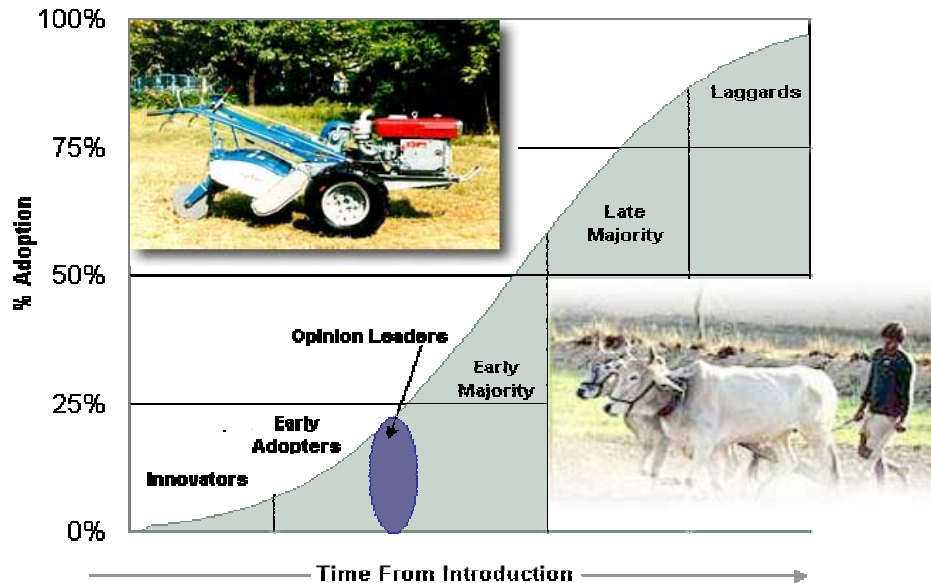


Subsector Analysis and Market Assessment

AGRICULTURAL MACHINERY, TOOL AND EQUIPMENT SUBSECTOR

Jessore, Dinajpur, and Bogra



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This DRAFT report, prepared by IDE for the DFID/REFPI project with a view to feeding into the design of BDS market development interventions in the agro-tool and machinery sector, provides an overview of the sector and points to interesting avenues for further investigation into issues, e.g., sector dynamics, competitiveness, productivity, and strategic services, etc. and intervention design by projects like KATALYST or other agencies. The report does not reflect KATALYST's current methodology and final conclusions on the sub-sector.

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- *Bangladesh Agricultural Machinery Merchants Association*
- *Bangladesh Engineering Industries Owners Association*
- *Chittagong Builders*
- Mr M.A. Motalib – Deputy General Manager of the *Bangladesh Small & Cottage Industries Cooperation* (BSCIC)
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- Professor Nurul Islam – Researcher and former Director in the *Institute of Appropriate Technology* – BUET.

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Agricultural Machinery, Tool, and Equipment Subsector
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List of Abbreviations and Acronyms

BADC	:	Bangladesh Agriculture Development Corporation
BAMMA	:	Bangladesh Agriculture Machinery Merchant Association
BARC	:	Bangladesh Agricultural Research Council
BARI	:	Bangladesh Agriculture Research Institute
BASC	:	Business Advisory Services Center
BAU	:	Bangladesh Agricultural University
BBS	:	Bangladesh Bureau of Statistic
BDS	:	Business Development Services
BEIOW	:	Bangladesh Engineering Industry Owner's Association
BMEDP	:	Bogra Metal Enterprises Development Program
BRAC	:	Bangladesh Rural Advancement Committee
BRDB	:	Bangladesh Rural Development Board
BRII	:	Bangladesh Rice Research Institute
BS	:	Business Services
BSCIC	:	Bangladesh Small and Cottage Industries Corporation
BUET	:	Bangladesh University of Engineering and Technology
BYDC	:	Bangladesh Youth Development Center
CARE	:	Cooperative for Assistance & Relief Everywhere
CYMMIT	:	International Maize & Wheat Improvement Center
DAE	:	Department of Agricultural Extension
DFID	:	Department for International Development
GDP	:	Gross Domestic Product
GNP	:	Gross National Product
GOB	:	Government of Bangladesh
GTZ	:	German Technical Aid
HYV	:	High Yielding Variety
IDE	:	International Development Enterprises
ITDG	:	Intermediate Technology Development Group
KB	:	Krishak Bandhu
MAWTS	:	Mirpur Agriculture Workshop and Training
MIDP	:	Minor Irrigation Development Program
NCDP	:	Northwest Crop Diversification Project
NGO	:	Non-Government Organization
PETARRA	:	Poverty Elimination through Rice Research and Assistance
RDA	:	Rural Development Academy
RDRS	:	Rangpur Dinajpur Rural Services
REFPI	:	Research And Extension in Farm Power Issues
SE	:	Small Enterprises
SME	:	Small & Micro Enterprises
SS	:	Subsector
SS-MA	:	Subsector Market Assessment
STW	:	Shallow Tube Wells
ToR	:	Terms of Reference

Glossary

- **Business Development Services (BDS):** any non-financial service provided to businesses on either a formal or informal basis. Also known as **Business Services (BS)**
- **Demand:** the quantity and type of goods or services that buyers wish to purchase at any conceivable price. (Describes the behavior of consumers.)
- **Consumer:** user or buyer of service products offered by business service providers.
- **Cost effectiveness:** the impact of a program intervention compared to its cost. A program is cost-effective if the ratio of benefits to costs is high.
- **Donor:** the funding agency that pays for development activities.
- **Facilitator:** international or local institutions, usually funded by governments or donors, that aim to expand and improve a BDS market by increasing demand or supporting BDS providers in developing new service products, promoting good practice, and monitoring and evaluating performance.
- **Impact:** sometimes called "effectiveness", this is the effect a service has on the SE client performance (i.e., that which can be attributed to the service itself, not to outside factors), or it is the broader economic and/or social effect of the intervention.
- **Intervention:** the temporary, facilitative mechanism by which donors and facilitators try to effect change (typically a project or a program).
- **A market:** a set of arrangements by which buyers and sellers are in contact to exchange goods or services—the interaction of demand and supply.
- **Market development-based or oriented:** activities that try to make the interaction between demand and supply more effective.
- **A market transaction:** the exchange between demand and supply is at full market price (the price at which suppliers are prepared to sell and consumers are prepared to buy, in an unsubsidized situation.)
- **Outreach:** sometimes called "coverage" or "scale", it is the number of the target population that uses the service. Note that in the PMF "outreach" is understood to also indicate coverage of disadvantaged groups such as the poor or women.
- **Practitioner:** A non-profit organization, a publicly funded consulting firm, or government institution that provides BDS to SEs or facilitates BDS provision. Distinguished from donors who fund these activities.
- **Provider:** a firm or institution that provides BDS directly to SEs. They may be private for-profit or not-for-profit firms, NGOs, parastatals, national or sub-national government agencies, industry associations, etc. Used more often to refer to non-profit organizations.
- **Public goods:** a good or service is said to be public if the amount consumed by one individual or firm does not reduce the amount available for consumption by others.
- **Service:** the product consumed by SEs—fax services, technical training, consulting, information, etc.
- **Supply:** the quantity and type of goods or services that sellers wish to sell at any conceivable price. (Describes the behavior of suppliers.)
- **Supplier:** a private sector or for-profit individual, organization, or mechanism that supplies BDS directly to SEs. (Contrasts with provider.)
- **Small Enterprises (SEs):** includes micro-enterprises as well as small- and medium-scale enterprises. These size categories are usually defined by the number of employees or by assets, and they vary by country and/or institution. No precise definition is adopted here.
- **Sustainability:** A BDS is "sustainable" if SEs have continuing access to services through unsubsidized, commercial channels beyond the life of a project. Sustainability in BDS is considered at the level of impact on enterprises, specific types of services, and BDS providers and markets. Financial sustainability is a critical part of overall sustainability. A BDS provider, facilitator, or individual service is sustainable if commercial revenues are at least as great as the full cost of service provision (direct and indirect costs, fixed and variable costs). Revenues received from the public sector (donors or governments) are not included. Similarly, revenues received as a result of philanthropic or political motivations are not included.

Executive Summary

Last year, IDE was requested by REFPI to conduct a subsector analysis and market assessment on agricultural machinery and tools. This DFID project, implemented in March/April 2002, aimed to investigate the market of business services in the on-farm agricultural machinery subsector of Bangladesh. The study focused on three major agro-machinery production areas of the country, viz., Bogra, Dinajpur and Jessore. In addition to the primary study carried out with the various value chain members in these target regions, interviews were also conducted with key informants, including representatives from the government, NGOs, research institutes and the private sector.

The project was able to identify and examine the main constraints faced by the subsector actors. Ten such problems are discussed in categories of market access, input supply, technology/product development, management and organization, policy, finance and infrastructure. These collectively contribute to growth retardation of the subsector through market stagnation, low productivity/profitability, poor product quality and general financial loss. These may be summarized below as:

- Small producers and sellers unable to realize credit
- Capacity of the employees leading to high employee turnover rate
- Policies and regulations not taking subsector needs and expectations into consideration
- Lack of information on innovative production technologies
- Lack of knowledge on basic operation/maintenance of agro-machinery
- Erratic raw material supply
- Farmers offered a limited range of agro-machinery and equipment
- Machine shops/foundries producing below capacity
- Farmers are not able to afford modern equipment

A description then follows of the Business Development Services (BDS) required to combat these constraints, thereby promoting the growth of the subsector. These included

- Building awareness on legal contracts/agreements which would serve to safeguard the interests of small producers/sellers who are vulnerable to poor credit recovery
- Implementing comprehensive human resource development (HRD) and skills development programs which devise incentives to retain employees (e.g., target bonuses, sales commissions, profit-share schemes and on-the-job training packages)
- Emphasis is also placed on advocacy and lobbying to protect subsector interests.
- Disseminating information on improved production technology by establishing links with agro R&D organizations and foreign machinery manufacturers. It is also vitally important for farmers to have access to illustrated instruction manuals written in simple Bangla text

Identification of the constraints and the BDS required to relax those constraints enable us to carry out a detailed assessment of the current status of the BDS market. Key points that have been looked at are:

- The current providers of the BDS
- Market size and penetration of the BDS
- Frequency of use of BDS

This then leads to an in-depth discussion of the constraints in the market from demand and supply perspectives. Furthermore, interviews conducted with the key informants provided valuable information on their awareness and satisfaction levels with the BDS/service providers.

Tabular representations are included of the following:

- Proposed providers (private sector companies, NGOs, research organizations) which can address the constraints
- Financial sustainability of service provision: For instance, membership/campaign fees contributed by subsector actors; training fees to pay for HRD/skills development programs, public funds to assist in R&D activities
- Impact on Farm Equipment Subsector (increased participation of farmers, increased production/profitability, improved product quality and more product options).

It was concluded that there is great scope for intervention in the areas of:

- Technology and Product Innovations
- Market Expansion
- Capacity building and awareness program

It was further recommended that a Facilitator should be appointed to oversee the improvement and intervention process by making full use of the private sector network. The Monitoring & Evaluation (M&E) process is crucial to ensure that stated goals and objectives are being achieved and that accepted methodology is being followed.

Introduction

The subsector analysis and market assessment on Agricultural Machinery and Tools was undertaken at the request of REFPI (Research and Extension in Farm Power Issues), a project of DFID, during the month of March and April. The primary objective of the study was to assess the market of business services (BS) in the on-farm agricultural machinery, tool and equipment subsector of Bangladesh. The study was carried out in three agro machinery production areas of Bangladesh – Bogra, Jessore, and Dinajpur. The Jessore study was carried out from 16th March through 22nd March 2002, followed by Dinajpur (29th March through 7th April), and Bogra 29th March through 10th April. A validation workshop was also organized in each study area after completing the survey to confirm the initial findings with the various actors of the subsector. The workshops were conducted as follows: Jessore 24th March, Dinajpur 10th April and Bogra on the 13th April.

This subsector market assessment was focused on the agricultural machinery, tool and equipment subsector from among the range of on-farm machines, tools and equipment being produced and sold in Jessore, Dinajpur and Bogra. The overall analysis of the subsector draws on both the primary study in the targeted areas as well as secondary data that was available through the interviews with key informants (including representatives from Government, NGOs, research organizations/institutes and the private sector) and related publications and research papers. This report identifies the constraints faced by the actors in the subsector, forces that are driving the changes in the subsector, demand for the provision of BS and the interventions that can play a critical role in addressing the constraints, thereby improving the performance of the subsector in strengthening a pro-poor growth. This would have an overall positive impact on the target subsector actors and ultimately the resource-poor farmers.

Background of Study

REFPI has funded about 40 sub projects carrying out research and extension activities on farm power issues. A large number of these projects have worked closely together with the private workshops and manufacturers that are engaged in the production and repair of agricultural machinery such as threshers, reapers, pumps, etc. In addition REFPI is financing the skills and business development through ITDG for a few small enterprises in this sector. Machinery and tools are a growing input in agricultural production and, over the past few decades, the numbers of irrigation pumps, power tillers and small rice mills have grown significantly. Through its various initiatives, REFPI is satisfying the growing need for research and development as well as product innovation. As a part of the initiative, several new products and modifications of existing products, such as threshers, sugar cane crushers, maize shellers, wetland weeders, seed drill, etc., are now entering the market. REFPI and its partners feel that there is a great interest in harvesting and transplanting equipment due to the increased demand for labor during harvesting and transplanting periods of the agricultural calendar. In addition, small entrepreneurs and NGOs in the rural areas are also increasingly becoming involved in food processing, thus creating a demand for equipment appropriate for processing purposes. However, the R&D and current market system are not able to sufficiently cater to these needs.

REFPI has intervened at different levels in the market and discovered that there is a need for a more structured approach to the subsector. However, this is beyond the mandate and current time limit of the project. Given that the mandate of the Swisscontact/Katalyst is to provide support to strategic subsectors and clusters through improvement of business services, they have displayed tremendous interest in this subsector. During the months of December – January, Katalyst has carried out initial mapping from about 12 sub sectors, with an aim to identify the areas that most

warrant their support. Initially light engineering (covering agricultural tools and equipment) was included in the 12-subsector mapping. However, since REFPI already planned to undertake the study, Swisscontact/Katalyst felt it was advisable to collaborate with REFPI in the study. This would enable Katalyst to best assess the potential for appropriate interventions for the development of this crucial subsector.

Meanwhile, IDE has successfully carried out a few Subsector Analysis and Market Assessment (SS/MA) in the chars and north-west Bangladesh on dairy and aromatic rice for DFID. IDE has also developed a national consortium that carried out subsector mapping on behalf of Katalyst in December 2002. In addition, IDE has wide experience working with the private sector and other service providers in the minor irrigation market for Treadle Pump, hand pump, small diesel engines, micro sprinklers, drip irrigation systems, etc. It was therefore, felt by REFPI and also Swisscontact/Katalyst, that IDE is quite well placed to undertake the current SS/MA and subsequently implement possible future interventions that might be adapted and supported by Swisscontact/Katalyst.

Based on this confidence, REFPI contracted IDE to carry out the SS/MA on on-farm agricultural machinery and tools in three areas of the country: Bogra (the largest cluster of pump and equipment manufacturers in Bangladesh); Jessore and Dinajpur which are supplying the markets in greater Faridpur and North West of Bangladesh. These areas have been identified and selected based on the working experience of REFPI as well as the mandate of Swisscontact/Katalyst as rural markets.

Methodology

Subsector Market Assessment Approach

In analyzing subsector and its market for BS as well as in designing related interventions, the methodology used was one that unites the strengths of the subsector approach (which identifies constraints that were faced by various subsector actors in the value chain) and BS market development. This combination provides for a concrete approach to developing markets by supporting the BDS providers who provide demand driven services on a commercial basis to large numbers of MSEs.

The following summarizes the methodology that was used in undertaking the subsector/market assessments. The methodology is in six steps:

Step 1: Subsector Selection/Product Selection

This step normally involves the establishment of criteria in assessing various subsectors in an attempt to choose the one that is most appropriate for support. Upon establishment of the criteria, they are ranked (using an appropriate ranking tool) to compare potential subsectors. The subsectors that rank the highest are chosen for more detailed analysis. In this particular study, REFPI felt that they have a good understanding of the subsectors in the target areas of operation. They have therefore identified and selected Bogra, Jessore and Dinajpur as potential areas for in-depth study for designing interventions. The formal selection process did not take place in this study as a result.

As the subsector to be studied is carefully selected, it may also become necessary to conduct the selection process to determine the targeted products of the subsector. This is relatively standard procedure in a case where there are numerous product possibilities but it is only feasible to focus on a manageable few. For this SS/MA a

separate activity was undertaken to determine the product focus for the study. End users of products, and retailers and wholesalers were interviewed followed by a ranking process.

Step 2: Initial Subsector Information Gathering and the Subsector map

Once the selection of the subsector and the product has been carried out, the next important task is to have an understanding of the subsector and its dynamics; hence relevant documents were studied and discussions were held with the “key informants”. Annex # provides a list of key informants interviewed during this study. Based on this initial information a subsector “map” was developed to graphically present all the actors in the value chain and their relationships to one another. The map essentially illustrates the “channels” of activity and shows the various scenarios of activity as they proceed from input supply, through production, collection, processing and distribution to the final consumer. The initial map was modified as and when new information about the subsector was gathered.

Step 3: Identification of Constraints and Opportunities

Data collection guidelines and tools were developed in Bengali and tested prior to their use on the field. Interviews with subsector actors were undertaken to facilitate the identification of constraints and opportunities typically faced by the subsector actors in seven areas, viz., market access, input supply, technology/product development, management and organization, policy, finance, and infrastructure. Samples of respondents were randomly chosen in order to ensure that the selection was unbiased and representative of the universes (all actors in the subsector).

Step 4: Identification of Business Services and Providers that Address Constraints and Opportunities

After the identification of the constraints, the subsector actors were requested to pinpoint the services that can address those constraints. The respondents were also asked to identify any BDS providers that are currently offering the identified service. Steps 3 and 4 both utilized the same standardized questionnaire.

Step 5: Market Assessment of Identified Business Services

This step focuses on the assessment of the market for the identified services. This was done by identifying: 1) size of the market (how many are accessing the service, or could access the service), 2) frequency of use of the service, 3) constraints in the market for the service (from both demand and supply perspectives), 4) satisfaction with the service, 5) awareness of the service and 6) costs of providing the service. Two separate questionnaires (demand and supply side of BDS) were designed for this step and were used for the subsector value chain actors and service providers.

Step 6: Design of Interventions to Develop Business Services in the Subsector

Steps 1-5 extensively describe the way in which relevant secondary information about the subsector has been collected from a variety of sources, viz., documents, key informant interviews, surveys, subsector workshops. A discussion also followed of the construction and fine-tuning of the draft subsector map. Designing appropriate interventions becomes the next logical step. These interventions would aim to strengthen the market by effectively and efficiently addressing constraints in the subsector in a way that improves the provision of demanded BDS.

It may be noted here that the SS/MA yielded a variety of interventions for each targeted subsector that was deemed necessary for the development of related markets. Interventions were chosen with consideration for their importance to the subsector in direct relation to the development of its market. In some cases it is possible to coordinate the intervention efforts with other organizations (donors, facilitators to work on broad advocacy and lobby and policy change) which work together in providing a wider range of needed interventions. The interventions are designed using the guiding principles of the market development paradigm. It is understood that the facilitator would coordinate all the necessary intervention activities. In this regard, subcontracts may be made to local firms to capacitate the BDS providers. Subcontractors may be chosen based on practical ability as well as their understanding of, and adherence to the market development approach. One of the first tasks in the implementation phase of the program would be to re-visit the intervention design, refine, and develop commitments from the partners.

Scope and Activities of the Study:

The scope of the study was limited to on-farm machinery, tools and equipment in the district towns of Bogra, Jessore and Dinajpur. Machinery for the study is defined as “any (manually, mechanically, or electrically operated) device, assemblage or parts, having a unique purpose that augments or replaces human or animal effort for the accomplishment of physical tasks”. Farm machinery is defined as “manual, mechanical, or electrical devices and implements, used in farming to save labor, increase efficiency, reduce time, and enhance productivity.

The activities of this work fall into three main categories 1) Orientation and training, 2) Information gathering, and 3) Present key findings.

The following provides a brief overview of the scope and activities of the study:

1. Orientation and Training

A 5-day orientation and training was designed to provide a good background in philosophy and practice in preparation of participants’ involvement with the fieldwork that is to follow. The one-week session began with explanations of the REFPI study, followed by general information on the BS market development paradigm, the subsector approach and planning for the fieldwork. It was decided that the training would be delivered in the local language to save time and facilitate ease of understanding on the part of the participants.

2. Information Gathering

There were five main components to Information Gathering, these being:

a. Secondary Data

An attempt was made to collect relevant documentation related to the subsector and the target areas. This proved to be a challenge of its own, as there was not sufficient written information available on the subsector

b. Narrowing Down Product

Agro machinery and tools consist of a large number of products ranging from completely imported engine and motors to country plough, spade and hoe. During the design phase of the study, about 138 different on-farm machines and tools were identified and latter narrowed down to 28 items based on the information from the

secondary sources and key enforcements. However, the list was further narrowed down during the field survey. Both demand (i.e., the farmers) and the supply (i.e., producers and sellers) viewpoints were looked into and five major products in each location were short-listed to be the subjects of more intense investigation. The following criteria were used for short-listing:

- Number of SMEs engaged in production and sales
- Demand (as expressed by the farmers) correlated with high sales (as expressed by the retailers and wholesalers)
- Appropriateness of the technology based on the land holding, ground water level, suitable for use by women)
- Appropriateness to existing cropping culture and crops
- Presence of strong rental market
- Requirement of specific infrastructural facility such as electricity
- Ease of accessing the technology by the farmers
- Knowledge and awareness about equipment

Based on the above weighted criteria, the following machinery and tools were narrowed down for the study:

Table 1: List of products narrowed down and studied in the three study areas

Products	Jessore	Dinajpur	Bogra
Shallow Machine	1	1	1
Power Tiller	2	3	2
Sprayer	3	2	4
Thresher	5	4	3
Plough (modified)	4	5	-
Seed drill	-	-	-
Weeder	-	-	5

Note: Priorities are shown according to the total score of the criteria

c. Key Informant Interviews

Key informants were identified (please see annex 1) and interviewed in both Dhaka and in the target areas, by using a standardized guide. The key informants provided a variety of information ranging from general socio-economic issues to specifics related to the individual sub sectors. These interviews of the key informants were conducted throughout the time span of the study.

d. Subsector Survey

A total of 265 subsector actors in three areas were selected randomly and were interviewed, using a standardized guideline for interview. The following tables show the breakdown of respondents in the value chain by study area.

Table 2: Respondents by Study Area

Area	Bogra	Dinajpur	Jessore	Total
Foundry	12	2	6	20
Blacksmith	2	6	8	16
Machine shop	28	23	9	60
Thresher Producer	2	3	3	8
Sprayer Producer	3	0	3	6
Wholesaler	11	3	10	24
Retailer	13	11	7	31
Input Supplier	11	5	9	25
Service Provider	5	3	14	22
Key Informant	9	5	5	19
Farmer	10	12	12	34
Total	106	73	86	265

e) Validation Workshop of Subsector Representatives

A validation workshop of subsector representatives was held in each of the three targeted areas. The workshop was organized to achieve three primary objectives, 1) to present the work that was undertaken in the area, 2) to validate the findings, and 3) to explore ideas for interventions that address constraints and aid in the development of the market for BS and, ultimately, for final goods and services. The workshop provided clarity to the findings and also offered valuable new information. A list of the people attended the workshop is provided in the annex 2.

Overview of On-Farm Machinery and Tools Production and Use:

Farm machinery and tools are central to the process of agricultural development. They not only transform inputs into outputs effectively and efficiently but also embody technological changes, which hold the key to successful expansion and accelerated agricultural growth.

The entire machinery industry in Bangladesh can be categorized as follows: Engines and turbines, Agricultural machinery, Metal & wood working machinery, Textile machinery, Industrial machinery, Electrical machinery and apparatus, Shipbuilding and repairing, Transport equipment such as motor vehicles and motor cycles, etc., and miscellaneous non-electric machinery.

The farm machinery and tools subsector in Bangladesh plays a very critical role in the economy. It consists mostly of a large number of medium and small private enterprises. In fact, the private sector farm machinery and tools industry in Bangladesh is dominated by small and cottage units, each of which employs two to three people working on one lathe machine or small crucible furnace. Even though reliable and up-to-date data on these small and cottage enterprises is difficult to obtain, one estimate shows that in 1989-90, small and cottage enterprises accounted for nearly 93 per cent of all private machinery and tools enterprises and 64 per cent of all employment in that category¹. However, productivity level in these small and cottage units is

Type	No. of units	Employment	Gross output (million taka)	Output per worker (million taka)
Cottage	25,000	75,000	1,500	0.02
Small	3,000	40,000	1,000	0.03
<i>Medium and Large</i>				
Private	2,000	30,000	5,000	0.17
Public	27	35,000	1,500	0.04
All	30,027	180,000	9,000	0.05

Source: M.M. Huq et al, Machinery Manufacturing in Bangladesh, University Press Ltd., Dhaka, 1993

generally said to be much lower because of lack of appropriate technology, skills, marketing and other necessary support services. It may be noted here that the machine and tools market in general, and agricultural machinery and tools in particular, is characterized by a very fragile market mechanism: for, it is not only the consumers (farmers) who are poor; the people (small and cottage enterprises) who engage in business with the farmers are also relatively poor. This leads to a downward spiral of means-end chain, leading to reduction in quality and affordability and deterioration in productivity. Economists recognize this as the downward spiral of “poverty trap”. As a result, the small enterprises are faced with a constant challenge of research & development and product innovation coupled with increasing operational efficiency.

The farm machinery and tools subsector has a fairly large aggregated production capacity; however, the level of capacity utilization is particularly low. As a result, the share of the industry in the overall manufacturing output is also small. The subsector actors – notably the manufacturers/fabricators – have attributed one critical factor to the slow growth of the machinery and tools industry in Bangladesh. This is unfavorable tariff policy. To encourage private investment and facilitate rapid industrial growth, the government is providing easy access to imported machinery by lowering import duty on these items. In contrast, the duty rates remain high on raw materials, parts and components for the machinery industry. This tariff anomaly is resulting in negative effective rate of protection for the indigenous machinery and tools industry in Bangladesh. This, in turn, is leading to under-utilization of capacity and output.

¹ M.M. Huq et al, Machinery Manufacturing in Bangladesh, University Press Ltd., Dhaka, 1993

Bangladesh is predominantly an agrarian economy and is characterized by small-scale, fragmented farming that employs primitive technology. The sector does not have the resources to meet the various challenges, despite the fact that agriculture serves as the primary means of livelihood of the population - contributing about half of the Gross Domestic Product and employing two-thirds of the total labor force. Technology, both hardware and software, is imperative to increasing production in crop agriculture. There are many underlying factors affecting the adoption and non-adoption of technologies, of which affordability, availability, accessibility, and appropriateness of technologies are considered especially critical. It was observed that wherever these and other conditions are favourable, farmers have shown themselves to be willing to adopt new technologies that significantly increased production.

In recent years, there has been gradual adoption of various useful agricultural machinery and tools such as threshers, seeders, weeders, cultivators, modified ploughs, power tillers, treadle pumps, small portable diesel, electric pump sets, etc. This wide range of technology - collectively referred to as farm machinery - enabled farmers to significantly increase their productivity and profitability. These systems have provided opportunities to the smallholders to increase productivity and efficiency and thereby gain more income. Local production, local repair and maintenance facility, rental market, etc, have also tremendously influenced the farmers to try their hands at new agro machinery.

Agricultural Labor Force			
In Thousand			
Year	Total Labor Force	Agricultural Labor Force	Percent of Total
1983-84	27,978	16,448	58.79
1986-86	30,562	17,478	57.19
1989	50,147	37,032	73.85
1995-96	40,300	20,600	51.12

Source: BBS Labor Force Survey, April 1992.

Agricultural Machinery and Tools Production in Bangladesh

The agricultural machinery and tools production in Bangladesh probably started in the early 1960s during the “green revolution”. During that period the agricultural machinery (mostly irrigation pumps) was primarily imported by the government and distributed through BADC. Local engineering workshops that were geared towards repair and maintenance of the imported machinery gradually emerged in the market. Initially the focus of these workshops was restricted to repair and maintenance. However, they soon started to use the limited pool of skills and resources at their disposal to produce small spare parts. The 1980s heralded a significant market liberalization and large-scale privatization of agriculture. This brought about a rapid growth in mechanization of irrigation and tillage technologies, leading to the emergence of this subsector as an important player producing and fabricating not only spare components but also a variety of low cost appropriate innovative machinery, such as seed drill, thresher, etc., A large number of farmers are currently using the machines produced by the local enterprises, either purchasing them directly or via rental arrangements. The local farmers² are currently using a total of 1.5 million treadle pumps, 760,000 shallow tubewells, 25,000 deep tubewells and 72,000 low-lift pumps. In 1999-2000, these pumps were together irrigating approximately 4.2 million hectares of land. It is estimated that 80,000 diesel engines are being imported annually for irrigation pumps³. Diesel engines are required for a number of activities in the country, including irrigation (shallow tube-well, low lift pump, deep tube-well), farm machinery (thresher, grain dryer, tiller, tractor), transport (inland water transport, and fishing boats), and for other purposes (power generating sets, compressors, welding sets, concrete mixers, rice hullers, harvesters, etc.). The use of diesel engines in Bangladesh is increasing almost everyday.

² Mandal, M.A. Sattar, “Agricultural Machinery Manufacturing and Farm Mechanization: A Case of Rural Non-farm Economic Development in Bangladesh”, Fostering Rural Economic Development through Agriculture-based Enterprises and Services International Workshop, GTZ-Haus, Berlin, 2002

³ Ibid

Minor irrigation has proved to be the most dynamic activity in the private sector. According to a study conducted by Dr. Mandal, the private sector activities in minor irrigation roughly involve 1.7 million owner/managers of mechanized irrigation pumps in addition to 760,000 owners of non-mechanized traditional irrigation devices. These are again linked with 160,000 rural mechanics that are providing installation, repair and maintenance services for irrigation pumps and engines on a variety of contractual arrangements. A rough calculation of these functions shows that it has generated approximately 11,000 man-years of employment for the rural mechanic providing support services for shallow tubewell irrigation. The enormous demand of such machinery has triggered a rapid growth of local engineering workshops. This has been further accompanied by the development of a flourishing second hand engine market and a thriving rental market in intensively irrigated regions of the country. In addition to supporting the growth of the minor irrigation sector, these enterprises have also generated productive employment for skilled and semi-skilled rural youths, thereby enhancing income for the farmers contributing directly to the food security to the country.

The use of mechanized tillage for land preparation has become a common practice among the general farmers in Bangladesh. According to the 1996 Agricultural census, 140,000 households reported the use of power tillers and tractors for land preparation. Bangladesh imports approximately 15,000 power tillers, 200 four-wheel tractors and 5,000 sprayers every year. In addition, a large number of small private enterprises are engaged in the production and fabrication of large quantities. Rangpur Foundry alone produces about 15,000 manual pumps and 1,000 centrifugal pumps per month.

A recent study conducted by Dr. Islam showed that when compared to the manufacture of traditional farming equipment, the average monthly income of the local blacksmiths engaged in the manufacture of power tiller tines increased three fold. The manufacture of spare parts for irrigation engines and power tillers has widely spread down to local level. Bangladesh has roughly more than 15,000 shops that deal in diesel engines/electric motors, irrigation pipes and filters (PVC pipes) and spare components. These manufacturers may be generally categorized as small and medium enterprises producing low-cost farm machinery, each employing between 3 to 14 semi-skilled workers. Primarily local raw materials are utilized during the production process, such as locally available wood, recycled cast iron, and cast iron sheets. Quite a few of these manufacturers are simple blacksmiths producing ordinary farm tools such as hand hoe, spades, sickles, tines for wooden country plough, etc. They have demonstrated enterprising skills by upgrading their production capacity and methods in response to increased demand for more sophisticated equipment such as power tiller tines, thresher, hand weeder, irrigation pumps, diesel engine accessories, etc.

Though these manufacturers are dispersed throughout the country, the agricultural machinery producers are mainly concentrated in Comilla and Bogra, now gradually spreading to Jessore, Dinajpur, Sylhet, Mymensingh and Chittagong.

Agricultural Machinery and Tools Production Environment

A remarkable feature of this subsector is that its valuable contribution has not been recognized by the government and has also been mostly overlooked by the large private sector entrepreneurs. The subsector is still considered and categorized by many as belonging to the “non-formal sector”. As a result, it is not able to enjoy the general facilities and privileges, which are generally enjoyed by other private sector enterprises. Policies, technology, finance and standardization of products, R&D, etc., that might encourage and protect these enterprises were deplorably low.

Production Constraints

The critical constraints of the subsector are under-utilization of capacity, raw materials and severe competition with imported products. Support for product innovation, enhancing production skills, improving production technology, creating scope for round the year production, providing encouragement and support from the government, and protecting the subsector against undue foreign competition – all these factors can contribute directly to the development of the subsector. The effects of R&D and standardization are also felt by the subsector actors.

Despite some recent reductions, tariffs in Bangladesh remain high, averaging over 50%. At the recommendation of the World Bank, Bangladesh has placed a 100% tariff ceiling on most goods, with the intention of bringing the ceiling down to 60% in the fiscal year 1993-94. A value-added tax (VAT) of 10 to 20% and additional fees, typically adding up to 15% of the cost and freight value, are also applied to imports. Duties are reduced to 2.5% for the installation of imported machinery in less developed areas. They are also reduced to 2.5% for capital machinery and factories using 70% or more indigenous materials. The same applies to imported machinery for export-oriented industries. Exemptions from duties and the import sales tax are available for a variety of goods.

Production Opportunities

The type of agricultural machines or the level of mechanization needed in any region are dependent on the socio-economic condition of the people, the number and quality of draft animals available, the availability of agricultural labor in that region, cropping culture and practices, favorable infrastructural support, etc. Even after taking into consideration the limitations and constraints for mechanization, it was observed by various experts and researchers that a tremendous potential exists for the agricultural machinery and tools subsector.

Agricultural Mechanization

The serious scarcity of animal draft power in the country necessitates the use of mechanical power for agricultural production activities. This forces the farmers to attach special importance to agricultural mechanization. As a result, the use of agricultural machinery has already increased significantly and immense opportunities exist to increase this mechanization further. In this regard, various national and international agencies and institutions are providing support to raise farmers' interest in mechanization as well as arrangements for credit facilities for the purchase of machinery.

Production and Import

The government actively encourages the production and import of agricultural machines. Availability, options and conveniences are three critical factors emphasized by both the government and the private sector. Machinery workshops and industries engaged in agricultural mechanization activities have certain tax/duty facilities for import of necessary raw materials (although the subsector actors do not feel this is adequate), to keep the agro machinery prices and quality within the purchasing capacity of the farmers

Financial Support

To speed up the process of agricultural mechanization for both the producers and the users of machines, there is potential to tap into the financial institutions to obtain necessary credit supports.

Rental and Lease Market

The rental and lease market for the agro machinery and tools is extensively growing in the rural areas. This is directly helping to popularize mechanization, as well as provide hands-on benefits to the farmers. A number of agencies and enterprises are providing lease and rental options for agricultural machines. A vibrant private sector is providing this service. It was observed that the demand and use of machines are increasing, particularly of those expensive machines that individual farmers find difficult to afford. Hands-on demonstrations would help potential buyers to shape their decisions, as would an explanation of the possible benefits of using these machines.

These and a host of other factors show that the agricultural machinery and tools subsector shows tremendous promise.

Review of Agriculture Sector Policy Reforms

Liberalizing trade in the minor irrigation sector and encouraging the private sector to supply minor irrigation equipment constitutes major reform. This was done step-by-step, first with the removal of restriction of import of small diesel engines in 1986-87, followed by the withdrawal of duty on such imports in 1988-89. The subsidy on deep tube-wells was also removed in 1992; furthermore, BADC was removed from the monopolized procurement and distribution of minor irrigation equipment, thereby providing scope and opportunities for the private sector to step in. These reform measures have certainly produced a positive effect on the demand for irrigation equipment, and consequently there has also been a rate of increase in the area under minor irrigation. The liberalization of trade and foreign exchange has also generated remarkable participation by the private sector in agricultural machinery. Recently the import of agriculture machines, including power tiller, has also been liberalized - resulting in the positive effect on import of power tillers. The area under power tiller utilization has grown by about 3.5% per year after introduction of the liberalization policy.

Major Policy Directions

In order to realize the objectives and targets of the FFYP (1997-2002), the Government is pursuing a number of critical policy directions with a view to gain self-sufficiency in food production and ensuring dependable food security for all. Some of the policies are provided below:

1. An appropriate policy framework for sustainable development of farm mechanization and commercialization of agriculture;
2. Strengthening of the agricultural research institutes and extension agencies to provide full support for augmenting agriculture;
3. Restructuring BADC to downsize it considerably and encourage the participation of the private sector in agricultural development;
4. Establishing appropriate institutional systems to ensure the availability of agricultural credit on time.

One of the important projects that are likely to be implemented during the Fifth Plan period is the set-up of a light engineering complex in the northwest region of the country. The above shows that there lies a remarkable opportunity for the private sector to participate profitably in the subsector.

Subsector Analysis and Market Assessment:

During the survey, it was identified that the agricultural machine tools market in Bogra and Jessore are more developed than Dinajpur. It may be noted that the selection of the areas was based on the briefing of REFPI. According to key informant interviews and suggestions from the REFPI, the towns (municipal areas) of the above mentioned districts were identified as the potential locations for agro machinery production and sales. However, during the field survey it was found that in some regions, for example in Jessore, the thresher production is concentrated outside the municipal area in Kaligonj upazilla. Similarly in Dinajpur, the production and fabrication of agricultural tools do not have any concentration in the district town. Rather, it is scattered all over Dinajpur district, covering 13 upazillas and 28 unions. This uniqueness was taken into consideration during the field study while developing an overall understanding of the production, distribution and sales of various agricultural machinery and tools.

Related Subsector Constraints:

The subsector analysis and market assessment provided valuable insights into the subsector and revealed certain critical constraints that are faced by various actors in the value chain. Apart from the constraints, the analysis and assessment also showed the dynamics of the subsector, its behavior, customs and practices, as well as potentials and opportunities. Before going into the constraints, an understanding of the dynamic interrelationships of the subsector might be useful. These can be understood through the subsector maps.

Subsector Map

In the subsector maps, the channels are identified on the basis of the core business unit, i.e., the producers. The various producers use different channels in the procurement of inputs. In general, the more integrated the units, the more capital-intensive they are. The integrated units also have fewer intermediaries. It was observed that the integrated units mostly have their own outlets for both retailing and wholesaling. In some cases, they even have a dedicated broker or marketing agent.

The subsector maps and the brief description of the channels and actors are provided in annex 3

Subsector Constraints

The major constraints that were identified in the three survey areas are listed below without any priority. It may be noted that the following constraints are generally found in all three areas, albeit in various degrees. On the other hand, some are very area specific. These area specific constraints are also explained in the list below:

1. *Inability to realize credit by the small producers and sellers resulting low working capital and distrust towards new traders*

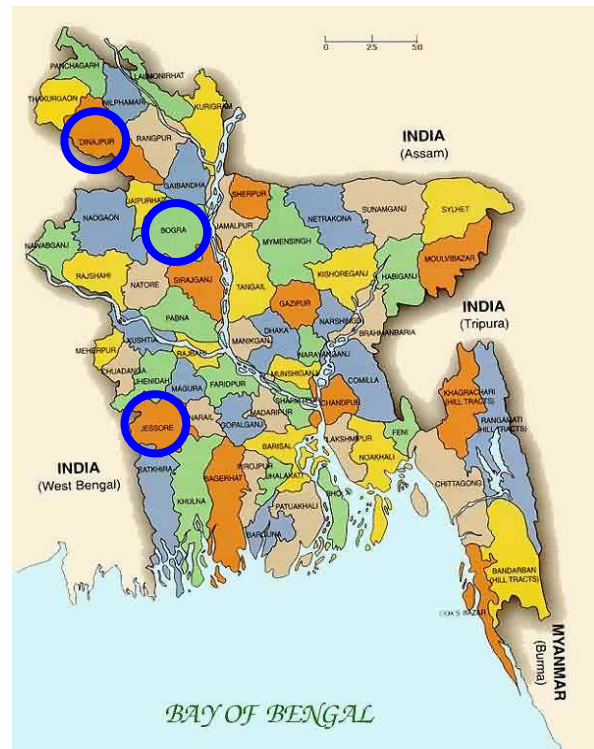


Figure 0: Location of field survey area

Credit sales and purchase are common phenomena in the sub-sector, and may be considered both as a blessing and a curse. Almost all the actors are engaged in credit (either sales or purchase) to various degrees. They range from the input suppliers to the final product suppliers. Realization of credit has been a subject of concern for all the actors in the sub-sector, particularly for the producers and sellers (both retailers and wholesalers). In all three regions, about 84% of the producers and sellers (about 88% in Bogra) sell their products in both cash and credit. In comparison to Bogra, it has been observed that credit sales are slightly more prevalent in Jessore. Slow and delayed realization of credits is the primary complaints of the actors, particularly the smaller producers and sellers (constituting 63%). The delays range from a month to a year, perhaps more. Often the credit takes the form of a vicious cycle, i.e., the buyer repays what he owes, only to purchase on credit again. Hence, this unrealized credit, sometimes ranging from Tk 10,000 to Tk 100,000, borne by the producers and sellers, constantly remains in the market. The problem is exacerbated when the buyers switch sellers without paying the outstanding amount; alternatively, the buyer may not place a repeat order and disappear without repaying the credit. Such indefinite delays trigger problems for the smaller producers. Two factors influence the difficulty in recovery, 1) the entry and exit is relatively easy, particularly in the sales of agro tools. Thus, businesses (buyers) may seize the opportunity without committing themselves to a long-term business effort. They terminate the business upon seeing a saturation of demand in a particular area, becoming completely untraceable afterwards; 2) A further complication is that it is impossible to exact payment through legal or other formal channels. This is because the verbal transactions are conducted on good faith, without any legally enforceable agreements being signed. In such cases, the sellers often attempt to recover money from the delinquent buyers by taking assistance from the Association. It was concluded from the survey that intervention for credit recovery is one of the important functions of the associations.

2. *Lack of skilled and experienced workforce at the producers level resulting in frequent change in job:*

In general, the subsector lacks a skilled and experienced workforce, particularly in the manufacturing and fabrication of tools, equipment and spares. Therefore, the demand for skilled and experienced personnel is particularly great. This fact is illustrated by the cutthroat competition between individual enterprises to recruit the most qualified and competent personnel. For instance, one enterprise may accuse and confront another for attempting to allure experienced technicians with the promise of attractive compensation and benefits packages. There are some who join an enterprise strictly to gain experience. They eventually leave the organization, with a view to start their own operation with the limited capital at their disposal. This has resulted in the proliferation of small enterprises in the subsector. Therefore, the supply and demand of skilled workforce are somewhat erratic in nature, causing employees to have a natural tendency of frequently ‘jumping’ from one business house to another. This frequent and high employee turnover has become a topic of great concern for the subsector. The respondents have reported that this high turnover rate has led to serious financial repercussions in the enterprises, e.g., low quality output, low productivity, non-delivery of products in scheduled time, increased wastage of raw materials, etc. These factors are directly responsible for the stunted progress of the subsector, in terms of slow growth, poor profitability and low quality output. They also leave the subsector more vulnerable to foreign competition.

3. *Lack of ability to collectively safeguard the interest of the subsector, resulting in inadequate reflection of the needs and expectations of the subsector in the policies and regulations:*

The enterprises in the subsector are primarily small and medium in size, being generally categorized in the “non-formal sector”. The subsector is also characterized by a high rate of proliferation of new enterprises. As a result, an engaging and productive coordination amongst the subsector actors is practically nonexistent. Despite the fact that 7 prominent associations have been found to be working in the subsector, only about 32% of the value chain actors are engaged in various associations. This is clear evidence of disintegration and isolation of enterprises in the subsector. Therefore, these enterprises are unable to protect their interests as a cohesive united force. They are equally unable to safeguard their interests by lobbying and advocacy activities with various policy formulating bodies. Currently the associations are mostly engaged in arrangement of picnics, credit recovery, conflict resolution, and provision of loans from an accumulated members-savings fund.

4. *Producers lack information on new and improved production technologies, which results in low productivity, and poor quality of products.*

The manufacturers and fabricators of agricultural machine and tools are still using old and indigenous technologies. About 82% of the respondents said that they procure second-hand outdated machines. Two important factors directly contribute to this: 1) minimum capital investment, and 2) lack of adequate information about new, improved machinery and their benefits. The respondents have mentioned that their machinery is primarily outsourced from locally fabricated machine manufacturers mostly from “dholai-khal”, Dhaka. The large machinery importers generally do not consider this as a potential market, although a few have relationships with some large agro machinery producers.

5. *Farmers lack adequate knowledge on the basic operation and maintenance of on-farm agricultural tools/machineries, resulting in weak interest and demand for usage of agro machineries by the farmers.*

Poor performance and frequent breakdown of their tools and machinery were frequent complaints cited by 62% of the farmers interviewed. The manufacturers and sellers further mentioned that the farmers had negligible knowledge of certain basic routine repair & maintenance work. Tasks such as oil check, routine servicing, proper storage, cleaning and washing after field operation, etc., are standard procedures to be followed to ensure optimal performance. The farmers complained that the sellers are not sufficiently cooperative when it comes to providing relevant knowledge and information. Furthermore, the users mentioned that on the rare occasion that the sellers provided operation manuals, these were found to be in English or Chinese. However, 67% of the sellers themselves admitted to their lack of knowledge on operation and maintenance of certain machinery i.e., engines, and power tillers. This obviously led to their inability to impart the necessary knowledge and skills to the users. A substantial majority of the sellers and manufacturers refuse to honor verbal promises made to users about product warranty and 1-year after-sales service. In addition to this negative attitude on the part of the sellers, there is also the inconvenience of carrying heavy, bulky machinery over large distances. These factors collectively dissuade users from approaching sellers for after-sales service. They would prefer doing the regular repair and maintenance work themselves, perhaps taking assistance from the neighboring mechanics.

6. ***Lack of regular supply of raw materials (particularly pig-iron) to the foundries during the peak season hampers production.***

The relatively smaller foundries face this crisis, particularly due to the lack of a smooth supply of pig iron during the peak season. These foundry owners maintain that the importers/suppliers of pig iron maintain the market price by releasing their consignment at regular intervals. The smaller foundries bear the brunt of the crisis; their working capital is not sufficient to allow them to stock up on the required raw materials over time. Only 5 large importers based in Dhaka and Chittagong import pig iron. Extensive capital investment is required to bring in materials by the container load from China and South Africa. Pig iron is also imported from India, but this is of substandard quality.

7. ***Limited options/choices of machinery, equipments and tools being offered to the farmers results in narrow market stagnation***

The operation of open markets in Bangladesh has brought about a significant change to cropping practices, cultures and patterns. Intervention by various government, non-government and private sector organizations is also a crucial contributing factor. Farmers are now more focused on various high value crops such as potato, corn/maize, vegetables and horticultural crops, which previously had no market prospects. About 60% of the farmers interviewed declared that they have started a new crop in the last 2-3 years. However, the machinery subsector is slow in responding to users' needs. This, in turn, is accompanied by a limited choice of machinery available to cater to the specific needs of small farmers and women. 40% of the manufacturers attribute the narrow range to insufficient R&D and product innovation.

8. ***A general stagnation in the market growth of agricultural machinery and tools, resulting in low profitability of the subsector actors.***

About 60% of the subsector actors, particularly the producers and sellers, have expressed their concerns about the sluggish growth of the market for agricultural equipment and tools. The survey found that the promotional efforts on the part of the subsector actors are generally confined to personal relationship. In fact, about 46% of respondents admitted to relying largely on personal contacts for selling their products. Only 10% have official company stickers/label on their products, whereas a meager 9% have brands. A wide majority feels that their sales volume can be improved through publicity of their products, both within the country and outside it. They feel that mass marketing beyond personal relationship is essential for the vertical expansion of agricultural machinery and tools. Many smaller enterprises are engaged in severe competition within the local market alone. However, they do not have the adequate linkage to venture beyond their local area.

9. ***Under utilization of existing production capacity of machine shops and foundries, resulting in poor profitability of the manufacturers***

About 93% of the machines shops and foundries reported their peak season (December to February and June to September for machine shops; November to March for foundries) capacity utilization to be roughly 60-70%. During the off-peak season, the capacity utilization decreases to as low as 10-15%. The manufacturers attributed the low average annual profitability to the limited scope and opportunity for round-the-year diversified products such as post harvest and agro processing equipment.

10. Lack of farmers purchasing ability to purchase agricultural equipment and tools retards the growth of the subsector

This is a general constraint faced by the subsector actors, particularly the manufacturers and the sellers. The small farmers⁴ (constituting about 53% of the total farming community) do not have adequate financial resources to purchase agricultural machinery and equipments. Despite the farmers' awareness and interest in mechanization, the agro-machinery manufacturers feel they cannot afford modern equipment. The resulting market segment has an extremely narrow approach, targeting only the medium and large farmers.

Description of the BDS Necessary for the Growth of the Subsector

1. Provision of mechanism for improvement of credit recovery for the manufacturers and sellers

The manufacturers and sellers, through the association, presently handle the credit recovery. The association acts as a mediator between the parties and provides a mutually agreed measure to settle the outstanding credits. A majority of the respondents expressed their satisfaction on the role of the association in the credit recovery process. However, some of the manufacturers and sellers, mostly association non-members, feel the need for other effective measures for recovery of credit. In this regard, they are interested in various legal procedures and their implications, timeframes and related cost involvements. We feel that there is very little awareness on legal procedures and their formalities. Another area that puzzles many is the kind of groundwork required to pave the way for legal actions, particularly books of accounts and agreements.

The service would include the following:

- a) Awareness and capacity building on credit systems and mechanisms
 - b) Awareness and capacity building on contracts and agreements (its needs, benefits, etc.)
 - c) Further strengthening the associations in tackling this issue more productively
- 2. Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover**

The subsector is presently suffering from a severe shortage of competently trained and experienced manpower. The manpower are in high demand in the subsector, despite the fact that they have little or no formal training and have learnt their work strictly through a process of trial and error over the years. According to the respondents, the employees leave due to a variety of reasons. They may be allured elsewhere by more attractive compensation packages, better work environment, and a healthier employer-employee relationship. Some employees often choose to start their own businesses. A comparison with other enterprises that do not have staff turnover problems led to interesting revelations. They have devised a variety of incentives in an attempt to 'hold on' to their existing employees. These measures include better compensation package for their employees, e.g., target bonuses, sales commissions and profit share schemes. It was felt that implementing structured human resource development and general skills development programs might reduce the constraints faced by the subsector actors. This was verified during the validation workshop. A majority of the participants agreed that "on-the-job" training would produce better results than classroom training.

The service would include:

- a) On-the-job training program to improve the skills of employees on various functions of machine shops and foundries.

⁴ Source Census of Agriculture -1996 "Structure of Agricultural Holdings & Livestock Population", Bangladesh Bureau of Statistics

- b) Concept on Human Resource Development, compensation and benefits
- c) Employee motivation and cultivation of employer-employee relationship
- d) Relationship building with other enterprises

3. *Provision for adequate reflection of subsector's needs and expectations in policies and regulations.*

About 80% of the respondents feel that the policies and regulations do not adequately safeguard the interests of the SMEs in the subsector. The duties on imported finished products and spare parts are at least 20-40% cheaper than those on locally produced products. High tariffs on imported raw materials and machinery for manufacture of agricultural spares all contribute to the high cost of local production. Other factors are taxes, VAT and regulatory permission and authorizations. Often discrepancies are also seen from various departments and agencies such as Inspector of Factories, departments of labor and environment, and local electricity and water authorities. Unfortunately, the subsector does not have collective bargaining power that would enable it to address such irregularities. Comprehensive advocacy and lobbying are critically necessary to protect the interests of the subsector. The association is presently involved in a limited range of activities that often do not represent the subsector very well.

The service would include:

- 1. Knowledge on policy formulation
- 2. The needs and benefits of policy advocacy
- 3. Capacity development of the association to undertake such initiatives
- 4. Linking other policy advocacy groups and activities

4. *Provision of access to information on improved production technology options for the manufacturers.*

A lack of appropriate information and knowledge has generally compelled manufacturers of the subsector to use obsolete technologies. A number of manufacturers feel that the lack of a skilled workforce may be significantly compensated by modern technologies that significantly reduce human error. Presently the large machinery suppliers do not see this subsector as a potential market, since a majority of the manufacturers in the subsector procures second-hand, locally fabricated machines. Strengthening the information link between the modern machinery suppliers, agro machinery R&D organizations and local manufacturers can be an effective way to disseminate information on improved technology. The association can also subscribe to better trade and technology publications, magazines and catalogues.

The service may include:

- a) Establishing linkage with large machinery suppliers and agro research and development organizations
- b) Establishing linkage with foreign machinery manufacturers
- c) Subscribing to foreign machinery and technology publications
- d) Organizing agro machinery fairs

5. *Provision of knowledge and information on basic operation and maintenance of agro-machinery/tools to the farmers.*

Knowledge on basic operation and maintenance techniques of machine is imperative for the users. About 62% of farmers reported that sellers of such agro-machinery neglect to provide them with the relevant technical information at the point of purchase. Operation manuals accompany neither locally produced machinery nor imported equipment. The provision of such information and knowledge is absolutely essential for the expansion of the agro machinery and equipment market. This can be arranged through the development of

illustrative operational manuals in simple Bengali; agro machinery and tools exhibitions could also be organized. Currently the village machinery technicians are providing such services, though on a limited scale.

6. *Provision of satisfactory supply of raw materials (pig iron) to the foundries during the peak season.*

This lack of adequate supply is particularly felt during the peak season. All the foundries in the subsector face this constraint. The large enterprises are maneuvering their way around the problem by building up raw material stocks over the years. This is obviously beyond the financial capability of the smaller foundries. The large enterprises have also succeeded in developing a strong working relationship with the suppliers/importers.

7. *Provision of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs*

The farmers do not have sufficient options and choices of machinery and tools to suit the requirements of the cropping pattern. For instance, many farmers are searching for potato harvester in Jessore. Comprehensive R&D and need assessment schemes are required to strengthen the product line which should take into consideration the specific demands of the farmers, i.e., cropping pattern, landholding size, etc.

The service would include;

- a) Need assessment and demand estimation
- b) R&D in association with the private sector manufacturers and fabricators

8. *Provision for increasing market growth*

The subsector actors generally feel that there is a stagnation of market demand for agro machinery. Extensive market development initiatives were not observed either at home or abroad.

The service might include:

- a. Developing appropriate promotional materials
- b. Developing a catalogue of locally manufactured products
- c. Developing web-site for the burgeoning export market
- d. Attending foreign agro machinery fairs

9. *Provision for increased capacity utilization of the manufacturers*

This is related to both product and market development initiatives. These efforts should adequately equip enterprises with the potential to produce throughout the year. Possibilities of harvesting and post-harvesting and processing machinery and equipment can also relax the present constraints on maximum capacity utilization.

10. *Provision for increasing the ability of small farmers to purchase agricultural machinery and tools*

This is generally affecting the subsector as a whole. The farmers' lack of ability of the farmers to purchase agro equipment is stunting the growth of the subsector.

The service might include:

- a) Linking with credit providers
- b) Linking the farmers with markets for selling their agro products
- c) Developing post harvest technologies to enhance the profitability of their products, especially storage and processing facilities.

BDS Market Information (Existing Providers, Market Size and Penetration, Frequency of Use)

BDS	Existing Providers	Market Size and Penetration	Frequency of use
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	The associations are currently providing this service	The credit recovery scheme could potentially serve a large number of producers and sellers and would directly or indirectly benefit all the subsector actors. Out of about 2000 producers and sellers, currently about 80% are involved in credit transaction. It is believed that a number of other actors in the chain might look for the service if they see potential benefit.	Considering the seasonality factors, the manufacturers and sellers would require this service at least twice a year. At the moment, though, the enterprises have reported using the services at least once in a year.
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	The association is providing limited services through collaborative arrangements between enterprises	About 64% of the respondents expressed their concern on high turnover (switching jobs from one enterprise to another). About 65% of 1000 manufacturers are looking for such services	The service is required at least once for key personnel in a manufacturing unit. However, because of different nature of job and various machine operation the frequency of usage of service would be high
<i>Provision for adequate reflection of subsector needs and expectations in policies and regulations</i>	The association is currently providing this service in a limited way	The entire subsector requires this service. Out of about 6,000 enterprises acting in the value chain, about 90% feels the need of advocacy and lobby for policy change.	This service is not required very frequently, but has a high impact on the subsector.
<i>Provision of access to information on improved production technology options to the manufacturers</i>	1. BAU 2. REFPI 3. GTZ 4. ITDG 5. Large Machinery Suppliers	Out of 1,000 producers, about 82% use second-hand outdated machinery due to financial crisis and lack of information. It was identified that about 20% of them are willing to obtain information that could help them acquire the technology. About 80% of the producers expressed their interest in the relevant information for the production of new agro machinery.	This service is required round the year.
<i>Provision of knowledge and information on basic operation and maintenance of agro-machinery/ tools to the farmers</i>	1. Large Importers 2. Large Dealers of Imported Products 3. Manufactures 4. Sellers	Out of about 150,000 farmers, about 63% use agro-machinery in various scales. Among them, roughly 71% feel that they need to know about the basic operation and maintenance of the mechanized agro-machinery.	Since a farmer uses the agro-machinery through out the year, the service is required whenever he procures a new machine.
<i>Provision of satisfactory supply of raw materials (pig iron) to the foundries in the peak season</i>	1. Importers 2. Large raw material traders	There are 44 foundries in three targeted areas; among them about 50% are large and small in size. Specifically, these small units are severely facing this problem.	This service is required round the year, particularly during the peak season.
<i>Provision of sufficient options/choices of machinery, equipment and tools to the farmers as per their needs</i>	1. BAU 2. REFPI 3. Manufacturers 4. BARI	About 60% of those 150,000 farmers are potential customers for this service. It is found that some realize that they need information on new agro-machinery.	Existing service providers not adequately fulfilling the market demand.
<i>Provision for increasing market growth</i>	1. Wholesalers 2. Agents/Brokers	There are about 6,000 actors in the value chain within the investigated three districts. Almost all of them have described the stagnation. Though Bogra is catering to 80% of the national market, the actors consider this to be insufficient for normal business growth. Dinajpur market, very small in size, is basically dependent on Bogra market.	Services required for market growth are not available. Such services are required by the local market on a regular basis. The dealers and agents are currently providing embedded service. These services are not available to the export market.
<i>Provisions to increase manufacturers' capacity utilization</i>	1. BAU 2. REFPI 3. Manufacturers 4. BARI	During the peak season, about 2000 manufacturers utilize roughly 60% capacities. This reduced to about 15% during the lean season. With the exception	The service is available in a very limited way

		of a few of these manufacturers and fabricators, a majority are desperate to increase their capacity utilization.	
<i>Provisions to increase the ability of small farmers to purchase agricultural machineries and tools</i>	<ol style="list-style-type: none"> 1. BRAC 2. Proshika 3. ASA 4. Grameen 	Farmers and subsector actors expressed strong views on this critical constraint. They mentioned that proper addressing of these constraints would automatically lead to a resolution.	NGOs provide the credit service. However, the terms and conditions are generally not suitable for the farming community. E.g., a weekly installment payment is difficult if not synchronized with the harvesting season.

Constraints in the Market for BDS (Demand Side and Supply Side)

BDS	Demand Side	Supply Side
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	Such services are required by enterprises to enable them to maintain their flow of funds, particularly working capital. The field research and interviews conducted with the associations show that there is a strong demand for this service. It may be mentioned here that despite the limited interventions being provided by the associations on credit recovery, the legal side of the recovery aspect has been largely unnoticed by both the enterprises and the associations. Moreover, this service is difficult to acquire for non-members of the associations.	Association: <ol style="list-style-type: none"> 1. The association do not have focus and mandate on credit recovery for their members or the subsector 2. The association do not have neither adequate experience and awareness, not sufficient knowledge on legal procedure for credit recovery 3. The associations have taken up the service because of the demand from the members and the subsector actors, but still do not have formal procedure, mechanism or system for effective recovery of credit
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	A majority of producers complained about the insufficient supply of skilled labor force, and of retaining them during the season. The manufacturer attributes to the lack of a specific agreement with the employees. Furthermore, these enterprises do not have any structured human resources management planning. Those organizations that do have these policies are receiving the comparative advantage in retaining skilled staff when needed.	<ol style="list-style-type: none"> a) Lack of appropriate services for training b) Sporadic trainings are usually too general and the application of knowledge is limited c) Lack of awareness on financial loss of skilled labor. d) Absence of any legal paper contract employing staff e) Absence of clear concept of benefits of human resource management in these enterprises.
<i>Provisions for adequate reflection of subsector needs and expectations in policies and regulations</i>	All key actors in this subsector require this service. The field research and interviews conducted with the associations indicate a strong demand for this service. Associations are forming pressure groups: they are trying to assert their rights by formulating policies that reflect their requirements. This initiative of the association is not adequate.	<ol style="list-style-type: none"> a) The associations lack appropriate advocacy and lobbying skills b) The associations do not have the right skills to analyze various policy implications on the subsector c) The associations do not have clear focus and direction to enable them to work on the issue constructively.
<i>Provision of access to information on improved production technology options for the manufacturers</i>	The producers are not adequately aware of new technologies available in the market. The limited information that they obtain from various agencies and suppliers is inadequate.	<ol style="list-style-type: none"> a) The service is available in a limited capacity through research organizations such as BAU, REFPI, BARI GTZ, ITDG and also through large machinery producers who are conducting R&D activities and field demonstrations. b) This is not adequately meeting needs and is not reaching the entire subsector. c) The research agencies do not have a viable network with the market. Also lacking is a sufficient extension program to encourage the large-scale production of new agricultural machinery.
<i>Provision of knowledge and information on basic operation and maintenance of</i>	During the interviews, about 62% farmers emphasized the need for knowledge on basic operation and maintenance of agro	About 67% of the sellers confessed their lack of knowledge on operation and maintenance of certain machinery i.e., engines, and power tillers. As a result,

<i>agro-machinery/ tools to the farmers</i>	machinery. The users mentioned that the sellers rarely provide operational manuals. Those that are provided are written in English or Chinese. The farmers suffer severely due to the language barrier	they cannot deliver the necessary information on appropriate operation and maintenance to the users.
<i>Provision of satisfactory supply of raw materials (pig iron) to the foundries during the peak season</i>	This constraint is faced primarily by the relatively smaller foundries. This is particularly due to the lack of an unhindered supply of pig iron during the peak season. The smaller foundries suffer the most, as their limited working capital cannot build up the required raw materials over a period of time.	Pig iron is imported by only 5 large importers iron in Dhaka and Chittagong. Extensive capital investment is required to import materials by the container load from China. Pig iron is also imported from India, where the quality of materials is of a low standard.
<i>Provision of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs</i>	Small farmers and women are being unable to participate in agricultural mechanization. This is because they do not have access to a sufficiently wide range of choices of machinery specific to their requirements. The need of appropriate machinery depends on cropping pattern, land holding size, operation by the women, etc.	Manufacturers feel that insufficient research and development and little product innovation contribute to the dearth of options and choices. As mentioned earlier BAU, REFPI, GTZ, ITDG are engaged in R&D. But there is insufficient coordination in research that could provide affordable technology solutions.
<i>Provisions for increasing market growth</i>	Majority of market actors feel that wide publicity of their products, both inside and outside the country, will greatly improve their sales volume. They share the view that beyond personal relationship, mass marketing is critical for vertical expansion of agricultural machinery and tools outside their periphery.	The market actors use limited services related to trademark, sticker, leaflets, agro-fairs, calendars and gift items. However, an organized service for market expansion is not present.
<i>Provisions for increased capacity utilization of the manufacturers</i>	Opportunities for increasing agro capacity utilization are limited due a number of factors: viz., season products, limited market expansion initiatives, insufficient diversity in the product line. Majority of the producers feel they need assistance in increasing capacity of their factories.	Agencies and enterprises (mostly the R&D organizations) are not addressing this comprehensively. Services for market expansion are not adequately present
<i>Provision for increasing small farmers' ability to purchase agricultural machinery and tools</i>	Despite demand, limited disposable income of the farmers makes it difficult for them to invest in agro machinery.	Credit services provided by the NGOs do not appropriately meet the needs of the farmers because of the cumbersome terms and conditions

Satisfaction with the Service

BDS	Satisfaction
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	The manufacturers and the sellers, especially the small and medium enterprises who have received the service, expressed satisfaction regarding the service they have received from the association.
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	The training service for the machine shops and foundries are not available readily. Some training programs were arranged by the associations through donor money, however, the actors feel that those trainings were too general and the trainees could hardly apply their knowledge in the workplace. The human resource development training services are also not available. There are very few quality manufacturers who are applying some of the techniques based on their own experience.
<i>Provisions for adequate reflection of subsector needs and expectations in policies and regulations</i>	There are very few initiatives undertaken by the associations to safe guarding the interest of manufacturer. None of the respondents are satisfied with the current initiatives. They feel that the general interest of the SMEs are not adequately safeguarded.
<i>Provision of access to information on improved production technology</i>	The large machinery suppliers who are providing embedded services by informing about the improved technologies are not adequate.

<i>options to the manufacturers</i>	
<i>Provision of knowledge and information on basic operation and maintenance of agro-machinery/ tools to the farmers</i>	Information on basic operation and maintenance of agro-machinery wholesaler and retailer is very poor and so is the satisfaction in this service.
<i>Provision of satisfactory supply of raw materials (pig iron) to the foundries during the peak season</i>	As 50% of the foundries are being affected, the satisfaction with the services is medium.
<i>Provisions of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs</i>	There are limited technological options for small farmers. The level of satisfaction is poor and often frustrating.
<i>Provisions for increasing market growth</i>	The services are primarily provided by the traders, very few large enterprises through their own initiative are engaged in the market expansion, however the initiatives are inadequate
<i>Provisions for increased capacity utilization of the manufacturers</i>	This is related to seasonality and market expansion, the present services are inadequate to increase the utilization of the capacity
<i>Provisions for increasing small farmers' ability to purchase agricultural machineries and tools</i>	The present services, supplier's credit, credit and loan facilities and increasing profitability from the sales of farm products are inadequate

Awareness of BDS

BDS	Awareness of service and service provider
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	The awareness regarding both is very high. Almost all the respondents (both members and non-members of association) are aware of this service and the service providers.
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	The awareness of this service is low.
<i>Provisions for adequate reflection of subsector needs and expectations in policies and regulations</i>	The respondents were not clear about this issue and its remedies. But they realize that existing service providers can solve this constraint by providing more emphasis on these urgent issues.
<i>Provision of access to information on improved production technology options to the manufacturers</i>	There is excellent awareness of both service and service provider. Almost all the respondents know about this service.
<i>Provision of knowledge and information on basic operation and maintenance of agro-machinery/ tools to the farmers</i>	The awareness of both the service and the service provider is very poor. Very few respondents have knowledge regarding this service and the service provider.
<i>Provisions of satisfactory supply of raw materials (pig iron) to the foundries in the peak season</i>	There is good awareness regarding the service and service providers. Almost all the respondents are aware of this aspect, despite the insignificant numbers of service providers.
<i>Provisions of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs</i>	The awareness regarding the service and the service provider is good. Almost all the respondents know about this service, but have expressed complaints about the insufficient numbers of service providers.
<i>Provisions for increasing market growth</i>	The awareness is not clear. Most of the respondents have been able to identify and discuss their problems, but have not been able to arrive at an appropriate solution.
<i>Provision for increased capacity utilization of the manufacturers</i>	The awareness is good. Almost all the respondents know about this service, but there are the select few who are not familiar with the service providers.
<i>Provisions for increasing small farmers' ability to purchase</i>	The awareness is very high. So far, the identified solutions have not been considered appropriate or practical to relax the constraints.

<i>agricultural machineries and tools</i>	
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Proposed Providers to Target for Interventions

BDS	Proposed Providers
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	A private sector provider will have to gain acceptance from both manufacturers and sellers. This could prove to be a challenging and complex task. The parties concerned might show skepticism towards a private sector provider: this is because an association is accountable to a large number of members and would be more transparent regarding their activities.
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	Most of the respondents feel that the associations can function as the service provider, doing most of the work in the process. In the past, the associations have organized training programs for the subsector actors. According to them it is wiser to strengthen the existing association that can work for the members by providing improved services for them.
<i>Provisions for adequate reflection of subsector needs and expectations in policies and regulations</i>	About 60% respondents felt that the existing association is sufficient for the provision of this service. A more proactive and dynamic association will be able to better safeguard the interests of its members.
<i>Provision of access to information on improved production technology options to the manufacturers</i>	Many feel that NGOs with research capabilities can work for the producers. They also feel that the association can play an equally vital role in the provision of this service. Moreover, research organizations and NGOs have access to updated information related to this subsector. A private sector company may be chosen that has links with such research bodies.
<i>Provision of knowledge and information on basic operation and maintenance of agro-machinery/ tools to the farmers</i>	About 60% farmers require this service, but there is no evidence of quality service providers in this market. The sellers and the manufacturers can be developed to provide embedded service to expand their sales volume and market share.
<i>Provision of satisfactory supply of raw materials (pig iron) to the foundries in the peak season</i>	The associations can take a proactive role in improving the situation by establishing links with existing importers and suppliers.
<i>Provision of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs</i>	It is identified that about 40% of the manufacturers and fabricators are looking for new machines or tools that can create a new market trend. In this situation, research organizations, universities, NGO, or any private organization can make a combined effort to invent new machinery and/or can provide new options of choice to the market.
<i>Provision for increasing market growth</i>	Existent and potential export businessmen can work towards new market exploration. Sales agents and traders are already actively engaged in this effort. However, a more cohesive and collaborative should be formed that includes export explorers, manufacturers and any other private organization that is able to sell a large volume to a virgin market.
<i>Provision for increased capacity utilization of the manufacturers</i>	So far, no providers have started working in this area. But any NGO or private organization can take the initiative to serve the manufacturers and fabricators. A direct provision of the service right to the doorstep of the manufacturing/fabrication unit would be even better.
<i>Provision for increasing small farmers' ability to purchase agricultural machineries and tools</i>	The credit providing agencies can be linked with the farmers and the agro machinery suppliers.

Financial Sustainability of Service Provision

BDS	Financial Sustainability
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	The respondents largely feel that credit recovery is very critical, and requires acceptance, extraordinary skills and the cultivation of relationships. The respondents also place a high premium on recovery. This is mostly due to the fact that a few credits few cases had to be written off as bad debt. All the respondents

	are willing to pay fees for such service. Hence, the financial sustainability of the service can be dependent on the mutually agreed predetermined fees
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	The financial sustainability can be achieved through fees for such training.
<i>Provisions for adequate reflection of subsector needs and expectations in policies and regulations</i>	The financial sustainability can be attained through membership fees or campaign fees contributed by the subsector actors
<i>Provision of access to information on improved production technology options to the manufacturers</i>	The subsector does not have sufficient capacity to undertake R&D investment. Research agencies can undertake such initiatives through public funds.
<i>Provision of knowledge and information on basic operation and maintenance of agro-machinery/ tools to the farmers</i>	A one-off facilitation activity to develop the capacity of the manufacturers and sellers to provide this as an embedded service for increased market and sales growth
<i>Provision of satisfactory supply of raw materials (pig iron) to the foundries during the peak season</i>	The association can initiate such linkage through the membership fees.
<i>Provision of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs</i>	The SMEs in the agro subsector do not have adequate financial strength to undertake R&D activities. This needs the assistance of public funds to demonstrate the benefits of R&D, enabling the SMEs to take up the initiative on a limited scale in future.
<i>Provision for increasing market growth</i>	The cost will be recovered through advertisement fees and the brokers, wholesalers and retailers will provide market linkage as an embedded service.
<i>Provision for increased capacity utilization of the manufacturers</i>	This activity also requires the assistance of public funds to demonstrate the benefits of R&D and new product development, enabling the SMEs to take up the initiative on a limited scale in future.
<i>Provision for increasing small farmers' ability to purchase agricultural machineries and tools</i>	The cost can be recovered by standard service charge of credit

Potential Impact on Farm Equipment Subsector

BDS	Potential Impact
<i>Provision of mechanism for improving credit recovery for the manufacturers and sellers</i>	<ul style="list-style-type: none"> • Increased awareness and knowledge on credit related issues, terms, agreements, legal implications, etc. • Vision and understanding about the potential providing services against fees • Strengthen the overall credibility of the association as a helpful institution • Increased income of the association to take on various programs and activities for the overall benefit of the subsector • Increased engagement of non-members, small enterprises within the association
<i>Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover</i>	<ul style="list-style-type: none"> • Increased awareness regarding HRD • Increased productivity • Enhanced Quality • Reduced wastage leading to increased profitability • Increased skilled workforce
<i>Provision for adequate reflection of subsector needs and expectations in policies and regulations</i>	<ul style="list-style-type: none"> • Increased participation of the SMEs • More productive contribution by the subsector to the agriculture sector

<i>Provision of access to information on improved production technology options to the manufacturers</i>	<ul style="list-style-type: none"> • Application of improved production technology • Improved quality of output • Increased profitability • Increased production
<i>Provision of knowledge and information on basic operation and maintenance of agro-machinery/ tools to the farmers</i>	<ul style="list-style-type: none"> • Decreased repair and maintenance cost • Increased encouragement to purchase agro equipments • Increased knowledge of product specifications of the buyers and seller
<i>Provisions of satisfactory supply of raw materials (pig iron) to the foundries in the peak season</i>	<ul style="list-style-type: none"> • Increased participation of SMEs • Reduced price of the product
<i>Provisions of sufficient options/choices of machinery, equipments and tools to the farmers as per their needs</i>	<ul style="list-style-type: none"> • Increased encouragement to purchase agro equipments • Increased benefit to the farmers in usage of machinery • Increased product line
<i>Provisions for increasing market growth</i>	<ul style="list-style-type: none"> • Increased profitability of the SMEs • Increased usage of farm machinery • Increased service provisions
<i>Provisions for increased capacity utilization of the manufacturers</i>	<ul style="list-style-type: none"> • Increased profitability • More product options
<i>Provision for increasing small farmers' ability to purchase agricultural machineries and tools</i>	<ul style="list-style-type: none"> • Increased participation of the farmers • Increased growth of the subsector

Conclusions

The agricultural machinery subsector is extremely important because it directly contributes to poverty alleviation and food security of the country. 80% of the population engaged in farming is reaping the benefits of this subsector to some degree or other. Despite limited capacity and knowledge, the subsector has demonstrated highly promising results. Some assistance and intervention were provided by various organizations and agencies in the past. However, those interventions were not adequately designed in relation to the potentially comprehensive impact on the entire subsector. At the moment, appropriate demand-driven product innovation and market expansion must be able to work alongside certain policy changes to encourage the SMEs in the subsector.

Technology and Gender Issues

In general, women in rural Bangladesh are responsible for most of the agricultural work in the homestead. Activities conducted by women in their homesteads range from storage of seeds, processing of field crops (e.g. threshing, winnowing, parboiling etc.) storage of farm produce, and a variety of other processing activities. These activities are reported to have increased significantly with the emergence of mechanization.

Gender Division of Labor in Rice Production			
Activities	Male	Female	Both
Seed testing	x		
Seed germination	x		
Sowing	x		
Land preparation	x		
Transplanting	x		
Weeding	x		

Irrigating, spraying	x		
Harvesting	x		
Preparing threshing floor		x	
Threshing		x	x
Winnowing/sieving		x	
Seed selection, storage			x
Parboiling		x	
Drying		x	
Husking		x	x
Storage		x	
Drying of straw		x	
<i>Source: Abdullah and Zeidenstein, 1982 & field study</i>			

Table 3: Gender Division of Labor in Rice Production

A recent study by “Poverty Elimination through Rice Research Assistance (PETRRA)” shows that contribution of women in various rice production and post production activities is increasing. The following table shows the percentage of labor contribution of women relative to men in various rice production and post production activities:

	Bhanga, Faridpur	Hobiganj district	Rajashi (Chimna)	Maijdi, Noakhali	Kushtia Central West region)	Rangpur	Comilla region
Incubating seeds	100	100	100	75	100		
Preparing seedbed				25			
Uprooting seedlings	30			25		10	
Transplanting	30		50	25		10	
Surface irrigation				12			
Application of fertilizer	20			25			
Weeding	10		50	25		10	
Harvesting			50	50			
Threshing	100		50	50			50
Drying paddy	100	100	100	75	100	100	90
Winnowing	100	75	100	100	100	100	100
Storing paddy	90	100	100	100		50	
Parboiling rice	100	100	100	75	100	100	
Drying straw	70					80	
Milling of paddy				6	100		
Seed selection							100

Source: Gender Impact Assessment Training Report, PETRRA, and January 2001

Despite the changes in the increased role of women and application of machineries by women, the present agricultural machinery market still focuses on and emphasizes the role played by men. From the study it was revealed that women require different or slightly modified tools which the existing manufacturers do not perceive the need. The manufacturers and importers of agro machinery and tools and implements undertake no market research, have no follow-up links with their clients, do little to ensure that the full range of their tools and equipments is available at sales points, and seem to ignore the fact that the women users of their products are rapidly increasing. As a result, many implements, such as especially threshers, are too heavy and higher than the average height of the females to use them comfortably. Lighter models appropriate for women are unavailable, and manufacturers as well as the research organizations devote little time to consulting with their female clients.

Substantial changes in the designing of appropriate technologies catering to their needs of the women may significantly increase the involvement and engagement of women in agriculture. The study reveals that an appropriate gender approach to the overall intervention should be focused particularly in product innovation, and new technology development as well as its application at the farm and family level.

Recommendations/Intervention Design

The subsector has remarkable potential with significant growth rate. The major challenge is to develop capacity and facility to produce quality products to compete with foreign spares and tools especially coming from China. Because of lack of certain facility, such as heat treatment, precession machines, strict quality control system, the subsector is suffering from the desired rate of growth and expansion.

In order to develop the subsector through removing the constraints, a facilitator should be identified to develop or strengthen the providers of services. The facilitator should be selected by making full use of the available private sector network. Ideally, the facilitator should have some current working experience related to the improvement of the subsector as well as have an understanding of the BDS paradigm. The SS-MA team feels that the facilitator should be able to make a positive contribution to the proposed program interventions mentioned above.

Implementation Program Guidelines

1. Establishing working relationship with SwissContact and other partners
2. Organizing the Facilitation Team and Management Structure
3. Developing capacity of the Facilitation Team (BDS, Market Development Paradigm)
4. Developing an Action Plan for implementation
5. Refining the Intervention Design
6. Conducting a baseline survey
7. Implementing the Facilitation Activities
8. Coordinating implementation of interventions as prioritized
9. Developing monitoring and evaluation guidelines and indicators
10. Ongoing monitoring and evaluations

The above list indicates the general categories of activities that would include many sub categories. For example “The Action Plan” activity might include:

- Reviewing of SS/MA study
- Implementation activities and timelines
- Assessment of resources
- M&E system design

It is expected that some members from the current SS/MA team will be actively involved in the listed activities, providing assistance during the course of the program.

- Forming workgroups with selected organizations of the subsector: These could comprise of private sector actors in the market chain, facilitation staff, government agencies, and others. The Facilitator will endeavor to assemble these groups within the local context. It is important that the members of the workgroup are carefully selected.
- Nurturing the process whereby the Facilitator: a) maintains regular contact with workgroup members; b) prepares well-planned meetings; c) produces and circulates detailed minutes; d) develops clear terms of reference for consultants undertaking

- workgroup commissioned studies; e) provides monitoring and follow-up of commissioned activities.
- Instilling an aspect of “ownership” amongst all members of the workgroup.
 - The use of Activity Sheets: These standardized forms, produced quarterly by the workgroup leaders, are used for each policy issue or member service being addressed. They provide a clear synopsis of: a) the activity; b) expected and actual impact; c) the implementation plan; d) the status; e) outstanding issues/ recommendations and; f) costs and contributors.

The critical interventions (illustrative) are provided below:

Illustrative Intervention 1: “Provision of Mechanism for Improving Credit Recovery for the Manufacturers and Sellers”

Related Constraint: *Inability to realize credit by the small producers and sellers resulting low working capital and distrust towards new traders*

Intervention for Developing BDS providers

BDS PROVIDERS: Associations

ACTIVITIES:

1. Detail service assessment
2. Capacity building of the service providers
3. Awareness campaign regarding the availability of service provision

SUSTAINABILITY

The service of providing credit recovery to the manufacturers and sellers will be sustained through direct sales of such service, or from funds recovered by the Association through dues or other member payments. The Associations can develop expertise in this area and continue to offer the service to members and eventually to other non- members on a fee basis.

METHODOLOGY

1. Together with the Association, the Facilitator will re-assess, in greater detail, the situation related to the issue of credit recovery for manufacturers and sellers. The assessment will identify things like:
 - Numbers and other specifics of defaulters
 - Legal ramifications from a local perspective
 - Current methods of credit recovery by manufacturers and sellers
2. The Facilitator will develop a program aimed at building the capacity of the Association relates to providing cost recovery services to manufacturers and sellers. Research related to this will include:
 - Methods used in other subsectors
 - Specific laws related to credit recovery
 - Negotiated settlements
 - Acting as a Mediator
 - Forms and documents to be used in providing credit recovery services
 - Costing and pricing of the BDS

3. Build capacity of the Association to undertake the provision of credit recovery services in the form of intensive training. This may be done by in-house Facilitation staff, or from outside consultant.
4. Follow-up assistance to the Association in the early stages of providing the credit recovery BDS (e.g., six months). Further, less involved, follow-up will continue after the initial period.
5. Documentation of total process to be coordinated by the Facilitator.

ROLE OF FACILITATOR

1. Mobilization and motivation of Association to “buy-in” to credit recovery services for manufacturers and sellers.
2. Coordinate, with Association, FGD type meetings with manufacturer and sellers in at the target area to share and exchange information, related to specifics of credit recovery issues in the subsector.
3. Capacity building of association to enable them to provide appropriate services relating the credit recovery BDS. This support will be in the form of intensive interactive training along with “hands on” field experience.
4. Continued support to Association, post training, in the form of regularly scheduled meetings and observation of fieldwork.
5. Monitoring and reporting of the entire process. This will be based on a system that will be established at the beginning of the intervention and will measure effectiveness of the entire process from reassessment through capacity to eventual provision of the BDS.

EXIT STRATEGY

1. Develop clear plan of action and guidelines as the initial task
2. Communicate transparently the exit strategy and time frame to all stakeholders from the outset
3. Define role and task of Facilitator and the Association (and possibility other consultants)
4. Develop capacities of the Association (BDS providers) such that they are able to eventually carry out the activities without any assistance from the Facilitators, within a particular time frame.
5. Prepare well defined post exit monitoring and follow up plan

Illustrative Intervention 2: **“Provision for developing skills of the employees particularly working in different production units (machine shops and foundries) as well as developing skills of the employers in retaining staff/reducing staff turnover”**

Related Constraint: *Lack of skilled and experienced workforce at the producers level resulting in frequent change in job*

Intervention for Developing BDS providers

BDS PROVIDERS: Institute of Appropriate Technology, BUET
Vocational Training Institute (VTI)

ACTIVITIES:

- Detail Service Assessment
- Training Need assessment
- Developing “hands-on, on-the-job” training curricula/module

- Awareness campaign about the service provision to the relevant subsector actors
- Building capacity of the service providers

SUSTAINABILITY

The service of providing training to the manufacturers will be sustained through direct sales of such service. The center can also cater the other machine shops/workshops and foundries (working in automobiles, industrial spare parts, etc.)

METHODOLOGY

1. Together with the Center, the Facilitator will conduct a need assessment, in greater detail, the existing situation, and need for new skills and capacity building for the machine shops/workshops and foundries. The assessment will identify things like:
 - a. Numbers and nature of enterprises require capacity development services
 - b. Number of trainees
 - c. Nature of training required by the SMEs
 - d. Mode, timing and duration of training
2. After the training need assessment a curricula will be developed by the Center, the facilitator will supervise the development to ensure both appropriateness and effectiveness of the curricula
3. Follow-up assistance to the Center in the early stages of providing the training service (e.g., six months). Further, less involved, follow-up will continue after the initial period.
4. Documentation of total process to be coordinated by the Facilitator.

ROLE OF FACILITATOR

1. Mobilization and motivation of Center to “buy-in” to training services for manufacturers and sellers.
2. Coordinate, with the Center, FGD type meetings with manufacturer and sellers in at the target area to share and exchange information, related to specifics of training and capacity building issues in the subsector.
3. Orientation of the Center on the subsector to enable them to provide appropriate services relating training and capacity building. This support will be in the form of intensive interactive dialogue with the facilitator and the members of the service recipients.
4. Continued support to interaction with the Center, service recipients, trainees, in the form of regularly scheduled meetings and observation of fieldwork.
5. Monitoring and reporting of the entire process. This will be based on a system that will be established at the beginning of the intervention and will measure effectiveness of the entire process from reassessment through capacity to eventual provision of the BDS.

EXIT STRATEGY

1. Develop clear plan of action and guidelines as the initial task
2. Communicate transparently the exit strategy and time frame to all stakeholders from the outset
3. Define role and task of Facilitator and the Center (and possibility other consultants)
4. Develop capacities of the Center (BDS providers) such that they are able to eventually carry out the activities without any assistance from the Facilitators, within a particular time frame.
5. Prepare well defined post exit monitoring and follow up plan

Illustrative Intervention 3: “Provision of access to information on improved production technology options for the manufacturers”

Related Constraint: *Producers lack information on new and improved production technologies, which results in low productivity, and poor quality of products*

Intervention for Developing BDS providers

BDS PROVIDERS: Chittagong Builders
Fair Organizers (Conference and Exhibition Management Services)

ACTIVITIES:

1. Detail service assessment
2. Linking large machinery suppliers through awareness campaign regarding the potential of the market
3. Supply of trade magazines
4. Organizing machinery fairs

SUSTAINABILITY:

The service of providing training to the manufacturers will be sustained through direct sales of such service. The Associations can develop expertise in this area and continue to offer the service to members and eventually to other non- members on a fee basis.

METHODOLOGY

Together with the service providers, the Facilitator will re-assess, in greater detail, the situation related to the issue of information on improved production technology options for manufacturers. The assessment will identify things like:

1. Number of manufacturer requiring such service
2. Current channel and quality of information

The Facilitator will develop a program aimed at orienting the service providers in organizing cost recovery or embedded services to subsector manufacturers. Issues that will include:

1. Methods used in other subsectors
2. Costing and pricing of the BDS
3. Follow-up assistance to the service providers in the early stages.
4. Documentation of total process to be coordinated by the Facilitator.

ROLE OF FACILITATOR

1. Mobilization and motivation of Service Providers to “buy-in” to the service for manufacturers.
2. Coordinate, with service providers at the target area to share and exchange information.
3. Orientation of the service providers to enable them to provide appropriate services. This support will be in the form of intensive interactive training along with “hands on” field experience.
4. Monitoring and reporting of the entire process. This will be based on a system that will be established at the beginning of the intervention and will measure effectiveness of the entire process from reassessment through capacity to eventual provision of the BDS.

EXIT STRATEGY

1. Develop clear plan of action and guidelines as the initial task
2. Communicate transparently the exit strategy and time frame to all stakeholders from the outset
3. Define role and task of Facilitator and the Service Providers (and possibility other consultants)
4. Develop capacities of the Service Providers such that they are able to eventually carry out the activities without any assistance from the Facilitators, within a particular time frame.
5. Prepare well defined post exit monitoring and follow up plan

Appendices

1. Terms of Reference (ToR)
2. Work-plan
3. Summary of Team Orientation and Training
4. Questionnaires
5. Bibliography
6. List of persons interviewed
7. List of workshop participants
8. Overlays
9. Constraint Matrix
10. Sub Sector Map
11. Key Informant List

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