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Working Paper No-7

AGRICULTURAL TOOLS AND IMPLEMENTS INDUSTRY IN BANGLADESH: A CASE STUDY.*

KHANDAKER MUSTAHIDUR RAHMAN**
KHAN MD. NABIUL ISLAM**

December, 1988

Bangladesh Institute of Development Studies,
E-17, Agargaon, Sher-e-Bangla Nagar

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* The authors are respectively Professor, Department of Economics, Jahangirnagar University and, Research Associate, BIDS. They are grateful to Dr. Q.K. Ahmad, the then Project Director, and to Dr. Z. Bakht of BIDS for their guidance while conducting the study. The authors wish to record particular thanks to Mr. Humayun Kabir, Statistical Officer, Ministry of Health, for his assistance provided at that time at various stages of the study including data collection and processing. However, for the remaining errors the authors alone are responsible.

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CONTENTS

CHAPTER - 1

1.1 Introduction

The importance of the agricultural tools and implements industry can hardly be over emphasized in a less developed & predominautly agricultural country like Bangladesh. Growth in this industry has been identified as one of the most important vehicles by which technological changes can be brought about in an economy with predominant agriculture sector; this has the unique advantage in having tools, implements and machinery fabrication facilities which can be used for adaptation and diffusion of technologies using indegeneous skills of labour and endowments. Diffusion and adaptation of technology in this industry has therefore a vital role to play in bringing about a technological change in the dominant agricultural sector in the economy which in turn will induce technological changes in other sectors of the economy through linkage effects.

Bangladesh is a typical less developed country. The dominant sector of the economy is agriculture. The technology in agriculture is rudimentary and the productivity is one of the lowest in the world. One way to foster growth in production and employment in this sector, is to improve the technology in use. The demand for new equipment from this sector then becomes one of the major determinants for the enterprises' decesion to produce it. One may identify several factors which will determine the nature and speed of the technological changes in the economy brought about by the farm tools and implement industry. First, the structure of the agricultural tools and implement industry will act as a determinant. Secondly, institutional factors will also determine the nature and speed of the technological change and finally, for the successful generation of the local production of an equipment innovation, and its use by farmers, infra-structure both social and physical should be developed and extension services are needed.

In view of the above, a study regarding the agricultural tools and implement industry in Bangladesh is useful. Unfortunately, very little amount of work has so far been done on this industry particularly, on the structural, technological and economical aspects of the industry.

1.2. Objective and scope of the study

The object of the study is to generate some useful information relating to structural, technological and institutional characteristics of the agricultural tools and implement industry and characteristics of it regarding inputs, outputs, labour, credit and marketing, with a view to understanding its potential for growth and identifying its constraints and difficulties, that will help policy markers to formulate appropriate policies. In particular, the study will highlight the following issues relating to the industry.

1. the structural characteristics of the industry such as size and age distribution of the enterprises, the composition of output, geographical location and the degree of specialization in the industry.

2. the characteristics of workers employed in the industry, their background, the nature of their involvement and terms and conditions of their services.

3. the structure of capital, and assets, the working capital requirements, the nature of technology in use and issues relating to investment in the enterprises.

4. the structure of inputs, costs, output and value added of the industry, the inter-industry linkages, the production behaviour with particular reference to efficiency of factor use, profits and the accumulation of capital in the enterprises.

5. the problems of finance, the characteristics of credit market, the organisation of marketing such as the procurement of raw materials and their agents, disposal of output and the degree of competition in the industry.

1.3. Definition of the industry

In defining the agricultural tools and implement industry there are certain problems. If one defines agriculture in narrow sense, then crop production activity only can be called agricultural activity. Under the broader definition of agriculture one could include fishing, cattle or sheep raising, forestry apart from the crop cultivation activity. Therefore, questions that one has to face regarding the definition are (1) what constitutes an agricultural activity and therefore which tools, implements or machines can properly be called agricultural and (2) how should one treat these implements and tools such as, boats, wooden cart, spade, sickle, axes, winnowers, containers, mat, etc. which have also non-agricultural use. Further, many of the enterprises producing farm-tools and implements also make non-agricultural implements such as, enterprises producing wooden and bamboo farm tools and equipments also produce chairs, tables, doors, and the blacksmiths produces both agricultural and non-agricultural metal equipments and tools.

The agricultural tools and implements were therefore, defined as those which were used in farming activity whether or not they had other uses. The users of tools and implements in farming and out farming were often the same individuals. Many of the enterprises produced both types of items. The enterprises which produced fishing nets and equipments (and also farm equipments), boats (used as farm implement in the rainy season) and the containers and mats made from bamboo and cane, were also included in the definition.

1.4. Selection of survey areas, and the samples

For the purpose of selecting a sample of enterprises in the industry, five RISP Thanas (1) and two other Thanas outside RISP survey areas were pre-selected on the basis of general concentration, concentration of key industry and accessibility. Allocation of the sample enterprises among these different thanas were done in proportion to the number of enterprises in this industry. The size of the sample was initially fixed at 90. However, only 79 observations could be retained after a thorough check of consistency. The proportion of enterprises producing various types of items in the total number of sample enterprises was fixed on the basis of number of enterprises in the RISP survey Thanas. [The sampling frame was that of the RISP]. The observations were drawn randomly.

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(1) see RISP, phase-1, report, BIDS, Dhaka
RISP Thanas were, Pubna (Kottwali), Muradnagar, Narsinghdi, Sherpur and Swarupkthi. Other thanas were Manikganj and Devidwar.

Allocation within a Thana was done on the basis of concentration of the key enterprises in the Thana. However, strict proportion could not be maintained due to factors like non-response and inaccessibility. Because of the purposive nature of selection and the small size of the sample, it can hardly be representative of the agricultural tools and implements industry in the economy. We therefore refrained from obtaining estimates of the economy as a whole.

Because of relatively small size of the sample, the errors were not probably minor. Since most of the enterprises were small, family based ones, the respondents often could not give the correct answers to some of the questions. Since they had no accounting system, most of the answers recorded were from memory. However, one can assume that the bias created in this way was uniform with zero mean and could not affect the sample in a significant way.

However, bias was also there due to willful hiding of information out of fear as they misunderstood the interviewers or exaggerations of information due to expectations. This bias was not evenly distributed and hence the sample may suffer from this bias.

1.5. Organization of the study

The study has been organised in the following way. In chapter-II, structural characteristics of the industry has been analysed. In chapter-III, characteristics of workers, their terms

and conditions of labour use, etc. have been discussed. In chapter-IV, the capital structure and the technology has been briefly analysed. In chapter-V, inputs, value-added, costs along the production behaviour have been analysed. In chapter-VI, problems of finance and marketing have been discussed followed by a concluding remark in chapter VII.

CHAPTER II

The main purpose of this chapter is to provide some insights into structural characteristics of the agricultural tools and implement industry in Bangladesh using the survey information. In particular, we shall be dealing with the composition of the output, the seasonality of production, the extent of repair activity, the entent of specialization of industry, the size and age structure, organizational forms and the occupational structure along with intergenerational occupational mobility of this industry. Some observations will also be made on incomes by main occupations of the enterpreneurs.

2.1. Composition of Output

The industry produces a wide range of tools and implements and their replacement parts. The types and composition of output, their relative share in the total value of industry output and a fuller description of tools and implements by the types of enterprises have been presented in Table 2.1. The diversity of the output is clearly evident from the table. It is also evident that many of the enterprises produce more than one product (the number of enterprises is 79 whereas the number of various items is 134). One can also notice that there is little overlap between the producers of different types of tools and implements.

TABLE 2.1

Composition of output of the sample enterprises
(in reference month)

Industry type	Description products actually produced in reference month	No. of enterprises manufacturing the products	% of total enterprises	Value of the output from sample enterprise(Tk.)	% of total value output
1	2	3	4	5	6
1. Boat making	i) Boat	7	8.9	8009	12.4
	ii) Row	2	2.5	4543	7.1
2. Wooden Cart & Agri. tools	i) Wooden wheel(cart)	2	2.5	10800	16.8
	ii) Harrow	9	11.4	1190	1.9
	iii) Hoe	2	2.5	400	0.6
	iv) Yoke	9	11.4	1164	1.8
	v) Plough,plough share,plough beam	13	16.5	5072	7.9
	vi) Rice hullers, Dheki, hullers and accessories	1	1.3	480	0.8
3. Fishing net & fishing equip.	i) Various kinds of nets	4	5.1	533	0.8
	ii) Fishing equipments, tools, etc.	5	6.3	1021	1.6
	iii) Other implements & tools	1	1.3	66	0.1

Contd....

Table 2.1 (contd.)

1	2	3	4	5	6
4. Agri.tools-blacksmithing	i) Chopper,sickle knife and other hand tools	18	22.8	13374	20.8
	ii) Spade,shavel, scrapper,harvesters weeders, etc.	13	16.5	2426	3.8
	iii) Axe,planer planters	4	5.1	966	1.5
	iv) Coulter	14	17.7	4078	6.3
	v) Guti(weights for nets)	2	2.5	860	1.3
	vi) Other agricultural tools	3	3.8	1165	1.8
5. Bamboo,cane, container & mat	i) Bamboo & cane mat	6	7.6	3227	5.0
	ii) Bamboo & cane container(small)	5	6.3	701	1.1
	iii)Winnowers	3	3.8	626	1.0
	iv) Bamboo & cane container(storage purposes) large	11	13.9	3701	5.8

NOTE: Col-3: A single enterprise may have produced several items - so the no. of enterprises manufacturing products are overlapping and hence the total no. of enterprises is obviously greater than 79.

Col-4: And as such col-4 dos not add to 100 but essentially greater than that.

Col-5: Value of output of all productions including stock, if any Industry type - 4, e.g. blacksmithing : Value of output includes revenue receipts from service.

Other industry types : Value of output excludes service receipts, if any.

Most of the items listed in Table 2.1 are self-explanatory and needs no further elucidation. However, items listed under fishing nets and equipments, bamboo, cane containers and mats, and agricultural tool (blacksmith), a wide range of products have been agregated.

The relative importance of each product can also be seen from the table. It is interesting to notice that there is a complete absence of items like pumps, tractors, disc harrows and other power driven agricultural machinery.(1) Boat making accounts for about 19.5 percent of total value of produce in the industry of which item like boats alone constitutes about 12.4 percent.(2) Wooden agricultural tools account for about 29.8 percent of the total value of produce of which harrow, hee, yoke, plough, ploughshare, plough-beam and items like ricehullers together constitute about 13 percent. Fishing nets and equipments constitutes about 2.5 percent of the total value of produce. Blacksmiths producing agricultural tools and implements account for the largest share, i.e. 35.5 percent of which chopper (Dao), sickle, knives and other hand-tools alone constitute about 20.8% of the total value of produce. Items like

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1. Pumps and power and manual-power driven agricultural machinery by small enterprises. There were some large cooperatives in existence run by BADC and Bangladesh Engineering Corporation which produce these items in small quantities. There are very few private enterpries which have machine fabrication facilities.

2. Boats are important agricultural implements in country like Bangladesh.

spade, shovel, scrapper, harvester, axe, planter, coulter and other agricultural tools account for 14.7 percent. Bamboo and cane containers and mats constitute 12.8 percent of the total value of the produce of the industry.

A considerable number of enterprises also produced nonagricultural tools and implements. These were exclusively for small-scale rural enterprises and consisted such items as wooden fixtures and furniture, doors and windows, wooden spindle for textiles, wooden wheels for cart, shuttles for handlooms, domestic metal tools, furniture and fixtures, etc. and bamboo and cane containers and mats for domestic uses. All these products could be produced by the enterprises of this industry with non-specialized tools and their prevalence reflects the natur of the enterprises of the industry. One can safely assume that their output mix is quite flexible and can be readily changed in response to changing demand conditions.

One should not however rely too much on the absolute figures of the value of output, they are merely indicative. For, most of the enterprises interviewed did not keep any records of input & output, some could not accurately remember their past output. The errors in recalling their output figures were also caused partly due to the continually changing output mix. Further, some made purposeful underestimation of their output while some made exaggerated claims. However, inconsistencies were removed by eliminating those enterprises that gave clearly misleading figures. Nonethless, there may still be some bias in the total value of the output of the enterprises. Despite the possible

biases in the absolute figures, there is no reason to believe that the ratio of the output of each item to the total industry output is subject to any systematic bias. Survey results provide us with fairly accurate picture of the composition of the output of the industry.

The composition of the output of the industry reflects mainly the domestic pattern of demand. The figures suggest that non-specific tools and implements such as land preparation implements, hand-tools and implements for weeding, harvesting and threshing are the most important items produced. These are the equipments that are found in wide-spread use in the area under study. Since the extent of mechanization and hence the local nature of demand for tools and implements are more or less the same throughout the survey area; and since there is the wide geographical distribution of enterprises, this number is the rough index of spread of the use of each equipment.

2.2. Repair activity of the Industry

Repair work constitutes a significant portion of total income of the enterprises (about 20.65 percent). Distribution of the service revenue as the percentage of the total receipt have been presented in Table 2.2. Enterprises producing fishing nets and equipments and bamboo cane container and mats did not do any repair work at all. Blacksmiths producing agricultural tools and implements carried out a substantial amount of

TABLE 2.2.

Distribution of service revenue as a percentage of the total receipt by types of enterprises

Types of Enterprises	Services revenue as % of total receipt
1. Boat making	4.78
2. Wooden cart & Agricultural tools	0.50
3. Fishing net & equipments	0.00
4. Blacksmithy (agricultural tools)	57.76
5. Bamboo, Cane Container & m t	0
All	20.65

repair work (repair receipt about 57.76 percent) while enterprises producing wooden agricultural tools and implements had only about 0.5 percent of the total receipt from repair activity.

There may be several reasons why repair activity and production were usually combined. Combining production with repair activity is very natural for the types of enterprises in this study since both types of work required similar equipment and the same skills. Another reason for combining both types of work is the nature of the products of the industry. Like all durable products, agricultural tools and implements produced by the blacksmiths require a certain amount of repair and maintenance during their life times. Producers provide this service for products of their own or others because the products are usually not standardized to warrant a separate service net-work and presumably the guarantee of repair service is essential to attract users. Yet another reason for combining repair activity with production is the shortage of working capital. While increased production may not require installation of additional capital equipments, it does need some additional amount of working capital to pay for raw materials, and in possible cases, credits to customers. The enterprises can instead, augment their income by doing repair work which needs little or no working capital. It follows that both repair and production activities are complementary to each other. It is not surprising to see why the enterprises producing fishing equipments and bamboo & cane containers and mats did not do any repair work. For them, the nature of the products and hence the demand pattern for these products is such that purchase of new equipment is more worthwhile than repairing the old ones.

The distribution of enterprises by the range of proportion of service revenue to the total receipts has been presented in Table 2.3. One will notice that there is a considerable

TABLE 2.3.

Distribution of enterprises by the range of propertion of service receipts to total receipt

Range of service	No. of enterprises	% of enterprise
0	56	70.9
0-0.25	6	7.6
0.25-0.50	5	6.3
+ 0.50	12	15.2
All .	79	100.0

variation in the propertion. About 29.35 percent of the enterprises provided some service - of which 15.2 percent of the enterprises had more than 50 percent of their total receipt from service. In order to analyse the variation in the ratio for a possible impact of other variables, such as, employment size of the enterprise (NE), the number of products produced (NP) and the age of firm (AGE), the following regressing equation was estimated by OLS:

$$(\text{Repair Prop}) = 0.001 - 0.0141(NW) + 0.0869(NP) + 0.0003(AGE)$$
$$\qquad\qquad\qquad\qquad (0.0345) \qquad (0.0219) \qquad (0.0021)$$

$$\bar{R}^2 = 0.1712 \; ; \; F = 6.095 \; ; \; n = 75$$

(Figures in parchtheses are standard errors)

Though the coefficient of determination adjusted for degrees of freedom ($\bar{R}^2$) is low, the F-ratio is significant. The estimated equation suggests that apart from the number of products (NP), there is no significant relationship between the above variables and proportion of repair revenue to the total receipts. It also provides evidence that repair activity and tools & implement production are some what complementary. Those enterprises that produce greater number of products tend to do more repair work.

2.3. Seasonality of Production

For most of the enterprises, both demand for farm implements and the requirement of repair services are seasonal. Table 2.4. presents the distribution of various types of enterprises by various lengths of duration of activity. It will be seen from the table that about 20.3 percent of the enterprises are run for a period between 3 and 6 months, 27.8 percent upto a period between 6 and 9 months, 5.1 percent upto a period between 9 and 12 months, while the rest (46.8 percent) are run year-round.

TABLE 2.4.

Distribution of length of working period by the types of enterprises

Industry type	Working period					
	Less than 3 months	3 - 6 months	6 - 9 months	9 - 12 months	Year round	Total
Boat making	-	3	3	-	3	9
Wooden cart agri. tools	-	7	13	1	2	23
Fishing net & equip.	-	-	5	-	4	9
Agri.tools blacksmithy	-	-	-	1	17	18
Container & mat	-	6	1	2	11	20
All industry	- (0.0)	16 (20.3)	22 (27.8)	4 (5.1)	37 (46.8)	79 (100)

In order to find out the seasonal pattern of the variation of the output and services, month-wise values of output services have been estimated and normalized by the estimated value of yearly output and services for each enterprise. The averages of normalized values converted to percentages have been plotted against the 12 months of the year for each type of enterprise. These percentages by types of enterprises are given in Appendix Table A. 2.1. Figure 0 gives the seasonal pattern of the value of output and services produced by all types of enterprises.

Fig 0: Estimated percentages of production activities showing seasonal pattern of All types of industries during the year

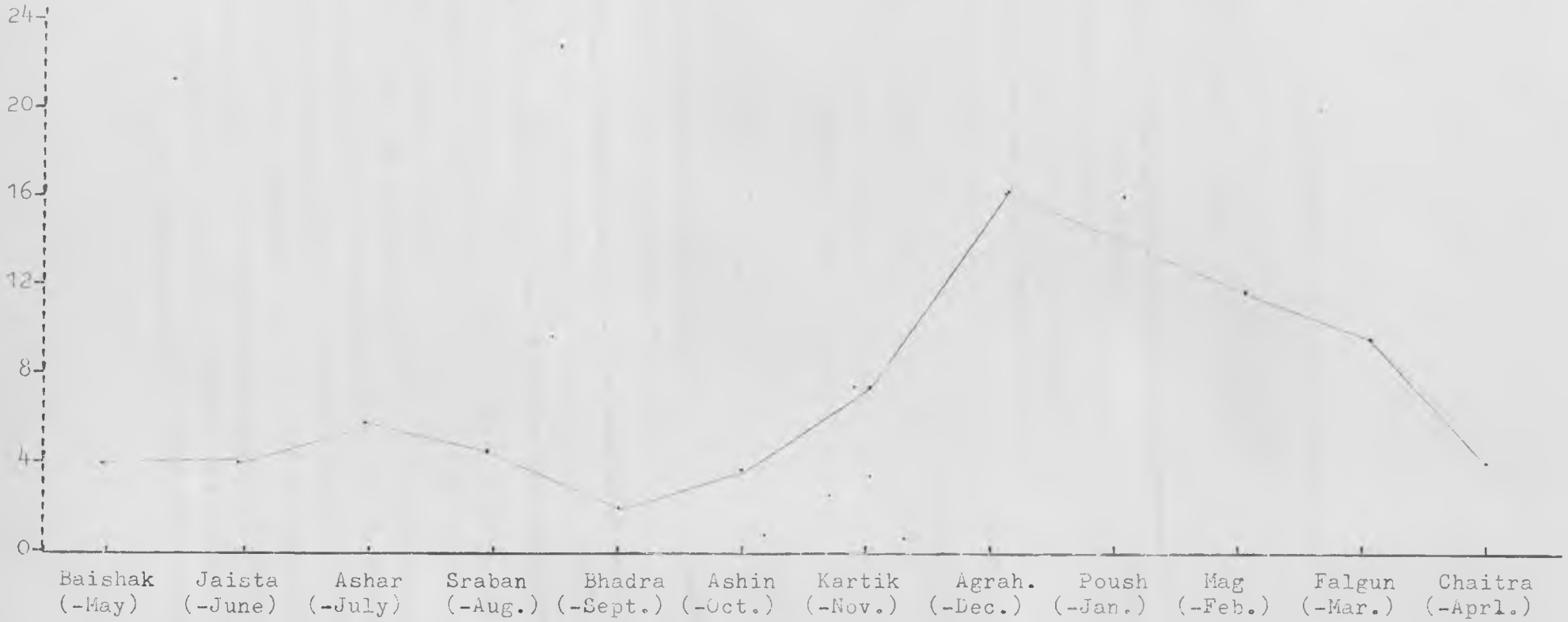

Fig 1: Estimated percentages of production activities showing seasonal pattern of Boat making during the year

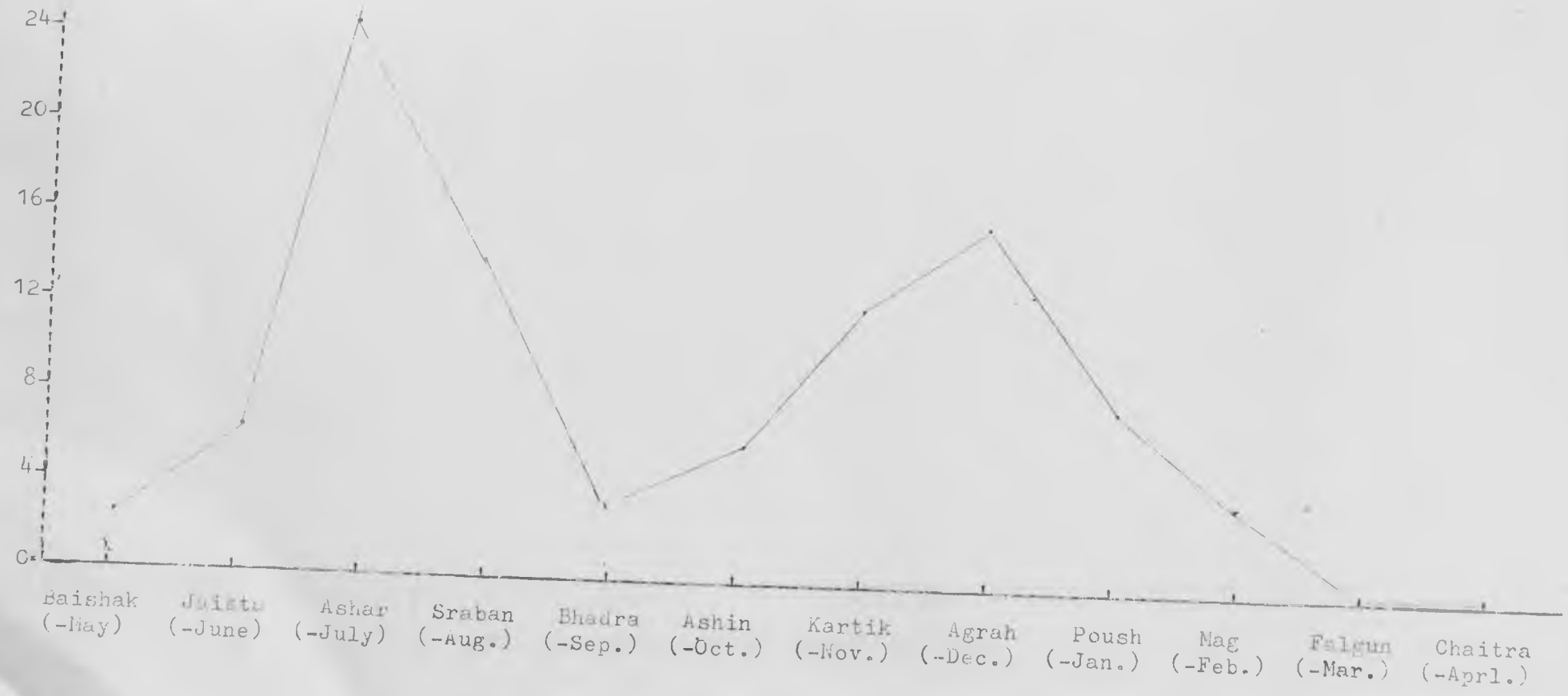

Fig. 2: Estimated percentages of production activities showing seasonal pattern of

Boden Cart & Ag. tools during the year

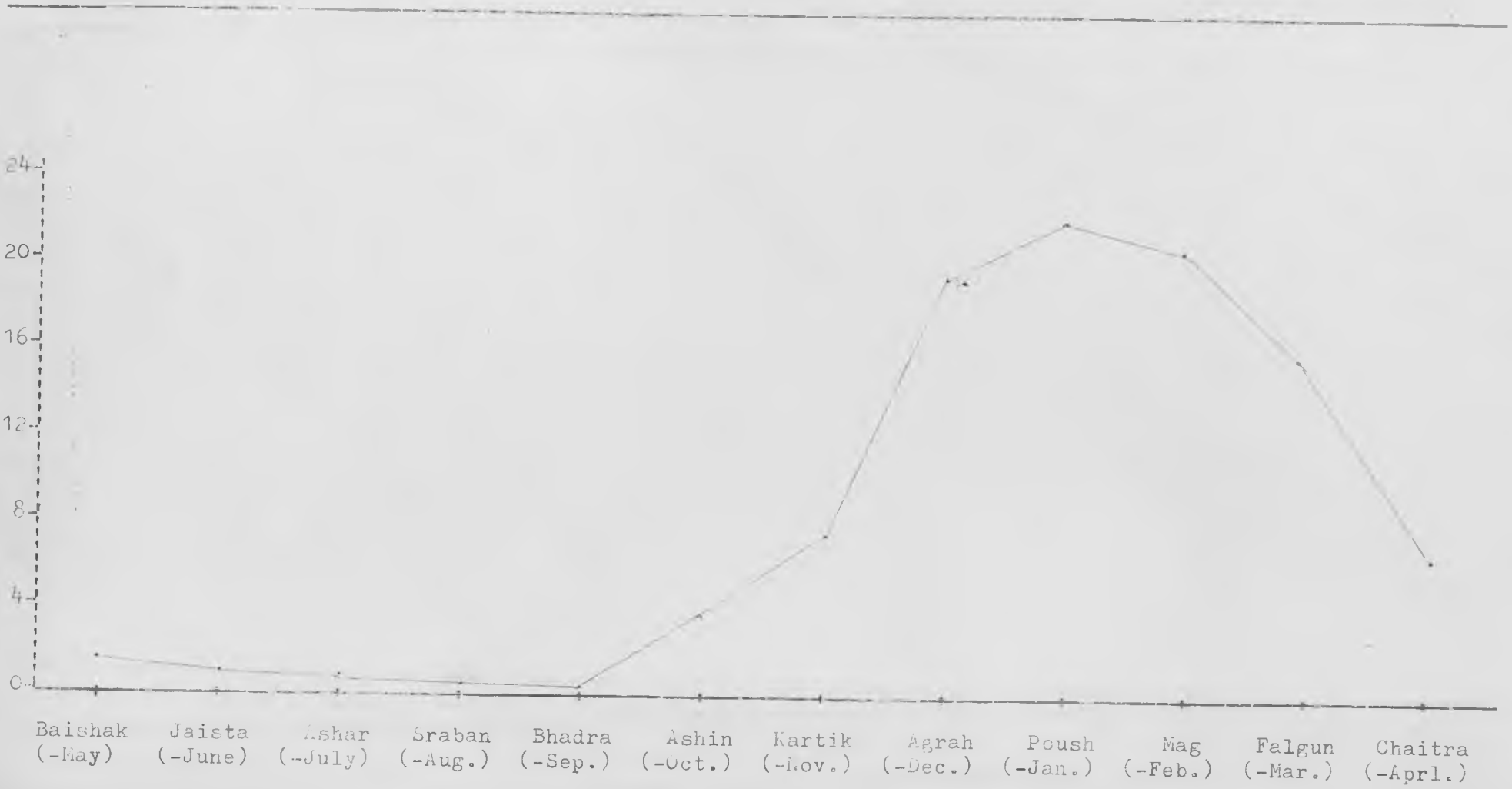

Fig 3: Estimated percentages of production act vities showing seasonal pattern of

Fishing net & equipments during the year

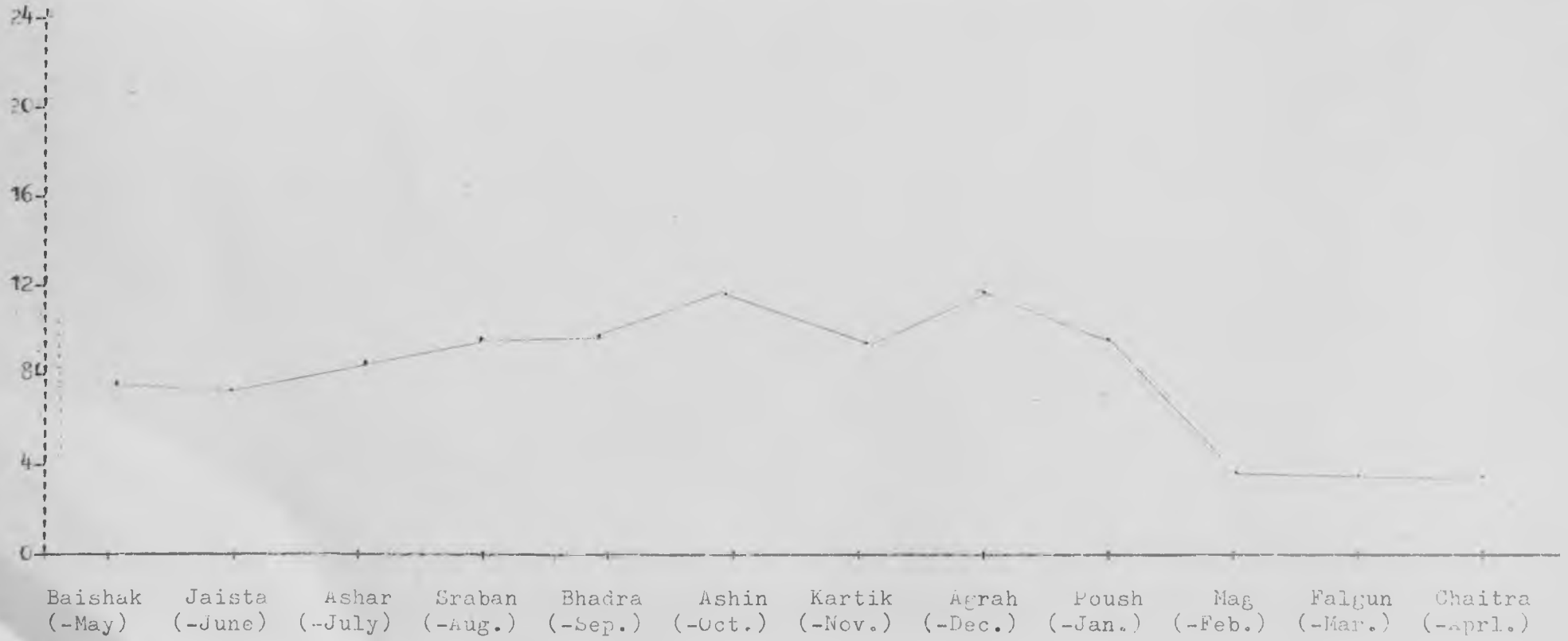

Fig. : Estimated percentages of production activities showing seasonal pattern of

Blacksmithing Agr. tools during the year

Fig. 5: Estimated percentage of production activities showing the seasonal pattern of

Bamboo & cane container & mat during the year

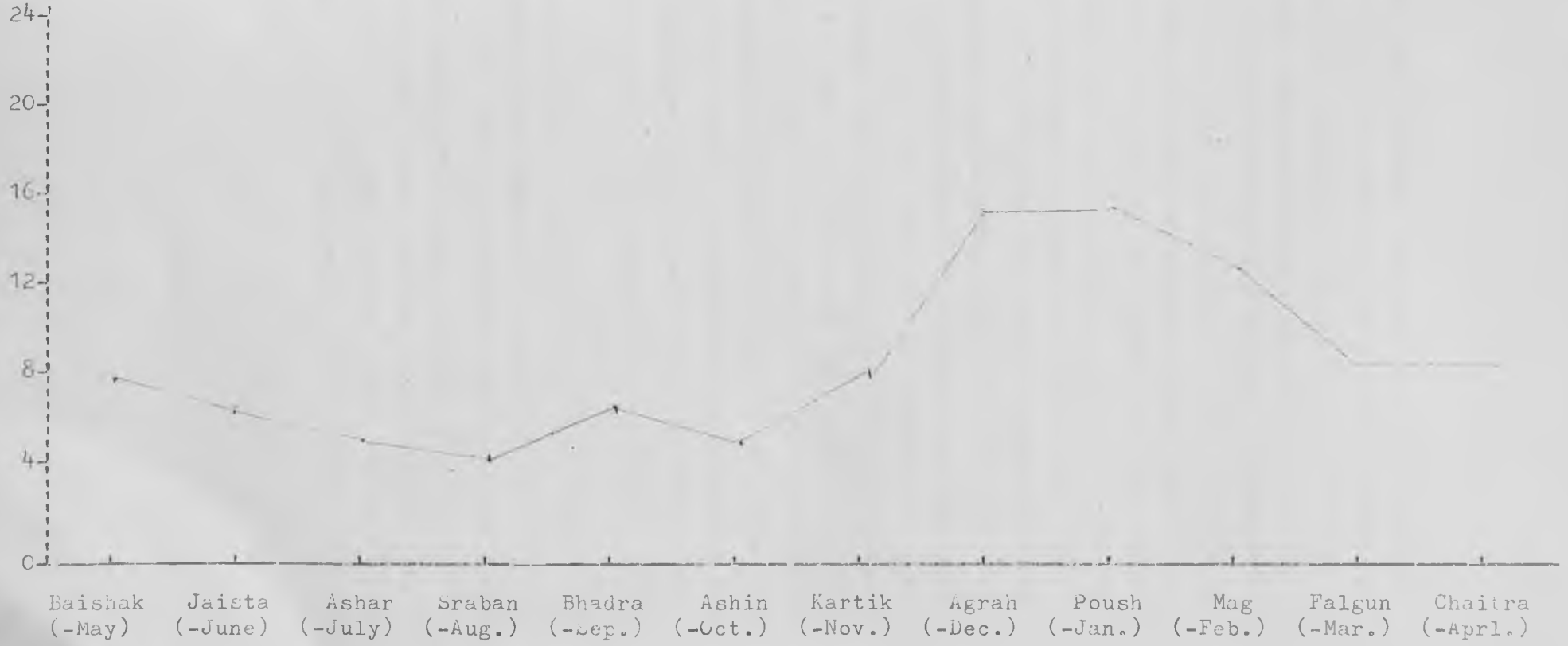

Figure-1, figure-2, figure-3, figure-4, and figure-5, show the seasonal fluctuations of output and services for enterprises producing boats and accessories, wooden agricultural implements, fishing equipments, farm tools and implements (blacksmiths), and containers and mats (bamboo and cane) respectively. From the figures, one will notice that for all enterprises, the peak period of activity is between Agrahayan and Paush (November - 15 - January - 14). For boat makers, however, the busiest period is during the month of Ashar (June - July) before the monsoon followed by another peak during the month of Agrahayan (December 15 - Jan. 14) when the monsoon is over. For the enterprises producing wooden farm tools and implements the busiest period is between the month of Agrahayan and Magh (Nov. 15 - Feb. 14); When for the blacksmiths producing farm tools and equipments, the same is between Agrahayan and Poush (Nov. 15 - Jan. 14). Similar observation can also be made is case of enterprises producing containers and mats. The enterprises producing fishing nets and equipments show an exception. Their activities are concentrated during the entire monsoon i.e. the period between the month of Sraban and Agrahayan (July 15 - Dec. 14).

What is interesting here is to note that the sales of farm tools and implements are concentrated between the harvest time, when the farmers have cash in hand, and the beginning of the planting seasons in Bangladesh, while, requirements of repair and maintenance are the highest prior to the planting and during the growing seasons. Thus the seasonality of the activity corresponds to the seasonality of the crop production.

Several factors may explain the seasonality of production and services apart from the seasonal pattern of demand for farm implements. First, the choice of main occupation. It will be seen from table 2.5 that as many as 29 out of 79 enterpriuers have their main occupation other than this industry. Of the total of 50 enterprepreneurs who have this industry as their main occupations, 29 enterpreneurs have other occupations as second

TABLE 2.5

Distribution of the occupations of enterprises by the main (primary), secondary and tertiary occupations

Main occupation	Occupations	Primary occupation	Secondary occupation	Tertiary occupation
1.	Agriculture	15	16	2
2.	Agri. day labour	9	8	-
3.	Industrial day labour	3	3	5
4.	Small industry	50	26	3
5.	Business	2	-	-
6.	Services	-	-	-
	Total	79	53	10

or third occupations. Interest in this industry will persist only if the returns from the industry are acceptable, otherwise, they will switch over to other occupations for higher incomes. Second, the seasonal fluctuation of the product and raw material prices may render some enterprises less profitable in a particular season, so that some may discontinue production. Finally, the shortage of working capital may also render one enterprise to undertake its production seasonally. It may be noted that the availibility of raw materials for the enterprises under study is also seasonal and hence one willnot be able to stock raw materisls in sufficient quantity when they are available to last the entire year unless one has sufficient amount of working capital.

2.4. The extent of specialization

The enterprises under study not only do repair work but, despite their smaller size tend to produce serveral products. The absence of specialization was also observed from Table 2.1. which, reported among other things, the number of enterprises producing each item of product. An average enterprise produces between 2 and 3 distinct products even if all the different constitutent parts of an item is counted as one. Enterprise producing seven or more items has also been observed. The distribution of enterprises according to the number of separate items produced has been presented in Table 2.6. One will observe

TABLE 2.6

Distribution of enterprises by number of products produced

No. of products	All enterprises		Boats & wooden farm tools producers	
	No. of enterprises	Percentage of the total	No.	%
1	41	51.90	21	65.63
2	14	17.72	7	21.88
3	11	13.92	2	6.25
4	4	5.06	1	3.12
5	3	3.80	0	0
6	3	3.80	1	3.12
7 & above	3	3.80	0	0
	79	100.00	32	100.00

from the table that relatively little progress has so far been made towards specialization. One will also notice that the activity in which a certain progress towards specialization has occurred is the production of boats and wooden agricultural

tools and implements. Of the total of 32 enterprises, about 65.63 percent are single product firms. The items that are produced are either boats or harrows or yokes or ploughs. About 21.88 percent of these enterprises produce two items. The products are usually ploughs with ploughshares or plough-beam and wooden rice-hullers with its accessories. Thus there is little overlap between enterprises producing these items and other enterprises.

One relevant issue that one might raise is regarding the factors determining the degree of specialization. This is rather difficult to determine and involves serveral socio-economic and institutional variables beyond the scope of this study. However, an attempt has been made to determine the factors determining the degree of specialization. In order to do so the following regression equation was estimated by OLS with the assumption that the error terms were distributed independently and identically with zero mean and finite variance.

$$NP = b_0 + b_1 (NW) + b_2 (AGE) + b_3 (\text{Rep. Ratio})$$

where NP is the number of products produced taken as a proxy for measure of degree of specialization, NW, the number of workers is included to measure the impact of size on specialization; AGE, the actual age of enterprise, is included to see if the firms tend to specialize as they become older; and repair ratio is the ratio of repair revenue to the total receipts. The estimated equation by OLS was the following.

$$NP = 0.368 + 0.3111(NW) + 0.0235\ (AGE) + 2.0897\ (REP.R)$$
$$(0.1654) \qquad (0.0097) \qquad (0.5264)$$

$R^2 = 0.27$, $F = 10.15$, $N = 75$

(Figures in parentheses are standard errors)

It can be seen that the signs of the estimated coefficients of all the variables are positive and except for the size (NW), all the coefficients are significant at more than 5% level on a two tail t-test. The coefficient of NW is significant only at 10% level. The sign of the estimated co-efficent of NW and its relative insignificance implies that smaller enterprises in general, produce a smaller number of items but there may not be any significant difference with the larger ones. This also suggests that it is physically not possible to produce a large number of products for the very small firms but as the size increases, a relatively larger number of items are produced.

What follows is that there is no tendency of the enterprises within this size range to specialize and take advantage of the economics of scale, if any.

The sign of the coefficient of AGE variable and its significance indicates that there is a tendency to diversify rather specialize as the firms become older. It was also observed that in general, older enterprises produced a wider variety of products. The significance of the coefficient of repair ratio implies that those enterprises that undertook more repair works produced a wider range of products.

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It may be noted here that production of various items use simple techniques, relatively simpler capital equipments and the items produced do not require special skills. Equipments that are used to produce ploughs can also be used to make boats. Similarly, the equipment which can produce coulters can also produce other metal farm tools and implements such as spade, sickle, scrappers and weeders. This non-specificity of equipments as well as skills may partly explain the absence of specialization in the industry. It appears that the enterprises may also face some difficulties in specializing in a particular product. They may not have adequate amount of capital to instal a specific capital equipment as the capital market is imperfect. Similarly, there are uncertainties in marketing a smaller number of products in large scale.

2.5. Size structure of enterprises

There is a significant variation in size of enterprise in this industry. Size of the enterprise has been measured by the size of the regular work force. Since size of work force is subject to considerable variation from season to season in an enterprise, the model value of the work force was taken to stand for the employment size. Another measure of size is value added of the enterprise but this variable is subject to even greater variation for the small enterprises of this industry. Table 2.7 presents the distribution of enterprises by the employment size group. It appears that about 32.91 percent employs one employee, 79.75 percent of all the enterprises

TABLE 2.7

Distribution of enterprises by the employment size groups

Size of workforce	No. of enterprise	% of total enterprise	Cummulative percentage
1	26	32.91	32.91
2	37	46.84	79.75
3	10	12.66	92.41
4 +	6	7.59	100.00
All	79	100.00	

employ upto two workers and only about 20.25 percent of all enterprises have three or more workers. The average size of employment of the industry is two.

Several factors may explain the existence of very small firms in the industry. It appears that the shortage of capital, production of a number of tools and equipments, their low value relative to their weight and bulk, use of very simple technique of production, etc. are among the main reasons for existence of many small enterprises in the industry.

There are some factors which may partly explain the size variation in the industry. In order to do so, a simple equation was estimated by OLS. The estimated equation was

$$\text{Size (NW)} = 1.723 + 0.1562\ (\text{NP}) - 0.0012(\text{AGE})$$
$$(0.0777) \qquad (0.0075)$$

$$R^2 = 0.046$$

The sign of the estimated coefficient of NP, the number of products produced is positive and significant which implies that the size increases with the number of items produced. The estimated coefficient of age variable is negative and not significantly different from zero. This indicates in the present context, that there is no impact on size as the firm grows older(3).

2.6. The age structure of the enterprises

The agricultural tools and implement industry is not very young. The average age of the enterprise is about 21 years. Table 2.8 gives the distribution of age of the enterprises in the industry. The table indicates that about 20 percent of the firms are below 5 years old, there are about 25 percent firms between the age of 5 and 10, about 19 percent firms are aged between 10 and 20 years. The percentage of firms above 20 years old is about 35. The table reveals a considerable age variation among the enterprises. On the average the enterprises producing metal farm tools and implements are generally

3. The insignificance of age is not surprising as the relationship between size and age is most likely to be non-linear, and any association that may exist between present size and age may be the outcome of the internal growth of the firms.

TABLE 2.8

Distribution of enterprise by age of the enterprises

	Age groups	No. of enterprises	% of the total	Average age of enterprise
1.	0-5 yrs.	16	20.25	3.5
2.	above 5-10yrs.	20	25.32	8.3
3.	above 10-20 yrs	15	18.99	17.2
4.	above 20-40 "	19	24.05	34.2
5.	above 40 yars	9	11.39	56.1
	Total	79	100.00	21.3

older than the rest of the enterprises. The average age for the blacksmiths is about 31 years while the same for enterprises producing boats and wooden farm implements is about 18 years. The average age of all enterprises excluding the blacksmiths is about 18.4 years. The difference between the average age

of blacksmiths and the rest is statistically significant at more than 1% level. If appears that the dissimilarities in the product mix as well as the main product produced partly account for the differences in average ages. Another reason for the metal tool producers to be older is that it is more of a family profession rather than an individual occupation. Table 2.9 presents a bivariate distribution of enterprises by age and size. It reveals an interesting feature regarding the age structure of the industry. The larger firms tend to be older than the smaller ones (however, the estimated x^2(chai) is 5.01 which is not significant at 5% level). It also appears that there is significant variation in age according to locality.

TABLE 2.9

Distribution of enterprise by age group by employment size group

Size group \ Age group	Upto 5 years	Above 5-10	Above 10	Total
1	7	6	13	26 (32.91)
2	6	12	19	37 (46.84)
3	1	1	8	10 (12.66)
4 +	2	1	3	6 (7.59)
All	16 (20.25)	20 (25.32)	43 (54.43)	79 (100.00)

Note: figures in percentheses are percentages of total.

x^2=5.01

2.7. Ownership pattern of the industry

Most of the enterprises are organized informally and this is reflected in their ownership pattern and legal status. Table 2.10 presents a distribution of ownership pattern classified by the size of the enterprise. One will notice from the table that about 69.62 percent of all enterprises are owned individually while rest are owned jointly by the family. There is no firm owned in partnership with individuals outside the family. For their daily operations, enterprises do not perhaps

TABLE 2.10

Distribution of ownership pattern (organizational forms) by enterprises employment size groups

Empl. size group / Ownership status	Indivudual ownership	Family ownership	Total
1	22	4	26 (32.91)
2	26	11	37 (46.84)
3	5	5	10 (12.66)
4 +	2	4	6 (7.59)
All	55 (69.62)	24 (30.38)	79 (100)

Note: Figures in parentheses are percentages of the total. The estimated x^2 at 3d. f is 8.34.

require a legal identity distinct from that of their owners and presumably the inability of the firms to take certain advantages of services by certain agencies is due to the lack of their legal status.

It is interesting to note that whether an enterprise is wholly owned by an individual or by the family is related to size. The estimated X^2(Chai) was 8.34 and was significant at the 5 percent level. This indicates that the smaller firms are generally owned by individuals while the larger ones are owned by the family.

It is also interesting to see that the parttern of ownership is related to age. Individual ownership is more common among the younger enterprises and as the enterprises grow elder, family ownership becomes more prevalent. The relationship can be observed from the following contigency table:

	upto 5 yrs.	above 5-10 years	above 10-30 years	above 30 years	Total
Individual	14	14	20	7	55 (69.62)
Family	2	6	4	12	24 (30.38)
Total	16 (20.25)	20 (25.32)	24 (30.38)	19 (24.05)	79 (100.00)

The estimated X^2 was 14.21 and was significant at the 1% level.

Perhaps the main reason for the individual ownership of the firms is that capital requirement is relatively low when the firm is small and young and hence allows an individual artisan to own the unit. As has been evidenced, the enterprises grow in size as they nature over time and the larger capital requirement, the problems of management and skills and those associated with marketing may render the units under the family ownership for better running of the same. However, as mentioned before, relationship between age and size is a complex one, and their joint impact on the pattern of ownership would be rather difficult to determine. The informal nature of ownership may possibly explain the absence of firms owned in partnership with others outside the family. Informal arrangement increases the chances of disputes and they are better handled with the family than outside it.

2.8. Present Location of the enterprises

Agricultural tools and implement industry is among the most geographically dispersed industries in the country. The distribution of the types of enterprises by their location has been presented in Table 2.11.

It will be seen from the table that about 74.68 percent of all enterprises are widely dispersed and located in villages while about 19 percent of the total are concentrated in village market. Surprisingly, about 6.33 percent of all the enterprises did not have any fixed address. These enterprises are the ones among the boat markers and wooden agricultural tools producers. Indeed, it has been observed that these

TABLE 2.11

Distribution of types of enterprises by location

Types of enterprises	Located in village	Located in vill. market	No. fixed address	Total
1. Boat making	5	2	2	9
2. Wooden Agr. tools	17	3	3	23
3. Fishing net & equipment	8	1	-	9
4. Agr. tools (blacksmithy)	12	6	-	18
5. Container & mats (bamboo cane)	17	3	-	20
Total	59 (74.68)	15 (18.99)	5 (6.33)	79

enterprises move from place to place in order to do their work presumably because the products, eg. boats, hoes and ploughs are bulky and have high transport costs relative to their value.

It may be recalled that the average size of the enterprises is very small compared to other rural industries. Small enterprise is again the result of the variety of items produced, high transport cost relative to value and existance of regional demand for some of the products like boats. Further, these enterprises do repair works. These are some of the reasons that account for the geographical spread of the industry.

TABLE 2.12

Reasons for chosing the enterprise at the present location.

Reasons for present location	No. of enterprises	Percentages of total
1. Residence in neighbourhood	15	17.65
2. Availability of raw-materials	2	2.35
3. Availability of labour	1	1.18
4. Nearness to the market	14	16.47
5. Availability of common facilities	1	1.18
6. No specific reason	50	58.82
7. Others	2	2.35
All	85	100.00

Table 2.12 presents the reasons given by the enterpreneurs for chosing the present location of the industry. It may be noted that as many as 58.82 percent of all enterprises did not have any specific reasons. About 17.65 percent of the enterprises gave residence in neighbourhood as the main reason while about 16.47 percent of all enterprises stated the nearness of the market as the reason for present location. Availability of raw materials, labour and common facilities do not seem to have influenced the enterpreneurs to chose the present location for the enterprises; they accounted for only 4.71 percent.

2.9. Occupational origin

An enquiry into the occupational origins of the entrepreneurs is worthwhile for one can learn and acquire skill from the family environment. It is also interesting to see whether a change in the occupational structure has taken place through generations. These information have been summarised in Table 2.13. One will notice from the table that about 55.7 percent of the enterpreneurs' grandparents had agriculture as

TABLE 2.13

Distribution of enterprises by the main occupations of enterepreneurs, their parents and grand-parents (intergenerational occupational mobility)

Main occupations	Enterepreneurs occupation	Fathers occupation	Grand parents occupation
1. Agriculture	15 (18.99)	37 (46.83)	44 (55.70)
2. Agrl. day labour	9 (11.39)	5 (6.33)	2 (2.53)
3. Industrial day labour	3 (3.80)	0	0
4. Small industry	50 (63.29)	35 (44.30)	31 (39.24)
5. Business	2 (2.53)	1 (1.27)	2 (2.53)
6. Services	0	1 (1.27)	0

Note: Figures in parentheses are the percentages of the total.

their main occupations; about 46.83 percent of enterpreneurs' fathers retained this at their turn while only about 19 percent of the enterpreneurs themselves are mainly engaged in agriculture now. On the contrary, the importance of this industry through generations has increased. While 39.24 percent of the enterpreneurs' grand-fathers had this industry as their main occupations, about 44.3 percent of the enterpreneurs' fathers did have this in their turn. The importance of this industry has increased even more to the engerpreneurs themselves to the extent of more than 63 percent, of all the enterpreneurs. Similar is the case for agricultural day-labouring as main occupation. It appears that there has been an inter-generational mobility among occupations. A sharp decline in the proportion of population engaged in agriculture has taken place while there has been gradual increase in the proportion of enterpreneurs having been mainly engaged in this industry. One can explain this phenomenon by the fact that the growth of agricultural productivity and the growth of employment in agriculture had been very low during the last century or so in this century and thus agriculture was unable to provide gainful employment for an increasing population. Therefore, surplus population moved out of agriculture to look for alternative employment opportunities for subsistence.

2.10. Sources and levels of Income

One will observe from table 2.13 that this industry is the main source of income of the 53.29 percent of all enterprises while about 19 and 11.39 percent of all enterprises have agriculture and agriculture day-labouring respectively as the main sources of income. Only about 6.33 percent of all enterprises have industrial day labouring and business as their main sources of income.

The distribution of household income, total population, average yearly income per enterprise, etc. have been presented in Table 2.14. One will notice that the distribution of income is highly skewed. One may also find that the estimated yearly family income[1] from this industry constitutes a fraction of the total income from all sources for each income group except for the income group-3. For group-3, about 102.37 percent of the total income comes from this industry. This indicates that income from this industry suppliment total income from losses from other sources. For all income groups, income from this industry consitutes about 78.61 percent of the total income. The income group-5 (having an income of more than Tk.10,000) surprisingly receives a negative contribution to the extent of -13.49 percent to their total income from this industry.

1/ For the procedure of the estimation of family income see chapter 5.

TABLE 2.14

Distribution of enterprises classified by the level of yearly income of the entrepreneurs from all sources

Household's total income groups(Taka)	No. of enterprises	% of the total	Total Population	Total income (in Tk.) from all sources	Total family income from this industry	Family income as % of total yearly income	Average yearly income per enterprise	Per capita income
1. Upto 4000	11	13.92	49	36,200	28576	78.94	3291	739
2. 4001-6000	31	39.24	191	171,200	152021	88.80	5523	896
3. 6001-8000	26	32.91	178	193,900	198437	102.3	7458	1089
4. 8001-10,000	7	8.86	61	67,200	41199	61.31	9600	1102
5. Above10,000	4	5.06	26	56,400	-7611	-13.49	14100	2169
All	79	100.00	505	524,900	412622	78.61	6644	1039

Note: Total income refers to incomes from all sources in which the entrepreneurs and other members of the household are involved.

It appears from the table that the contribution of family income to the total income rises gradually from income group-1 upto the income group-3 and then gradually falls. It is rather difficult to explain this phenomenon. However, one is tempted to argue that in the case of rural household, the total income of the household is positively related to the size of asset holding. For households upto the income level 8,000, it is less likely that they would have other equally gainful occupations and thus this industry is taken seriously. Income higher than this increases the possibility of the income from other asset holdings such as land and business and therefore this industry declines in its importance as contributor to the total income. Table 2.15 gives the distribution of the total and yearly family income by the main sources of income of the enterprises. It can be observed that about 104.09 percent of the total income came from this industry for those whose main sources of income were this industry. The enterprises whose main sources of income were agriculture, agricultural day-labouring and the industrial day-labouring, received 27.79, 26.78 and 21.21 percent of the total income respectively from this industry. On the whole, 26.20 percent of the total income came from this industry for those who had main sources of income other than this industry. It appears that the enterpreneurs or the members of his household cannot fully rely on one source of income for their subsistence since the major occupations such as agriculture, rural industry and agricultural day labouring are seasonal. One cannot remain fully employed in one such occupation throughout the year because of the seasonality. The occupations taken up by the enterpreneur and the members of his household are in general complementary to one another.

TABLE 2.15

Distribution of the total and family income of the enterpreneurs by main sources of income

Main sources of income	No of enterpreneurs	Yearly total income from all sources (in taka)	Estimated yearly family income from this enterpreneurs	Yearly family income as % of the total income
1. Agriculture	15	99,900	27,764	27.79
2. Agricultural day labourer	9	46,600	12,481	26.78
3. Industrial day labourer	3	13,000	2757	21.21
4. Small Industry	50	353,200	367,637	104.09
5. Business	2	12,200	1983	16.25
All	79	524,900	412,622	78.61

CHAPTER - III

Employment and Labour

The object of this chapter is to highlight some of the major characteristics of the agricultural tools and implement industry regarding structure of employment and workers with background and nature. In particular, emphasis will be made on the issues of composition of workers, their various characteristis e.g., education, training, land ownership status and wage rates.

3.1. The types of workers

The employment size distribution of the enterprises was given in the earlier chapter. In this section we shall only deal with the types of worker in the industry. Table 3.1 based

TABLE 3.1

Distribution of types of workers by

TYPE OF WORKER	MALE		FEMALE	
	Number	Percentage	Number	Percentage
1. Family worker	115	90	11	9
2. Hired worker	31	100	-	-
a) Permanent	17	100	-	-
i) Family	6	100	-	-
ii) Apprentice	3	100	-	-
iii) Permanent	8	100	-	-
b) Casual	14	100	-	-
i) Casual	11	100	-	-
ii) Piece-rated	3	100	-	-
Total	146	92.40	11	6.96

age & sex

CHILDREN		TOTAL	
Number	Percentage	Number	Percentage
1	1	127	80.38
-	-	31	19.62
-	-	17	10.76
-	-	6	3.80
-	-	3	1.90
-	-	8	5.06
-	-	14	8.86
-	-	11	6.96
-	-	3	1.90
1	0.64	158	100.00

on appendix Table A.3.0 gives the distribution of the types of workers by age-sex in the industry. From the Table, one will notice the predominance of family workers. Of the total workers, about 80.38 percent are family non-wage workers, while about 19.62 percent are hired workers. There are various types of hired workers. Permanent hired workers constitutes about 10.76 percent of all workers of which the shares of family -wage, permanent non-relation and the apprentice workers are 3.80, 5.06 and 1.90 percent respectively. Casual workers constitute about 8.86 percent of all workers of which the percentages of piece rated and casual are 1.90 and 6.96 respectively. One can also observe that the industry is a male-worker dominated one. Male worker constitutes about 92.4 percent of all workers while the female and child-workers constitute about 7.0 and 0.6 percent respectively of all workers. It is interesting to note that there is no incidence of hired female and child workers in the sample. They are all family workers who provide a helping hand to the enterprise.

The proportion of family workers tends to decline as the employment size of enterprises increases. This is evident from Table 3.2 where the percentage distribution of types of workers with their sex and age characterstics by employment size of enterprises have been presented. Family workers constitutes about 96.2 percent of all workers in size group 1 whereas the same for groups 2,3 and 4 are 92.0, 70.0 and 42.8 percent respectively. The systematic decline is compensated by the gradual rise in the proportion of hired workers as the size group increases. Percentage of family wage workers rises from

TABLE 3.2

Percentage distribution of types of workers by the size of enterprise.

Type of worker / Empl. size group	Family (non-wage)				Family (wage)				Apprentice				Piece-rated			
	M	F	CH	T	M	F	CH	T	M	F	CH	T	M	F	CH	T
1	96.2	-	-	96.2	-	-	-	-	-	-	-	-	3.9	-	-	3.9
2	79.6	12.2	1.4	92.0	2.7	-	-	2.7	-	-	-	-	-	-	-	-
3	70.0	-	-	70.0	6.7	-	-	6.7	3.3	-	-	3.3	-	-	-	-
4+	39.7	(7.1)	-	42.8	7.1	-	-	7.1	7.1	-	-	7.1	7.1	-	-	7.1
ALL	72.8	17.0	10.6	80.4	4.0	-	-	4.0	1.9	-	-	1.9	1.9	-	-	1.9
Total No.	127				6				3				3			

(Contd.)

Table 3.2 (Contd.)

Permanent				Casual				TOTAL			Total No.
M	F	CH	T	M	F	CH	T	M	F	CH	
-	-	-	-	-	-	-	-	100	-	-	26
4.1	-	-	4.1	-	-	-	-	86.5	12.2	1.3	74
16.7	-	-	16.7	3.3	-	-	3.3	100	-	-	30
	-	-		35.7	-	-	35.7	92.9	7.1	-	28
5.1	-	-	5.1	7.0	-	-	7.0	92.4	7.0	0.6	158
	8				11				158		

2.7 for group 2 to 7.1 for group 4; the incidence of apprentice workers is 3.3 percent of all workers for size group 3 and it rises to 7.1 percent for size group 4 and the percentage of piece-rated workers rises from 3.9 percent of all workers for group 1 to 7.1 for group 4. Permanent workers rises from .1 percent for group 2 to 16.7 percent for group-3 while there is no incidence of casual workers upto group-3. The incidence of casual workers rises from 3.3 percent for group-3 to 35.7 percent for group 4.

It is interesting to note that in enterprises with one employee, a very little work is done by the piece-rated workers -there is no incidence of other types of hired workers in this group. The distribution of types of workers by the types of enterprise has been presented in Table 3.3. The table is self explanatory and needs no further comment. However, one will observe that the incidence of casual workers is the feature only to the wooden agricultural tool makers whereas the incidence of permanently hired workers is observed in the enterprises producing boats and metal agricultural tools and implements. Enterprises producing containers and mats do not use hired workers at all while the incidence of family workers is the lowest for those producing metal tools and implements. The practice of keeping apprentice in the workforce is observed only in the enterprises producing metal farm tools (blacksmiths).

TABLE 3.3

Distribution of types of workers by types of enterprises

Type of industry / Type of worker	No. of observation	Family (Non-wage)	Family (wage)	Apprentice	Piece-rated worker	Permanent worker	Causal worker	Total No. of workers
Boat-making	9	17 (81.0)	2 (9.5)	-	-	2 (9.5)	-	21 (100)
Wooden cart & Agr. tools	23	31 (70.5)	-	-	2 (4.5)	-	11 (25.0)	44 (100)
Fishing net & equip.	9	12 (92.3)	-	-	1 (7.7)	-	-	13 (100)
Ag. tools-blacksmithy	18	30 (69.8)	4 (9.3)	3 (7.0)	-	6 (14.0)	-	43 (100)
Container & mat	20	37 (100.0)	-	-	-	-	-	37 (100)
All Industries	79	127 (80.4)	6 (3.8)	3 (1.9)	3 (1.9)	8 (5.1)	11 (6.9)	158 (100)

It appears that the incidence of wage employment is relatively low in this industry. Several factors may account for this. One reason for this is that the enterprises are located mostly in the rural areas[1] where industrial activities are less concentrated. A further reason is, it is possible to substitute family labour (both male and female) for hired workers for these enterprises which are operated in relatively smaller scales.

3.2. Labour use in the industry.

The informal types of enterprises as evidenced from previous tables may account for the incidence of a large proportion of workers working part-time in the industry as they may devote a part of their time in other non-industrial occupations. Unfortunately, however, we are unable to determine the extent of the part-time employment of both male and female workers given our sample. Instead, we have records of hours of work done per day by each labourer. Table 3.4 gives the distribution of average number of hours worked per day per worker by the types of enterprises. It will be seen form the table that the average number of hours worked per enterprise is about 15 hours while the average duration of work per worker is about 7.92 hours. The highest average number of hours per worker daily occurs in boat making enterprises (9.71) whereas the lowest (4.76) occurs in enterprises producing fishing nets, equipments and tools.

1/The incidence of wage employment is, in general high in modern activities where a large proportion of enterprises are located in urban areas (see RI&P final report).

TABLE 3.4

Distribution of average number of hours worked per day per enterprise and per worker.

Enterprise group	No. of entp.	Ave. No. of hours worked per day Per enterprise	Ave. hours worked daily per worker
BOAT MAKING	9	22.8	9.71
WOODEN CART & AGRL. TOOLS	23	13.9	7.31
FISHING NET & EQUIP.	9	6.8	4.76
BLACKSMITHY	18	21.9	9.03
BAMBOO & CANE CONTAINER	20	13.1	7.10
ALL	79	15.84	7.92

It is interesting to note that the average number of hours worked daily per worker increases as size of enterprise increases. This is evidenced from Table 3.5. It is not surprising

TABLE 3.5

Distribution of enterprises by average number of hours worked per day by employment size

Emp. Size Group	No. of Enterprise	Ave. No. of Hours worked per day per enterprise	Ave. Hours worked daily per worker
1	26	5.55	5.55
2	37	15.30	7.65
3	10	28.05	9.35
4+	6	39.56	8.48
ALL	79	15.84	7.92

that the per unit number of man-days worked in the reference month increases with size. However average number of man-days worked per employee does not seem to have any relationship with the size of enterprises. This can be observed from Table A. 3.1 placed in the appendix.

The distribution of mandays worked in the enterprises by types have been placed in Table-3.6 based on the appendix table A. 3.2. It will be noticed that of the total mandays worked (in the reference month) family labour, hired permanent and hired casual constitute respectively about 79.83, 11.68 and 8.49 percent. The distribution of the mandays worked by various types of workers by size is given in Table 3.7 based on appendix Table. A. 3.3. The table is self-explanatory and needs no further comment, but the trend (as in case of

TABLE 3.6

Distribution of mandays worked by the types of workers by industry Type

Industry type	No. of obs.	Family (Non-wage)	Hired permanent	Hired Casual	Total
Boat making	9	403 (82.41)	86 (17.59)	-	489 (100)
Wooden Cart A.T.	23	579 (66.25)	-	295 (33.75)	874 (100)
Fishing net & Eq.	9	267 (90.51)	-	28 (9.49)	295 (100)
Ag. Tools & Blacking	18	864 (70.70)	358 (29,30)	-	1222 (100)
Cane, Bamboo Cant. & mat.	20	923 (100.00)	-	-	923 (100)
ALL	79	3036 (79.83)	444 (11.68)	323 (8.49)	3803 (100)

Note: The figures in parenthesis are the percentages.

Hired Permanent = Family (wage) + Apprentice + Permanent labour.

Hired Casual = Piece-rated + Casual

TABLE 3.7

Distribution of mandays worked by various types of workers by size group of the industry

Emp. Size Group	No. of Obs.	Family (Mandays)	Hired Permanent (mandays)	Hired Casual (mandays)	Total (mandays)
1.	26	408 (93.58)	-	28 (6.42)	436 (100)
2.	37	1727 (93.10)	128 (6.90)	-	1855 (100)
3.	10	574 (70.00)	230 (28.05)	16 (1.95)	820 (100)
4+	6	327 (47.25)	86 (12.43)	279 (40.32)	692 (100)

Note: Figures in parenthesis are persentage of Total

Hired Permanent: Family (wage)+ Aparentice + Permanent labour

Hired Casual : Piea-rated + Casual labour.

Workers) is evident here that the proportion of mandays worked by family labour declines and that of the hired workers rises as the size of enterprise increases.

3.3. Types of hired workers and their wage-rates

It may be argued that the duration of employment provides a partial picture of the level of hiring of the workers employed in the industry for, one may be fully employed by the time-criterion but may not be able to scratch a living from it. The level of earning and hence the level of living is determined by the number of days of employment and the daily wage rate together. Further, the wage rate may be taken as a datum for either the level of skill requirement in a particular task or the labour productivety. Hence a look into the wage-rates is worthwhile.

The distribution of wage rates by the types of hired workers has been presented in Table 3.8. One will notice from the Table

TABLE 3.8

Distribution of wage rates by the types of hired workers.

Type of hired workers	No. of workers	Monthly wages (in Taka)	Daily wages (in Taka)	Hourly wages (in Taka)	Average hours worked per day
1	2	3	4	5	6
Family worker (hired)	6	177	7.68	0.92	8.30
Apprentice	3	20+meal	-	-	8.73
Piece-rated workers	3	-	7.55	1.73	4.34
Permanent worker	8	200	7.41	0.76	9.76
Casual worker	11	365	16.28	1.90	8.56

that there is a considerable variatation in the wage rates for different types of hired workers. The hourly wage rate is the highest (1.90 taka) for the casual workers followed by the piece rated workers (Taka 1.73). The hourly wage rate is the lowest for the permanently hired workers (Taka 0.76). Apprentices get a monthly remuneration plus meals. Except the one for the casual workers, the daily wage rate did not seem to vary much with the types of workers. The average daily wage is Taka 16.28 for the casual workers and Taka 7.53 for the rest, a difference which is statistically significant at 1 percent level.

The distribution of the labour days and their respective wage rates by the types of enterprise has been presented in Table 3.9. One will observe from this that there is a considerable variation of wage rates (hourly, monthly or daily) among the

TABLE 3.9

Distribution of Wage-labour and their wage rates by types of enterprises in the reference month.

Types of enterprises	No. of enterprises	No. of workers	Total Mandays	Total monthly wage	Average daily wage rate	Average monthly wage rate
Boat making	3	4	86	710	8.26	178
Wooden Cart and agricultural tools	4	13	295	4480	15.19	345
Fishing net and equipments	1	1	28	112	4.00	112
Agricultural tools and blacksmithy	11	13	358	2010	5.61	155
ALL	19	31	727	7312	10.06	236

various types of enterprise producing various products. The daily wage rate is the highest in the case of enterprises producing wooden farm tools while that of the fishing equipments is the lowest. One will find several explanations for this variation of wage rates among the enterprises producing various products. The various types of tools produced require different levels of skills for their production. Further, low wage rate will occur in the type of enterprises mainly operated by the use of family labour. Furthermore, low wage rate may also occur due to the differential incidence of various types of wage labour: as enterprise having a high proportion of casual workers will, in general, pay a higher average wage than the one which has a low proportion of casual workers. The average wage rate paid to workers by the metal farm tools producers appears to be low compared to others despite the high incidence of wage labour. The reason for this is that, of the total wage labour, a significant proportion of the hired workers are apparentices, family wage workers and permanent workers who are paid low wages compared to casual workers.

There seems to be a systematic variation of wage rates (daily and monthly) with employment size of enterprise. Both daily and monthly wage rates seem to have a positive relationship with size. The distribution of wage rates by the employment size has been presented in Table 3.10. The hourly wage rate does not seem to vary with size upto size group 3, but the average hourly wage rate for the enterprises employing upto 3 workers is about Taka 0.79 and 1.63 for the enterprises employing four or more employees, a difference which is statistically significant at 1 percent level.

TABLE 3.10

Distribution of wage labourers and their wage rates classified by the enterprises size group in the reference month.

Employment Size group of enterprises	No. of enterprises	No. of workers	Total no. of mandays worked	Total no. of hours worked	Total monthly wage	Average hourly wage	Average daily wage	Average monthly wage
1	1	1	28	140	112	0.80	4.00	112
2	5	5	100	1148	900	0.78	9.00	180
3	8	9	264	2226	1758	0.79	7.15	195
4+	5	16	353	2780	4542	1.63	12.87	284
ALL	19	31	727	6294	7312	1.76	10.06	236

3.4. Characteristics of workers and proprietors

In this section, various characteristics of workers and proprietors will be examined. Emphasis will be given on the land ownership status, levels of education and training, age of workers and enterpreneurs and lengths of service of the workers in the industry.

3.4.1. Land ownership status

Land ownership status reflects the employment linkages between agriculture and industrial activities. Table 3.11.

TABLE 3.11

Distribution of workers (including proprietors) by ownership status by employment size

Emp. size group	Land ownership status (acres)	0.00 acres	0-2.00	2.00 & above	Total
1		24	2	-	26 (16.45)
2		59	15	-	74 (46.84)
3		28	2	-	30 (18.99)
4+		28	-	-	28 (17.72)
TOTAL		139 (87.97)	19 (12.03)	-	158 (100.00)

*x^2=9.24 (Employment size groups 3 and 4+ together and 0-2.00 and 2.00 & above groups have been merged in order to estimate x^2.)

Note: the figures in parentheses are percentages of the total.

presents the distribution of workers (including the proprietors) by land ownership status by employment size. It will be observed that as many as 87.97 percent of all workers have no cultivable land while only about 12 percent workers own land upto 2 acres. It is interesting to note that there is a strong association between land ownership status and the size of enterprise. The estimated X^2 is 9.24 which is significant at 1 percent points of X^2 distribution with relevant degrees of freedom.

The distribution of enterpreneurs by ownership status by size has been presented in Table 3.12. The proportion of

TABLE 3.12

Distribution of enterpreneurs by ownership status and employment size

Ownership (acres) Empl. Size	0.00	0-2.00	2.00 & above	TOTAL
1	23	3	-	26 (32.91)
2	30	7	-	37 (46.84)
3	8	2	-	10 (12.66)
4+	6	-	-	6 (7.59)
TOTAL	67 (84.81)	12 (15.19)	-	79 (100.00)

X^2=0.76 (Size groups 3 and 4+ have been merged to calculate X^2)

Figures in parentheses are percentages ofthe total.

enterpreneurs who are landless is about 84.81 percent of all enterpreneurs. This proportion is slightly less than that of the workers. Whether an enterpreneur is landless or not is quite unrelated to size. The estimated X^2 was 0.76 which is not significant at an acceptable probability level. It appears that those who do not have enough land tend to adopt industrial activities more more than others for their need to survive economically.

3.4.2. Level of education

The educational background of workers as well as the proprietors have been presented in Table 3.13 and 3.14. One will

TABLE: 3.13

Workers' level of education by employment size group

Level of education / Empl. size group	Illiterate	Primary	Secondary	Above	TOTAL
1	14	9	3	-	26 (16.45)
2	49	16	9	-	74 (46.84)
3	10	18	2	-	30 (18.99)
4+	17	8	3	-	28 (17.72)
TOTAL	90 (56.96)	51 (32.28)	17 (10.76)	-	158 (100.00)

X^2=14.67

X^2 has been estimated by merging Secondary & above secondary groups together.

Note: Figures in parenthesis are row percentages.

TABLE 3.14

Enterpreneurs' level of education by employment size group

Level of education Empl. Size group	Illiterate	Primary	Secondary	Above	TOTAL
1	14	9	3	-	26 (32.91)
2	21	11	5	-	37 (46.84)
3	3	5	2	-	10 (12.66)
4+	3	1	2	-	6 (7.59)
TOTAL	41 (51.90)	26 (32.91)	12 (15.19)	-	79 (100.00)

X^2=2.37 (This has been estimated by merging employment size groups 3 and 4+ together and by merging secondary level with above secondary level).

notice from these tables that both workers and entrepreneurs have low levels of education but higher than national average. About 57 and 52 percent of the workers and enterpreneurs respectively are illiterate. The percentages of workers and entrepreneurs having secondary level of education are respectively 10.76 and 15.19. Whether a worker in the enterprise is illiterate or not is quite related to size. The estimated X^2 was 14.67 which was significant at the 5 percent level. Whether an enterpreneur is educated or not is quite unrelated

to size. The estimated X^2 was 2.37 which was not significant at an acceptable probability level. Presumably, the present low level of education in this industry is one of many constraints which hinder the expansion of the industry despite its potential. All the female workers were illiterate and therefore, were not presented here. The distribution of workers' level of education has been presented in Table A. 3.4.

3.4. Level of training

Although both workers and enterpreneurs have some educational background (the level being higher than national average), none of the workers or enterpreneurs seem to have any formal training. The distributions of workers and entrepreneurs by formal-informal trainings by size has been presented in Table 3.15 and 3.16. The most of the workers and enterpreneurs

TABLE 3.15

Level of training of workers' by employment size group

Empl. size group / Level of training	FORMAL	ON-JOB	FULL-WORKER	TOTAL
1	-	3	23	26 (16.45)
2	-	12	62	74 (46.84)
3	-	9	21	30 (18.99)
4+	-	6	22	28 (17.72)
TOTAL	-	30 (18.99)	128 (81.01)	158 (100.00)

Note: Figures in parentheses are percentages of total.

TABLE 3.16

Level of training of enterpreneurs by employment size

Level of training Empl. Size	FORMAL	ON-JOB	FULL-WORKER	TOTAL
1	-	3	23	26 (32.91)
2	-	1	36	37 (46.84)
3	-	-	10	10 (12.66)
4+	-	1	5	6 (7.59)
TOTAL	-	5 (6.33)	74 (93.67)	79 (100.00)

Note: Figures in parentheses are percentages of total.

have completed on the job-training. About 19 and 6 percent of the workers and enterpreneurs respectively are at present on job training. It appears that whether the workers or the entrepreneurs have any training or not is unrelated to size of enterprise.

3.4.4. Length of service of workers and enterpreneurs

The distributions of the workers and enterpreneurs' length of service by size of enterprise have been presented in Tables 3.17 and 3.18. It appears that there is a strong association between length of service and the size of enterprise for the workers. A higher proportion of more experienced workers seems to be associated with the size. The estimated

TABLE 3.17

Length of service of workers by employment size group

Empl. Size group / Length of service (yrs.)	∠5	5-∠10	10+	TOTAL
1	6	5	15	26 (16.45)
2	35	21	18	74 (46.84)
3	17	4	9	30 (18.99)
4+	15	-	13	28 (17.72)
TOTAL	73 (46.20)	30 (18.99)	35 (34.81)	158 (100.00)

X^2=18.35 (Emp. size group 3 and 4+ have been merged in order to estimate the value of X^2).

Note: Figures in parentheses are parcentages of total.

TABLE 3.18

Length of service of the enterpreneurs by employment size

Emp. size group / Length of service (yrs.)	∠5	5-∠10	10+	TOTAL
1	7	5	14	26 (32.91)
2	6	12	19	37 (46.84)
3	2	1	7	10 (12.66)
4+	3	1	2	6 (7.59)
TOTAL	18 (22.78)	19 (24.05)	42 (53.17)	79 (100.00)

X^2=3.66 (estimated by merging empl. size groups 3 and 4+ together)

Note: Figures in parentheses are percentages.

X^2 is 18.35 which is significant at one percent level. However, the length of service does not seem to be associated with size of enterprise for the enterpreneurs. The estimated X^2 is 3.66 which is not significant.

3.4.5. Age of workers and entrepreneurs

The distribution of the age of workers and entrepreneurs by the length of service have been presented in Table 3.19 and 3.20 respectively. From the tables it will be observed that as many as 44.30 percent of workers are under 25, years of age while about 15.19 percent of entrepreneurs are about of the same age. The workers and entrepreneurs in the range

TABLE 3.19

Length of service by age of workers

Length of service (yrs.) / Age of workers	∠5	5-10	10+	TOTAL	Percentage
∠25	58	8	4	70	44.30
26-∠45	15	21	33	69	43.67
45+	-	1	18	19	12.03
TOTAL	73	30	55	158	100.00
Percentage	46.20	18.99	34.81	100.00	-
		X^2= 70.90			

TABLE 3.20

Length of service by the age of enterpreneurs

Length of service (yrs.) / Age of entrep. (yrs.)	∠5	5-10	10+	TOTAL	Percentage
∠25	9	2	1	12	(15.19)
26-∠45	9	17	28	54	(68.35)
45+	-	-	13	13	(16.46)
TOTAL	18 (22.78)	19 (24.05)	42 (53.17)	79 (100.00)	(100.00)

$X^2=22.60$

26-45 are about 43.67 and 68.35 percent respectively. The lengths of service of both workers and enterpreneurs seem to be related to the age of workers and entrepreneurs. The strong degree of association between the length of services and the age were evidenced from the estimated X^2 which were 70.90 and 22.60 for contigency tables 3.19 and 3.20 respectively. It appears that the degree of association is stronger in case of workers than that of the enterpreneurs.

CHAPTER IV

Capital Technology and Investment

The present chapter will deal with the capital requirements, the composition of capital assets and level of technology in use of the agricultural tools and implement industry. The estimation of the capital requirements has some important bearings. Knowledge of the capital requirements throwing some light on the levels of technology in use will help setting up new enterprises in the industry, if one wants to, and will increase efficiency in use of scarce capital resources. Furthers, it will help policy makers to formulate effective credit policies for development of this industry.

In order to use capital in an efficient way, it is also necessary to have knowledge regarding composition of capital assets, the nature of their acquisition and their place of origin, for, they have implications for diffussion and adaptation of technology in this industry. Description of the composition of capital is given first, the issues regarding technology is taken up next and finally, the level of investment made by the enterprises are examined in the context of this industry.

4.1. Composition of capital

Capital assets can be conveniently divided into two broad categories: Fixed capital assets and working capital. Description of the fixed assets will be taken up first followed by the one of working capital.

4.1.1. Fixed assets

Measurement of capital stock presents insur-moutable difficulties. Four broad categories of capital stock were considered: land, structure, machinery and tools and equipments.

Given the great variety of tools and equipments used, it was impossible to obtain replacement or market value of the stock directly. Estimation of the true replacement also posed problems as truce were and tear of the stock could not be ascertained taking into consideration of the changes in prices. Knowledge of price of tools and equipments often did not measure corectly the present discounted value as the enterprise's own discount rate was probably different from the market interest charges. Compounding these problems are the errors in the measurrement of the size of work force which make the estimation of capital-labour ratios extremely unreliable.

Despite these difficulties, some of the data that were obtained on the capital assets are worth reporting as they illustrate some aspects of the capital-labour substitution by these enterprises.

Despite these odds, the value of capital stock was measured in terms of the replacement cost in current prices. Replacement cost was approximated by the value an asset would have got if sold in the market in its current state of condition at that time. This piece of information was collected from the respondent themselves. The value of the rented assets was not considered at all in the excercise. This did not however, seriously distort the estimate as the proportion of rented assets was negligible. The values of mechanery, tools and equipments were aggregated to yield what had been termed as the value of fixed capital. Structures are built on land and hence forms an integral unit. Therefore, value of land and structures were

agregated under a single item. Value of fixed capital as defined, the value of land and structure and the value of working capital together consituted what had been termed as the total capital.

The composition of capital by the types of enterprises have been presented in Table 4.1. From the table, one will notice that there is a considerable variation in the requirements of capital. The average value of fixed capital varied from as low as Taka 33 for enterprises producing fishing nets and equipments, to Taka 495 for the enterprises producing metal farm tools and equipments. The average value of the total capital also varied from Taka 676 for the boat makers, to Taka 3316 for metal farm tool makers (blacksmiths).

It will also be noticed from the table that the composition of the total capital is also different for enterprises producing different types of products. For example, fixed capital for the enterprises producing boats, metal farm tools, and containers and mats (bamboo and cane) constitute about 17.30, 14.93 and 4.86 percent of the value of total capital respectively. Land and structure for the enterprises producing the same items of products constitute about 56.27, 81.87 and 84.14 percent of the value of total capital respectively. What the table reveals is the relative magnitudes of various components of fixed capital assets. The relative share of the component of land and structure is the highest and this constitutes about 76 percent of the total value of capital stock for all enterprises. It appears that high value of capital stock is almost invariably associated with the high value of land and structure in this predominantly rural industry.

TABLE 4.1

Composition of capital assets by the types of enterprises(in taka)

	Enterprise type	No.of observation	Value of fixed capital (FC)	Value of land of structure	Total fixed assets	Working capital (WC)	Total capital	Average total capital per enterprise	Average FC per enterprise
1.	Boat making	9	1049 (17.30)	3412 (56.27)	4461 (73.57)	1603 (26.43)	6064 (100.00)	674	117
2.	Wooden cart & agricultural tools	23	5828 (24.41)	15640 (65.50)	21468 (89.91)	2411 (10.09)	23879 (100.00)	1038	253
3.	Fishing net & equipments	9	6816 (27.97)	17550 (72.03)	24366 (100.00)	-	24366 (100.00)	727a	33a
4.	Blacksmithy & agrl. tools	18	8909 (14.93)	48869 (81.87)	57778 (96.80)	1912 (3.20)	59690 (100.00)	3316	495
5.	Bamboo, cane container & mat.	20	785 (4.86)	13585 (84.14)	14370 (89.00)	1776 (11.00)	16146 (100.00)	807	39
	ALL	79	23387 (17.97)	99056 (76.11)	122443 (94.08)	7702 (5.92)	130145 (100.00)	1647	216[b]

Note: 1. Figures in parentheses are row percentages.

2. a= based on 8 observations; b= based on 78 observations.

There ar some systematic factors that explain the part of the variation in capital requirements for the enterprises in the industry. First, the location of an enterprise may substantially affect the true capital requirements. For, the value of land and structure would be in.riably high if t e enterprise is located in urban areas and the capital requirement would be higher. However, for the enterprises located in the rural areas, the quantitative measurement of total capital which includes the value of land and structure would be some what misleading. For, it has been observed, that many of the enterprises do not have separate structures for their activity, part of the house or structure is used for this purpose, and hence the opportunity cost of such s ructures would be close to zero.

Secondly, the capital requirements of enterprises may increase with the size of the enterprise measured in terms of the size of the work force. The composition of capital assets classified by the size of enterprise have been presented in Table 4.2. Indeed, one will notice from the table that the size of the capital requirements systematically increases with the size of enterprise. The average fixed capital requirement increases from Taka 53 for enterprises having one worker irrespective of the types of enterprise. Similar is the case of the total capital requirements.

It appears that, for the farm tools and implement industry, which is predominantly a rural based industry, the capital requirement would be best approximated if only the costs of machinery, tools and implements are included in the calculation. One can conveniently read off the requirement from the tables here.

4.1.2. Working capital

Working capital has been defined as the aggregate of the value of stock of raw materials and fuels, stock or inventory of finished products and the outstanding credit.(1) Like the measurement of fixed assets, the measurement of the working capital is also beset with problems. For, each of the components of the working capital may be subject to day-to-day fluctuations.

This is even more so in case of this industry, as it has been observed that, both the availibility of raw materials and the demand for products, are seasonal. Therefore, each constituent items of the working capital may be held in different proportions in different time periods. In order to circumvent the problems, we have sought to measure the working capital in the following way: first, estimate of each of the components was made for each of the twelve months of the year. Then a monthly average was estimated for the purpose(2). This methodology would somewhat remove the extreme seasonality, though it may not be entirely legitimate.

The composition of working capital by the types of enterprises has been presented in Table 4.3. The table reveals that the average working capital requirements for the industry is about Taka 97. There is a considerable variation of the

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(1) Other components like cash in hand, cash with banks, advances and loams tec. have not been considered because of the magnitude of each.

(2) see Chapter II on seasonality of production.

TABLE 4.2

Composition of capital assets by enterprises employment size gtoup (in taka)

Employment size group	No. of enter-prises	Value of fixed ca-pital (FC) (in taka)	Value of land & struc-ture	Total fixed assets (TEA)	Working capital (WC)	Total capi-tal (TC)	Average total capital assets	Average fixed capital per ent-er prise	Ratio of working capital to fixed capital
1	26	7847 (22.60)	26680 (76.84)	34527 (99.44)	196 (0.56)	34723 (100.00)	647[a]	52[a]	0.15
2	27	6569 (11.70)	46226 (82.30)	52795 (94.00)	3371 (6.00)	56166 (100.00)	1518	178	0.51
3	10	2758 (15.06)	13900 (75.89)	16658 (90.95)	1658 (9.05)	18316 (100.00)	1832	276	0.60
4+	6	6213 (33.65)	12250 (66.35)	18463 (88.17)	2477 (11.83)	20940 (100.00)	90	1036	0.40
ALL	79	23387	99056	122443	7702	130145	1647	216[b]	0.46

Note: 1. Figures in parentheses are the percentages of the total capital

2. a= based on 25 observations; b= based on 78 observations.

working capital requirements for the enterprises producing different types of products. It ranges from zero for the producers of fishing nets and equipments, to Taka 178 for those making boats.

The composition of working capital also appears to be different for different types of enterprises. For example, stock of raw materials and finished goods constitute about 35.29 and 64.71 percent repectively for boat makers, 53.40 and 46.60 percent respectively for the metal farm tool producers and 46.10 and 48.92 percent for the wooden farm tool producers. The item of outstanding credit appears only in case of the wooden farm tool producers which constitute only about 5 percent. For all enterprises, the proportion of the outstanding credit in the working capital is as low as 1.56 percent.

The working capital requirements, in general, appear to be very low and may not reflect the true requirements. For it will be observed, that many of the enterprises expressed their need for credit for working capital. It appears that the figures presented in the table may reflect more appropriately the provisions they are able to make rather than what they require. This view is strengthened, when one finds that the enterprises tend to economize on this form of capital. It appears that the firms hold relatively little inventory of finished products and buy their material when the need arises, some even asks their customers to provide the materials for their orders. It has also been observed that a significant proportion (about 40 percent) of boat makers, wooden farm tool

TABLE 4.3

Composition of working capital by types of enterprises (in taka)

Enterprises	No. of enter-prises	Stock of raw-mat & fuels	Stock of finished goods	Outstanding credit	Total work-ing capital	Av. W.C. per enter-prise
Boat making	9	565 (35.29)	1038 (64.71)	-	1603 (100.00)	178
Wooden cart & ag. tools	23	1111 (46.10)	1180 (48.92)	120 (4.98)	2411 (100.00)	104
Fishing net & equipments	9	-	-	-	-	-
Ag. tools black-smithy	18	1021 (53.40)	891 (46.60)	-	1912 (100.00)	106
Bamboo & cane container	20	604 (34.87)	1128 (65.13)	-	1776 (100.00)	87
ALL	79	3301 (43.12)	4235 (55.32)	120 (1.56)	7702 (100.00)	97

Note: a) Figures in parentheses are the percentages of th row totals.

b) Figures are obtained by averaging out the seasonal variation of the stock holding.

TABLE 4.4

Composition of working capital by employment size groups of enterprises (in taka).

Employment size groups	No. of enterprises	Stock of raw-materials	Stock of finished goods	Outstanding credit	Total working capital	Average working capital per enterprise	Ratio of WC to FC (WC/FC)
1	26	21 (10.64)	175 (89.36)	-	196	7.84	0.150
2	37	1140 (33.82)	2231 (66.18)	-	3371	91.11	0.513
3	10	430 (25.95)	1108 (66.81)	120 (7.24)	1658	165.80	0.601
4+	6	1710 (70.31)	767 (29.69)	-	2477	412.83	0.400
ALL	79	3301 (42.86)	4281 (55.58)	120 (1.56)	7702	97.49	0.329

makers and blacksmiths producing metal farm tools do not start working on product unless they get firm orders and they even ask for advances.

In table 4.4., the composition of working capital by the size of enterprise has been presented. One will notice from the table that the average working capital increases with the size. The composition of working capital also reveals an interesting pattern. While the proportion of stock of raw materials to the total working capital increases with size, the proportion of the inventory of finished products decreases as size of enterprise increases.

This indicates that the larger firms are relatively in a better financial condition than the smaller ones to hold stocks of raw materials to carry on production smoothly and at the same time they can dispose off the finished products quickly preseumably because they have better market connections and they can extend very short term credits to their customers.

Although the estimates of both working capital and the fixed capital are suspects, it will be less likely that their ratio will be. These ratios for each size group have been given in the last column of the Table 4.4. The ratio indicates the relative working capital position to the fixed capital. The average for all enterprises is 0.329. It appears that the ratio is positively related to size. The finding is not surprising, for, larger enterprises need greater amount of funds for procuring and stocking raw materials than the smaller ones.

4.2. Technology

Given the size distribution of the enterprises and the absence of specialization, it appears, that the organization and methods of production within many of the enterprises is rather primitive. It has been also observed that most of the task of the enterprises producing a vari ty of products are non-mechanized. Therefore, one may get some idea regarding the levels and nature of technology from the degree of mechnisation in the enterprises and from the ratio in which labour is combined with capital to produce output.

A descri tion of use and origins of mechnery has been presented in Table 4.5. One will notice from the Table that about 87 percent of all the enterprises do not use any mechinery

TABLE 4.5

Percentage distribution of use and origin of machinery used by enterprise type

	Types of enterprise	Without machine	With machining	Using new machining	Using old machine	Using local machine	Using foreign machine
1.	Boat making(9)	100.0	-	-	-	-	-
2.	Wooden cart and agricultural tools(23)	100.0	-	-	-	-	-
3.	Fishing net and fishing equipment agr. tools (9)	88.9	11.1	100.0	-	100.0	-
4.	Agricultural tools & blacksmithy (18)	50.0	50.0	88.9	11.1	89.9	10.1
5.	Bamboo, cane container and mat. agr. tools	100.0	-	-	-	-	-
	All	87.34	12.66	90.0	10.0	90.0	10.0

at all. The table also reveals that there is a complete absence of use of machinery in the enterprises producing boats, wooden farm tools and containers and mats. As many as 50 percent of all the enterprises producing metal farm tools use machinery for their production. One will notice from the table that 90 percent of all machines in the machine-using enterprises were new. For the enterprises producing metal farm tools, the proportion of new machines was 88.9 percent among the machine users.

of all the users of machines, 90 per cent were using local machines. The machines were all of general purpose and many were built by the enterprises themselves. It appears that the technology was simple and indigeneous in general. Locally made machines were of low quality compared with the equivalent foreign makes. The products were non-standardized and the quality was poor.

Use of machines, however, does not adequately reflect the technology of production. One needs to find the capital-intensity, for this has important implications for productivity as well as generation of employment in the industry.

Capital intensity or the capital-labour ratio has been defined as the proportion in which labour is combined with capital to produce output. One can measure capital or labour in different ways. Capital can be measured in terms of total capital or fixed capital or fixed capital and working capital[1] together. Similarly, labour has also been measured in terms of workers, mandays and man hours worked[2]. These various measures of capital intensity classified by the types of enterprises have been presented in Table 4.6. It reveals that there is a significant variation of capital intensity among the various types of enterprises. To test whether capital intensity varies with size of enterprise, the distribution of capital intensity by size is

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(1) Fixed capital has the most direct bearing on productivity, but since working capital is also important, we have sought to measure capital by the aggregate of fixed and working capital. This definition of capital is preferable because capital measured by total capital includes the land and structure component which probably has little bearing on productivity.

(2) Labour measured in terms of mandays or manhours takes into consideration the differential seasonal variations in activity.

TABLE 4.6.

Capital intensity by types of enterprise

Types of Enterprise	Total cap./ mandays	(FC+WC)/ mandays	Total cap./ man hours.	(FC+WC)/ man hrs.	Total cap. per worker	(FC+WC) per worker
1. Boat making	12.40	5.42	1.28	0.56	289	126
2. Wooden Agr. tools	27.32	9.43	3.74	1.29	543	187
3. Fishing not & equipment	22.00	1.00	4.60	0.21	485	22
4. Agr. tools (blacksmiths)	48.85	8.86	5.44	0.98	1388	252
5. Cont. & mats (Bamboo & cane)	17.49	2.77	2.46	0.39	436	69

given in Table 4.7. It appears that capital intensity does not seem to have any relationship with size except the one defined as the fixed and working capital per worker (last column). This seems to vary directly with size.

4.3 Level of investments

It was observed that the level of investment in the industry was extremely low. Data were collected on the investment carried out on the new tools and equipments, extension of building or structures, the repair and maintenance of tools and equipments and repair of buildings or structures. Gross investment (GI) was defined to include all the above investments. Net investment was

TABLE 4.7

Capital intensity (capital labour ratios) by enterprises size groups (weighted averages)

Enterprises size group	No. of enterprises	Total capital/ mandays	(FC+WC)/ mandays	Total capital/ man hrs.	(FC+WC)/ man hrs.	Total capital per worker	(FC+WC)/ no. of worker
1	26	79.64	18.45	14.36	3.33	647[a]	60[a]
2	37	30.28	5.36	3.96	0.70	759	134
3	10	22.19	5.24	2.37	0.56	607	143
4+	6	0.26	12.56	3.57	1.48	748	310
ALL	79	34.19	8.14	4.32	1.03	823	155[b]

Note: a= based on 25 observations; b= based on 78 observations.

defined as the investment on new tools and equipments and the extension of buildings or structure; while the investments on the repair and maintenance of tools and equipments as well as that of buildings and structure were included to form the replacement investments.

The distribution of yearly investment by the types of enterprises has been placed in Table 4.8. One will observe that the average new investment or replacement investment vary significantly among the various types of enterprises. Gross investments as the percentage of gross output[(1)] also vary significantly among the various types of enterprises.

(1) Estimation procedure of the gross and the net outputs have been given in chapter-6.

TABLE 4.8

Yearly investment classified by the types of enterprises (in taka)

Types of enterprise	Total new investment (NI)	Total replace-ment invt. (rep+Mt.)	Total gross invt. (GI)	GI as % of Gross output (GO)	NI as % of Net output (NO)	GI as % of NO
1. Boat making	279	626	905	0.65	0.35	1.08
2. Wooden agr. tools	2155	664	2819	0.83	1.15	1.50
3. Fishing nets & equip.	135	-	135	0.90	-72.19	-72.19
4. Agr. tools (black-smith)	2070	865	2935	0.80	1.02	1.44
5. Container & mat (bamboo & cane)	310	515	825	0.58	0.34	0.97
ALL	4949	2735	7684	0.77	0.51	1.38

Several factors may explain the variation in the gross investments of enterprises. First, diversity of tools and implements used in the firms would necessitate diverse amount depreciation costs. Secondly, the gross investment may systematically vary with the size of enterprise; and finally net output may explain part of the variation in gross investment.

In order to find the determinants of gross investment the following regression equation was used

$$GI = b_o + b_1 (SIZE) + b_2 (NO) + c$$

Where c is the error term independently and identically distributed with zero mean and finite variance, GI is the gross investment, SIZE is the size of the enterprise measured in terms of the number of workforce, NO is the net output and b_o, b_1 and b_2 are the coefficients.

The estimated regression equation by OLS was the following;

$$GI = 621.573 - 462.584(SIZE) + 0.057\ (NO)$$
$$\qquad\qquad (25.380) \qquad\quad (0.007)$$

$\bar{R}^{''} = 0.383$; $F = 22.34$; $n = 75$

(Figures in parentheses are standard errors)

The estimated coefficients of both size and the net output are highly significant. These two variables explain about 38 percent variation of gross investment (adjusted for degrees of freedom). Gross investment is negatively related to size, while it is related positively with net output. If net output is taken a close proxy of income of the enterprise, then its estimated coefficient may be interpreted as the marginal propensity to invest. What this implies is that an additional unit of income will induce an additional increase in gross investment by 5.7 percent of additional income. The average investment propensity is about 1.38 percent of the net output, which is smaller than the marginal propensity to invest indicating a positive accumulation of capital in the industry, though it appears to be very low.

CHAPTER V

INPUTS, VALUE ADDED AN PRODUCTION

There are several advantages in studying the input structure, value added and production behaviour of an industry. First, the structure of material inputs used and their sources will reveal the inter-industry linkages of production and employment generation; and will identify the physical constraints for expasion of output and employment of the industry. Secondly, by studying the production behaviour, one will be able to determine the degree of returns to scale, the degree of substitutibility of factors, allocative efficiency of factors of production and the technical change. And finally, this will reveal the industry's potential in generating surplus in the form of profit and the possible impacts of its pattern of utilization on the accumulation of capital of the industry.

This chapter is therefore planned with a view to a) examine the industry's input structure and the value added, b) analyse the production behaviour, c) throw some light on industry's potential in generating surplus and its role in capital accumulation; but first a brief acccunt of the organization of production is in order.

5.1. Organization of production

It has been observed that the organization and methods of production of the enterprises is rather primitive. This is borne

out by the evidences of low degree of specilization and the size distribution of the firms. Further, there are other evidences, on the internal structure of the firms and their production techniques that support the above. In almost all the enterprises, production was carried out on the individual unit basis. There was no evidence that the production was carried out in batches (several distinct repititive tasks). It appeares that the low level of output of each product that is partly due to the absence of product specialization and inadequate circulating capital, forces many enterprises to make each item individually after receiving confirmed orders from their customers.

There is also evidence that the workers of the enterprises do not specialize. This low degree of specialization is presumably due to the several interacting factors such as low level of product specialization, item-wize production and relatively small size of enterprises.

5.2. Input structure and value added

The following is the list of various raw material inputs used in different industries.

1. Boat making	log, timber and planks, nails, paints, Alkatra (protective paints), etc.
2. Wooden Agricultural tools	timber, planks, nails, paints, etc.

3. Fishing net & Equipments	Cotton & nylon threads, bamboo, colours, etc.
4. Blacksmiths	Scrap metal (mainly iron), pig iron, coal, charcoal
5. Container and mat	Bamboo, cane, hogla, etc.

It will be noticed that availability of many of the raw materials (e.g., timber, bamboo, cane, etc.) are seasonal. Hence, the enterprises require a substantial amount of fund in order to stock raw-materials. This increases the working capital requirement substantially. This does not, however, mean that the raw material inputs are not available in other seasons; what it indicates is that one has to be prepared to pay a higher price for the raw-materials inother seasons. Due to shortage of working capital, many enterprises cannot stock raw-materials and procure them as and when required.

Table 5.1 presents the estimated yearly costs of raw materials, fuels, transport and marketing costs, along with the estimated values of yearly gross output and value added of the various types of enterprises. The table indicates that for all enterprises, the raw material costs account for about 34 percent in the total gross value of output, while that of the fuels is about 7 percent. Transportation and marketing account for 1.03 and 1.61 percent respectively. The proportion of raw materials in the total value of gross output is the highest in enterprises producing fishing nets and equipments (91.54%) followed by the

TABLE 5.1.

Estimated yearly output and Costs by Types of Enterprises

Types of Industry	ESTIMATED YEARLY COSTS OF					Estimated yearly total costs	Estimated yearly gross output	Estimated yearly value added	Value-added per worker	Value-added per enterprise
	Raw materisls	Fuels	Transportation	Marketing*	Miscelleneous					
1. Boat making (9)	53729 (33.33)	543 (0.39)	1667 (1.19)	80 (0.06)	160 (0.11)	56179 (40.08)	140159	83980 (59.92)	3999	9331
2. Wooden cart & Agricultural Tools (23)	133589 (71.20)	493 (0.26)	10667 (5.69)	6133 (3.27)	-	150882 (80.42)	338509	187627 (19.58)	4264	8158
3. Fishing net & Equipments (9)	13678 (91.54)	-	-	783 (5.24)	667 (4.47)	15123 (101.25)	14936	-187 (-1.25)	-14.38	-20.78
4. Agricultural Tools and Blacksmithy (18)	87518 (23.94)	65158 (17.82)	2904 (0.79)	3145 (0.86)	3352 (0.92)	162077 (44.33)	365596	203519 (55.67)	4733	11307
5. Bamboo & cane container and mat (20)	47513 (33.61)	400 (0.28)	1133 (0.80)	5938 (4.20)	1240 (0.88)	56224 (39.77)	141381	85157 (60.33)	2302	4258
ALL	336022 (33.58)	66594 (6.66)	16371 (1.03)	16079 (1.61)	5419 (0.54)	440485 (44.02)	1000581 (100)	560096 (55.98)	3545	7090

Note: Figures in parentheses are raw percentages

*Marketing costs include hat tax, toll tax, brokerage, etc.

ones producing wooden agricultural tools (71.20%) and boat makers (28.33%). The proportion of the estimated costs of transportation is the highest in enterprises producing wooden agricultural tools presumably because of the bulk of the produce. The table also reveals that the industry does not provide substantial backward linkages to transport.

The estimated value added accounts for about 56 percent of the total gross value of production for all enterprises. The proportion of the estimated value added appears to be highest for the enterprises producing containers and mats (60.33%) followed by the ones producing boats (59.92%) and the ones producing metal agricultural tools (55.67%). The value added per worker appears to be the highest in case of enterprises producing metal agricultural tools (blacksmiths), while that of the producers of fishing net and equipments was the lowest.

In order to see whether there is any systematic variation of the proportion of value added in the gross value of output with the size of the enterprises, the gross value of output, various costs and the value added have been classified according to the size and has been presented in table 5.2. The table reveals that there is no appreciable differences in the proportions of value added in the total gross value of output in different size group of enterprises, though, the proportion seems to rise as size increases upto size group with 3 workers and then falls. However, the table indicates that value added

TABLE 5.2

Estimated yearly output and costs by Employment size group

Employment size group of Enterprise	ESTIMATED YEARLY COSTS OF					Yearly estimated total cost = (1+2+3+4+5)	Estimated yearly gross output	Estimated yearly value-added	Value-added per worker	Value-added per enterprise
	Raw-materials	Fuels	Transportation	Marketing	Miscellaneous					
1	27386 (38.06)	1250 (1.74)	500 (0.69)	2433 (3.38)	667 (0.93)	32236 (44.80)	71962	39726 (55.20)	1528	1528
2	143296 (32.29)	38294 (8.63)	3271 (0.74)	8472 (1.91)	3611 (0.81)	196944 (44.38)	443757	246813 (55.62)	3335	6671
3	68326 (27.35)	23090 (9.24)	2300 (0.92)	487 (0.19)	508 (0.20)	94711 (38.91)	249802	155091 (61.09)	5170	15509
4+	97014 (41.27)	3960 (1.68)	10300 (4.38)	4687 (1.99)	633 (0.27)	116594 (49.60)	235060	118466 (50.40)	4231	19744
ALL	336022 (33.58)	66594 (6.66)	16371 (1.63)	16079 (1.61)	5419 (0.54)	440485 (44.02)	1000581	560096 (55.98)	3545	7090

Note: Figures in parentheses are row percentages.

per worker systematically increases as size of the enterprise increases.

It appears that the estimated yearly value added per enterprise for most of the enterprises is modest. Relatively higher value added per enterprise occurs in the enterprises having relatively higher capital intensity and higher proportion of hired workers in their work force. The modest amount of value added per enterprise is largely due to their seasonal nature of production activity, high proportion family labour and low capital worker ratio.

5.3. Inter-industry linkages

It is useful to estimate the inter-industry linkages of an industry, as it grows, it promotes growth of other industries. There are backward linkages of an industry when it generates demands for output of other industries for its intermediate consumption as inputs. There are also forward linkages when the output of the industry is consumed by other industries as inputs. The industry seems to have both high backward and forward linkages with other industries.

The extent of backward linkages of the industry has been estimated by the proportion of intermediate consumption as raw-material inputs in the gross value of output and has been presented in Table 5.1. Backward linkages with agricultural and non-agricultural sectors, however, have been estimated by the percentages of the values of raw-material inputs and fuels from

each sector in the total value of raw-materials and fuels in the industry. The estimated values indicating backward linkages for the enterprises producing various tools and implements have been presented in Table 5.3. The table indicates a very high linkages of the industry with the agricultural sector. About 77 percent of the total value of raw-materials used in the industry came from agricultural sector, of which non-processed agricultural goods and agricultural goods processed by small industries respectively accounted for about 61 and 16 percent. All the enterprises except the ones producing metal farm tools (backsmiths) had high backward linkages.

The industry does not however have high backward linkages (except for the blacksmiths) with the non-agricultural sectors.

The above seems to indicate that an additional increase of Tk. 100/00 in the gross value of output of this industry will induce an increase in the output of agricultural sector approximately by (0.40 x 0.77 = 0.31) Tk. 31.

The extent of forward production linkages of the industry has been estimated by the proportion of the value of intermediate and capital goods in the gross value of output. The percentage distribution of output used as intermediate as well as capital goods has been presented in Table 5.4. From the table, it will be observed that about 88.77 percent of the output of the industry is used as intermediate and capital goods in other sectors. It will also be observed that the industry has very high forward linkages with the agricultural sector as about 88 percent of the total output is alone used by this sector as intermediate (6.49%) and capital goods (81.95%).

TABLE 5.3

Distribution of raw-material procurements of the enterprises by various sectors as a percentage of raw materials costs

Raw materials coming from	Boat making	Wooden Agrl.tools	Fishing nets & Equip.	Agrl. tools (Blacksmiths)	Containers & mats (Bamboo & cane)	All
1. Agrl. Sector	89.50	100.0	66.67	20.41	99.75	77.38
a) Processed by Large industries	-	-	-	-	-	-
b) Processed by Small industries	89.50	13.04	0.11	12.47	-	15.96
c) Non-processed	-	86.96	66.56	7.94	99.75	61.42
2. Non-agrl. Sector	10.50	-	33.33	79.59	0.25	22.62
a) Processed by Large industries	10.50	-	33.11	46.35	0.25	15.26
b) Processed by Small industries	-	-	-	5.00	-	1.10
c) Non-processed	-	-	0.22	28.24	-	6.26

Note:- 1/Raw materials include the value of fuel.

5.4. Productic behaviour

In order to analyse the production behaviour, a Cobb-Douglas production function has been used. This functional form h s been used partly because it is easy to estimate and partly because it seemed to fit well, There are however several difficulties in estimating a Cobb-Douglas production function. First, Cobb-Dauglas production function imposes restriction of unit elasticity of substitution between any pair of inputs. Secondly, this also assumes that the degree of returns to scale is invariant with the level of output[1]. Thirdly, there are difficulties associated with the estimation of single equation production models by ordinary least squares. In a production system production function is not an isolated relation. Data are generated by profit maximizing or cost minimizing consideration of the enterprise and thus output produced and the levels of variable points are simultaneously determined in the system. The production function is only one of a system of simultaneous equations and thus single equation estimates are, in general, biased. Yet another difficulty in case of single equation least-square estimates of Cobb-Douglas production function is that under the assumption that disturbances in various equations of the system are independently distributed but that the disturbance associated with the production function is related to the independent variables, the sum of the estimated co-efficients has a profound tendency towards a sum of one regardless of the true sum[2].

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1 See Nerlove: Estimation And Identification of Cobb-Douglas Production Function, Rand McNally & Co., Chicage, 1965.

2 Hock, I; "Simultaneous Equation Bias in the Context of Cobb-Douglas Production Function", Econometrica, Vol. 26, October, 1958.

TABLE 5.4

Percentage distribution of output consumed by various sectors

Output by sectors	Boat making	Wooden agrl. tools	Fishing net & Equip.	Agrl. Tools (Blacksmiths)	Container & mats (Bamboo & Cane)	All
1. Consumer goods	-	1.31	-	21.47	23.50	11.23
2. Intermediate goods						
a) Used in agrl. Sector	-	21.30	-	0.59	-	6.49
b) Used in Non-Agrl. Sector	-	-	-	-	-	-
3. Capital Goods						
a) Used in Agrl. Sector	100.00	77.39	100.00	76.47	76.50	81.95
b) Used in Non-Agrl. Sector	-	-	-	1.47	-	0.33

In our estimation of Cobb-Douglas production, it is assumed that the error terms (u) are multiplicative with zero mean and finite variance and u is independent of the input levels. The following is the estimated Cobb-Douglas production function:

$$\ln Y = \ln A + a\ln(L) + b\ln K + u$$

where Y is the gross value of output, L is the labour days and K is value of fixed capital (value of machinery, tools and equipments plus the value of working capital as estimated in chapter - 4).

The measurement of the dependent variable Y presents some difficulties. One implicitly assumes that the product composition of entire production is similar for all enterprises. Since firm - price s are used, the total value of production also includes the effect of differential prices, if any, by different enterprises for the same marketed product. This has some difficulties, for, if some enterprises produce a high valued products, then what may essentially be a product composition effect may be worngly attributed in the production function studies as size effect or returns to scale effect. One way to circumvent this difficulty is to estimate product - wise production function which has not been done here due to limitations of data.

The labour (L) has been measured in terms of mandays worked including both family and hired labour. It has been implicitly assumed that the labour, whether it comes from family worker or from the hired worker is homogeneous.

The capital (K) has been measured by the present value of stock of machinery, tools, implement and the value of working capital. It was extremely difficult to estimate the user cost

of capital because of the heterogeneity of various types of capital. The implicit assumption that has been made here is that the services of capital is proportional to the value of stock of capital. Since, land and structure have very little opportunity cost in this industry, they have been excluded from the capital.

The estimated cobb-Douglas production by ordinary least squares was the following:

$$\ln Y = 1.787 + 0.473 \ln L + 0.535 \ln K$$
$$\qquad\qquad (0.097) \qquad (0.047)$$

$$R^2 = 0.84, \; F = 196.91, \; n = 75$$

(Figures in parentheses are standard errors)

The estimated coefficients of both labour and capital are highly significant. The coefficient of variation $\bar{R}^2$ (adjusted for degrees of freedom) is also very high for the cross-section data. Furthermore, the sum of the estimated coefficients is 1.008 which is not significantly different from unity indicating constant returns to scale in the industry.

It is interesting to see if both labour and capital are used efficiently in the industry. In order to do so, marginal value products of both labour (L) and capital (K) have been estimated at the geometric mean levels of inputs and output. This has been presented in Table 5.5.

TABLE 5.5

Value marginal productivity of Labour and Capital.

Inputs	Value marginal productivity (VMP)	Average wage rate/Interest rate	Allocative efficiency (VMP/prices)
Labour (L)	5.21	10.33	0.51
Capital (K)	1.98	0.17*	11.65

*Official bank rate of interest.

The Table indicates that the marginal product (value) of labour is smaller than the wage rate indicating overuse of labour than the efficient level, whereas an additional taka of capital would increase value productivity by about Tk. 1.98. If the enterprises can borrow capital at a rate of interest of 17 percent, then one additional taka of capital invested would pay for itself more than 11 times over.

Several factors may explain the inefficient use of capital in the industry. One important factor that may explain this is that most of the enterprises do not have access to institutional credit markets either because it is too cumbersome and time consuming process to prepare necessary papers for credit or they do not have connections in the financial institutions to secure loans. As a result of this, they resort to borrowing from the

non-institutional sources (from local money lenders, etc.) where credit is available easily but at a very high interest rates[1]. It appears that it is not worthwhile to increase size of capital by borrowing. Further, it appears that, the imperfact capital markets give rise to distortions in capital use. Those who can borrow from institutional sources at cheaper rates tend to use relatively more capital intensive techniques than those who do not have such access.

It is interesting to investigate regarding the contribution of gross investment (I)[2] for the enterprises under study. In order to do so, the following production function have been estimated:

$$\ln Y = \ln A + a \ln L + b \ln K + I + u$$

where I is the gross investment per enterprise. In the above equation Investment (I) has been treated as a technical progress or shift parameter in the production function. It is, however, not entirely legitimate to include both capital stock and investment together, as investment in a year is the change

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[1] See, Rural Industries Study Project, Final Report, BIDS, Dhaka, February 1981, pp. 144-145.

[2] See, chapter - 4, for measurement of investment.

in capital stock in that year and any change in capital stock will have already manifested in the capital stock variable. The situation in our case is slightly different, for, the proportion of new investment is extremely small in gross investment and most of the investment is of irreversible type which affects production indirectly.

The estimated production function with investment by ordinary least squares was the following:

$$\ln Y = 1.819 + 0.469 \ln L + 0.526 \ln K + 0.0003 I$$
$$\qquad\qquad (0.096) \qquad (0.0002)$$

$$\bar{R}^2 = 0.844, \; F = 135.42, \; n = 75$$

The results indicates that all the estimated coefficients are positive and except that of investment, all are highly significant. The estimated Co-efficient of investment is not significantly different from zero at the 5 percent level on a two-tail t-distribution (it is significant only at the 15 percent level). This result is not surprising, for, a major portion of the investment is used for depreciation purposes indicating a very little net addition to capital stock.

5.5. Productivity of labour and capital

Labour Productivity.

Net outputs (or value added) per worker per month, net outputs per manday and per manhours, etc. have been presented in Table 5.6. The average monthly productivity per worker was Tk. 220/- for all enterprises which seems to be very low. Average productivity per manday was about Tk. 9.15 whereas productivity per hour was about Tk. 1.16.

It appears that there is a considerable variation in the productivity of labour. The productivity of labour may differ due to differential use of capital with labour. This is not surprising for, if capital and labour are substitutes of each other, then average productivity of labour will increase as capital intensity rises. The average productivity of labour also varies systematically with size of the work-force. This is revealed by the table 5.6. The net output per manhour rises systematically from Tk. 1.11 in size group with one worker to about Tk. 1.48 in size group of enterprises having four or more workers. This tendency is also evident in all other measures of labour productivity in the table.

Capital Productivity

Value added per Taka of total capital (value of land, structure, machinery, tools, equipments and working capital)

TABLE 5.6

Output, labour ratios by employment size group of enterprises
(weighted averages)

Size group of Ent.	No. of enterprises	Net output per worker per month	Net output per canday	Net output per Manhour	Gross output per manday
1	26	103	6.16	1.11	11.23
2	37	195	7.76	1.02	14.12
3	10	302	11.04	1.18	19.37
4+	6	310	12.54	1.48	24.24
ALL	79	220	9.15	1.16	16.76

and value added per Taka of fixed capital (value of machinery, Tools, equipments and working capital) have been used to measure capital productivity. The estimated capital productivity ratios classified by size of enterprise have been presented in Table 5.7. It will be observed that the average productivity of per taka of total capital however, appears to be quite high (Tk. 1.12) for all industries. From the table it also appears that the average productivity capital (measured per Taka of fixed capital) systematically increases from about Tk. 0.33 in enterprises having one worker to about Taka 2.11 in the enterprises having three workers, then falls to Tk. 1.00 in enterprises having four or more workers. This is also true for average productivity of capital measured in terms of per Taka of total capital.

5.6. Utilization of profits and capital accumulation

Static efficiency criterion only deals with the efficient utilization of existing resources at a given point of time but does not give any indication regarding the industry's potential in generating surplus in the form of profit and its re-investment for capital accumulation. Whether an industry will grow, will depend on the rate of accumulation which will, in turn, promote growth of output and employment in the furture.

In order to explore the possibilities of the industry's potential in generating surplus and its role in capital accumulation, information regarding the utilization of profit were collected. Profits were directly estimated from the input-output returns. In order to estimate profits, the following definitions of Family Income and profits were used.

TABLE 5.7

Output capital ratios, capital employment per worker classified by employment size group of the enterprises (weighted)

Employment size group	No. of enterprises	Net output/ total capital	Net output/ FC+WC
1	26	0.08	0.33
2	37	0.26	1.45
3	10	0.50	2.11
4+	6	0.41	1.00
ALL	79	0.27	1.12

Family Income = Value added[1] - Wage Bill paid to hired workers -Rent paid for hired buildings, machinery and tools and equipments (if any) - Estimated value of depreciation of owned fixed assets.

Profit = Family Income - Imputed value of family labour.

Since there were various capital goods, an accurate measure of the depreciation of capital assets could not be obtained. However, for simplicity, a life of 30 years for pucca and semi-pucca buildings, 10 year for kacha buildings, 20 years for machinery and 5 years for all tools, equipment and other assets, were assumed. Further, a constant depreciation of all assets was also assumed. This constant depreciation however implies an increasing depreciation rate for all assets. For valuation of family labour, an average hourly wage rate for all permanent workers (including the family workers on wage basis) was arbitrarily used.

[1]Value added have been defined in section 5.2 of this chapter.

It will be observed that there is a considerable variation in both family income and profits in the sample enterprises (see appendix Table A.5.1). Further, the rate of profit defined as the profit per unit of capital has a tendency to rise with the employment size (upto enterprises having three employees but then drops). Profit rate was the highest for enterprises having three workers. It appears that the profit rates are low not for the enterprises having low capital intensity and run relatively on smaller scale (e.g., enterprises having one worker) but also for the ones run relatively on larger scale and but relatively higher capital intensity.

Information on savings and utilization of profit is difficult to obtain particularly when entrepreneurs have other occupations apart from the one in question, since it is difficult to isolate saving from one industry's income from the ones from other sources. Further, because of the informal nature of the organization of industry, the entrepreneurs often regard profit as family income. The Table 5.8 presents the proportion of profit utilized on various causes on the basis of the entrepreneurs' responses. The findings however, are morely suggestive. From the Table one will notice that there is a considerable variation in the savings and utilization of profit. The average savings out of profit was about 11 percent of the total profit of which only about 9 percent of the profit was reinvested in the enterprise.

In Table 5.9, pattern of utilization of profit by size group of enterprises has been presented. The table indicates that percentage of savings out of profit systematically increases

TABLE 5.8

Pattern of utilization of profit

Enterprise type	% of profits used for			
	Consumption	Reinvestment in this enterprise	Saved or used for other purposes	% of saving reinvested
Boat making	86.67	13.33	-	100.00
Wooden cart & Agrl. tools	85.43	10.22	4.35	70.14
Fishing net & equipment	83.33	11.11	5.56	66.65
Agrl. Tools & Blacksmithy	90.56	9.44	-	100.00
Bamboo, cane container & mat	96.25	3.75	-	100.00
ALL	89.24	8.86	1.90	79.93

with the size. Further, reinvestment of profit in the enterprises also systematically rises with size. Furthermore, a significant proportion of prifit (about 20 percent) are diverted from this industry to other sectors of the economy.

For the accumulation of capital from a given dose of investment, one should consider the marginal savings and reinvestment rates rather than average savings and reinvestment rates. In order to do so, the following regression equations were estimated by ordinary least squares:

TABLE 5.9

Pattern of utilization of profits

Enterprise size group	% of profits used for			% of savings reinvested
	Consumption	Reinvestment in this enterprise	Saved or used for other enterprise	
1	91.35	4.80	3.85	55.49
2	90.00	9.32	0.68	93.24
3	87.50	12.50	-	100.00
4+	78.33	17.50	4.17	80.77
ALL	89.24	8.86	1.90	79.93

$$\text{SAVINGS} = 778.21 + 0.1296\ (\text{FAMILY INCOME})$$
$$(0.0258)$$

$$\bar{R}^2 = 0.25,\ F = 25.21,\ n = 75$$

$$\text{REINVESTMENT} = -721.55 + 0.0963\ (\text{FAMILY INCOME})$$
$$(0.0179)$$

$$\bar{R}^2 = 0.24;\ F = 23.98,\ n = 75$$

The estimated coefficients of both the equations are significantly different from zero. From the above equations, one can find that the marginal saving and reinvestment rates are 12.96 and 9.63 percent respectively. The average savings and reinvestment rates are respectively 10.76 and 8.86 percent of the family income. It appears that there is a positive accumulation ofcapital and the marginal rates are higher than the average rates indicating a slow but gradually rising rate of capital accumulation.

CHAPTER VI
FINANCE AND MARKETING

The object of this chapter is to highlight some of major issues regarding finance and marketing in the agricultural tools and implement industry. Issues relating to finance and marketing are somewhat inter-related and a particular condition in one limits the other. Issues relating to finance will be discussed first followed by a description of aspects of marketing in the industry.

6.1. Finance

In the context of rural based cottage and small industries, it has been observed by many that lack of adequate finance, under-developed financial institutions with their inadequate lending policies and imperfect nature of the capital markets impede growth of output and employment.

It has been observed that the enterprises had limited access to capital markets; both for short term and long term credits. The main source of an enterprise's initial capital was personal andfamily savings. The distribution ofthe enterprises by their main sources of initial capital has been presented in Table 6.1. It will be seen from the table that about 94 percent of the enterprises relied entirely on the personal savings-of which 73 percent of the enterprises relied on personal savings from sources other than agriculture; only about 21 percent relied on savings from agriculture for

TABLE 6.1

The volume of initial investment in the enterprises (founded by entrepreneurs themselves) by the main source of funding

SOURCES OF FUNDINGS	No. of enter-prises	No. of enter-prise as % of total*	Total amount (in Tk.)	% share	Average time taken to acquire funds (in years)	Aver-age amount of I. cap.
1. Personal savings						
a) Savings from sources other than agricul-ture	35	72.92	4065	37.32	1.33	116
b) Savings from Agriculture	10	20.80	530	4.86	0.54	53
2. Inhertence	4	8.34	3100	28.45	0.50	775
3. Gifts (from dowry, from father in laws, etc.)	3	6.25	3200	29.39	1.00	1067
Total	52		10,895	100	1.19	227

Note: The number of enterprises founded by the entrepreneurs themselves is 48. There are 6 enterprises having more than one source of finance.

* the percentages are based on 48 as total.

the initial capital. Of all enterprises, about 8.34 and 6.25 percent of the enterprises relied on inheritance and gifts mainly from dowry and gifts from fathers - in-law respectively for initial capital. However the volume of initial capital coming from these sources were different. About 42 percent of the total volume of initial capital came from personal savings of which savings from sources other than agriculture accounted for about 37 percent. The shares of the sources such as inheritance and gifts in the total volume of initial capital were 28.45 and 29.39 percent respectively. The table also reveals that,no enterprise received any loans from sources like relatives, banks and money-lenders. The average time taken to raise the initial capital varied from sources to sources. While average time taken to raise the initial capital from personal savings from sources other than agriculture was about 1.33 years, it was about 0.5 and 1.00 year respectively from inheritance and gifts.

Access to capital markets has, since then improved, though the improvement was marginal. The enterprises have perhaps enhanced their credit rating. The distribution of enterprises taking loans from different sources by types of enterprise has been presented in Table 6.2. The table reveals that only about 6.33 percent of all enterprises took loans either from institutional sources or from non-institutional sources, of which about 3.80 percent of all enterprises took loans from non-institutional sources.

The distribution of enterprises bysources of credit, the rates of interest, amount and duration of loans by the types of enterprises has been presented in Table 6.3. The table reveals few interesting aspects. First, loans were essentially small amount loans of short durations, advanced by commercial banks. It appears that there is a complete absence of long-terms credit market for these enterprises. None of the enterprises reported

TABLE 6.2

Distribution of enterprises taking loans from different sources by types of enterprise

Types of enterprises	No. of enterprises taken Institutional loans	No. of enterprises taken non-Institutional loans	Total
Boat making (9)	-	2 (2.53)	2 (2.53)
Wooden Cart & Agr. tools (23)	1	1.27 (1.27)	2 (2.53
Fishing net & equipment (9)	-	-	-
Blacksmithy and agr. tools (18)	1 (1.27)	-	1 (1.27)
Bamboo, Cane, Container and mat (20)	-	-	-
ALL	2 (2.53)	3 (3.80)	5 (6.33)

Note: Figures in peretheses are percentages of the total number of enterprises.

TABLE 6.3

Distribution of the sources and cost of institutional and non-institutional loans by types of enterprises

Type of enterprises	% of enterprises takings loans in the group	INSTITUTIONAL LOANS					NON-INSTITUTIONAL LOANS			
		Total amount of loan	Source	Rate of interest	Real interest rate	Average duration of loan (in years)	Amount of loan	Sources	Rate of interest	Real rate of interest
1. Boat making	22.22	-	-	-	-	-	300	F R	-	-
2. Wooden cart & Agrl. tools	8.70	1000	CB	12.5	17.5	1.00	700	F R	-	14.3
3. Blacksmithy	5.56	800	CB	12.5	37.5	0.50	-	-	-	-
ALL	6.33	1,800	CB	12.5	26.4	0.75	1000	F R	-	10.0

Note: CB & FR indicate commercial bank and friends and relatives respectively. Real rate of interest has been estimated, by taking into account, apart from the nominal rate of interest the various costs for obtaining loans, i.e., number of working days lost, unauthorised payments made in cash or kind for the loan and miscellaneous costs.

taking loans from any other financial institutions which seem to exist in the country. An amount of Tk. 1000 was the maximum reported in the sample enterprises. The duration of such loans varied from 6 months to one year. The non-institutional sources that advanced loans included friends and relatives (FR) only where duration of loans was not specified. None of the enterprises received loans from the professional indegeneous mony-lenders. Secondly, it appears that the amount and duration of loans depended essentially on the sources of credit. Commercial banks generally do not advance long-term credit or substantial amount of credit to these small enterprises who cannot offer large stock of goods or enough fixed assers as collaterals. Other specialised financial institutions which offer long-term credit did not advance any loans to these enterprises. Specialized government small/cottage programmes require collaterals, licenses, etc. The enterprises who are in serious need of funds, lacked collaterals most. Thirdly, though the official rate of interest charged for the loans by commercial banks did not vary significantly, the real rate of interest (estimated by taking into account the official rate of interest, various costs for obtaining loans, eg. number of working days lost, unauthorised payments made in cash or kind and miscellaneous costs) varied significantly among the individual loan advances. It varied from 17.5 to 37.5 percent. Further, apart from the variation of real rate of interest within a financial institution, it is observed that their is a wide variation of rate of interest among the loans giving agencies. The variation of the rate of interest, besides other evidences, suggests that the credit is rationed or access to credit market is limited. For many of the enterprises long term or short term credit was not simply available even at a higher interest rates. It may be pointed out that unorganized money market is not at all equiped to provide anything but short term, small amount trade credit. Finally, it appears that the percentage of enterprises taking loans increases as the size of the enterprise increases.

Further, the cost of credit (real rate of interest) declines as the size of the enterprise increases. This is revealed by Table 6.4. The percentage of enterprises taking loans systematically increased from about 8 percent in enterprises employing two workers to about 17 percent in enterprises employing four or more workers. That this reveals is that the entry, into credit market may be related to the size of the enterprises.

It may be mentioned that most of the enterprises did not take institutional loans. To investigate why respondents were asked to state reasons for not taking institutional loans, the result has been summarised in Table 6.5. Of the total of 69 entrepreneurs, about 43.48 percent had no need for credit from institutional sources. The rest (56.62 percent) had the need but did not take loans; 33.33 percent did not know that the loans were available, about 16 percent reported that they did not know how to apply, about 1.45 percent did not have any security to offer and about 3 percent considered this troublesome.

According to the entrepreneurs' own perception about various constraints, shortage of working capital and shortage of raw-materials were the most frequently mentioned difficulties. Table 6.6 gives the number of instances where the most frequently encountered constrains were ranked. Of the total 16 of enterprises desiring government assistance 14 mentioned their need for credit for working capital, 11 for raw-materials and 6 cited the need for tools and equipments. Shortage of capital thus appears to be one of the most serious constaints for small farm tool markers.

TABLE 6.4

Distribution of the sources and costs of institutional and non-institutional loans by enterprises' employment size groups

Employment size group of enterprises	% of enterprises taking loans in the group	INSTITUTIONAL LOAN					NON-INSTITUTIONAL LOANS			
		Total amount of loan	Sources	Rate of interest	Real rate of interest	Average duration of loans	Amount of loan	Sources	Rate of interest	Real rate of interest
2	8.11	800	CB	12.5	27.5	0.50	800	F R	-	12.5
3	10.0	-	-	-	-	-	200	F R	-	-
4+	16.67	1000	CB	12.5	17.5	1.00	-	-	-	-
ALL	6.33	1800	CB	12.5	26.4	0.75	1000	F R	-	10.0

Note: CB and F R indicate Commercial bank and friends and relatives respectively. Real rate of interest has been estimated, by taking into account, apart from the nominal rate of interest, the various costs of obtaining loans, i.e , number of working days lost unauthorised payments made in cash/kind for the loan and miscellaneous expenses incured.

TABLE 6.5

Reasons for not taking institutional loans by enterprises type

Reasons for not taking loans	Boat making	Wooden cart & agrl. tools	Fishing net & equipment	Blacksmithy & agrl. tools	Bamboo, cane container & mat	Total
1. Did not know that loans were available	2 (3.70)	6 (26.09)	2 (3.70)	6 (26.09)	7 (30.43)	23 (33.33)
2. Did not know how to apply	3 (27.27)	-	-	6 (54.54)	2 (18.18)	11 (15.94)
3. Did not have any security to offer	-	-	1 (100)	-	-	1 (1.45)
4. Too Troublesome	-	-	1 (50.0)	-	1 (50.0)	2 (2.90)
5. Had no need	4 (13.33)	9 (30.0)	2 (6.67)	8 (26.67)	7 (23.33)	30 (43.48)
6. Others	-	-	-	-	2 (100.0)	2 (2.90)
ALL	9 (13.04)	15 (21.74)	6 (8.70)	20 (28.99)	19 (27.54)	69

Note: (1) Some of the enterprises reported more than on reason. Some did not report at all

(2) Figures in parentheses are row percentages.

TABLE 5.6

Ranking of constraints faced by entropreneurs

Constraints / Ranks	1	2	3	Frequency
1. Credit for working capital	5	9	-	14
2. Raw-materials shortages	7	1	3	11
3. Tools and equipments	4	-	2	6
4. Marketing Facilities	-	1	2	3
5. Fixed assets	-	-	2	2
6. Product design	-	1	-	11

The shortage of capital that is mentioned by the enterprises is probably the inevitable consequence of the absence of adequate, organised and properly managed financial institutions for the provision of both short-term and long-term credit to these enterprises. While short-term credit is required to meet the working capital requirements, long-term credit may facilitate purchasing of plants, new machinery equipments, replacement of obsolete processes, etc. so that both output and employment could increase.

6.2. MARKETING

Marketing affects conditions of availability and cost of raw materials and disposal of output; hence it affects production, technology choice and efficiency of operation of an enterprise. Marketing has often been recognised as one of the main impediments for growth of the rural, small scale industries. In this section some of the aspects of marketing in the context of the agricultural tools and implement industry will be analysed. In particular, the issues relating to sources and availibility of raw materials, organization of marketing and degree of competition will be taken up.

6.2.1. Agents and availibility of raw materials

The types of agents from whom the enterprises procure their raw-material inputs will depend on a number of characteristics of raw materials and the product itself. First, if the raw material is mainly food crop/edible item, and the product is a little processed food/edible item-then raw-material may be produced by the entrepreneur himself. For example, some of the rural industries, such as gur making, oil pressers, etc. may produce their own raw materials[1]. Secondly, if the raw materials are locally produced primary products then agents are likely to be the producers of raw materials themselves.

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[1] See RISE, Final Report, op. cit. pp. 304.

Thirdly if the raw-materials inputs are processed items either imported or domestically produced then the suppliers are likely to be the wholesalers and retailers. Finally, if the production of the raw-material inputs are seasonal and if they are primary commodities the suppliers are likely to be middlemen who creates value by storing and preserving the raw-material. These agents are by no means mutually exclusive and the enterprises may of course, procure raw-materials from vareity of sources.

Table 6.7 gives distribution of enterprises by main agents of raw-materials.

One will boserve from the table, that their is a complete absence of self-produce raw-materials. This is not, of course, surprising because none of the raw materials are food items.

TABLE 6.7
Percentage distribution of enterprises procuring raw-materials from various sources

Sources	Boat making	Wooden cart & Agrl. tools	Fishing net & equip-ments	Blacksmith-ing & Agr. tools	Bamboo & cane conta-iner & mat	Total
Producer	-	91.30	44.44	58.82	90.00	68.33
Wholeseller	75.00	-	22.22	29.41	-	16.88
Retailer	100.00	17.39	55.6	70.59	10.00	40.26
Creditor	-	-	11.1	-	-	1.30
Others	-	4.35	-	5.88	-	2.60

Note: Many enterprises have more than one source of procuring raw-material and hence the cell column total percentage will not add to 100

Further, no enterprises procured raw materials from the co-operatives or government agencies.

One will further observe that in most of the cases, the enterprises procured raw materials from various sources simultaneously. A significant proportion of enterprises(68.83 percent) procured raw-materials from the producers themselves without depending on any intermediaries. For example, 91 percent of the wooden tool makers and 90 percent of the container and mat makers procured their raw-materials from the producers. In most cases, the raw materials were however locally produced primary commodities. Direct procurement of raw-materials gives some price advantages to the purchasers.

About 40.26 and 16.88 percent of all enterprises procured their raw materials from the retailers and wholesalers respectively. All the boat makers, about 56 percent of all fishing net and equipment producers and about 71 percent of all the metal tool producers (blacksmiths) procurred raw materials from the retailers. Further, the percentages of enterprises procuring raw materials from the wholesalers were about 75, 22 and 29 respectively for the boat-makers, fishing net and equipment producers and the metal farm tool makers. One observes that most of the raw-materials such as log wood, timber, planks, thread (Nylon or cotton), scrap metals, coals, etc were all processed items.

Creditors appeared to be the main suppliers of raw-materials in only about 1.30 percent cases of all enterprises. This occured only in about 11 percent cases of fishing nets

and equipments producers who procured raw materials from the creditors. The prices paid to the supplier were about 10 percent higher than the usual market prices in these cases.

It sometimes gives misleading picture, unless one knows the volume of purchase of raw-materials by the enterprises from different sources of suppliers. Such a distribution has been presented in Table 6.8. One will notice that the observations made in cases of raw-material procurement are borne out by this table also. Procurement of raw materials (in value) by the enterprises from producers, retailers, wholesalers and creditors were about 60, 27,, 11 and 0.65 percent respectively.

TABLE 6.8

Distribution of volume of purchase of raw-materials by the enterprises by the types of agents.

Procurement of raw-materials from:	Boat making	Wooden cart & Agr.tools	Fishing net & equip-ments	Black-smithing & agr. tools	Bamboo, cane container & mat	Total
Producers	-	34.78	44.44	25.59	90.00	59.55
Wholeseller	37.50	-	11.11	25.29	-	10.78
Retailer	62.50	10.87	38.89	46.77	10.00	27.20
Creditor	-	-	5.56	-	-	0.65
Others	-	4.35	-	2.35	-	1.82

Raw-material shortages have been identified as one of the main constraints in the context of these enterprises. It may be worth-while to identify the areas in which raw-material shortages are acute and the factors behind the shortages. It has

been observed that, where the raw-materials are either domestically processed items or imports, the enterprises cannot sometimes procure right amount of raw-materials at the right prices and shortages of raw materials seem to occur for the enterprises using them. Several factors may explain this. First, inadequate domestic production or imports, may create scarcity resulting price hikes. Secondly, mal-distribution of raw-materials will also have the same effect. Further, scarcity due to inadequate domestic production or imports coupled with mal-distribution will further accentuate the problem. Finally, poor infra-structure of the economy may also aggravate the situation, particularly, poor transportation, which will mean that the raw-materials are simply not available in remote areas or if they are, then prices are very high.

6.2.2. Organization of marketing

The organization of marketing has number of implications. As mentioned earlier, the enterprises were geographically widely dispersed and their geographical sphere of marketing was more or less limited. It has been observed that only about 12 percent of the enterprises sold products outside the Thana where they were located. It has also been observed that the geographical extent of each of the enterprises market seemed to depend on the size of the enterprise. However, a rigorous attempt to establish the above was not made here, though it seemed possible that the geographical sphere expanded as the size increased.

As a consequence of the local nature of the market, most of the enterprises sold directly to the users of the product, i.e., the farmers and rural households. The distribution of the volume of produce of the enterprises by various agents has been presented in Table 6.9.

TABLE 6.9

Percentage distribution of value sold to various sources

Sources to which product sold	Boat making	Wooden cart & agr. tools	Fishing net & equip-ments	Agr. tools & Black-smithing	Bamboo, cane cont-ainer & mat	Total
	(8)	(23)	(9)	(17)	(20)	77
1. Directly to users	61.23	93.48	81.11	100.00	86.5	88.31
2. Wholesellers	12.50	-	-	-	6.5	2.99
3. Retailers	26.25	6.52	13.33	-	7.00	8.05
4. Creditors	-	-	5.56	-	-	0.65
5. Others	-	-	-	-	-	-
Total	100	100	100	100	100	100

It will be seen from the table that about 88 percent of the products of all enterprises have been directly sold to the users, be the farmers or any other agents. About 8 percent of goods were directly sold to retailers, whereas about 3 percent only of the volume of products were disposed to the wholesellers. The enterprises sold about 0.65 percent to the creditors. As can be seen from the table, while the sources of raw-material procurement varied due the nature of raw materials and the product, the agents to whom the outputs were disposed did not seem to vary among the various types of products.

The proximity to and the direct contact with the users have several advantages as well as disadvantages. Apart from the very narrow gap between producers and consumers' price, close contact between the producers and the users, could be instrumental to the technology transfer, and make the producer aware of the needs of the user in the locality. Further, because of the limited horizon and the close contact, there are advantages of easy repairs to the users. However, easy repair services in the vicinity may retard the tendency for standardization of the products.

As mentioned earlier, about 40% of the enterprises undertake construction of an implement only after receiving firm order. They often ask for advances before they start working on an implement. Presumably, this was due to the shortage of working capital, as the enterprises tried to economize the working capital requirements. Only a few (about 5 percent) produced for stock only and the rest (about 55 percent) of the enterprises produced for both stock and order. However, for these enterprises, the ready stock they kept was minimal-so to say, to attract the customers. Only a few of the container and mats producers kept stock of produce.

Naturally, the enterprises could not sell on credit and this procedure was perhaps necessitated by the shortage of working capital. Further most of these small enterprises themselve did not receive any credit and therefore extension of credit to thecustomers to enhance the sales of produce could not be achieved. The sample had only one case where the

producer extended credit to the customers. This absence of provision of credit which may be used as a form of price competition, was not however an indication of the product market perfection. As other evidences suggest that the imperfection, if any, was in the capital markets.

The shortage of capital and skill coupled with the nature of demand for the tools and implements generated by the technology in use in agriculture and by the users did not probably produce any congenial atmosphere and incentive for any innovation. As the Table 6.10 reveals, only about 2.33 percent

TABLE 6.10

Distribution of enterprises by nature of innovations undertaken

Nature of innovation	No. of ent. in irrigated area	No. of enterprise as % of total in irrigated area	No. of enterprise in unirrigated area	% of total unirrigated area	Total no. of enterprise	% of the total
1. No Innovation	36	97.30	41	97.62	77	97.47
2. Product improvement	-	-	-	-	-	-
3. New product/new process/ or new raw-material used	1	2.70	1	2.38	2	2.53
4. Total	37	100.00	42	100.00	79	100.00

of all the enterprises made use of new raw materials, or new process or a new product in the market. In the cases of enterprises operating in the irrigated area the percentage was about 2.70. However, the enterprises in non-irrigated areas, the same was only about 2.53 percent. It appears that the differential type of areas did not make any significant difference in case of innovation. It appears that the uncertainty in maketing a new product is likely to influence its production.

It has also been observed that the terms of transaction were mostly cash terms. The producers even gave a discount for the cash payment of the products. For most of the enterprises, except boat makers and some of the blacksmiths, they would carry on making tools and implements - their dailytasks, for five or six days a week and go to the market place to sell the product on the market days or hat days. The payments to the workers are made in the following day or fortunightly. The products are generally carried by carts, boats or rickshaws if they are bulky, otherwise they are transported by headloads. The system of marketing, however varies from location to location.

6.2.3. Competition

Since the enterprises in the industry produces rather a wide range of non-standardized durable products, it is extremely difficult to indicate the degree of competition in the industry. Comparison of prices could have beenuseful, if the enterprises produced a small range of products and if the products were standardised. However, in addition to the absense of standardization of products, there is a good deal of variation of the services provided by enterprises to their customers. Limited geographical sphare of marketing of the product may bestow some local moncpoly power but it appears to be temporary because virtually there is no barrier to entry. Some of the producers enjoyed some reputation for excellence but this was essentially local. There was no advertisements and no aggressive move for selling the products on the part of the producers.

CHAPTER VII

CONCLUDING REMARKS

From the present state of the agricultural tools and implement industry, one can make a number of observations which seem to be of interest.

First, the results suggest that agricultural tools and implement industry in Bangladesh comprises of small and family based firms, geographically dispersed, combining repair activity with production of a wide range of tools and equipment. The products are non-standardiged, and of indifferent quality standards. The production activity is seasonal having peaks around the planting and harvesting periods. There is virtually no specialization in the industry. It also suggests that the enterprises have sprung up sponteneously in response to the demand for agricultural tools and implements. They belong to a sector which has been termed in the literature as the traditional, the unorganized, the artrisans or the craft sector.

Secondly, most of the workers are family workers with a negligible amount of hired-workers. The terms and conditions for work is quite similar to that of agricultural sector. Most of the workers do not have any formal training and the firms entirely rely on the on-the job training. More than 80 percent of workers come from landless agricultural households. Many entrepreneurs have sources of income other than this industry and the proportion of income coming from this industry to the total income seems to vary inversly with the total income.

Thirdly, the structure of capital assets reveals that land and structure constitute more than 80 percent of the total capital assets. The value of machinery, tools and implements accounts for a small portion. Apart from inadequate machinery and tools, there is a shortage of technological know-how and skills, which make the technology in use rudimentary. The results also suggest that there is an acute shortage of working capital as a result of which the firms tend to economize on working capital requirements by making implements after they receive firm order and a part payment in advance, byreducing stocks of both raw material and output and by cash selling of products. Net investment in the enterprises appears to be very low compared to net output.

Fourth, an analysis of inputs and costs structures suggests that a significant proportion of inputs are domestically produced primary goods. Inter-industry linkages were high. An analysis of the production behaviour suggests that the returns to scale are constant. Though labour is slightly over utilized than the efficiency criteria, the capital is under-utilized. An additional amount of capital invested would generate additional output more than the amount of capital invested. The reasons for not investing in capital appears to be (a) access to capital market is extremely limited and (b) the interest charges are vary high in the unorganized money market so that it is not profitable to invest in capital by borrowing it. There seems to be a positive accumulation of capital in these enterprises.

Finally, the results suggest that both long term and short term credit market is extremely limited. Shortage of working capital for the enterprises limits their capibilities to finance

their production and for providing lied loans to their customers. The real cost of borrowing appears to be very high. There is very little innovation and this seems to be partly the result of marketing uncertainties and partly due to the fact that the demand for production innovation is not forthcoming from the farmers.

It must be pointed out that, the results are essentially based on a sample of firms producing farm tools and equipments coming from within the framework of rural industries[1] and does not include modern agricultural tools and machinery producing enterprises which are mostly located in the urban areas. For example, enterprises producing various types of power pumps, tubewells, etc., are mostly located in the urban areas. These modern enterprises use sophistated technology with highly skilled labour. Therefore, the dual nature of the agricultural tools and implement industry as a whole has not been reflected in the study. This is of course, a serous limitation and the readers are, therefore, warned that the results are merely suggestive.

Inspite of this limitation, there are some implications of the study regarding future policies concerning the small rural-based agricultural tools and implement industry. Instead of making specific policy recommendations, a general but disirable direction of change of policies will be indicated.

It has been observed that the firms suffer from both short term and long term capital for their production. While long-term credit is needed to build up new structure, purchase of new machinery and tools, short term-credit may ease the working

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[1] Rural Industries Study Project, Final Report, 1981, BIDS.

capital requirements of the enterprises. Since the money market is unorganised and the firms simply cannot get credit from financial institutions, an appropriate credit policy for both short and long term credit of the government may help the enterprises for expansion of output and employment. The credit policy may be designed so as to correct distrotions in capital market, institute a less discriminitory policy for allocation of funds, and ease the terms and conditions (such as collaterals) for availing credit, in order to create a more favourable condition for the small firms. It will also facilitate the firms to extend credit to their customers. This will also create opportunity for more innovative and dynamic firms to realize more effectively the potential for increased productivity in making their present product as well as allocate additional funds to the search for and the selection and adaptation of new implements.

It has been further observed that the marketing uncertainties affect production and hence employment and income. Further, the marketing uncertainties act as deterrent for production innovation. The firms face difficulty in both procuring raw materials and disposal of output. Shortage of raw materials is mainly due to either inadequate supply or unscrupulous intermediaries who create artificial scarcity. The situation can be eased if there are government functionaries which will deal with such raw-materials and make them available to the firms. Formation of producers' cooperative in both procuring raw material and selling of output may be another way for easing of the situation.

It may be mentioned here that even in the developed industrialized economics[1], the agricultural machinery and tools are typically produced by relatively small firms. Small firms can adapt

[1] See Strickler, Paul E, "Farm Machinery and Equipment" in U.S. Dept. of Agriculture, Structure of Six Farm Input Industries, Washington, D.C. and Cowling, K; Metcalf, D; Rayner, A.J.; Resource Structure of Agriculture: An Economic Analysis, Pergamon Press, Oxford.

themselves more quickly to local conditions and as such encouragement of making implements which lend themselves more readily to local adaptation is called for. For the successful generation of local production of an equipment innovation, extension services should be provided, particularly to these who pioneer its production.

Finally, as mentioned earlier, this industry can act as a vehicle by which appropriate technological change can be brought about in the developing economics with predominant agricultural sector. Therefore, development of this industry plays a crucial role in accelerating technological progress in agriculture and also the rest of the economy through linkage effects. This has great implication for employment generation in the economy. Further research in this area is called for in order to clearly understand the dynamics of the process so that appropriate policies may emerge.

TABLE A 2.1

Distribution of the monthly output as a percentage of estimated yearly value of output classified by types of enterprises

Months / Types of enterprise	Baisakh Apr. 15 May 14	Jaistha May 15 Jun.14	Ashar June 15 Jul.14	Sraban Aug.15-Sep.14	Bradra Aug.15-Se.14	Ashsh-in Sep. 15-Oct. 14	Kartik Oct.15-Nov.14	Agra. Nov.15-Dec.14	Poush Dec.15-Jan.14	Magh Jan.15-Feb.14	Falgon Feb.15-Mar.14	Chaitra Mar.15-Apr.14	Estimated output(in taka)
Boat making	2.25	6.51	24.43	14.91	3.00	5.96	12.86	16.70	8.23	4.33	0.46	0.38	140159
Wooden agr. tools	1.61	1.00	0.94	0.43	0.55	3.47	7.55	19.02	22.17	21.63	15.12	6.49	338509
Fishing net equip.	7.34	7.04	8.74	10.[illegible]	10.30	11.81	9.60	11.40	8.92	4.85	4.73	4.74	14936
Agr. Tools (Blacksmiths)	5.33	5.40	4.48	4.12	3.86	3.99	7.75	18.74	17.39	12.60	10.70	5.63	365596
Cont.& Mat (bamboo & cane)	7.33	5.83	4.96	3.93	6.63	4.42	7.42	14.94	15.06	13.06	8.14	8.27	141381
ALL	3.94	4.15	6.20	4.44	3.10	4.25	8.37	17.89	17.25	14.44	10.31	5.54	1000581

TABLE A.3.0 (a)

Distribution of types of workers (Age and sex) by types of enterprises

Type of worker / Industry type	No.of observation	Family (Non-wage)			Family (wage)			Apprentice			Pioca-rated		
		M	F	CH	M	F	CH	M	F	Ch	M	F	CH
Boat making	9	17	-	-	2	-	-	-	-	-	-	-	-
Wooden cart & Agr.tools	23	29	1	1	-	-	-	-	-	-	2	-	-
Fishing net & equip.	9	9	3	-	-	-	-	-	-	-	1	-	-
Agr.tools balcksmiths	18	30	-	-	4	-	-	3	-	-	-	-	-
Container & mat	20	30	7	-	-	-	-	-	-	-	-	-	-
TOTAL	79	115	11	1	6	-	-	3	-	-	3	-	-
GRAND TOTAL		127			6			3			3		

(Contd...)

Continued Table A.3.0(a)

Type of worker / Industry type	Permanent			Casual			TOTAL			Percentage			Grand total
	M	F	CH	M	F	CH	M	F	CH	M	F	Ch	
Boat making	2	-	-	-	-	-	21	-	-	100	-	-	11
Wooden cart & Agr.tools	-	-	-	11	-	-	42	1	1	95.1	2.4	2.4	44
Fishing net & equip.	-	-	-	-	-	-	10	3	-	76.9	23.1	-	13
Agr.tools blacksmiths	6	-	-	-	-	-	43	-	-	100	-	-	43
Container & mat	-	-	-	-	-	-	30	7	-	82.4	17.6	-	37
TOTAL	8	-	-	11	-	-	146	11	1	92.6	6.7	0.7	158
GRAND TOTAL	8			11			158						

TABLE A.3.0(b)

Distribution of type of workers by employment size group

Emp. size group / Type of worker	No. of observation	Family (wage)	Family (non-wage)	Apprentice	Piece-rated	Permanent	Casual	TOTAL	Percentage
1	26	25	-	-	1	-	-	26	16.5
2	37	69	2	-	-	3	-	74	46.8
3	10	21	2	1	-	5	1	30	19.0
4+	6	12	2	2	2	-	10	28	17.7
ALL	79	127	6	3	3	8	11	158	100.0
Percentage		80.3	3.8	1.9	1.9	5.1	7.0	100.0	

TABLE A.3.1

Distribution of no. of workers, per unit man days worked and average number of days worked per worker by the employment size group of industry in the reference month

Empl. Size Group	No. of enterprise	No. of Workers	Per Unit Mandays Worked	Av. Days Worked Per Worker
1	26	26	17	17
2	37	74	50	25
3	10	30	82	27
4+	6	28	115	25

TABLE A.3.2

Distribution of mandays and manhours worked by various types of workers by the types of industries

Industry type	No. of Obs.	Family (non-wage)		Family worker(wage)		Apprentices	
		Mandays	Manhours	Mandays	Manhours	Mandays	Manhours
Boat making	9	403 (82.41)	3920 (82.53)	26 (5.32)	250 (5.26)	-	-
Wooden cart & Agr.tools	23	579 (66.25)	4082 (63.88)	-	-	-	-
Fishing net & Equipment	9	267 (90.51)	1263 (90.02)	-	-	-	-
Agr.Tools & Blacksmithy	18	364 (70.70)	7828 (70.92)	112 (9.12)	896 (8.12)	90 (7.36)	786 (7.12)
Cane,Bamboo cont.,& mat	20	923 (100)	6552 (100)	-	-	-	-
ALL	79	3036 (79.83)	23,645 (78.47)	138 (3.63)	1146 (3.80)	90 (2.37)	786 (2.61)

Contd...

Continued.

Table A.3.2.

Industry type	Piece-rated		Permanent		Casual		TOTAL	
	Mandays	Manhours	Mandays	Manhours	Mandays	Manhours	Mandays	Manhours
Boat making	-	-	60 (12.27)	580 (12.21)	-	-	489	4750
Woomen cart & Agrl.Tools	48 (5.49)	190 (2.97)	-	-	247 (28.26)	2118 (33.15)	874	6390
Fishing net & Equipment	28 (9.49)	140 (9.98)	-	-	-	-	295	1403
Agr.Tools & Blacksmithy	-	-	156 (12.77)	1528 (13.84)	-	-	1222	11038
Cane,Bamboo Cont.,& mat	-	-	-	-	-	-	923	6552
ALL	76 (2.00)	330 (1.10)	216 (5.68)	2108 (7.00)	247 (6.49)	2118 (7.03)	3803	30133

Table A.3.3

Distribution of percentage mandays and manhours worked by various types of workers by the employment size group of industries

Size group	No. of Bbs.	Family (Non-wage)		Family (wage)		Apprentices	
		Mandays %	Manhours %	Mandays %	Manhours %	Mandays %	Manhours %
1	26	93.58	94.21	-	-	-	-
2	37	93.10	91.91	3.02	3.16	-	-
3	10	70.00	70.97	6.83	5.84	3.65	2.95
4+	6	47.25	49.30	3.35	4.26	8.67	9.55
ALL	79	79.83	78.47	3.63	3.80	2.37	2.61

Contd...

Continued

Table A.3.3.

Piece-rated		Permanent		Casual		TOTAL	
Mandays %	Manhours %	Mandays %	Manhours %	Mandays %	Manhours %	Mandays	Manhours
6.42	5.79	-	-	-	-	100	100
-	-	3.88	4.94	-	-	100	100
-	-	17.58	18.36	1.95	1.88	100	100
6.94	3.24	-	-	33.38	33.65	100	100
2.00	1.10	5.68	7.00	6.49	7.03	100	100

TABLE A.4.1

Percentage distribution of types of building structure by enterprise type

Types of enterprise	No. of observation	Without structure	With structure	Types of structure	
				Pucca	Kancha
1. Boat making	9	11.1	88.9	-	100.0
2. Wooden cart and agricultural tools	23	82.6	17.4	-	100.0
3. Fishing net and fishing equipment	9	55.6	44.4	25.00	75.00
4. Agricultural tools and blacksmithy	18	-	100.0	-	100.0
5. Bamboo, cane container & mat.	20	70.0	30.0	-	100.0
ALL	79	49.4	50.6	2.5	97.5

TABLE A.5.1

Distribution of enterprises' profits and family income by size

Empl. size group	No. of entp.	Family income from the enterprises	Profit	Av.Family income from these enterprises	Profit rate
1	26	35381	8050	1361	0.25
2	37	222468	34152	6013	0.61
3	10	125087	53081	12509	2.92
4+	6	29686	-2567	4948	-0.12