family in a southern village, who shared experience in

²³ It is reported that the Frizium variety gives 18-20 liters milk per day; mixed breed gives 12-14 liter/day; and Shahial variety gives 10-12 liter/day. After delivery, a cow normally gives milk for 11 consecutive months. And a female calf reaches adulthood to give birth at the age of 2 years. It is safe to assume one birth per year.

raising Khaki Campbell and several other breeds that eventually had to be closed. Some of her lessons, shared by others we talked to, are summarized below:

- Almost 40 to 50% of foreign ducks die.
- Locally born and raised ducks (even if it is of foreign origin) have greater probability of survival.
- Normal expectation from Khaki Campbell is 80%+ rate of egg production. However, only 50 – 55 % could be reached due to increasing salinity (and inadequate feed).
- Feed price is extremely high and uncertain.

There is however one good news. It is reported that there are small-sized river clams in the saline water of southern rivers; and these are good for locally born ducks. The very poor who live by the side of the rivers can raise some ducks without having to spend much on feed or on labor.

4.4.3 Goat rearing

In the presence of free natural fodder in the form of plants, including grass, goat rearing is an attractive proposition demanding only supervisory labor. Of all the places covered under the SCUK-Shiree project, Kapilmuni appeared to have the greatest potential for goat rearing. A package of 2 goats is considered for evaluation; and the basic estimates on costs & returns are summarized in Table 10. Looking at the figures, one may get the impression that poverty can be reduced merely by handing out a package of (say) 5 goats to each EP household. There are however several constraining factors, that limit the prospect and some such factors increase the risk. The foremost is the availability of fodder – a rare item in coastal south with high level of salinity. Moreover, land where such fodder is grown may not be accessible to EP households.²⁴ A second important constraint is the availability of labor within the EP family who may look after the goats and particularly the kids when they come in large numbers. As in the case of pigs, this appears to be an important binding constraint that one ought to account for while transferring assets. A third factor is attacks of disease/plague, which is not uncommon in Bangladesh²⁵. Sometimes, meso-level investments to ensure healthy environment for the cattle may need to precede micro-level transfers of cattle assets.

Attempts were made to assess if tampering with the value chain in marketing of goats can increase the income to the poor households. Since it is a two-way traffic – buying at one time to sell at another time – the implications are less important. More importantly, major markets of goats are found to be located at Keshabpur (Jessore), Chuknagar (Khulna), Manirampur (Jessore), Atharo Mile (Khulna/Satkhira). There are reasons to believe that the major consumer market is across the border, which also help keep the prices up.

²⁴ Meso level initiative, such as, growing Napier grass on land leased in by a collective (or, an NGO) for providing supports to cattle reared by EP household is can possibly circumvent the problem.

²⁵ One could add a fourth, difficulties in getting female goats, particularly in project areas where several programs often engage on the same item creating an artificial crisis.

Table 10
Costs & Returns to Goat Rearing, package of 2 goats, Kapilmuni

Description	Quantity	Price	Value
Purchase price of 2 goats	2	2000	4000
Grained food (Kg)*	140	10	1400
Immunizing kids	8	32	256
(Total cash cost)			(5656)
Supervision labor	?	?	?
Value of space for cattle-living	?	?	?
Selling Kids	4	1800	7200
Goats retained	2	1800	3600
Retained Kids	4	1800	7200
Net Cash Return (Tk)			1544
Value of assets retained (Tk)			10800

Note: * During one month preceding delivery and one month immediately following delivery, a mother goat has to be fed 300 gms of grained food each day. The latter is equivalent to 36 kg/goat. During rest of the year, total requirement is around 33 kg/goat. We consider the lower range of prices reported in the area; and consider its market value to decline with each delivery.

4.4.4 Pig Rearing

The illustration on goat rearing applies to pigs; and is not repeated here. In stead, an example is provided on pig fattening, which is more manageable by the Rishi families who are scattered through out the southwest and combine bamboo craft activities with home-based pig rearing or fattening. The estimates provided in Table 11 suggest of relatively low return (Tk. 446 per month) if one includes food cost in the original investment. However, very few spend required amount on pig rearing and end up selling at an early age.

Table 11
Cost & Returns on Pig Fattening

Item	Cost (BDT)
Small Pig	1750
Food (polis)	10000
Medicine	200
Total Cost	11950
Value of fattened pig after 1 year weighing 130 kg	$130 \times 170 = 22,100$
Net return (in 1 year)	10150

Unlike goats, rearing pigs do not require open fodder land. A closed pen, sufficiently big to house several pigs, holds good prospect of ensuring high returns to families joining a cooperative to look after the pigs. It is worth looking into the possibility of leasing land

for such purpose and forming groups of EP households, even amongst Muslim community, with a commercial motive.

4.5 Transport Activities

4.5.1 Rickshaw Vans/Van Pulling

It is one of the most popular items since the early days of microfinance. With increased connectivity within the domestic economy and a growth in labor (as well as cargo) mobility that outpaces the growth in population, demand for services rendered by vans appear to perennially remain unsaturated.

Demand for an asset called ‘rickshaw vans’ may arise for different reasons, and it gets reflected in the various modalities of running/operating vans one observes in the real world. Five such cases are noted below:

1. Van owner operates it – part of the year, uses for services pertaining to own farm activities; rest of the year, earn by running it on the road. Supplementary labor activities/ supplementary income.
2. Van owner operates it but mostly for own purpose (like self-driven private car)
3. Van owner himself is a full time laborer running it on the road round the year
4. Van owner hires a van puller, primarily for own activities: and the van driver is accountable to van owner for other receipts from transportation. Owner pays the van driver round the year but at variable rates.
5. Van owner rents out the van to the van driver who may then use it for any purpose he wants to.

The above setting makes standard calculation of returns difficult. It is important to appreciate the fact that desire to possess vans have lot more similarity with the desire to own private cars in urban centers. A driver wants to own a car that will assure him employment through car rental market and (at times) rental income; there are private car owners who use their cars at times as well as rent those out through agencies; and there are many who own cars for private use only. With increasing ‘urbanization’ of rural areas, rickshaw vans are the best substitutes in those areas, as are the auto-rickshaws in small towns.

In assessing the desirability of giving a van to an EP household, one needs to account for several aspects. These are mentioned below with figures on daily returns to labor estimated from Mongla area.

- Because of multiple uses of vans from the perspective of ownership, it is difficult to ensure market segmentation; and ownership may change hands with no trace of being caught.
- For a self-driven van, total annual earning is around Tk. 5000 per month with an annual expense of Tk. 4600 on a second-hand van assumed to last for three years. A new van will cost roughly Tk. 5000 more; and if sold in the second hand market after three years, would involve an annual additional cost (compared to a

second hand) of Tk. 600 (approx)²⁶. Generally, a new van has higher probability of attracting passengers and cargo – thus earn additional income so that the returns may be marginally higher on a new van. Compared to a daily income of about Tk. 175 from a self-driven van, a van driver employed by a van owner (say, a restaurant requiring regular supply of drinking water, or, a shrimp depot owner, or a factory in need of regular cargo transportation), gets a daily wage of Tk. 80 in addition to two meals a day.

- In Mongla bazaar, four months during the shrimp season fetch high daily earning (Tk. 350 to Tk. 400). Similarly, van drivers in Mongal jetty area (on the mainland side) earn more when ships are in the jetty and there is loading and/or unloading.
- Major competition on supply of services is from the engine vans, locally called Tomtommy or Nascimon.
- Van drivers, be they owners, tenant or wage workers, have flexibility to switch jobs. Thus, during seasons of better alternative opportunities, many of them avail those.
- Total supply of vans (stocks) in a market influence the return, as one would expect. Returns are reported to have been dampened after the Sidr when many development agencies flooded the market with vans. Many of these are built in Gallamari area in Khulna, where parts of the market-mediated benefits transferred.

4.5.2 Boats

In areas where transportation depends critically on boats, one would find analogy with the vans on roads. In addition to the observations made for rickshaw vans, and the fact that returns to both vans and boats are location-specific, boats have an added use in high-return activities around resource extractions from Sundarban and the sea. In most such cases, gangs of fishermen-cum-boatmen operate under a ‘Sadari’ system of labor contract for a ‘Mahajan’. In such arrangements, it is quite often difficult to ensure adequate returns from ownership of boats. Since such arrangements prevail in most cases of resource extractions from nature – golpata harvest, honey collection, sea-fishing, etc. – mere transfer of boats (along with nets) may fail to make major dents into the system that perpetuates poverty.

Calculation of costs & returns are not attempted here since those are specific to sizes of boats, which in turn, determine the kind of activities the boats may be used for. Moreover, boats for ferrying passengers or carrying cargoes are stand-alone income-earning assets. In contrast, fishing would require nets – different kinds for different seasons. As in the case of vans, one can procure a new boat of xx ft. length at Tk. 10,500, while a second-hand one will cost less than Tk. 5000 (including initial repairs). There are places where a boat may fetch Tk. 400 earning per day (which includes the payment for

²⁶ A new van bought from Mongal bazaar is approx Tk. 7500 to Tk. 8000; and allegedly use poor-quality frames. Those ordered from Gallamari in Khulna, believed to use ‘original’/high quality frames, require Tk. 8500. It is important to note that the saline environment corrode the metals used in the frame and more frequent changes are called for.

the boatmen) during the peak season, but remaining idle during rest of the year. In other places, the operation period may be longer with varying returns.

It is important to note that there no unique value chain analysis to be made with regards to usage of boats.

4.6 Extractions from nature

4.6.1 Honey Collection from Sundarban

The season of honey collection starts from the Bangla month of 18 Chaitra to 30 Jaistha. People go to collect honey in groups, each consisting of 7-8 persons, who are called Bawali in local term and they work under a Mahajon The Mohajon has to pay the license fee of Tk.500 to forest office for each person for each trip, normally extending to one month (targeting one Goan); and a group may at most make two trips in a season (year). During their trip they (the Bawalis) have to bear the cost of their own food which ranges from Tk.50-60. Generally they collect 10-12 maund of honey in a trip which value Tk.10,000 per mound at local market. The collected honey is divided equally among the Bawali, Boatman and Mohajon. However, the Bawali and the Boatman are compelled to sell their portion of honey to the Mahajon at prices lower than those prevailing in the markets. Above the Mahajans are the wholesalers of these areas, who purchase the honey at Tk. 300-400 per kg. In case one wants to sell the honey to markets in Khulna and Jessore, additional cost on account of transportation by bus (Tk.100-150 per maund) has to be borne.

4.6.2 Golpata Collection from Sundarban

Golpata collection season begins during the Bengali month of *Agrahayan* and lasts till the month of *Magh*. During this period, a single group gets two trips where a trip lasts one month. Golpata is collected by the local people who are also known as *Bawali*. They go to Sundarbans in groups of 12-15 under a *Mahajan*. The *Mahajan* pays them Tk.150-200 per day during a trip, though the Boatman gets Tk.8000-10000 for a single trip. Moreover, they are also provided with meals during the whole trip. Sometimes the *Mahajan* has own boats. Otherwise he has to pay Tk. 5000-6000 for renting boats. The *Mahajan* has to collect legal permission from the Forest Authority; the permission fee depends on the size of the boat. The present rate is Tk. 975 for every 100 maund size²⁷. Thus, a 500 maund size boat have to pay Tk.4875. Generally the boat size ranges from 500 to 800 maunds. Besides, payment needs to be made to the forest supervisor (Locally known as Co-Officer) in the range of Tk.1500-1600 as bribe money.

There are additional costs to be borne by Mahajans undertaking golpata harvest. For example, tolls have to be paid to the forest pirates/bandits (locally known as *Bon Dakat*) - around Tk. 5000-7000 per trip (it depends upon size of the boat). Generally, a group of

²⁷ Here size is defined in terms of the weight of the golpata the boat can carry. In practice, load carried by a boat is more than that recorded for the purpose of paying license fee.

12 persons with 80 mound size boat can collect 80 Caun Golpata in a single trip²⁸, which is worth Tk. 20,0000.

Since such engagements are not meant for an EP household, no additional presentation is made on the value chain linking to end market.

4.7 Skill-based activities

4.7.1 Home-based Bamboo Craft

Traditionally bamboo crafts are the specialty of members of Rishi families, scheduled caste Hindus (or converted Christians), who continue to transfer the skill from one to the next generation. Rishi Paras, where such families live in clusters, exist in almost all major localities, often several of them in the same upazila. Demand for bamboo-based products had always been there – for fencing, houses, household storage and utensils, and for traditional fish traps. With the expansion of the fishery activities in the coastal area, demand for the products increased over time. But the pace of expansion slowed down since 1996 when use of plastic drums was made mandatory for transportation to fish processing plants; and when extensive use of cork-sets began. Information contained in this section draws from consultations and field queries in several places, including Paikgacha, Bajua in Dacope, Rampal, Morelganj, Mongla Bazaar, etc.

There are numerous products made out of bamboo:

Kula, Chalni/Chalon, fuler shaji (flower basket), Jhuri, Dala/baskets, Chatai, Kharoi, Fish-traps (Kharoi/Foloy), Cage for poultry, etc. Even within a single commodity type, there are numerous size categories meant for different usages. For example, there are small baskets used for carrying earth (used by earth workers); and there is another shade of small for carrying vegetables and/or fish. There are large baskets for carrying storing cow-dung and the bigger ones for storing paddy.

There are many users as well, including, households; rice mills, faria (who buys fish from the Ghers and sells those to Depots); gher-owners, and fishermen.

Presence of multiple products and end users do not permit a unique representation of marketing channel and therefore a unique value chain analysis. At a general level, location/presence of three agents defines the nature of the market and the approach to value chain analysis:

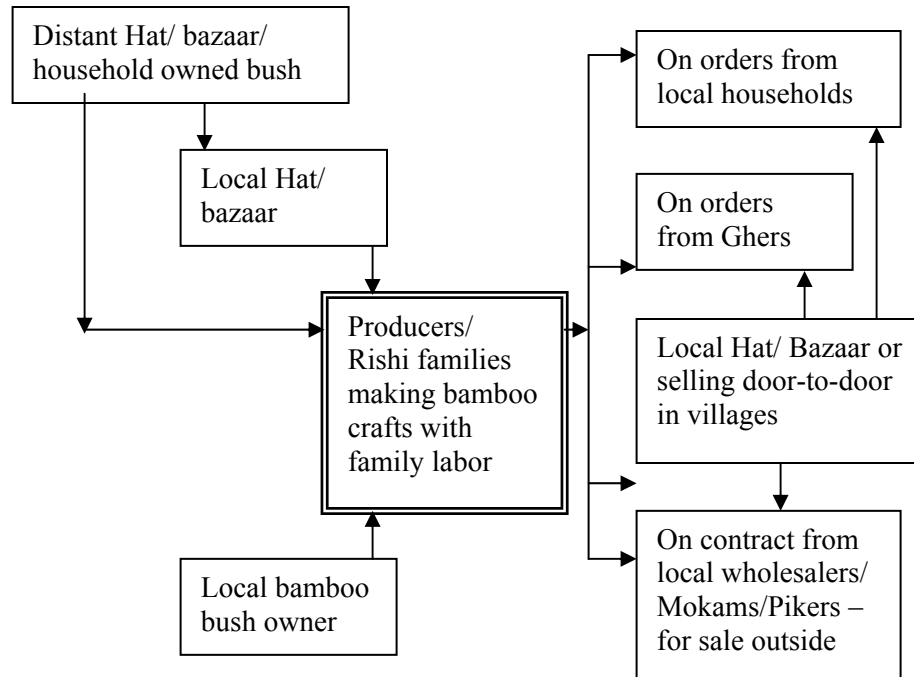
- end users (consumers, dominated by Gher activities)
- processor/laborer/Rishi families (skill labor, historically determined with which there is currently a mis-match)
- Bamboo bushes (primary input, sources are shifting towards north, ironically away from the location of consumers and due to expansion of the Gher cultivation)

Thus, there are three broad types of marketing arrangements:

²⁸ 1 caun = 16 pons = 16x80 pieces = 10 maunds (approx).

1. Rishi families live close to the end users, but away from the bamboo sources;
2. Rishi families live close to bamboo sources, but away from major markets of their products.
3. Both bamboo sources and consumer markets are located in close proximity to the residence of Rishi families.

Figure 4
Sources of Inputs and Market Outlets in Bamboo Crafts



The third case of having all three agents in the same location is not considered here since the focus is on coastal belt. For the same reason, we are more interested about the prospects for the Rishi families located in the south (case 1: close to end users and away from the source). However, they clearly compete with imports of products from elsewhere and therefore one may look into the second marketing arrangement as well.

The basic approach to calculating returns from bamboo craft is by estimating returns to labor. Thus, a cost of procuring a piece of bamboo has to be estimated, which includes the price paid - to seller if procured from market and to owner of the bamboo bush if bought from rural household. In the latter case, one ought to account for the labor used for the purpose of traveling and harvesting and the cost of transporting the bamboos. Once brought home, the bamboo poles are submerged in water before there are made into thin strips for weaving. The main act of weaving into usable products (bamboo crafts) comes next, which is followed by selling them in markets or handing those over to the customers/traders who placed the orders.

For the purpose of illustration, bamboo craft activity in Bajua is presented here. There are about 30 families engaged with the activity. Quality bamboo is not locally available. Generally, these are purchased from Vorosapur, Gobindapur, Chulkhati, Foyla, Khanpur, and Bagerhat. There is a local market of bamboo in Bajua; and there are dealers who sell bamboo if anyone places orders. During haat days, many wholesalers bring in their supplies and prices offered by them are normally higher than that paid for direct procurement from the orchard by Tk. 15 to 20. Average prices at haat in Kailashganj are Tk. 120 for large, Tk. 80-90 for medium and Tk. 70 for the small ones. One has to pay an additional 10% on account of toll/tax and for transport.

Table 12
Input-Output Relations in Bamboo Crafts; Harintana, Kailashganj, Dacope

Material	No. of pieces from one large bamboo	Output per labor day	Price (Taka/unit)
Basket for soil carrying, S	5	5	30-35
Basket for cow dung, L	3.5	4.5	30-35
Basket for vegetables/fish, S	10	8	20-25
Basket for paddy storing, L	0.25	0.5	500
Kharoi	9	9	25
Kula	12	12	22
Chalon	11	11	20-25
Flower basket (Shajee)	15	15	4-5
Cage for poultry (6'D, 1'H)	0.33	0.67	500
Cage for duck keeping	0.25	2.67	60

Note: S=Small; L=Large.

Source: Own consultations.

Table 12 presents the basic information on raw material-labor-output relations for different types of bamboo products. One may consider a composite good, depending on the market a particular production group serves, and undertake a cost & returns analysis. One may however note that the revenue earned from a day's labor, once adjusted for all other costs, is usually lower than the prevailing daily wage rate.

In areas where bamboo craft is still able to earn livelihood, the producers often prefer to operate in small segmented markets rather than going for long term arrangement with a marketing agent tied to distant/national markets. Normally prices are lower by Tk. 5-7, compared to local market, when dealers order for small basket, kharoi, kuala, chalon, cage for hen & duck keeping etc. Such difference is Tk. 1-2 in case of fuler shaji (flower basket); and as high as Tk. 50-60 for large baskets used for storing paddy and for cage to store poultry. There are other areas where balance is sought to serve both markets in order to ensure employment round the year. In Bajua, as in many other coastal areas of southwest, local production of bamboos is becoming rare due to salinity and encroachment of shrimp cultivation. This has raised the cost of procuring bamboos and

timely availability may not always be ensured through markets. With increasing uncertainty, many members of the traditional bamboo craft producing community (Rishi families) are moving out of the profession. Some in Bajua have already engaged with band party (perform at marriage ceremony), van pulling, shoe repairing, etc. There are others who sought employment with a bamboo workshop (situated at Bajua main town). In those workshops, they are mainly engaged with *shala* (upper layer) clearing. One person can clear *shala* of two bamboos. From one large bamboo, they receive Tk. 400-500. Women are mainly engaged with *bana* preparation. Women receive only Tk. 5-8 for 1.5 ft of bana preparation; and the local market price of it is Tk. 45 (wholesale) & Tk. 60 (at retail).

4.7.2 Home-based Pati/Mat Weaving from Hogla leaves (Ambaria, Morelganj)

There are 100 families in Ambaria Dakkhin Para. Input procurement is jointly organized by 15 families. If a family borrows Hogla leaves to produce mats, it is done on a share basis – one-third is paid in kind to the supplier of hogla leaves. Hogla leaves are procured from low-lying areas around the road from Bagerhat to Pirojpur. Production of Hogla requires tides and sweet water.

The usual practice is buy the right to harvest Hogla on a piece of land. The price for 1 bigha (66 decimals) of land varies between Tk. 10 to 20 thousand, depending on the quality and density. An average of Tk. 15,000 is assumed for cost assessment.

Labor is hired to harvest (which is done three times) and to dry the leaves. Harvest is done during Jaisthya to Ashwin months. 2 days x 5 persons = 10 person days on each occasion. Thus, a total of 30 person days of labor is required to harvest 66 decimals of Hogla land. On a contract basis, the same may be harvested and the product dried at a total price of Tk. 3,000.

Transport in van or in trawler. In case of trawler; transport cost is Tk. 4000. Further drying at home is needed; following which three different sizes of strips are prepared out of the leaves: Big = 9 ft long; Medium = 7.5 ft.; and Small = 6 ft.

Three major product types reported include:
Mat for sleeping (3.5 x 4.5 hands²⁹);
Mat for drying fish (3.5 x 4.5 hands);
Mat for drying paddy, for poultry farms, fish depot (customized);

Most products require big ones for warp and small ones for weft. Mats for drying fish and for the fish depot, medium is needed. As in the case of bamboo craft discussed earlier, one may take several routes to assess the prospect of engaging in pati weaving with Hogla leaves. For the purpose of illustration, we consider weaving of standard mats of 3.5x4.5 hands, a total of 720 pieces of which may be produced with the hogla leaves one gets from 66 decimals of land. The basic information are summarized in Table 13. One

²⁹ 1 hand = 1.5 ft.

may find the return to labor to be quite low. And across the regions, such part-time home-based activities are found to fetch similar return to labor (around Tk. 45 to 55).

After the Aila, there is severe shortage of hogla leaves due to increase in salinity. Thus, many families are now switching out of mat weaving with Hogla leaves; and male members of these families go to Gopalganj in Baishakh to harvest paddy. Some go to other areas for work during Kartik – Falgun.

Table 13
Returns from Weaving of Hogla Mats

Description	Value
Land procurement (Taka/66 decimals)	15000
Hired Labor for harvest and drying	3000
Transport	4000
Cost-1	22000
Others (cost of finance)	3300
Cost-2	25300
Output, piece; standard mats of 3.5x4.5 hands	720
Farm gate price (Taka/piece)	60
Total revenue (Taka)	43200
Net return (Taka)	17900
Output/labor (piece/labor day)	2
Total labor, person days	360
Return to labor, Taka/labor day	49.72

4.7.3 Home-based Sewing machine

Mainly the machines of Singer Company are preferred by beneficiaries. As is evident from Table 14, sewing machines operated at homes at home with limited market to support such activities may at most provide supplementary income to female members of EP households. While such preferences are more pronounced in land-owning better-off families, adult female members in EP families may choose to engage in labor that is more remunerative.

Table 14
Returns to Operating a Sewing Machine

Cost Item	Value (Taka)
Singer machine	6335
Scissor	125
COST	
Annual recovery of machine cost @ 10 % per year	634
Annual recovery of scissor cost @ 50% per year	63
Oil	600
Bobbin cage	60
Tape	8
Screw driver	25
Raw materials: fabric + thread/yarn @ Tk. 900/month	10,800
Total Cost	12,180
REVENUE	
Kameez (55*315)	17325
Blouse (17.5*315)	5512.50
Total Receipt	22837.50

4.7.4 Shop-based: Repair Shop

The scopes are limited in size (number of activities that may be supported in an area). The skill is generally acquired through apprenticeship – working at a workshop in return for meals and lodging only. A case studied (along Tala-Paikgacha road) revealed that the size of investment was negligible since the person (owner/operator of the repair shop) acquired various items over time and these were second-hand ones. He hesitated to put a value of all these (including range, hammer, etc.) exceeding Tk. 1,000. With a rent of Tk. 200 paid per month and a monthly electricity cost of Tk. 50 per month, his net earning is Tk. 6,000 per month. He would however love to have someone young as an apprentice since more services could be offered over longer hours and he could get times off to do household and other remunerative work.

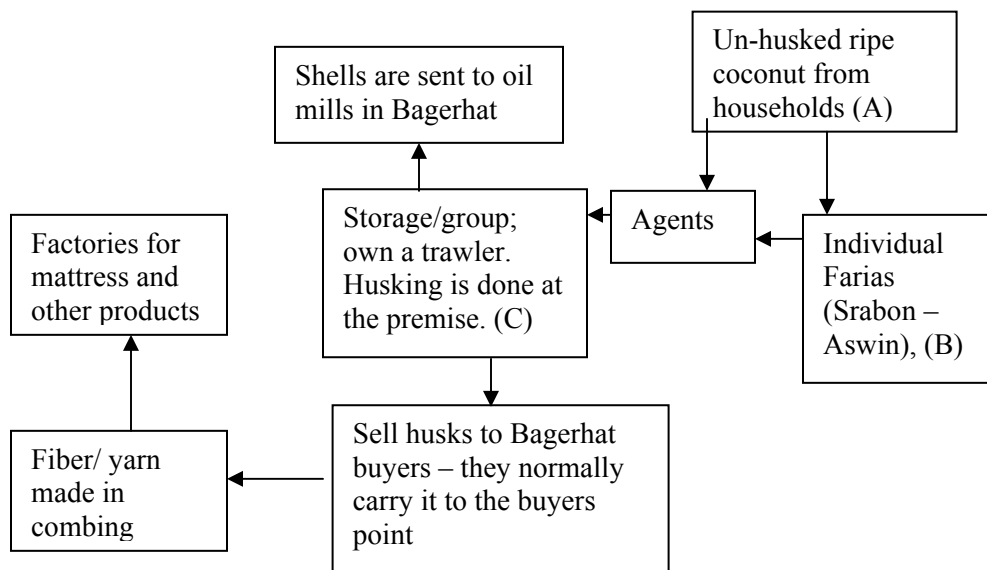
4.7.5 Factory-based: Coconut/Coir Industry

Coconuts have multiple uses. The green ones have the market in the form of drinking water; while the ripe ones have increasingly diversified usages. Other than using the coconut milk in different meals, the primary usages are in producing coconut oil and using both the hard shells and the un-husked fiber in multiple usage. For example, handicrafts can be made from the shells and shell dusts are finding remunerative usages. Because of the bio-degradable nature, the coir-made rope, geo-textiles, door-mats, etc. are on increasing demand.

While the marketing channels along with some information on the prices at various points in the flow of products are presented in this sub-section, it is understood that the supply of coconuts in the southwest has been on decline and its production took a major beating due to Sidr and Aila. Moreover, increased competition from imported coconut oil has lowered the price of coconut oil and forced many oil mills to close. At the same time, demand for coir has been on increase with increasing appreciation for bio-degradable geo-textiles, particularly in China; and demand for coir mattress in the cities have also been on increase. Since supplies are demanded in bulks (to reduce transport and other transfer costs), most stakeholders fear that international demands will move out of Bangladesh products, possibly to India, where policy supports are pro-active.

If coconuts are bought at village households (A), the average price paid is Tk. 4/small piece; and Tk. 5/bigger piece. In such case, household members are normally responsible for plucking the coconuts; and transportation (to C) by trawler is done by the trader. When individual farias collect unhusked coconuts (B), they call the intermediate agent, who goes and collects those. Normally, an additional Tk. 100 to Tk. 200 is paid for a day's commission to the Farias (over and above the prices paid to the tree-owners). Bulk of the purchase is done during the rainy season (Srabon, Vadro and Ashwin).

Figure 5
Marketing Channel of Coconut for Coir



Labor is hired for de-husking the coconuts (at C), who are also responsible for unloading and loading. Wage paid to this labor is Tk. 120 – 150 per day; and each laborer can un-husk at least 1,000 coconuts per day. Thus, the cost per piece is approximately 12 to 13 paisa.

The husk is sold at a rate of Tk. 200 for 1,000 pieces. The price had, in the recent past, shot up to Tk. 700 per 1000 pieces of husks. Generally, the traders keep a Tk. 2 margin on each piece. However, it may vary due to market prices of coconut oil – Tk. 1.50 to Tk. 2.50 margin.³⁰

The turnover in the depot/warehouse under case study was found to be 30,000 coconuts every month during Sraban, Bhadra and Ashwin. In all other months, it is about 15 to 20 thousand per month. Transportation cost is borne by the oil millers. Trawler is used for other purposes as well.

One may note that the trade requires large fund to be used for the purposes of advances that put claims on future supply of coconuts; requires trawlers for transportation, connectivity with market tiers above and hire wage labor. For obvious reasons, such initiatives fall far outside the feasible domain of EP households. It is only in the role of farihas that EP household members may function during the rainy season when there is little work in the fields.

4.7.6 Agriculture Machinery: Threshing machine

Rice is short in supply – not a likely option.

Machine price 3000 BDT. Income is earned for a period of only 4 months. During this period net income (minimum) per day is Tk. 100. Thus, total earning per year is expected to be Tk. 12000.

4.7.7 Value Chain of Tally

Tally is widely used in the local household of Paikgachha. Besides, it has international demand too. Local markets where these are normally sold include, Paikgachha, Meherpur, Magura, Chuadanga. International markets include certain captive segments in the Netherlands, Italy and Austria. For obvious reasons, people with contacts in the external markets have to take leads in organizing production in conformity with consumer tastes prevailing in the terminal markets.

The Tally producing season is from the Bangla month of Agrawon to Jaistha, when 10-12 laborers are normally employed in a plant for the whole working. It is gathered that the existing labor cost is Tk.350 for producing 1000 pieces of Tally. The details of costs and returns summarized in Table 15 reveal that unless connected with a premium (export), tally production is not very lucrative. It provides employment for labor, but the undertaking is beyond the means of EP households. No instance of group-based undertaking of the business was reported from any of the study areas.

³⁰ Farmgate price of coconuts may increase to Tk. 8 to Tk. 10 per piece. Current retail prices of coconuts are in the range of Tk. 10, which may increase to Tk. 13.

Table 15: Cost & Returns in Tally Production (1000 piece of Tally)

Ingredients	Amount/remarks	Cost (Tk.)
Earth	2500 kg	400
Sand	4 Bags	50
Fuel Wood	@ Tk. 100/maund; 25 maund/1000 tally	2500
Labor	per 1000 pieces	350
Dice	@ Tk. 2000/dice and 2 dices per season	40
Plates	@ Tk. 14/plate; and 1 plate/ 100 tally	140
Total Cost	per 1000 pieces	3480
Gross Revenue	Wholesale price per 1000 pieces	4500
Net Revenue/Profit	per 1000 pieces	1020
Net revenue/season	100000-150000 tally per season	10200 - 15300

Note: 1 maund = 37. kg. Prices of tally vary – retail price in the locality is Tk. 5,500 per 1000 when the wholesale price is Tk. 4,500. In cases of exports, the prices are lot higher.

4.8 Skill developments for service sector activities

The field-level consultations revealed that there may be scopes for meso level interventions that facilitate education and training of members of EP households in the fields of nursing, security personnel in the cities, maids in urban households and for working in the RMG factories. Extensive probing into these areas was beyond the scope of the current study.

4.9 Interlinking markets

Another set of external interventions may take the form of facilitating organized trade/business development to grab market niches. One example is to find alternative trade routes and gainful exchanges between tow locations. Suppose, location ‘A’ is currently importing commodity ‘x’ from location ‘K’ in exchange of its export of commodity ‘y’; and location B is importing ‘y’ from ‘K’ (or any other location) in exchange of its export of ‘x’. Current pattern of commodity flows have been shaped over time by developments of markets size and subsequently a transport regime that dictates the terms. It is quite possible that an alternative transport regime, carrying ‘x’ from ‘B’ to ‘A’ and brining ‘y’ from ‘A’ to ‘B’ on return journey, by (say) mechanized vans, benefit consumers of x and y at both ends as well as the new group of traders. Surely, the old traders will lose – but the move may benefit the EP households in the locality.

Similarly, there are scopes to identify entry points to reduce expenditure of EP households through interventions. All these are however left out of the exercise since SCUK-Shiree project has exclusive focus on micro-level transfers to pre-identified EP households.

Annex 1

A Note on the Conventional Value Chain Analysis³¹

What is Value Chain Analysis?

The value chain is a systematic approach to examining the development of competitive advantage. The chain consists of a series of activities that create and build value. It is a method for accounting and presenting the value that is created in a product or service as it is transformed from raw inputs to a final product consumed by end users. VCA typically involves identifying and mapping the relationships of four types of features: (i) the activities performed during each stage of processing; (ii) the value of inputs, processing time, outputs and value added; (iii) the spatial relationships, such as distance and logistics, of the activities; and (iv) the structure of economic agents, such as suppliers, the producers, and the wholesaler. Value chains can become complex when they reflect multi-stage production systems with multiple types of agencies operating in different locations in one country or multiple countries around the world.

Methodology

The world of production and exchange which we are observing is complex and heterogeneous. Not only do value chains differ (both within and between sectors), but so, too, do national and local contexts. So there is no mechanistic way of applying value chain methodology. Each chain will have particular characteristics, whose distinctiveness and wider relevance can only be effectively captured and analyzed through an understanding of the broader issues which are involved.

As value chains are complex, and particularly in the middle tiers, individual firms may feed into a variety of chains. Which chain – or chains – is/are the subject of enquiry therefore very much depends on the point of entry for the research inquiry. Retailers, independent buyers, key producers, sub-suppliers, commodity producers, agricultural producers, small farms and firms, informal economy producers and traders and women, children and other marginalized and exploited groups.

In each case, the point of entry will define which links and which activities in the chain are to be the subjects of special enquiry. For example, if the focal point of the enquiry is in the finding scopes for extreme poor to get involved in the chain, then the point of entry might be in informal economy of producers and traders. This will require the research to find out both vertical and horizontal linkages. At the other end of the scale, a concern with small and medium sized firms, which feed into a number of value chains, might require the research to focus on final markets, buyers and their buyers in a number of sectors, and on a variety of input providers. Once the point of entry is defined, simplicity and an easy clarity of focus are called for. However, the real world can be much messier. There may be several branches and sub-branches of each entry points.

³¹ This annex draws upon Kaplinsky, and Morris (undated), Dunn (2005) and FIAS (2007), where VCA is used to assess competitiveness with a view to compare across countries and across sectors. The first draft of the annex was prepared by Sara Zabeen, Research Associate, ERG.

Three stages of VCA

The three integral stages of the VCA presented in the documents reviewed include:

- Process mapping of industry chains in qualitative (graphical) terms and quantitative terms by disaggregating metrics such as cost, time, productivity, and value addition along the various segments of each chain. The qualitative mapping presents all activities, actors, relationships among segments of the chain and interaction between the various stakeholders, including producers, intermediaries and buyers.
- Establishing benchmarks for performance indicators against international or national (for products that is not exported) competition and best practices. The performance measures, together with benchmarking against instruments (for comparing a measured property of an object), helps in assessing the relative importance of the different issues that affect the performance of the value chain, and in prioritizing the most binding constraints that directly affect the competitiveness of an industry.
- Explicitly understanding the policy and institutional factors underlying these performance measures. This helps in developing a targeted reform agenda that, if addressed, will enhance growth and competitiveness of the subject industries, and will potentially attract private investments, enabling higher value job creation.

Some important factors to be noticed

Analysts should probe into several aspects to get a complete picture. Few of the main features are highlighted briefly.

Competitiveness: The ability of a firm or value chain to achieve or maintain an edge over market rivals. This edge can be based on price, efficiency, quality, quantity, asymmetric access to information, uniqueness, branding, advertising, good service, and/or other environmentally or socially valued standards (e.g., social marketing, fair trade practices).

Competitive strategy: An approach for improving or maintaining firm and/or value chain competitiveness over the long term.

Critical success factors: Firm or value chain characteristics that underlie competitiveness. Examples of these characteristics include price, quality, uniqueness, delivery reliability, and the presence of inter-firm cooperation.

Risks: loss or the chance of a loss. The chance of things not turning out as expected.

Vertical linkages: Market and non-market interactions and relationships between firms performing different functions (i.e., operating at different levels) in the value chain.

Annex 2
Activity Calendar

Dacope

	Wood logging	Grocery	Honey collection	<i>Golpata</i> collection	House repair	Fishing, white fish	Catch crabs	Catch lobster larva	Earth work	Van pulling	Domestic helper	Net weaving	Fishing in sea	Cultivate Vegetable	Cultiv watermelon	Motorbike service	Repair van/bicycles
Baishakh1																	
Baishakh2																	
Jaistha1																	
Jaistha2																	
Ashar1																	
Ashar2																	
Shrabon1																	
Shrabon2																	
Vadro1																	
Vadro2																	
Ashin1																	
Ashin2																	
Kartik1																	
Kartik2																	
Agrahayon																	
Agrahayon																	
Poush1																	
Poush2																	
Magh1																	
Magh2																	
Falgun1																	
Falgun2																	
Chaitra1																	
Chaitra2																	

Source: Own compilation.

Mongla

	Wood logging	Grocery	Honey collection	<i>Golpata</i> collection	House repair	Fishing, white fish	Catch crabs	Catch shrimp larva	Earth work	Van pulling	Domestic helper	Net weaving	Fishing in sea	Cultivate Vegetable	Cultiv watermelon	Motorbike service	Repair van/bicycles	Fishing in Sundarban
Baisakh1																		
Baisakh2																		
Jaistha1																		
Jaistha2																		
Ashar1																		
Ashar2																		
Shrabon1																		
Shrabon2																		
Vadro1																		
Vadro2																		
Ashin1																		
Ashin2																		
Kartik1																		
Kartik2																		
Agrahan1																		
Agrahan2																		
Poush1																		
Poush2																		
Magh1																		
Magh2																		
Falgun1																		
Falgun2																		
Chaitra1																		
Chaitra2																		

Morelganj

	Wood logging	Grocery	House repair	Wood/carpentry	Fishing, white fish	Brick field work	Earth work	Van pulling	Domestic helper	Mat weaving	Kantha stitching
Baishakh1											
Baishakh2											
Jaistha1											
Jaistha2											
Ashar1											
Ashar2											
Shrabon1											
Shrabon2											
Vadro1											
Vadro2											
Ashin1											
Ashin2											
Kartik1											
Kartik2											
Agrahayon1											
Agrahayon2											
Poush1											
Poush2											
Magh1											
Magh2											
Falgun1											
Falgun2											
Chaitra1											
Chaitra2											

Paikgacha

	Wood logging	Grocery	House repair	Fishing, white fish	Catch prawn	Earth work, Gher	Van pulling	Domestic helper	Net weaving	Cultivate Vegetable	Repair van/bicycles	Day Labor	Paddy harvest/cultivat	Tea stall	Clean water hyacinth	Jute cultivation	Making roof-tally	Work in brick field
Baishakh																		
Baishakh																		
Jaistha																		
Jaistha																		
Ashar																		
Ashar																		
Shrabon																		
Shrabon																		
Vadro																		
Vadro																		
Ashin																		
Ashin																		
Kartik																		
Kartik																		
Agrahan																		
Agrahan																		
Poush																		
Poush																		
Magh																		
Magh																		
Falgun																		
Falgun																		
Chaitra																		
Chaitra																		

Rampal

	Van pulling	Tea stall	Cloth business	Grocery	Shrimp business	Selling white fish	Work in fish depot	Faria/Middlemen	Day Laborer	Sell crabs	Paddy field work	Sell water	Bamboo/cane craft	Singer/fluting	Earth work	Fishing	Net weaving/hooks
Baishakh1																	
Baishakh2																	
Jaistha1																	
Jaistha2																	
Ashar1																	
Ashar2																	
Shrabon1																	
Shrabon2																	
Vadro1																	
Vadro2																	
Ashin1																	
Ashin2																	
Kartik1																	
Kartik2																	
Agrahayon1																	
Agrahayon2																	
Poush1																	
Poush2																	
Magh1																	
Magh2																	
Falgun1																	
Falgun2																	
Chaitra1																	
Chaitra2																	

Annex 3
Crop Calendar

Dacope Upazila

Season I (Monsoon) (July- December)	Season II (Winter) (January - March)	Season III (Summer) (April - June)
Transplanted Aman	Fallow	Fallow
Transplanted Aman	Boro	Fallow
Transplanted Aman	Watermelon	Fallow
Transplanted Aman	Vegetables	Vegetables

Mongla Upazila

Season I (Monsoon)	Season II (Winter)	Season III (Summer)
Fallow	Boro	Aus
Transplanted Aman	Boro	Fallow
Fallow	Boro	Fallow
Transplanted Aman	Fallow	Fallow

Morrelganj Upazila

Season I (Monsoon)	Season II (Winter)	Season III (Summer)
Transplanted Aman	Fallow	Fallow
Transplanted Aman	Boro	Fallow
Transplanted Aman	Fallow	Transplanted Aus
Transplanted Aman	Pulses	Fallow
Transplanted Aman	Vegetables	Fallow
Transplanted Aman	Vegetables	Vegetables

Paikgachha Upazila

Season I (Monsoon)	Season II (Winter)	Season III (Summer)
Transplanted Aman	Fallow	Fallow
Transplanted Aman	Boro	Fallow
Fallow	Boro	Aus
Transplanted Aman	Vegetables	Vegetables

Rampal Upazila

Season I (Monsoon)	Season II (Winter)	Season III (Summer)
Fallow	Boro	Aus
Transplanted Aman	Boro	Fallow
Fallow	Boro	Fallow
Transplanted Aman	Fallow	Fallow

Annex 4
Zones by Upazilas

Dacope

Characterization/economic activities	Unions
Sundarbans related activities	Sutarkhali , Banisanta, Kamarkhola, Khailashagan
Gher/shrimp cultivation	Tildanga, Sutarkhali, Baniasanta, Kamarkhola, Pankhali
Watermelon Cultivation	Bajua , Dacope, Loudove
Paddy	Pankhali, Dacope, Tildanga, Bajua, Kailashganj, Loudove, Baniasanta

Mongla

Characterization/economic activities	Unions
Sundarbans related activities	Chila, Sundarnan , Chadpai
Gher/ shrimp cultivation	Burirdanga, Sonailtola, Mithakhali
Fishing at Sea, and river	Chila , Chandpai, Sundarban
Paddy	Sonailtola, Mithakhali, Burirdanga

Morrelganj

Characterization/economic activities	Name of the Unions
Paddy and Vegetables Cultivation	Hoglapasha, Daibaggyahati, Hoglabunia, Banogram, Ramchandpur, Chingrakhali, Boloibunia, Khaolia
Shrimp and white-fish Cultivation	Jiudhara , Teligati, Panchonkoron, Putikhali, Nishanbaria, Bohorbunia, Baroiakhali, Morrelganj

Paikgacha

Occupation	Name of the Unions
Jute Cultivation	Kapilmuni , Raruli, Haridhah, Gadaipur
Shrimp Cultivation	Laskar , Lata, Sholadana, Deluti, Chandkhali

Rampal

Occupation	Name of the Unions
Paddy	Mollikerber , Ujalkur, Gauramva, Rajnagar
Shrimp Cultivation	Perikhali , Rampal Sadar, Bhojpatia

Annex 5
Statistical Tables

Table A5.1
Crop Calendar – additional checks to assess potential conflicts in labor use

Month \ Activity	Van pulling	Grocery	Rabi crops-watermelon	Earth work	Pen culture (fresh water)	Middle-man/faria	Fishing net preparation
Baishakh	Rabi crops marketing		Harvesting		Ruhi, Silver cup, Tilapia etc.		
Jaistha						Vegetable marketing	
Ashar							
Shrabon							
Bhadro						Fish marketing	
Ashwin							Limited field work
Kartik							
Agrahayon							
Poush	Paddy marketing						Paddy marketing
Magh			Sowing				
Falgun				Pond preparation			
Chaitra						Limited field work	

Table A.5.2
Cost-benefit analysis of Pen Culture (1.5 acre)

COST items	Price (BDT)
Land lease (1.71 acre for 2 years)	25000
Caco ₃ (Tk. 10/decimal)	1500
Fingerlings 10000 pcs (1 BDT/pc)	10000
Feed	7000
Net (for 5 yrs)	500
Bamboo enclosure	1000
Rope & maintenance	500
Labour for pen preparation	500
Fish catching	200
Total	21200

REVENUE items	Price (BDT)
Cultivated fishes- 1500kg (50 BDT/kg)	75000
Open fish (not stored)-150kg (30 BDT/kg)	4500
Total	79500
Net Return (in 6 months)	58,300

Note: Note: 60 households are involved in 1.71 acre.

Source: Sushilan.

Table A5.3: Crab Fattening Status in the Southwest Coastal Region of Bangladesh, 2008-09

District	Upazilla	No. union covered in the fattening	No HH involved in crab fattening	No of crab fattening pond /plot	Fattening Land area (acre)	Annual Crab Fattening status		No of depot	Annual Crab handling status			Annual Harvesting	
						Annual crab fattening / Production (MTs)	Annual sell after fattening / price (Core in BDT)		Depot purchases from the Sundarban, Shrimp farm and after fattening (MTs)	Annual export from the Depot (Core in BDT)	Annual Local consumption (MTs)	% of direct collect from the Sunderban	% collect from Shrimp farm/ canal
Khulna	Paickgacha	7	1200	2620	25.14	1440	28.80	330	3564	78.40	5.67	65%	35%
	Dacope	4	224	305	4.04	458.3	9.45	130	1104	19.45	5.02	70%	30%
	Batiaghata	2	90	124	2.27	445	9.03	100	612	13.45	3.12	75%	25%
	Koyra	4	205	407	7.32	311	6.96	125	470	10.94	2.22	65%	35%
Bagerhat	Morelganj	4	94	105	0.92	410	8.21	125	810	16.20	2.04	80%	20%
	Sharonkhola	2	17	28	0.25	40	0.86	12	430.2	10.53	1.10	85%	15%
	Mongla	3	997	2393	27.07	1196.4	28.71	305	3294	75.76	7.47	65%	35%
	Rampal	5	1010	2625	28.37	1603	37.36	317	3994.2	95.46	7.25	65%	35%
Total		48	5050	10641	122.2837	8003.91	171.13	1811	18426.2	400.95	47.13	69%	31%

Source: ProSCAB Project, Shushilan

Table A5.4
Grade-wise buying and selling prices of mud crabs (*Scylla serrata*) by gender and seasons, in Shyamnagar

Grade	Price in winter/kg		Price in Summer/kg	
	Buy	sell	Buy	sell
Male				
SM	30-50	100-120	25-35	60-70
L	70-80	120-150	50-60	80-100
XL	100-120	200-250	80-100	120-150
XXL	140-180	300-350	110-130	170-200
Female				
KS1	280-380	350-450	150-170	250-300
KS2	70-90	130-150	30-50	80-100
KS3	70-80	120-140	30-60	80-100
F1	300-350	350-400	200-250	250-300
F2	120-140	140-180	80-90	100-120
F3	100-110	120-130	50-70	70-90

Source: ProSCAB Project, Shushilan

Table A5.5
Definition of Various Grades and their Prices as Reported in the Field

Sex	Grade	Size (gm)*	Size (Gram)	Sale price (Tk/kg)
Male	XXL	- / 500+	480 or above	500
	XL	401-500	380-479	400
	L	301-400	280-379	300
	M	251-300	200-279	300
	SM	201-250	170-199	300
Female I	F1	181-200 ⁺	180+	700
	F2	151-180	151-180	380
	F3	121-150	120-150	270-280
Female II	KS 1	180+	180+	250
	KS 3	121-180	121-180	100

Note:

Male varieties mentioned are full of meat hard. WXL and WL are two other varieties which have partial development soft. F-varieties under female are full gonad hard; while KS 1 is partial gonad hard and KS 3 is immature gonad.

Weights under each grade vary across domestic and export markets, and even across quotations placed in the net for exports from Bangladesh. We take the export market grades mentioned in Ferdoushi (2010) in the 3rd column marked by *; and consider field reports in 4th.

Annex 6

Acts and Policies restricting fishing practices in the coastal areas of Bangladesh

Restrictions regarding Net usage

1. Mesh size should be up to 4.5 cm. This is a high court rule.
2. There has been a widespread discussion for banning ‘Current jaal’³² for a long time.’ Current jaal’ is the traditional name of gill net.³³ It is a major concern of development practitioners as the act says- *No person shall manufacture, fabricate, import, market, store, carry, transport, own, possess or use current jal.* But unfortunately it is not strictly implemented yet.
3. There is an embargo in using Fixed net (khora jaal)³⁴ and Fixed engine (paati badh)³⁵. In Khulna, erection of fixed engine is prohibited on the river Modhumati. The Bangladesh Gazette describes it in this way- ‘No person shall erect or use fixed engine in the rivers, canals, khals and beels.’

Restrictions regarding catching

According to Fish Act of 1950, Government prohibited throughout the province of East Bengal the offering or exposing or possession for sale or barter of fishes of the species and sizes mentioned below.

Species of fish	Sizes of fish	Period
Carps (i.e. Catla, Ruhi, Mrigal, Kalbaus and Ghunia)	Below nine inches in length	Between July and December in any year
Hisa (popularly known as jatka in some parts of the country)	Below nine inches/23 cm in length	From 1 st November to 31 st May in any year
Pungas, Silond, Bhoul, Aair	Below twelve inches in length	Between February and June in any year
Shol, Gazar, Taki (while moving in clusters and/or the parent fish guarding them in the rivers, canals, khals, beels or any sheet of water which ordinarily has direct communication with any river, canal, khal or beel in the districts of Faridpur along with few others.)	----	From 1 st May to 31 st August, in any year

Source: Department of Fisheries, 2010

³² “Current Jal” means fishing net made of monofilament synthetic nylon fiber of different mesh sizes.

³³ Gillnetting is a common fishing method used by commercial fishermen of all the oceans and in some freshwater and estuary areas. Because gillnets can be so effective their use is closely monitored and regulated by fisheries management and enforcement agencies.

³⁴ There are several types of fixed nets. A drive net is such a net, used by small-scale fishermen. It is used to catch schooling forage fish. The fishermen either wait until a school swims into the net, or they drive fish into it by creating some sort of commotion. Then the net is closed by lifting the front end so the fish cannot escape.

³⁵ Fixed engine means any net, case, trap or any other contrivance for catching fish, fixed in the earth or made stationary in any other way.

It shall not apply to the catching, sale, transfer or possession of any fish for the purposes of or in connection with pisciculture.

- *No person shall catch or cause to be caught fry or post larvae of fish ,shrimp and prawns of any kind, in any form and in any way in the estuary and coastal waters of Bangladesh.*
- Collecting hilsa from **Hilsa Sanctuaries** is forbidden in every year 15-24 October (30 Ashwin-09 Kartik) as it is the high time for them to breed.
- *No person shall import, carry, breed, culture, sell, receive or take, market, expose and possess of any species of fish of piranha group*

Restrictions regarding dams and embankments

No person shall construct bunds, weirs, dams and embankments or any other structure whether temporary or permanent in, on, across or over few rivers, canals, khals or bills for any purpose other than irrigation, flood control or drainage. According to this law, in Khulna river Modhumati and the canal known as Dalbasania and Gazaria are restricted for such activities. The canals are also restricted for catching or causing to be caught carps of any size.

Few other restrictions

1. Fishing by using poison is strictly banned. There is only one world wide approved medicine named 'rotanon' but fishermen do not use it due to high price. Because a pond full of fishes get killed by poison of 500 tk only which is obviously very cheap. Act says-*No person shall destroy or make any attempt to destroy any fish by poisoning of water or the depletion of fisheries by pollution, by trade effluents or otherwise in inland waters.*
2. There is another embargo on using explosives etc. *No person shall destroy or make any attempt to destroy any fish by explosives, gun, bow and arrow in inland waters or within coastal territorial waters.*

The effect of violating the above rules and regulations can be leave serious impact. The offender can be arrested without warrant; case will be filed against him/her, illegal possessions will be seized. If the seized products are equipments then it will be sold in auction. If it is fish, then it should be sold to public in an open place. Businessmen are not allowed to buy it. According to The Bangladesh Gazette, Extra, October 17, 1985-*Any fish forfeited for a breach of any of these rules shall be disposed of by auction money thereof shall be deposited in such Head of Account of the Government as it may direct.*

Identifying Economic Activities

Self-employment needs to be conceptually re-grouped on the basis of labor involvement in such activities. One may also differentiate in terms of risk-taking which is positively related to capital (fixed and working) involved and the produce is marketed. A third line of differentiation may be in terms of degree of processing involved.

	Almost no finance	Small finance	Finance required
Wage employment	- Labor on paddy field; - earth work; - work in gher		
Contract labor	- Honey Collection; - going to sea for fishing; - work in brick field;	- Harvest and other labor in paddy field; - golpata	
Involves only supervisory labor on a part-time basis	- Cow fattening; - poultry rearing;		
Involves only supervisory labor on a full-time basis			- Fish depot - crab cultivation
Involves seasonal labor	- Catching Prawn-Larva; - catching crab;	- Weaving net; - make net kathi; - Bamboo/cane (basket); - Catching fish; - procure & sell water; - house repair;	- Logging activities; - vegetable production; - Trade in fruits; - Trade in cloth/fabric - Other small business
Involves round-the year labor + supervision		- Vendor/trade fish; - selling sarees;	- Repairing van/cycle workshop; - Van pulling; - motor bike services; - rent in land for cultivation (water melon, paddy, jute); - Tea stall; - Grocery/vendor;

Annex 7

Brief on Crabs: excerpts from Ferdoushi et al (2010)³⁶

Introduction

Following the 1980's, the unregulated boom in intensive shrimp culture contributed to the spreading of disease, particularly the white spot syndrome virus (WSSV) epidemic, which led to farms seeking alternative species for sustainable aquaculture practices, both economically and environmentally, as a replacement for shrimp. Capture and culture of crab started as a consequence of it from that era.

Scylla serrata (Forsk.) popularly known as Mud Crab and locally called *Haubba Kankra*, appears to be the most popular and important species of crab species to be cultured in Bangladesh for food and trade. Here a substantial area of mangrove tidal flats (about 628,780 ha) lay that enables successful capture and culture of mud crab. In recent years, there has been increasing interest in crab farming due to growing markets and international demand.

Distribution and abundance

In Bangladesh, mud crabs occur abundantly in the coastal rivers of Cox's Bazaar, Chittagong, Barisal, Patuakhali, Satkhira, Khulna, Noakhali and the inshore islands of Moheshkhali, Kutubdia, Sandip, Hatia and Dubla *i.e.* all inshore islands, except for Saint Martin. They are most abundant in the Khulna and Chokoria Sundarban areas. Interestingly, in these areas, shrimp culture is also well-established. Shrimp and crab live in similar environmental conditions. They are quite abundant in places 40-50 km inland from the Bay, in the creeks and canals of the brackish water estuaries. (Khan and Alam, 1991)

A study by Sushilon (a local NGO) found 58.3% of catchers to catch crab exclusively from the forest, 21.7% of catchers mentioned of forest, banks of river and gher as the source of their catch. Only 20% mentioned of catching crabs from gher and riverbanks. Most of the women crab catchers were involved in catching crab from the gher and banks of the river. They reported that fishing and crab-catching in the forest was too dangerous for them. (Ferdoushi *et al.*, 2010)

Production of Mud Crab

The mud crab fishery in Bangladesh is totally dependent on the wild catch from swamps, tidal rivers, canals and tide-fed traditional shrimp gher. Other sources of mud crab supply to the market are from traditional shrimp gher and from the fattening ponds. Usually mud crab larvae enter into the ponds along with the tidal waters through different channels. In addition, some fatteners collect the lean crabs from the wild catchers and live crabs from different depots which are rejected for export. All of those go for fattening in their ponds for future sale. Supply of mud crabs for export and for domestic consumption is thus mainly dependent on wild sources.

Culture of mud crab: Techniques for the culture of mud crab are yet to be developed within the country. There are a number of reasons for this.

³⁶ This annex was prepared by Papon Dev, an NGO activist, who had provided part-time assistance to the ERG Study.

First, culture of mud crab involves more labor and capital, while, at the same time, there is risk due to the crab's behavior, including its cannibalism.

Secondly, the crab is a non-traditional species and is not popular, being eaten by few people. While several traditional and popular fish and shrimp species are being cultured, the development of crab culture is not likely to be fast. But since foreign markets have opened up for Bangladesh crab, its culture may develop.

Harvesting System: Mud-crabs dwell in mangrove environment - living in muddy bottoms, marshes and in river estuaries. They live in mud burrows, which occur densely in inter tidal mangrove swamps. These burrows are also found in embankments of shrimp culture ponds and coastal irrigation projects areas. Crabs take shelter in burrows during the day when tides are low. During high tides at night they swim around in search of food.

Mud crab catchers with small boats usually stay out 7 to 10 days on each fishing trip. They use very simple type of traps and bait for catching crabs. Mechanized devices have not yet been developed for crab fishing. Generally fishermen use the local gear suited to a particular habitat to trap crab. (Ahmed, 1992) The usual types of gear are long metal hook, split bamboo trap (chai), rope line, cast net and set bag net. Among them the last 3 gears are widely used in coastal belts of Khulna.

Rope line: Crabs are extensively fished in the estuarine and mangrove swamps of the Sundarbans using this method. A rope line of about 100-200 m is stretched across the estuary or swamp. One end of the rope line is tied to pole fixed on the bank and the other end is tied by boat to the extent the rope permits. This line is weighted at regular interval with bricks. When the line is sufficiently heavy with crab, the fishermen lift the rope to within 5-8 cm of the water surface. The crab are then captured with a scoop net³⁷ and stored in a tin basket to prevent their escape. (Ahmed, 1992)

Cast Net: This gear is generally used to catch shrimp and fish. During such fishing, a small quantity of crab is also entrapped. In semi-intensive shrimp culture farms, the culturists spread pieces of fish in a definite area where crab concentrate. Then they use the cast net to entrap the crab, which are considered pests by the shrimp farmer.

Set Bag Net: During the regular water exchanges through the sluice gates in shrimp farms, indigenous set bag nets are installed by the gates to prevent the shrimp from escaping. During this activity, some crabs too are entrapped in the nets.

The rope line used in the Sundarbans is the most effective of these methods.

Harvesting time: The rainy season (April-July) is the major fishing period for almost all areas, particularly in mangrove and shrimp ponds. Crabs caught in the rainy season are larger in size than those caught in winter (Sept-January). During this time, the catch is relatively high, 3 - 4 times more by weight than in winter. Usually the maximum catch is achieved during spring tide and neap tide³⁸. The dry season (October to March), is the peak season from the Sundarban Reserve Forest (SRF), while June to October is the peak harvesting season from shrimp gher. (Ferdoushi *et al.*, 2010 and Khan and Alam, 1991)

³⁷ A **scoop net**, is a net or mesh basket held open by a hoop. It may or may not be on the end of a handle. It is also called hand nets which have been used since antiquity and can be used for scooping fish near the surface of the water

³⁸ Neap tide is one when the difference between high and low tide is the least. It comes twice a month, in the first and third quarters of the moon.

Employed people and their livelihood

In Bangladesh, mud crab is an export item that is important in national and international markets. It can generate employment directly and indirectly in terms of people employed in the production, marketing and other associated business. More than 50,000 fishers, traders, transporters and exporters are estimated to be involved in this sector. (Kamal, 2002)

Mud crab catchers

As the mangrove forest in Bangladesh is the main source of mud crabs for marketing, the crab catcher's role in these areas has been vital to the supply of crabs to the market. Most of the catchers live in remote areas and, for religious reasons; mostly Hindus are involved in this occupation. The Sushilan survey found that 83.3% of crab catchers were Hindu, while only 16.7% were Muslim. Very few women (16.7%) were found to be involved in this profession. (Ferdoushi *et al.* 2010) Usually the crab catchers harvest the crabs from the **SRF** throughout the year.

Marketing System

Mud crab marketing channels in particular is complicated, since market operators may perform more than one marketing function. The marketing channel of mud crab in Bangladesh starts from the wild catchers and passes through a number of intermediaries such as catchers, farmers, middlemen, depot owners, local agents for the exporter and finally from the exporter to the foreign countries. The catchers are the most disadvantaged group. About 63.3% of the crab catchers were found to sell their crabs to the collectors and 36.7% sell their catch directly to the depot owner due to the verbal agreement with the catchers and the depot owner. For this reason the crab catchers are often bound to sell their catch to them which prevents them from getting the actual market price. A small part of their catch goes for local consumption (mostly broken legs and small crabs) and 8.3% were found to have fattening ponds.³⁹

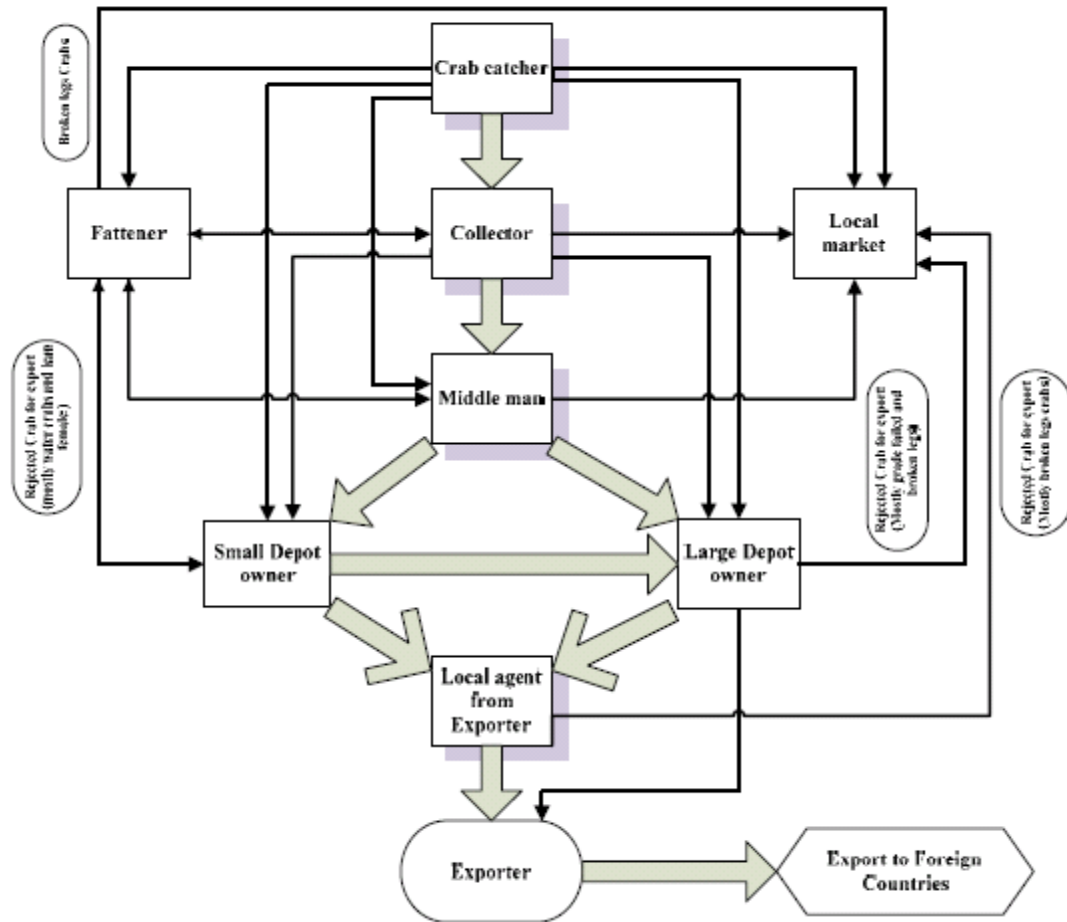
Sometimes the crab catchers sell a small part of their catch directly to the fatteners. Most of the mud crab supplied from the catching sector was traded at first hand by the collector or foria, who distributed it to other market operators, usually the depot owner. The collectors buy the crabs from the catchers and sell them to the depot owner with a large profit. The depot owner invests money through a lending system to the catchers and the collectors (faria) with a verbal contract that they have to sell their collected crab to them. Some depot owners also take loans from the exporter with similar contact arrangements.

Local agents for the exporter collect crabs from all small and large depots through the depot owners. About 90% of the total supplied from different sources goes to Dhaka for export. On the other hand, some part of the rejected crab with broken legs and other physical damage go to the rural and neighboring urban market for domestic consumption, whereas some of the poorly graded⁴⁰ ones are collected by the fatteners. According to Ferdoushi *et al.* (2010), 86.7% of depot owners were found to have fattening ponds.

³⁹ Details would be found in Ferdoushi, Z. , Xiang, Z. and Hasan, M.R. (2010) Mud crab (*Scylla* sp.) marketing system in Bangladesh. *Asian Journal of Food and Agro-Industry, As. J. Food Ag-Ind.* 2010, 3(02), 248-265, ISSN 1906-3040.

⁴⁰ The crabs are graded by their size and weight. Other than that claw, shell and gonad condition is also considered.

Figure 7.1: General Mud Crab (*Scylla sp.*) Marketing Flow in Bangladesh



Source: Ferdoushi et al 2010.

Mode of payment

Mutual understanding is the major factor upon which the mode of payment was found to depend in the case of purchasing and selling of mud crabs in the research area. The payment was found to be generally 50% immediate or advance payment (Dadon) and 50% provided later, usually ranging from 1 to 7 days. It is similar for all operators engaged in mud crab trading, from catchers to local agents. (Ferdoushi *et al.*, 2010)

Transportation

Crabs are easy to keep alive for several days if they are kept under cool and moist conditions. From Bangladesh only live crabs are exported. They do not need any refrigeration or other sophisticated facilities during transportation. The crab catchers, collectors or middle men keep the harvested crabs in plastic bags or bamboo baskets during transportation and to avoid mortality they keep their crabs moist by spraying water over them. At first crabs are carried to the local depot by wooden boats, bicycle or by van. Following this, all collected crabs from different small and local depots are transported to Dhaka by truck or pick up van usually at night. For local transportation different grades of crab are kept in the same bamboo basket and covered with

gunny bags. Betel-nut leaf is placed in the bottom to prevent dehydration and to keep the temperature low. (Ahmed, 1992)

Domestic Marketing

In comparison with other fish or fishery products, the demand for mud crabs in Bangladesh for domestic consumption is less. Generally, rejected underweight crabs for export and damaged crabs come to the local rural and urban markets for domestic consumption. Two types of domestic market so far have been reported by Ahmed.⁴¹ One is nearer to local markets in the vicinity of the fishing village and another one is the consumer markets away from fishing areas. The non-Muslim and tribal people are the main consumers of crabs in Bangladesh. The main consumers of Sundarban's crab are the non-Muslims of Dacope, Koira and adjacent areas.

Direct sale by fishermen in the local market or in consumer markets is the general mode of marketing. Previously, there were no middlemen in this trade. But now 2 purchasing centers, at Shoronkhola and Burigualini in the Khulna region, have been set up. Crabs are purchased at these centers by retailers, for supply to the consumer market. The market price varies with the grade and with the season and the selling price is normally fixed through bargaining between the seller and consumers.

Price Influence and Seasonality

There are many factors affecting the price of mud crab in both the domestic and international markets, particularly as the supply of crab is mainly dependent on wild sources. The supply is affected by the season which is defined by the government of Bangladesh.⁴²

Supplies of exported crabs were also reported by some traders to experience some sort of seasonality during Chinese New Year (based on lunar year. This year it began on 14 February) and Christmas time (end of December) when the international consumption increases greatly, which ultimately affects the price of the crabs in the international market.

Traders and the fatteners also reported that they can earn higher profits especially during this time. On the other hand, demand in the local or domestic market is seen as steady throughout the year. Sometimes the price is also related to fluctuations on the international market, especially for male crabs and gravid female crabs. Any price increase in the international market will ultimately increase the price in the domestic market. In addition, when the interviewees were asked about the influence of marketing operations over the price, the majority of the collectors and farmers claimed their depot owner had the most influence over price, while conversely, the depot owners felt that suppliers and exporters had the greatest influence over the price paid.

Restriction

However, the fishing along the Sundarban East and West Sanctuaries along the sea coast during December to February and May to June is strictly prohibited by the government of Bangladesh to protect the brood mud crabs. (Ferdoushi *et. Al*, 2010)

⁴¹ Ahmed, K. (1992). Mud crab: a potential aqua-resource of Bangladesh. In: C.A. Angell (ed.), Report of the seminar on the Mud Crab Culture and Trade. Surat Thani, Thailand, November 5-8, 1991. BOBP/REP/51. Madrfas, India: Bay of Bengal Programme, pp. 100.

⁴² To protect the brood stock, GoB has made some embargo on catching crabs for few months in the places where crabs are available during breeding season. Thus supply is affected.

Policies

The crab fishery in Bangladesh has grown without any government support. But it is an important observation that during monsoon months while there is scarcity of government jobs and food, crab cultivation provides some succor. (Khan and Alam, 1991) The undersized crab which are now sold at a very low price and do not contribute much in terms of weight to the total population should be used for culture and fattening. This needs an extension programme, with external and government support to transfer technology and provide financial and credit facilities to crab culturists. An extension and motivation programme is also necessary to control the mesh size of crab fishing traps. So, government should take the initiative to encourage farmers and support their socio-economic growth by helping to develop production and trade to sustainable levels.

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