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PRE-STUDY REPORT ON THE USAID RURAL INDUSTRIES STUDY IN BANGLA-DESH *

A Consultant Report Prepared

By

ENYINNA CHUTA

August 15, 1977

DRAFT

* This draft report has been prepared under an AID - Michigan State University Contract No. 12-17-07-5-1927

for

Office of Rural Development
Technical Assistance Bureau
U.S. Agency for International Development

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DEFINITIONS AND TERMS

Geographic/Political Divisions

Thana	- Approximately 440 county sized political sub-divisions of Bangladesh
Union Council	- Sub-division within Thanas (10-20 Unions/Thana)
Village	- Approximately 16 villages per Union Council

Government Agencies

BSCIC	- Bangladesh Small and Cottage Industries Corporation, Government Corporation responsible for development of small industries.
IRDP	- Integrated Rural Development Program, Government agency charged with rural development, principally directed through multi-purpose cooperatives.

International Agencies

USAID	- United States Agency for International Development
UN	- United Nations
ILO	- International Labor Office
IDA	- Industrial Development Agency
UNIDO	- United Nations Industrial Development Organization
EEC	- European Economic Community
IBRD	- International Bank for Reconstruction and Development

Currency

Paisa	- 1/100th of One Taka
Taka	- Bangladesh Taka, the assumed exchange rate being Taka 15 = $1.00
$	- U. S. Dollar

1. INTRODUCTION

1.1 The Role of Small Scale Industry

Recently, most developing countries have begun to realize the penalties from pursuing industrial development strategies which have main emphasis on the promotion of large scale capital-intensive and urban-based industries (Frank, 1968; Morawetz, 1974). While the pursuance of large scale capital intensive industrial policies has resulted in the displacement of labor (thus worsening the unemployment situation) and shortage of foreign exchange, urban-based industrial strategies have led to urban congestion and increased rural-urban income differential. 1/ Many developing countries and donor agencies have thus become increasingly aware of and interested in strengthening the role of rural small scale industries in industrialization policies.

Recent empirical evidence from Sierra Leone indicated that in terms of the number of firms, employment and value-added, the small-scale sector dominates the entire industrial sector. 2/ It was also discovered that within the small-scale industrial sector, production processes were most productive if scarce capital and abundant labor so that there was no conflict between increasing employment and output. 3/

1.2 The Importance of Rural Industrialization for Bangladesh

Recent empirical studies have revealed that the majority of small scale industries are located in rural areas. 4/ This phenomenon will no doubt be particularly true of Bangladesh where only nine percent of the population live in urban areas. According to a recent World Bank projection 5/ over the period 1961-1973, approximately 30 percent of the rural population of Bangladesh is engaged in non-agricultural activities. In the same report, it is indicated that the rate of growth in non-agricultural labor force is far greater than that of agriculture, indicating an accelerated dependence of rural labor force on non-farm income sources. The same World Bank report has also revealed that in the areas of trade, transportation and service industries, rural services employment account for over 10 percent of the total Bangladesh work force, a figure that is twice that of the urban contribution. In manufacturing, construction and utilities, the number of rural workers is almost quadruple that of the number of urban workers.

1/ These urban-based industries pay subsidized wages as dictated by minimum wage laws. These wages are often higher than the opportunity cost of urban labor.

2/ See Liedholm, Chuta, 1976, pp 8-14.

3/ For Bangladesh, there is the need to generate more accurate data in order to establish these facts.

4/ See Chuta and Liedholm, 1975.

5/ IBRD, 1974, p.41.

The importance of rural industrialization is also reinforced by the existing inheritance law in Bangladesh wherein the pace of land fragmentation is accelerating as population increases. Accelerated fragmentation of agricultural land will result in an increase in the pool of landless people. In the absence of farming opportunities, many landless citizens will revert to rural non-farm occupation if and when possible, a trend that is already being experienced. Furthermore, so long as agricultural production is very seasonal due to flooding during periods of the year, non-farm occupations will assume a very important role in engaging underemployed rural labor.

1.3 The Objective of USAID Rural Industry Study in Bangladesh

Currently, USAID/Bangladesh is examining strategies for the promotion of rural industries in order to reduce unemployment and absorb surplus capital in rural Bangladesh. Unfortunately, as in most developing countries, adequate empirical and analytical studies of rural industries do not exist in Bangladesh. A recent review 1/ of all the previous industry surveys in Bangladesh has revealed that such surveys do not shed light on constraints, linkages and growth aspects of rural small industries. Without such information, there can be no determination of the prerequisites for rural industrial development. Although USAID believes that projects such as rural electrification are important preconditions for improving the performance of rural small industries, thus improving the rural standard of living, it also believes that a comprehensive rural industries study is needed which will highlight alternative policies and project activities for stimulating industries in rural areas and market towns, and which will take advantage of existing or planned resources, such as rural electrification.

In order to generate adequate baseline information for designing appropriate rural industry projects for Bangladesh, this report is written with the following terms of reference in mind:

1. Conduct site visits and interviews to gain an understanding of rural industries in Bangladesh.

2. Develop a scope of work for a rural industries study.

3. Design a survey questionnaire to be used for assembling a data base for the rural industries study and conduct a field test of the questionnaire to determine effectiveness.

1/ For more details, see Chapter 3 of this report.

4. Identify methodology which will be helpful in data compilation.

5. Prepare a preliminary schedule and budget for carrying out the rural industries study including time, manpower, and material requirements and recommend skills composition of the survey and study team.

6. Prepare recommendations for the list of criteria to be used as the basis for selection of areas to be surveyed and included in the survey.

7. Identify government and educational institutions which could contribute toward study development and implementation.

8. Prepare a final report covering items 1-7 and provide 5 copies to USAID/Bangladesh, 3 copies to AID/Washington, and one copy to the Contracting Officer's Representative.

This report has therefore been organized in nine chapters according to the above terms of reference.

1.4 Summary of Recommendations

The Rural Industries Study should be conducted in approximately 15 Thanas, with six two-digit level industries or group of industries being the main focus. Initial industry and Thana selections have been recommended in this report on the basis of pre-established criteria. For industries, dominance (in terms of size distribution, employment and value-added shares), appropriate technology factors (output-capital ratios, labor-capital ratios, local raw material intensity) and growth and linkage factors were considered. With respect to study locations, factors included USAID rural electrification project sites, concentration of enterprises, different techniques of production, product quality and variety, location specificity, local availability of skills and raw materials.

The Rural Industries Study should be conducted in three phases: In Phase I (three months) a simple questionnaire has been designed to gather information concerning the types of industries existing in selected localities. For example, information on type of industry, address or name of proprietor, workshop description, different employee classification and types of machines being used should be collected. Street-by-street enumeration of selected Thanas and Union Councils should be utilized with the resulting information constituting sample frames for post-enumeration stratifications and random selection of enterprises for detailed study. It is recommended that the Phase I survey be undertaken in the forthcoming winter months, a period most favorable for compiling a complete listing of establishments. This means that survey preparations should be initiated no later than September 1, 1977.

In Phase II detailed input-output data collection on a daily basis, case studies, and an entrepreneurship study should be undertaken. The initial input-output data should include stock data on buildings, tools, equipments, and furniture, output and material input. Additional data concerning daily labor inputs, weekly purchases of miscellaneous inputs, output and the disposition of such output should then be assembled. Finally, data on monthly financial transactions should be gathered. The questionnaires for conducting this sruvey have been pretested for effectiveness in Tangail and Chandina Thanas. A total of about 1500 respondents should be interviewed in Phase II survey following which data should be coded, edited and programmed for analysis. It is recommended that Phase II be extended over a period of up to one year so that both the seasonality which characterises rural enterprises and the interaction between rural farm and non-farm activities can be captured. Detailed analysis of the input-output data to be generated should highlight forward and backward industrial linkages, urban and rural, domestic and foreign linkages and growth potentials of rural industries. Also, the specific case studies which have been recommended should identify technological, management, marketing, infrastructural and socio-economic constraints which hamper the development of rural industries.

On the basis of the results of the analysis of the data which will be generated from phases I and II, phase III should then be devoted to the identification of existing and new projects which will need AID financing for development and improvement. In addition to project identification, detailed information concerning cost benefit analysis, location of projects, budget estimates, institutional and personnel requirement, time schedules, for implementing each identified project should be provided. Also, the direct and indirect employment impacts of such projects, procedures for monitoring such impacts and further gaps in available information base concerning the development or improvement and implementation of those projects have to be outlined in detail.

The organization of field data collection, supervision and coding for Phase I and II should be decentralized so that the various specialized and non-specialized academic institutions in Bangladesh and some government agencies can draw on high quality skill for developing and implementing the Study. However the training of enumerators, coding procedures and analyses should be coordinated and standardized through the Research Coordinator and research fellows in Dacca. Research activities should be well supervised and scheduled to ensure reliable data and timely execution of the Study.

Finally, a scope of work has been developed, spelling out in contractal terms, the goals which the Rural Industry Study is expected to accomplish, the duties of the consultant and each member of his research team and the work schedule required for a successful implementation of the Study. An outline of the types of data which are to be generated, the kinds of analyses to be undertaken and how such analysis will lead to the identification of projects are also provided. The specific tasks of the consultant which will be carried out in Phase III have been outlined in detail. Finally, the sources of funding and support which the consultant needs for carrying out his duties have also been outlined in the scope of work.

2. SITE VISITS

Field trips were initially undertaken in the eastern, northern and western parts of the country to provide background information for preparation of survey questionnaires. 1/ Comilla, Bogra, Pabna, Tangail, Mymensingh, Rajshahi and Kushtia Districts were visited on the 15th, 16th, 17th and 21st of June and 19th of July respectively. 2/ The specific Thanas and industries visited, insights gained during each visit, and problems cited as hampering the performance of those industries are discussed below.

2.1 Comilla

On the way to Comilla, we stopped at Daudkandi to visit several handloom factories. One factory manager introduced us to the yarn twisting, dyeing and weaving sections of his factory. The only complaint mentioned was shortage of yarn. In Comilla, the Director of the Academy of Rural Development (BARD) was first contacted, he emphasized the need to reactivate many cottage industries so as to sustain a reasonable level of employment in rural areas. He pointed out that the handloom industry was dying because products of the large textile mills were competing with those of handloom factories. As a result of this discussion, we toured a nearby textile mill with the mill manager and his technical staff. It was confirmed that the textile mill was producing cotton sarees, an agelong product of handloom weavers. Because of such competition along product lines, handloom factories are being denied much of the needed yarn.

We also visited the Comilla IRDP Project Director, Mr. M. Baset. The Project Director arranged for his Chandina Project Officer, Mr. Abdul Rahim, to accompany us to the Women's Cooperative Societies in Chandina. On arrival in Chandina, we were escorted by Mr. Rahim to Sabdalpur village to meet with Mr. Malumia, the Chairman of both the Shuhilpur Union Council and Sabdalpur Farmer's Cooperative Society. Messrs. Rahim and Malumia briefed us on the organization of the Sabdalpur Women's Cooperative Society. The cooperative, which was affiliated with the Chandina Thana Central Cooperative Association, was started in March 1977 by Mr. Rahim, had a membership of 46 and a rural capital formation of Tk 50 per week. The Sabdalpur Cooperative produced finished goods of bronze,

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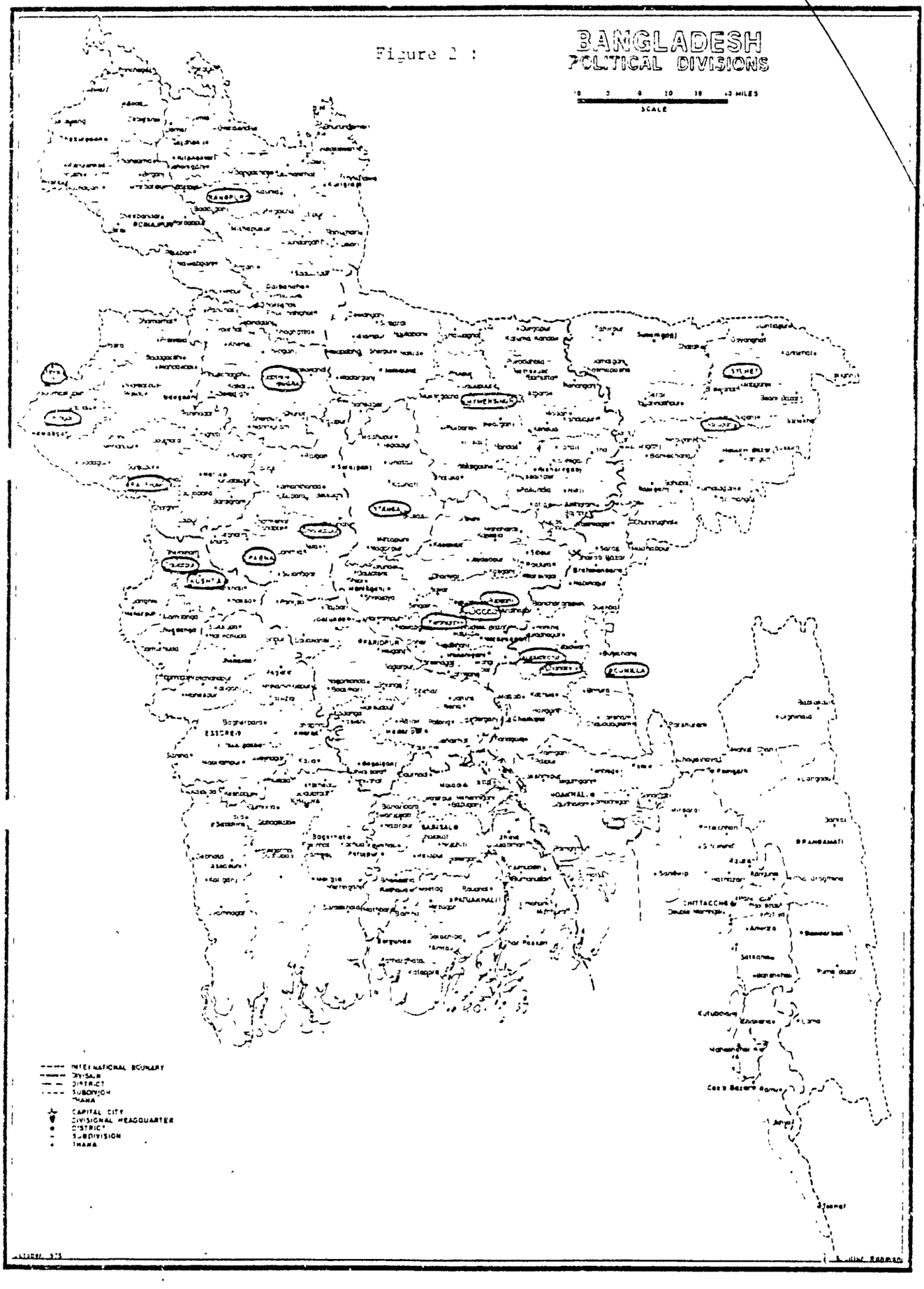
1/ These visits were undertaken in the company of Harun-al Rashid, an officer of the Program Division of USAID, Bangladesh.

2/ See figure 2

Figure 2 :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CHITTAGONG
INTERNATIONAL BOUNDARY
DIVISION
DISTRICT
SUBDIVISION
THANA
CAPITAL CITY
DIVISIONAL HEADQUARTER
DISTRICT
SUBDIVISION
THANA

silver, etc., and had no problem of marketing its goods. The only problem that the Women's cooperative faced was that of rising the sum of Tk 80,000 in order to purchase vital equipments.

2.2 Bogra

In Bogra the IRDP Project Officer was contacted. He introduced us to Mr. Tanfiqul Arif, the Agricultural Engineer, Rural Development Academy, Bogra, who became our chief escort. A visit was made to Shibganj village (10 miles from Bogra) where Mr. Abdur Rahman, his sons and grandchildren were engaged in producing good quality and relatively inexpensive locks, handloom shuttles, rod cutters, grinders, etc., on a full-time basis. Some of their problems included lack of funds to buy simple tools and electricity to run such tools. Obtaining raw materials and marketing the finished products were no problems.

During our second trip to Bogra District, we visited a village pottery industry in Dengan village of Amrul Union. The pottery industry produced various sizes of pots which were used for domestic cooking, water livestock food storage, seed preservation, milk pots, and ornamental purposes. The pottery industry, which engage both men and women, had no problem of obtaining raw materials, but was not able to meet the current demand for pots. In this regard, the industry faced problems concerning workshop space and storage of large quantities of finished products for sale in the rainy season. An important finding from the pot makers in Demgan village was that, according to the Hindu religion, individuals are destined to practice certain trades. The villagers pointed out for instance that the black-smithing and pottery industries are dominated by Hindus. Therefore, an important factor which needs to be investigated in the study is the types of industries which are strongly associated with specific religions or cultures.

2.3 Pabna

On the way from Bogra to Pabna, we stopped in the village of Shahzadpur to visit three handloom factories. We were told by the villagers that about 50 percent of such factories had closed down due to shortage of yarn. In Pabna, visits were made to Mr. Taslim Uddin the BSCIC Manager and Mr. Ataullah, the BSCIC mechanical engineer, whose offices were both situated at the Pabna Industrial Estate. We therefore, visited the oil seed, handloom, power loom, hosiery, printing press and oil mill factories in the Industrial Estate. These factories were initially established by the BSCIC and sold to private entrepreneurs on

hire purchase. Some of the problems mentioned included shortage of nylon yarn (which is produced in Chittagong), lack of spare parts for the mills and power looms, shortage of mustard seeds, electricity supply and reliability, inefficient management and inadequate workshop space.

2.4 Mymensingh

Our main contacts in Mymensingh were Prof. M. Ahmed Chowdhury, Vice Chancellor of the Agricultural University, Prof. A.M. Muazzam Hossain, Dean of the Faculty of Agricultural Economics and Rural Sociology, and Associate Prof. Mustafizur Rahman of the Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh. Associate Professor Mustafizur Rahman, showed us where he was breeding silk worms on mulberry leaves, developing cocoons, extracting silk and weaving silk saree. He later introduced us to farmers in a nearby village (Dighar Kanda) who were generating income from the production of cocoons, these activities being financed by the rural credit branch of the Janata Bank. In addition, we visited a women's rice processing cooperative where the traditional method - 'Dheki' - was being employed. Some small scale and medium scale jute baling plants, wheat processing and rice processing factories were also visited in the suburbs of Mymensingh Kotwali Thana. Prof. M.A. Chowdhury emphasized the importance of rural industries which increase employment opportunities since many farmers cannot cultivate their land due to floods for about five months in every year.

2.5 Tangail

We had talks in Tangail with the IRDP Project Officers and the BSCIC Managers. The BSCIC Manager was in charge of a small scale industries training centre which provided services and material inputs for small scale entrepreneurs in the Tangail District. We also visited a handloom factory in which Jamdani products were being produced.

2.6 Rajshahi

In the Rajshahi District, Shibganj, Bhalahat and Nawabganj thanas are famous for silk yarn production and weaving. An attempt to visit these localities on the 19 July was not successful due to communication problems. However, the BSCIC Sericulture centre at Ghoramara, in Rajshahi, was visited in order to obtain information concerning the silk industry in Rajshahi district.

The main contacts at the Ghoramara Sericulture centre were Messrs B.Sen Gupta, Deputy Director of Sericulture and Humayun Kabir, the BSCIC Senior Development Officer. Different sections of the Sericulture

centre were visited, including the sections for breeding of cocoons, reeling, winding, twisting, doubling and warping of silk yarn and weaving of silk cloth. Total employment at the Sericulture centre at Ghoramara was 286, of which 64 were female. A plan was underway to install 60 more reeling machines and employ 100 more women.

On the basis of the visit, some major problems of the silk industry were highlighted. The first major problem concerns efforts to develop a high yielding cocoon variety. For example, the Sericulture Centre in Ghoramara was using a cocoon variety that yielded about 250 yards of silk yarn while India's variety yields up to 600 yards of silk yarn. Research efforts to develop the cocoon variety at the Sericulture Centre in Rajshahi and the involvement of Bangladesh Universities in this effort are limited. Since production of a high yielding cocoon variety is the key to profitable silk textile production in many countries, Bangladesh has to consolidate efforts in this direction.

Some limited technological developments have taken place in the silk industry in Rajshahi. Apart from rearing mulberry worms on mulberry leaves in order to produce cocoons which yield about 100 counts silk yarn, the Sericulture Centre was also breeding more vigorous worms which fed on castor leaves and yielded cocoons from which about 210 counts yarn are being produced. While mulberry cocoons produce continuous filaments which could be reeled, cocoons produced from castor leaves yield yarns with non-continuous filaments, and therefore could not be reeled. However, the Development Officer at Rajshahi fabricated a simple inexpensive machine, called the " End Spinning Charkha ", for spinning yarn out of the castor cocoons. About 300 of these machines have been produced on a pilot basis and are being utilized by village women and the Sericulture Centre. Annual production of silk yarn from mulberry cocoons is about 40,000 pounds while the yield from castor cocoons is over 50,000 pounds of yarn annually.

The second problem the Ghoramara Sericulture Centre faces is the difficulty of securing cold storage and denumidifier facilities for preserving cocoons. It is estimated that a storage capacity of about 20,000 tons of cocoon, costing about $10,000, would be adequate. Related to this problem is the need for an electricity generator of at least 50 KV which would be used during failure of the regular electricity supply. Expectations are that the provision of these facilities would double employment and output in the Sericulture Centre through doubling the present single-shift work system.

2.7 Daulatpur (Kushtia)

In Daulatpur, about 23,000 acres of tobacco were being cultivated by farmers. Two varieties of tobacco -- Harrison special and Virginia special -- were in the market in Daulatpur. According to the IRDP Project officer, Mr. Ted Shahjahan, there were about 500 rural small scale tobacco processing units in Daulatpur. The BSCIC maintains 20 warehouses of tobacco in the Thana. At the time of visit, tobacco was being processed in temporary mud buildings measuring either 1728 or 729 cubit feet. Weed firing was generally utilized in tobacco processing.

Three problems are of major concern in the tobacco processing industry. First, the existing mud establishments cannot stand the heavy rains and floods. Money is therefore being wasted on rebuilding establishments as they repeatedly crumbled due to rains and floods. It was estimated that Tk 7000-8000 would be sufficient for the construction of a permanent establishment. Second, the processors complained that the scarcity and high cost of firewood prevents more efficient and profitable tobacco processing. They pointed out that the provision of adequate electricity would solve their fuel problem. Third, the activities of middlemen were pointed out as the most important factor affecting profitability of tobacco processing. Whereas the Government buying price is fixed at Tk 10 per pound, the middlemen insist on purchasing at only Tk 5 per pound, thus gaining extra Tk 5 per pound. The middlemen were therefore a disincentive to production of processed tobacco, a valuable export commodity. Finally, the processors complained that they had problems transporting their processed tobacco over long distances (frequently over 30 miles) where middlemen purchased them for storage at the different warehouses.

2.8 Summary

Rural industries examined included handloom, Jamdani, jewelry, locks, pottery, printing, silk, tobacco, jute baling, and rice, grain and oil processing. Several powerloom factories and large scale jute and textile mills were also visited to identify linkages with related small-scale industries.

Finally, because of the important linkages between small scale industries and agriculture, jute and rice farms were also visited. The main problems mentioned as hampering the development of rural industries included shortage of raw materials, lack of capital, of spare parts, and of electricity, poor management, inadequate workshop space, cultural or religious barriers to skill formation and employment, inadequate technical research, and exploitative practices of middlemen.

3. ESTABLISHING CRITERIA FOR SELECTING INDUSTRIES AND LOCATIONS FOR STUDY

This chapter presents first an outline of criteria for identifying the industries which will constitute the main focus of the USAID rural industry study, and second another set of criteria for selecting specific locations where the Study will be undertaken. Some of the criteria are quantifiable while others are not. Simple procedures utilized for ranking the industries will be described.

3.1 Criteria for Selecting Industries

In establishing workable guidelines for industry selection within the rural industries subsector, three major factors deserve attention. The first group of factors are those which spotlight industries that dominate the subsector in terms of number of establishments and their geographical dispersion, employment and output. Since it is important to at least sustain the existing levels of employment and output, development efforts should chanelled into such dominant industries 1/. Second, there are also appropriate technology factors which indicate industries whose techniques of production are not only labor intensive (in terms of how much labor combines with one unit of capital), but also most productive of scare capital and using local raw materials, manpower, and skills.

Industries utilizing such appropriate technologies have the potential to generate increased employment and output. It is assumed that in those industries, if resources are priced at their opportunity cost, the elasticity of substitution 2/ conditions will encourage a greater utilization of labor-intensive techniques. Third, there are linkage and growth factors which highlight inter-industry (small scale and large scale), intersectoral (agriculture and industry urban and rural) and international trade dependencies. These linkages reveal the

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1/ A review of previous industries research in Bangladesh (see next chapter) revealed that the 1961/62 survey of cottage and small scale industries undertaken by the East Pakistan Small Industry Corporation, generated the most reliable data on small industries. Therefore, all computed industries' statistics concerning number of firms, employment, output and economic ratios (Appendix 3-1) have been based on that survey. The data which were generated in 1969 (Appendix 3-2) have been utilized for ensuring that no sectoral shifts have occured over time.

2/ These elasticity parameters which have not been estimated for rural industries in Bangladesh could be estimated from data which might be generated from the proposed survey.

integrated nature of the entire economy and are necessary for policy and planning efforts. Other aspects of the linkage/growth factors include profitability as an indicator of the capacity to invest and expand industrial activities, and product demand elasticities which indicate the longrun growth potential of rural industries.

The three groups of factors which will be used as guidelines for selecting industries of main focus in the rural industries study are summarized as follows:

A. Dominant Factors 1/

1. Numerical Strength and Geographical Dispersion in Rural Areas
2. Size of Employment
3. Size of Output (Value-Added)

B. Appropriate Technology Factors 2/

1. Output-Capital Ratio
2. Labor-Capital Ratio
3. Utilization of Local Raw Materials
4. Utilization of local Manpower and Entrepreneural Skills

C. Linkage and Growth Factors 3/

1. Interindustry Linkages
2. Intersectoral Linkages
3. Interlocational Linkages
4. Domestic Market Potential
5. International Trade Linkages (Export Orientation)
6. Profitability
7. Female Role

1/ See Bell, 1966, p.6; Chuta and Liedholm, 1975, p.17; Shetty, pp.44-47.

2/ See Ntim and Powal, 1975, p.95; Shetty, pp.44-47; Harper 1976; ILO, 1975, p.6; Bell, 1966, p.27.

3/ Bell, 1967, pp.27.

Since the three broad criteria might conflict with one another, it may not be necessary that any one industry satisfy all three. However, it will be imperative that industries to be selected rank high in at least one of the three major criteria. A close examination of specific aspects of the three criteria will reveal that the present state of data on rural industries will not permit a quantitative evaluation of criteria such as import content, local material intensity, local market potential and various linkages. Thus it becomes necessary to rearrange the criteria so that evaluation and ranking could be undertaken for items 1-3, 4-5 and 6-11 respectively as follows:

1. Total establishment share
2. Total employment share
3. Total value added share
4. Capital productivity
5. Labor intensity
6. Foreign exchange earning/export orientation
7. Local material intensity
8. Industry-agriculture or sectoral linkages
9. Small-scale-largescale industry linkages
10. Domestic market potential
11. Female role.

The first two groups of items (1-3 and 4-5) are quantifiable while the third (6-11) is not quantifiable at the present moment. Evaluation of the third group of items will be based on experience and knowledge gained during the site visits and from existing literature. 1/

3.2 The Selection of Industries

Two stages of selection are involved. First, at the sector level 2/, all sectors which constitute at least 5% of the total number of establishments, employment and output were selected. Second, for each selected industrial sector, all specific industries constituting at least 5% of the subsector total number for firms, employment and output were also selected. 3/ For each of items 1-3, an equal score (1 unit) was assigned

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1/ It is anticipated that the relative importance of criteria 6-11 will be reassessed after more reliable data have been generated from the proposed study.

2/ See Appendix 3-1. The choice of 5% as a cutoff point is arbitrary. The actual cut-off point however does not alter the ranking.

3/ See Table 3-1.

TABLE 3-1

Industry Selection by the Criteria of Dominant Factors

Criteria	Sector	Industries
1. Establishment Share	Agriculture	Rice mill, Grain mills, Bakery, Flour mills,
	Textiles	Handloom, Tailoring, Hosiery, Dyeing of Yarn, Readymade Garments
	Metal Works	Printing Press, Brass Works
	Cane Bamboo and Wood products	Wooden Furniture, Saw mills, Wood products Boat Building, Bamboo products, Cane products.
2. Employment Share	Textiles	Handloom, Hosiery, Silk products, Dyeing of Yarn.
	Agriculture	Rice mill, Bakery, Other grain mills, Jute baling, flour mill
	Glass and Ceramics	Bricks and Tiles
	Metal Works	Printing Press, General engineering, other Metal products, Jewelry, Brass works.
	Cane, Bamboo, Wood products	Wood Furniture, Saw mills, other Wood products, Bamboo products, Boat Building.
3. Value-added Share	Agriculture	Bakery, Jute baling, other Grain mills, Rice mills, Flour mills, Oil mills
	Textiles	Handloom Hosiery, Dyeing of Yarn, Tailoring, Readymade Garments.
	Metal Works	Printing press, General engineering, other Metal products, Jewelry.
	Glass and Ceramics	Bricks and Textiles, Glass, Minor amples.
	Leather, Rubber and Plastic products.	Footwear, Tannery, other Leather products, Hides and Skins curing.

to each industry according to the frequency of occurence. For this exercise, 3 was a perfect score 1/. The processes of selection and scoring were repeated for items 4 and 5 with at least 2 and .001 as attainable levels of output-capital and labor-capital ratios respectively. 2/

The summaries in Table 3-5 show industrial subsectors which have perfect scores for the first five criteria. The handloom and the dyeing of yarn subsectors have perfect scores both in terms of shares of number of firms, employment and output, and also in terms of capital productivity and labor intensity. For items 6-11, personal judgment was utilized to select industries without scoring them 3/ When all the criteria (1-11) are considered together, the result is summarized in Table 3-7 while the ranking of industries on the basis of the numbers of criteria that were satisfied is shown as follows:

1st	Handloom
2nd	Jute Baling
3rd	Silk Products, Bricks, Dyeing of yarn
4th	Agro-based industries listed and cane products
5th	Pottery, Leather works, Blacksmithy, Jewelry, Jamdani, Hosiery, Printing, and Tobacco processing
6th	Fish canning, Fish drying, Locks, Miscellaneous Industries, Shill Patta

Thus, it can be seen that six possible areas of concentration can be delineated with handloom industry leading, followed by jute baling and silk products, along with bricks and dyeing of yarn, agro-based and cane products industries, pottery etc, and finally, fish canning and drying, locks, miscellaneous industries and shill patta. It will be appropriate for project identification efforts to follow the above order of industries' ranking.

1/ See Table 3-2

2/ See Tables3-3 and 3-4. Also see Appendices 3-3, 3-4

3/ See Table 3-6

TABLE 3-2

Scores Using the Criteria of Dominant Factors

Sector	Industry	Score
Agriculture	Rice Mills	3
	Grain Mills	3
	Bakery	3
	Flour Mills	3
	Jute Baling	3
	Oil Mill	1
Textiles	Handloom	3
	Tailoring	2
	Hosiery	3
	Dyeing of Yarn	3
	Readymade Garments	2
Cane, Bamboo and Wood Products	Wooden Furniture	2
	Saw Mills	2
	Wood Products	2
	Boat Building	2
	Bamboo Products	2
	Cane Products	1
Metal Products	Printing Press	3
	Brass Works	2
	General Engineering	2
	Other Metal Products	2
Glass and Ceramics	Bricks	2
	Glass, mirror amples	1

TABLE 3 - 3

Selection of Industries Using Capital Productivity and Labor Intensity Criteria

Criteria	Sector	industries
Output-Capital Ratio (2 and greater)	Pharmacentical	Lime and lime products, Paint and varnish, Boot polish, battery, raw oil, candle making.
	Glass and Ceramics	Shill patta, sanitary waves, bricks and tiles glass mirror and ampies
	Leather, Rubber and Plastic products	Other leather products, footwear, hides and skins, rubber products, tannery.
	Textiles	Hempropes, dyeing of yarn, readymade garments Jamdani products, tailoring, silk products, thread spinning, handloom, mantle making, socks.
	Miscellaneous	Photo binding, musical instruments, umbrella handles, art and painting.
Labor-Capital ratio	Glass and Ceramics	Pottery, bricks, shill patta
	Leather, Rubber and Plastic products	Rubber products, other leather products, footwear.
	Textiles	Hempropes, Jamdani products, dyeing of yarn handloom, sockes, coir products, cloth printing, silk products.
	Miscellaneous	Photo bindings, musical instruments, art and painting, umbrella handle.

TABLE 3-4

Scores Using Capital Productivity and Labor Intensity Criteria

Sector.	Industry	Score
Pharmaceutical	Lime Products	1
	Paint and Varnish	1
	Boot Polish	1
	Battery	1
	Hair Oil	1
	Candle	1
Glass and Ceramics	Shill Patta	2
	Sanitary wares	1
	Bricks	2
	Glass, Mirror etc.	1
	Pottery	1
Leather etc.	Other leather Products	2
	Footwear	2
	Rubber products	2
	Hides and skin	1
	Tannery	1
Textiles	Hemp ropes	2
	Dyeing of Yarn	2
	Ready made Garments	1
	Jamdani Products	2
	Thread Spinning	1
	Handloom	2
	Mantle Making	1
	Socks	1
	Coir making	1
	Silk products	2
Miscellaneous	Photo binding	2
	Musical Instruments	2
	Umbrella Handles	2
	Art and Painting	2

TABLE 3-5

A Summary of Industry Selection Based on the Dominant Factors, Capital Productivity and Labor Intensity Criteria

Sector	Industry	Criteria
Agriculture	Rice Mills	Establishment, Employment, output dominating
	Grain Mills	-do-
	Flour Mills	-do-
	Jute Baling	-do-
Textiles	Handloom Dyeing of Yarn	Both establishment, employment, output dominating and employs techniques with high output-capital and labor-capital ratios
	Hosiery	Establishment, employment, output dominating
	Hemp ropes Jamdani Products Silk Products	High output-capital, labor capital ratios
Metal Products	Printing Press	Establishment, employment, output dominating
Glass and Ceramics	Bricks, Shill Patta	High output-capital, labor-capital ratios
Leather	Other leather Footwear Rubber Products	High output-capital, labor-capital ratios
Miscellaneous	Photo binding Musical Instruments Art and Painting	High output-capital, labor-capital ratios

TABLE 3-6

The Selection of Industries based on Growth and Linkage Criteria

Sector	Industry	Criteria
Agriculture	Jute Baling	Local raw material, foreign exchange earning/export orientation, sectoral and industrial linkage effects.
	Tobacco Processing	Export orientation, linkage effects, local raw material.
	Fish canning & Fish Drying	Local raw material, foreign exchange earning/export orientation.
Glass and Ceramics	Bricks, Pottery	Local raw materials, domestic market, female participation, sectoral linkage effects.
Metal Works	Blacksmithy Lock & Jewelry	Linkage effect with agriculture, foreign exchange saving via import-substitution, local material, domestic market, female participation.
Textile	Handloom	Industrial linkage effects, domestic market availability, foreign exchange saving via import substitution, female participation.
	Silk Products	Industrial linkage effects, domestic market availability, female participation.
Leather	Footwear	Domestic demand
Cane, Bamboo and Wood Products	Cane Products	Available raw material, available local skill, export market potential, local demand.

TABLE 3-7

Summary of Industry Selection Based on Factors of Dominance, Capital Productivity, Labor Intensity, Growth & Linkage Criteria

Sector	Industry	Criteria Number
Agriculture	Rice Mills Grain Mills Bakery Flour Mills	1, 2, 3, 7, 10
	Jute Baling	1, 2, 3, 6, 7, 8, 9, 10
	Fish Canning and Drying	6, 7
	Tobacco Processing1/	6, 7, 8
Textiles	Handloom	1, 2, 3, 4, 5, 8, 9, 10, 11
	Dyeing of yarn	4, 5, 8, 10, 11
	Hosiery	1, 2, 3
	Hemp ropes	4, 5
	Jamdani	4, 5, 11
	Silk Products	4, 5, 7, 10, 11
Cane, Bamboo and Wood Products	Cane Products	6, 7, 10, 11
Metal Products	Printing Press	1, 2, 3
	Blacksmithy	7, 8, 11
	Locks	7, 10
	Jewelry	7, 10, 11
Glass and Ceramics	Bricks	4,5,7,8,10
	Shill Patta	4, 5
	Pottery	8, 10, 11
Leather etc.	Other leather Footwear Rubber Product	4, 5, 10
Miscellaneous	Photo binding, Musical Instruments, Umbrella handles, Art and Painting	4, 5

1/ On the basis of the 1969 survey of small scale industries, value added in tobacco manufacturing had increased to 16% of total national income (see Appendix 3-2).

3.3 Criteria for Choosing Geographical Areas for the Study

In addition to establishing the criteria for identifying industries, there is also a need to establish a set of criteria for selecting locations to be included in the survey. In this respect, Appendices 3-3 to 3-11 provide information for the key locations of the different rural industrial subsectors 1/. For example, appendix 3-3 shows that jute baling is dominant in Rangpur and Bogra. However, in order not to dissipate efforts in the various Districts and Thanas, additional specific criteria will be needed to isolate locations which will yield information for individual industrial subsector.

On the basis of site visits and knowledge of rural industries products traded locally, it has been possible to associate certain locations with specific product lines. Thus, it is conveneient to distinguish between silk sarees produced in Narshindi and Rupgonj of Dacca district from the cotton saree produced in Shahzadpur in Pabna district. Also, most Bengali know that sarees produced in Tangail are of a high quality. The Basaks who inhabit the Chandi village of Tangail Kotwali Thana have a special skill in weaving the celebrated marriage saree called 'Katan' Banarasi. This special saree is also exported. Jamdani products produced in Rupsi and Nowapara areas of Keraniganj Thana of Dacca Districts are different from the coarse cotton handloom products of the Chandina Thana in Comilla District. This distinction along product lines becomes a convenient way of selecting locations in order to identify different kinds of constraints within an industry.

Another criterion that is useful for identifying geographical areas of study is the technology involved. For example, in the handloom industry, weavers in Daudkandi in Comilla District utilize the local tat machines while others in Shahzadpur utilize the Japanese tat machines. In addition, some private small scale entrepreneurs in Tangail Kotwali Thana weave on power looms. Thus, differences in the efficiency rates and product quality due to the utilization of three types of machines might call for specific policies of intervention. Also, while the handloom weavers in Shahzadpur operate in a village and cottage environment, weavers in Pabna Kotwali Thana establish factories similar to the government industrial estates and isolated from the village surrounding. Differences in location and industrial organization even within the same Thana and industry could affect the efficiency of production.

1/ Some industries concentrate in certain areas due to availability of local raw materials, and special skills.

In the pottery industry, product quality has influenced the choice of different locations. While potters in the Demgan village of Bogra Thana produce different size pots for storing water, seeds etc, the Biyoypur potters of Comilla Kotwali Thana produce more sophisticated items such as tea cups, tea jugs, water jars, etc. Such difference in the quality of products necessitate the inclusion of more than one pottery location so that different constraints can be identified.

For other industrial subsectors whose products are location specific, i.e., silk in Rajshahi districts and tobacco processing in Rangpur district, or whose product variety or quality may not vary with location i.e., jute baling, blacksmithing, jewelry, leather works or locks, single locations have been selected.

In the agrobased industries such as rice milling, grain milling, flour milling and bakery, the rates of capacity utilization could be a function of location, climatic variations, cropping patterns and availability of raw materials. Thus, the agrobased industries in Sylhet might face a different set of constraints than those located in Dacca districts. Thus it becomes necessary to include many locations for studying agrobased industries.

Table 2-8 below summaries the fact that surveys should be undertaken in several Thanas due to the concentration of particular industrial firms in certain locations, the existence of different techniques of production product quality and variety within one industry and variations in climatic and cropping patterns. Single locations have been chosen for some industrial subsectors either because industries are location specific or because product quality or variety does not change with location.

TABLE 3-8

Locations[1/] Recommended for the Rural Industries Study

District	Thana/Market Town	Industry of main focus	Rationale for choice of location	Further Remarks
1. Dacca	Keraniganj -Nowapara Tupsi	Handloom Rice mill. Bakery Grain mills	Product variety Area of concentration.	Jamdani product
	Fuggani	Handloom Rice mill. Bakery Grain mills.	Product variety Area of concentration	Silk saree, Mosquito nets, bedspreads etc.
2. Rajshahi	Chiriganj	Silk		Silk cloth weaving.
	Dashenat		Location specific	Breeding of cocoons, traditional reeling and weaving.
	Gaoramara			BSCIC operations
		Blacksmithy Rice milling Grain milling	Areas of concentration	agricultural tools
3. Pabna	Kowali	Handloom Power loom, Rice Grain, Oil	Area of concentration Technique of production product variety. Industrial estate type of production (BSCIC & private	Japanese Tat cotton saree
	Shahzadpur	Handloom	Area of concentration Technique of production Wage factory production	Japanese Tat
4. Comilla	Laksandi	Handloom	Technique of production	Local Tat
	Chandina	Handloom Jewelry Khadi dyeing and printing Rice mills Grain mills	Product variety Special skill Product quality & variety special skill. Areas of concentration	Prong items Cooperative organization
5. Tangail	Kotwali	Handloom	Area of concentration Product quality & variety Special skills Different techniques of production	'Katan' Banarasi Baraka Use of local and Japanese Tat and privately owned powerloom
		Pottery	Raw material & local skill availability	
		Rice mill	Area of concentration	

1/ See Figure 2.

TABLE 3-8 (contd)

District	Thana/Market Town	Industry of main focus	Rationale for choice of location	Further Remarks
6. Bogra	Sibganj	Jute Baling Rice mill Locks etc. Blacksmithy Rice milling	Area of concentration Area of concentration Special skill Special skill Area of concentration	Agri. tools
7. Mymensingh	Kotwali	Jute Baling Bakery Rice milling	Area of concentration Area of concentration Area of concentration	
8. Sylhet	Balaganj	Cane product Rice milling Bakery Footwear Blacksmithing	Area of concentration	
9. Rangpur	Kaunia (Haragacha)	Tobacco processing Jute baling	Location specific Area of concentration	Export promotion
10. Kushtia	Daulatpur	Tobacco processing Rice processing Handloom	Location specific	Export promotion

4. QUESTIONNAIRE DESIGN, PILOT STUDY AND RECOMMENDED SURVEY DESIGN

The questionnaire set that has been designed for gathering most of the data needed for the rural industries study is included in Appendix 4-1. All the questionnaires have been pretested for effectiveness in two Thanas. The pilot study that was undertaken in those Thanas will be discussed in detail to point out the lessons which have been learnt during the period of questionnaire pretesting. Finally, a survey design for the rural industries study will be outlined. The survey design will include determination of the sample size of establishments, the sampling procedures for selecting the establishments from each Thana, and the preliminary time and cost estimates required for implementing the survey design.

4.1 The Pilot Study

In order to systematically develop a survey design suitable for generating adequate base-line data for the rural industries study a limited pilot study was undertaken in two Thanas - Tangail Kotwali and Chandina thanas. The pilot study provided an opportunity for testing the effectiveness of the set of questionnaires included in Appendix 4-1. It also provided a means of estimating preliminary time and cost budgets for conducting the survey, and of generating some variance estimates which were necessary for determining the sampling scheme for the survey.

Before the pilot study was undertaken, letters of introduction were obtained from the Planning Commission in Dacca for presentation to the IRDP directors at the Thana headquarters. The IRDP directors in the rural Thanas therefore had the authorization to contact the relevant Circule Officers and Union Council Chairmen so that enumerators had no problems of executing their duties. Five enumerators were posted in each Thana, and field questionnaire pretesting lasting two weeks. Throughout this period the consultant and local counterparts supervised the pilot study. The local counterparts were Professor Mustafizur Rahman from the Department of Agricultural Economics in Mymensingh Agricultural University and Mr. Sadiq Ahmed from the Bangladesh Institute of Development Studies, Dacca. Most of the enumerators had M.A. or M.Sc. degrees. Two weeks were devoted to analysing the data which were generated from the pilot study.

4.2 Some Lessons on Questionnaire Design

One lesson learnt during the pilot study is that the names of entrepreneurs could be used in form 1A (see Appendix 4-1) for identifying each enterprise. Thus, if an enterprise was selected for a phase II survey, it would be

possible to trace the proprietor in a particular village. Second the enumerators did not probe sufficiently to obtain accurate information. An enumerator should be able to evaluate the information given to him by a respondent. If there are grounds to suspect any inconsistencies, more questioning should be undertaken to put the respondent on the ball path. Third, data obtained on the Biri industry was highly suspicious. This situation arose because it is deemed illegal to posses the leaf that is used for making biri. It is therefore recommended that this industry should be excluded from the proposed survey. Fourth, in connection with obtaining data on actual labor hours worked, the Muslim prayer time provided more accurate approximations than the rising or the setting of the sun . Fifth, the enumerators manual should contain important historical events in Bangladesh for estimating the age of proprietors or the year of purchasing equipments, and should contain detailed explanations concerning each column of the questionnaire. All corrections resulting from the pilot study have been incorporated into the questionnaire set included in Appendix 4-1. However, this does not exclude the need for further modifications and pretesting.

4.3 Distribution of Work Load

On the basis of the pilot survey, it was possible to estimate the average time it took to administer each of forms 4, 5, 6, 7 and 8 respectively. 1/ Such average time allocation has been presented in Table 4-1 below.

TABLE 4-1

Average Time for Administering Rural Industries Study Questionnaires

Form No.	Name of Form	Average Time
Form 4	Labor Input	35 mins.
Form 5	Output data	35 mins.
Form 6	Miscellaneous Input	20 mins.
Form 7	Financial Information	18 mins.
Form 8	Entrepreneurship Data	95 mins.

1/ See Appendix 4-1

On the average it took about 75 mins. to administer forms 4, 5, 6 and 7 on each respondent. With good rapport and increase in efficiency in administering the forms due to familiarization with the questionnaire and learning process on the part of the respondents over time, it should take less than one hour to administer these forms. Therefore, one respondent could visit six to seven respondents each day.

4.4 Twice Weekly Visits

During the pilot study, attempts were made to test the accuracy of information which respondents were asked to recall over the previous four, three and two days respectively. Long periods of memory recall (i.e. four days) required only two visits a week to each respondent while short recalls (i.e. two days) required three to four visits per week. While fewer visits tended to generate less reliable data, more frequent visits were irritating to respondents. A thorough examination of the results of the pilot study in Tangail and Chandina Thanas suggested that two weekly visits are adequate so that data could be obtained for a four day recall during each visit. It is therefore recommended that each enumerator statifies his 20 respondents into three groups - A, B and C so that he could visit the A group on Mondays and Thursday, B group on Tuesdays and Fridays, and C group on Wednesdays and Saturdays. 1/ The grouping of respondents should consider matters of proximity and firm size. The grouping of respondents according to specific days of visits has an advantage of facilitating field supervision. Thus, the field supervisor or any member of the research staff knows which establishments an enumerator will visit on any particular day and where to look for him.

4.5 Recommended Survey Strategy for Assembling Data on Rural Industries

It is recommended that the rural industries study be undertaken in three phases. In Phase I, an attempt should be made to estimate the current number of industrial establishments in each Study Thana. Information such as type of enterprise, current address, workshop description, number of different types of labor and machines utilized in the subsector should be obtained during the Phase I survey period. These types of information will constitute a sample frame that will facilitate post-enumeration stratifications for selecting establishments for the Phase II survey. The Phase I survey should be conducted by a method of street-by-street interview, with the help of location informants to ensure that all enterprises are enumberated.

In the Phase II survey, detailed input-output data collection should be undertaken for a group of sample firms. Although the major industries of interest in the study include handloom, jute baling, silk products, [illegible]

1/ See page 30 for information on sample size

agro-based, tobacco etc., other industries which appear to be important from Phase I study should be included for investigation. All relevant data relating to entrepreneurship and household expenditures, and in depth case studies should be undertaken during the Phase II period of data collection. Also, all information on labor and output should be assembled on a daily basis. In order to achieve this strategy, establishments should be visited twice weekly so that information could be recalled for a period of only 4 days with a one day overlap. The one day overlap is necessary for checking accuracy of the memory recall. Experience derived from the pilot survey revealed that such a period of recall is adequate both for the convenience of respondents and the reliability of the data to be collected. The recall periods for other inputs could vary from one week to one month as is shown in Table 4-2.

Although it is being recommended that respondents be visited twice weekly, each week, for a period of one year to gather input-output data, some unusual circumstance, such as extreme fatique on the part of a large proportion of the respondents, leading to high rates of non-response should necessitate a modification in the frequency of visits. While still adopting a procedure of two weekly visits, information should be collected for only one week in a month. 1/ The actual week to be visited each month should be randomly determined. If for some reason, the survey cannot be extended through a period of one year, the survey should be planned so that information can be obtained for both the monsoon and winter periods. It needs to be pointed out that one major reason for the refusal to give information over a prolonged period is lack of frequent visits by senior members of the research team. If the enumerator is visited frequently by the research fellow, senior research fellow, research coordinator and AID personnel from Washington at different periods in time during the survey period, to chat with respondents in the village over their problems, enthusiasm is engendered and the rate of non response is reduced to a minimum

4.6 Sample Size 2/

On the basis of the variance estimate generated for employment (no of workers per establishment) during the pilot study, it is recommended that about 100 establishments be selected for study in each rural Thana, allowing for a ten percent rate of non-response. This means that an overall sample size of 1500 establishments should be randomly selected for detailed study.

1/ If the workload is thus reduced for enumerators, the rest of their time should be devoted to the coding of data.

2/ See Appendices 4.2 - 4.4 for procedures utilized for estimating viance and sample size.

TABLE 4-2

Recommended Schedule for Administering Field Questionnaire

Form No.	Form Name	Time to Administer Questionnaire
Form I A'	Phase I	First six weeks
Form I	Inventory of Buildings.	First one month after Phase I survey.
Form 2	Inventory of Equipment	-do-
Form 3	Inventory of Material and Output Stock	-do-
Form 4	Labor Data	As soon as forms I, 2 and 3 have been administered and twice weekly for each respondent.
Form 5/5B	Output Data	Same as for Labor Data
Form 6	Material Input	Administer first page on the last weekly visit to each respondent and obtain information for the previous seven days. Administer the second page on the last visit of the month to each respondent and obtain information for the past one month.
Form 7	Financial Information	Administer on the last day of visit each month to each respondent and obtain information for the past one month.
Form 8	Entrepreneural Characteristic	Administer as soon as rapport is established with respondents but not within the first four months of survey.

The variance estimate utilized for computing the sample size of establishments refers to Tangail Thana where a more complete coverage of establishment listings was carried out. 1/ The formular for computing the variance estimate for average employment and determining the sample size are presented in Appendix 4-4. Appendix 4-3 contains the frequency distribution of employment for 10 (out of 12) Union Councel in the Chandina Thana of Comilla District that were partially enumerated. It can also be seen that the variance estimate, as computed for Chandina Thana in Appendix 4-4 , is very close to the variace estimate obtained for the Tangail Thana.

4.7 Sampling Procedures

It is recommended that a two-staged cluster sampling procedure be adopted in collecting the primary data on rural industries. Due to the purposive nature of the proposed rural industries study, the first stage units (Thanas) have already been predetermined. 2/ The second stage units which will be individual establishments within each Thana, should be selected by a procedure by simple random sampling from a sample frame assembled during the first phase of the rural industries study. From such a sample frame a post-enumeration stratification of establishment listings by both industry and technique of production 3/ should be carried out. On the basis of the post -enumeration stratification of the establishment listings assembled during Phase I of the survey, the number of firms allocated to each industry should be proportional to the size distributions of industries, techniques of production and product varieties within each thana. For example, power looms, local tat and Japanese tat machines on the one hand, and Jamdani, saree and Katan Banarasi products, on the other hand should be proportionally represented within each Thana. This method of proportional allocation of the sample size simplifies the procedures of estimating parameters for a particular Thana. 4/

1/ In three out of the fifteen Union Councils of Tangail Kotwali Thana, only 80% of the geographical area was enumerated due to communication problems.

2/ See page _____ of Chapter 2.

3/ These establishment listings should be assembled by administering form 1B of Appendix 4-1

4/ For more details, see Hansen Herwitz and Madown, 1953.

An illustration from the result of the analysis of the Phase I data generated during the pilot study might help to drive home the procedure of sample size allocation with probability proportional to size. In Tangail Thana for instance, it was discovered that 61 percent of the total number of establishments enumerated during the Phase I survey were handloom establishments, followed by 6% for pottery and bamboo/cane industries respectively, 3% for mustard oil, and brass work respectively, 1% for rice and flour mills etc. Since the sample size allowed for each Thana is 100, the allocation procedures therefore dictates that 61% of 100 establishments should be constituted by handloom, 6% by pottery and bamboo/cane respectively etc. In addition, the analysis of Phase I data revealed that 11% of the 61% of the total number of handloom establishments in Tangail Thana utilized powered looms while the rest (87%) utilized nonpowered looms. Therefore out of the 61% of 100 i.e. 61 handloom establishments to be randomly selected for study in Tangail Thana, 11%, i.e., 7 establishment utilizing powered loom should be included in the sample while the rest, 54 establishments utilizing nonpowered machines be randomly selected for study.

4.8 Costs of Executing the Study

Table 4-3 and 4-4 show the cost estimates forthe execution of each of the two phases of the proposed study. These estimates do not yet include the costs of an expatriate research coordinator, vehicle(s) housing for enumerators, office equipment, and approximately 6000 coding sheets. These estimates take into account the fact that most of the research staff would be taking on temporary jobs which would be highly demanding of time, effort and commitment. If for some reasons the Phase II survey cannot be extended for a period of one year, the required cost estimate would be a proportional reduction of the sum of the values of items 1 to 7 of the Phase II budget.
It is strongly recommended however that the study be extended through a one year period in order to capture the element of seasonal variation characteristic of rural industries. On the whole, the proposed study will cost approximately $135,000 (Tk 2 million). If contingencies are provided for, the total cost of the survey could be approximately $160,000 (Tk 2.5 million).

TABLE 4-3

Budget Estimates for Phase I Survey

1.	75 Field Investigators at Tk 1000 each per month	Tk	225,000
2.	15 Research Associates at Tk 2000 each per month		90,000
3.	4 Field Supervisors at Tk 1200 each per month		14,400
4.	12 Coders at 600 each per month		21,600
5.	1 Senior Research Fellow at Tk 3000 per month		9,000
6.	1 Research Fellow at Tk 2500 per month		7,500
7.	Duplicating papers (9 realms)		423
8.	1 Typist at Tk 400 per month		1,200
9.	1 Messenger at Tk 300 per month		900
10.	Key punching & programming		13,000
11.	Transportation (fuel) 1/		21,000
	Sub-Total 2/		404,023

1/ Experience gained from field trips revealed that the maximum fuel cost of travelling 116 miles could be about Tk 210. Given that the area of Bangladesh is about 55000 square miles and that the rural industries study will be undertaken in 15 thanas, then the average distance between thanas is about $\sqrt{\frac{55,000}{15}}$ or 61 miles (see Hansen Herwitz and Madow, Vol.i, p.274).
Assuming that two beginning trips and two ending trips are made during the survey and that each thana is visited at least twice each month for 16 months during the survey period, then the monthly fuel cost of supervising the survey is about Tk 7000.

2/ The subtotal budget estimate is for three months of Phase I survey.

TABLE 4-4

Budget Estimates for Phase II Survey 1/

1.	75 Field Investigators @ Tk 1000 each per month	Tk 975,000
2.	1 Senior Research Fellow @ Tk 3000 per month	39,000
3.	1 Research Fellow @ Tk 2500 per month	32,500
4.	4 Field Supervisors @ Tk 1200 each per month	62,400
5.	12 Coders at Tk 600 each per month	93,600
6.	1 Typist at Tk 400 per month	5,200
7.	1 Messenger at Tk 300 per month	3,900
8.	85 Hand bags at Tk 65 each	5,525
9.	80 Bicycles at Tk 1000 each	80,000
10.	80 Umbrellas at Tk 70 each	5,600
11.	80 Lamps at Tk 20 each	1,600
12.	320 pencils @ Tk 1.50 each	480
13.	400 Ballpoint pen @ Tk 5 each	2,000
14.	100 Pencil cutters at Tk 2 each	200
15.	1000 Writing pads at Tk 3 each	3,000
16.	191 Ream duplicating paper	9,400
17.	½ Dozen duplicating ink	480
18.	50 Stencils at Tk 3 each	150
19.	Transportation (Fuel)	19,000
20.	Key punching	86,000
21.	Programming	144,000
	Sub-Total	1,641,000

1/ These estimates are for a period of thirteen months.

During the third phase of the rural industries study, the results of the analysis of the data generated during the first and second survey phases should be utilized to identify existing and new projects which need development and improvement through AID financing. In addition to identifying projects which need funding, other detailed information which will be required for implementing the identified projects will have to be provided. For example, information will be needed on type of industries, their locations and the criteria utilized for choosing those industries and locations. Also, detailed cost-benefit analysis will have to be undertaken to evaluate the direct and indirect employment impacts of selected projects and at different locations. It will be necessary to carry out sensitivity analysis to evaluate the effects of different project designs and factor prices on identified projects. In the third phase of the study also, enough information will be needed concerning what methodology can be utilized for monitoring the various impacts of projects over specified length of time. Also, data gaps that are needed for improved project identification and implementation will be outlined. Very importantly, a thorough evaluation and recommendation should be made concerning what institutions and personnel in Bangladesh will be needed for implementing each project in particular locations.

5. RECOMMENDED DATA NEEDS FOR THE RURAL INDUSTRIES STUDY

5.1 Introduction

Before laying out the scope of work for the USAID rural industries study, it is necessary to review previous surveys of industries in Bangladesh. A summary of such surveys is presented in Table 5-1 which contains information on the types of surveys undertaken, the year of survey, the associated research agency, survey design, variables covered and the kinds of analyses that were undertaken concerning those variables. The last column of Table 5-1 contains remarks concerning the strengths and weaknesses of each of the surveys.

Two important related points emanate from the review of previous survey efforts concerning small scale and cottage industries in Bangladesh. First, most of the previous research on small scale and cottage industries were undertaken with the sole purpose of enumerating firms by industry and location (division or district) and/or to take inventory of the number of workers, value of fixed assets, raw materials and output. As a result, the analyses that were based on such surveys have been mainly tabulations that are not addressed to any policy issues or problems, such as employment and output generation. Second, most of the previous surveys were designed to be administered by a method of one-shot interviewing, a procedure which has limitations.

The technique of one-shot interviewing can have two disadvantages. First, since only a negligible minority of small scale interpreneurs keep records of their transaction[1/], one-shot surveys designed to draw from the past memories of respondents could yield unreliable results. Moreover, the lack of accurate knowledge concerning seasonality has two additional adverse consequences. First, since no one knows which month of the year represents the average level of resource allocation and output among small scale industries, estimations based on monthly mean figures derived from a one-shot survey could yield overestimates or underestimates of the population parameters, depending on whether the reference period related to peak or low-level of industrial activity. Second, the lack of knowledge concerning seasonality limits the ability of planners to allocate idle resources for construction or rural works programs without interfering with farm or nonfarm production activities. Seasonality may also vary both by location and industry. Therefore, it is important to undertake prolonged surveys which highlight specific patterns of seasonality.

A close examination of Table 5-1 also reveals that previous surveys of small scale industries did not assemble any data base highlighting the linkages between small scale and large scale industries, industry and agriculture, urban and rural areas, or small scale industries and export trade. The lack of quantitative knowledge concerning such interdependencies places serious

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1/ The pilot study undertaken in Tangail Kotwali and Chandina Thanas reveals that only about two percentage of rural small scale and cottage entrepreneurs keep any form of records.

Table 5-1 A Review of Previous Industry Surveys in Bangladesh

Type of Survey	Year	Agency Responsible	Survey Design	Variables of Interest	Type of Analysis Undertaken	Remarks
Census of Pakistan	1951	Census Commission	Stratified the country into census districts charges circles B 10 Cks (villages).	Household listings data on language, religion, occupation.	1. Economic classification of workers by agriculture, non-agriculture, male, female, urban and rural.	1. No specific data on cot or small scale industri. 2. Survey not location specific, not industry specif 3. Survey not policy orient not constraint shooting 4. No demand aspects 5. No linkage aspects 6. Nothing about entrepre ship, management or s' formation.
Census of manufacturing in East Pakistan	1954	The statistical Authority. Central Statistical Office Provincial Board Bureau of Commercial and Industrial Intelligency, East Pakistan.	Proformas mailed to Registered Industries - Large, Small Scale and Cottage.	1. Fixed aspects 2. Stocks of raw materials and output 3. Work in progress 4. Cash on hand and in the bank	Industry wise classification of variables.	1 Data not generalizable (Registered list, not representative.) 2. Analysis not location specific 3 Survey not policy orien 4. Nothing on demand, In. Entrepreneurship, man ment constraints, skill formation.
National Sample Survey Second Round	1966	Central office of Statistics	1. Three-staged stratified sample design 1st stage- Tehsil/Taluka/Thana 2nd stage - village 3rd stage - family/household 2. At 1st & 2nd stages, selection probabilities equal to size, at 3rd stage, random selection	Mostly input-output data stock and flow	1. No detailed analysis with respect to cottage and small scale industries	1. Ran into the problem o inadequate Frame 2. resorted to the use of census frame which w outdated 3. No information on linka 4. No information on labo 5. No information on entre neurship, management skill formation.

Table 5-1, Page 2

Type of Survey	Year	Agency Responsible	Survey Design	Variables of Interest	Type of Analysis Undertaken	Remarks
			3. Utilized 4 coordinators for 4 zones 16 enumerators chose 2000 respondents. In one thana selected per zone 250 villages selected per thana 8 households selected per village.			6. Data not generalizable for small scale industries 7. Contains information on demand.
Survey of Cottage and Small Scale Industries in East Pakistan	1961-1962	East Pakistan Small Industries Corporation (EPSIC)	1. Phase one survey-listing 2. Phase two survey-one shot input output data collection 3. Two stage stratified Random Survey 4. Stratified on basis of Union Council 5. Sample size 322 unions 60,000 cottage industries	1. No. of firms 2. Fixed Assets 3. Labor stock 4. Output values 5. Raw materials	1. Industries classified according to ISIC 2. Industry results presented type-wise district-wise division-wise 3. Summaries presented	1. Data generalizable 2. Nothing on demand and I effects. 3. Nothing on entrepreneur management and skill formation.
Census of Establishments in 5 towns or cities of East Pakistan	1964-1967	Central Statistical Office	1. Each city divided into Union Councils 2. One enumerator to each Union Council 3. Covered manufacturing units, commercial organization and the service sector.	1. Type of workshop 2. Tenancy status 3. Type of organization 4. Ownership pattern 5. Storage facility 6. Employment by sex 7. Year of establishment 8. Registration status 9. Power utilization	Simple Tabulation of data	1. Questionnaire inadequat 2. Nothing on fixed assets, raw materials, output, 3. Nothing on linkages, de entrepreneurship, manag ment training etc. 4. Did not focus on rural in

limitations on planning efforts. Previous surveys also failed to generate data on entrepreneurship and the overall constraints relating to the utilization of different categories of labor, fixed capital assets, working capital and foreign exchange.

On the analytical side, the existing input-out put data base has not been utilized to answer important questions concerning scale effects or capital-labor substitution possibilities in small scale industries and has not been disaggregated along product lines. While scale parameters highlight the efficiency of small scale production vis-a-vis large scale production, substitution parameters reveal the extent to which labor-intensive techniques can be substituted for capital-intensive ones given the opportunity cost of capital and labor. The analysis of the major determinants of profitability in small scale industry is also completely absent. No information exists concerning socio-economic cultural barriers to enterprise in small scale industry, nor have specific case studies relating to technology, marketing, distribution, demand potential (domestic and external) and cooperative institutions with respect to small scale industries been undertaken. Analyses of the effects of levels of government policies such as wage rate, customs duties, infrastructure, and rate of interest on employment and output of small scale industries is also lacking. These issues and data requirements are essential for determination of specific policies for developing rural industries. The data requirements of the rural industries study will therefore be detailed out in the next section of this chapter.

Since the data to be collected for the Phase I survey is straightforward, this section will be devoted to describing the data which should be collected during the Phase II survey. The major categories of data to be assembled relate to labor, capital, purchased inputs, output, entrepreneurship, case studies and household expenditures (if possible). Although the proposed study should make very extensive use of survey data, it is recommended that vital sources of nonsurvey data be utilized. The rest of this chapter will therefore be devoted to discussions of survey and nonsurvey data that will be utilized for the rural industries study.

5.2 Labor Input Data

Labor is one of the most important small-scale industry inputs, consequently, this input must be measured with particular care. In this subsection, the relevant labor classification will be discussed first, followed by a consideration of the most appropriate labor measure units and the treatment of labor compensation.

A small-scale industry survey should attempt to obtain information on all those individuals "engaged" in the establishments. The "engaged" individuals would include all those who work in or for the establishment including working proprietors and family workers.[1/]

1/ This definition of "engaged" is consistent with the definition stated by the United Nations' 1973 World Program of Industrial Statistics [1971, p.20].

Although several different classifications of the number 'engaged' are possible, it is proposed that the most appropriate major classification for small-scale industries would be in terms of (1) proprietor and family labor, (2) apprentices, and (3) hired (or wage) workers. The delineation of apprentices is the most significant feature of this classification scheme, since apprentices are not specified in the United Nations Statistical Office's recommendations [United Nations, 1971, p. 21]. In small scale industry surveys in developing countries, however, it is important that apprentices be delineated, because they could represent quantitatively a large part of the engaged labor and might provide a measure of the significant training function that small-scale industries perform. In Sierra Leone, for example, survey data [Liedholm and Chuta, 1976, p.41] indicated that apprentices represented 41 percent of the small-scale industry employment.

The three major labor types reflected in this classification scheme possess differing employment characteristics. The results of the Sierra Leone study indicated, for example, that the marginal productivities of these three labor types differed significantly from one another as did the nature of their compensation. 1/

These three labor classifications should usually be further subdivided by both sex and age, since both wage rates and compensation appear to be affected by these factors. 2/ Given the difficulties in measuring age, however, it is probably sufficient to differentiate only between children (less than fifteen years of age) and adults. Thus, one would further subdivide each of the major labor types into the following three categories. (1) male-adults, (2) female-adults, and (3) children. There is the additional problem, however, of deciding what weights, if any should be used to convert women and child labor into equivalent man labor units. Although some farm management researchers have sometimes used or proposed rather complicated weighting schemes, there are rather persuasive arguments presented by Spencer [Kearl, 1973, p.110] for the use of weights of one for adult men and women and 0.5 for children. 3/

The next important issue is to determine the units in which the labor units are to be expressed. Data on the stock or numbers of workers should be obtained. The flow of labor services is also important for determining the seasonal labor bottlenecks and the degree to which labor is underutilized.

1/ The hired workers are paid a formal wage, proprietors receive no formal wage, while apprentices generally receive no monetary compensation [Liedholm and Chuta, 1976, p.63].

2/ See Spencer [1972, p.12] for a discussion of this point.

3/ In most farming and small-scale industry activities in which both men and women participate, for example, it appears that women are as efficient as men [Spencer, 1976].

The labor flow data can be measured in terms of man-days or man-hours. Man-days would be sufficient if the number of hours worked per day did not vary over the season or between industries. The Sierra Leone Study [Liedholm and Chuta, 1976, p.24] indicates, however, that the number of hours worked per day does vary significantly over the season and between industries. Thus, it would appear to be important to collect labor flow data on a man-hour basis.

In collecting man-hour data it is important to obtain information on both the number of hours spent actively working as well as the hours actually spent at work, a figure that includes waiting time. The small-scale industry survey in Sierra Leone [Liedholm and Chuta, 1976] indicates that waiting time accounts for significant portions of the working day, particularly at certain seasons of the year; hence, measuring only the hours actually spent at work may mask the amount of excess capacity existing in these industries. The United Nations Statistical Office [United Nations, 1953, p.79] recommends, however, that only actual hours spent at work be measured, because it believes, "few establishments, if any, would be able to furnish figures on the number of hours spent actively working".

The experience derived from the Sierra Leone study indicates that it is possible to collect data on hours actively worked as well as hours actually spent at work. The hours actually spent at work are generated by obtaining daily data on the time the business opened and closed. The hours actively worked can be collected, on the other hand, if the hours worked by each individual are tied to the specific item produced.1/ Moreover, hour figures can be obtained from even those respondents who do not possess clocks if time units familiar to the respondents are used. In Sierra Leone, for example, hours were estimated using Muslim Prayer times or the length of the sun's shadow.2/ Experience from Sierra Leone indicates that labor hours actively worked can be obtained from twice weekly interviews.

An important issue centers around the procedures used to measure the data on labor compensation. It is important, for example, to be cognizant of the variety of compensation forms in the small-scale industry sector. In addition to the formal wage payments, which are generally only received by the hired workers, there are also the payments in kind, which are often received by the apprentice labor, and the more "informal" and irregular payments that are received by the proprietor and family labor. The payments in-kind are generally for food and lodging. Data should be obtained on the types and quantities of such in-kind payments as well as their estimated values. The informal payments to family labor and management are even more difficult to measure than in-kind payments. One could perhaps accept, as did Child [1973, p.28], their reported "monthly" drawing, but the measurement errors are unduly high. Indeed it may be safer and preferable to determine these figures by imputation, rather than to try to collect these figures directly.

1/ See Appendix Form 4 for the recommended labor questionnaire designed to relate individual labor hours to the specific task performed.

2/ See, for example, Kearl [1976, p.108].

With respect to the formal wage payments, it is important that the labor quantities associated with that compensation be identified; otherwise it will be difficult to relate the compensation to the individual quantity of work performed. In the Sierra Leone study, for example, it was discovered too late that the vast majority of hired workers were paid on a monthly basis and that no record was kept of the specific monthly labor quantities related to those payments. Thus, although the compensation should be recorded when the transactions occur, it is equally important that some measure of the individual labor quantities associated with that compensation also be recorded, even if it is simply the stock of labor at that time.

5.3 Purchased Input Data

The evidence from the Sierra Leone survey and our recent pilot study in Tangail and Chandina Thanas indicate that reasonably accurate data on purchased inputs by small-scale industries can be obtained from weekly or monthly rather than twice-weekly interviews. Specifically, it is recommended that data on raw materials, lubricants and fuels, office supplies, repair and maintenance work and commissions, should be collected weekly since these transactions occur rather frequently during the month.1/ On the other hand, the transaction relating to electricity, water and telephone as well as enterprise-related taxes generally occur at the end of the month and thus only need to be collected monthly.

The largest component of purchased input will generally be the raw or semi-finished materials. Data on the quantities purchased2/ of each of the materials that are physically incorporated into the products of the establishment should be separately listed to ensure that all items are included. Since the basic materials vary from industry to industry, it is useful to have a list available for the enumerators of the major raw materials used by each of the major small-scale industries. The other weekly and monthly input categories, which have been specified previously, generally parallel those recommended by the United Nations Statistical Office (United Nations, 1971, p.28) and thus need not be discussed individually.3/

The inputs should ideally be valued at the delivered price at the establishment. In some cases, however, the proprietor or employee of a small-scale firm in developing countries will travel to purchase the inputs; in such instances, the transport cost should be added to the value of that transaction.

1/ An example of a form that can be used to collect the data can be found in Appendix 4-1, Form 6.

2/ It is recommended that quantities purchased rather than quantities consumed be used for all the input categories, since our experience indicates that quantities purchased can be more accurately recalled.

3/ The category goods shipped as received has not been included in the small-scale industry survey due to its general lack of relevance. water, telephone and office supplies on the other hand, are sometimes not broken out explicitly.

The data on the value of purchased inputs are needed in order to compute the value added as well as the profits of small-scale firms. These data can also indicate the extent to which these firms are dependent on certain critical inputs, such as fuel and electricity. Additional insights into the small-scale industry sectors can be obtained, however, from further classification of the purchased input data.

It is recommended, for example, that information be collected on the method used to finance the input purchase. Specifically, at a minimum a distinction should be made between those inputs purchased on credit and those purchased with cash. Such information will be useful in providing insights into the financial position of firms and industries in the small-scale sector.

The input data can also be usefully classified in terms of the source of the purchased input. Ideally, this would include data on both the location and the identity of the entity producing or providing the input. These data can provide a perspective on the intersectoral linkages within the economy as well as on the import dependence of firms or industries within the small-scale sector. Detailed information, for example, on the nature of the sources of water and electricity input of small-scale firms would be useful in assessing the efficiency of including of improving these inputs in rural electrification and water projects. Moreover, data on the nature and extent of the input market for small-scale industries would also assist in identifying the types of industries that might locate in such projects as well as shed light on the need for interventions in the areas of marketing and transportation.

5.4 Capital Input Data

Capital input presents several problems to those attempting to generate useful data. In this section, data needs and issue relating to the stock of fixed assets (buildings and equipment) and inventory will be discussed first, following by a discussion of measurement of capital flows and generation of financial information.

Data on existing stock of fixed assets are not usually collected in industrial surveys conducted either in developed or developing countries. The United Nations Statistical Office, for example, recommends that only gross fixed capital formation or the changes in fixed assets be obtained [United Nations, 1971, p.36]. This recommendation is, in part, due to the ambiguities and difficulties that surround measurement and valuation of capital. The experience derived from the Sierra Leone study [Liedholm and Chuta, 1976, p.26] and from Steel's study of small-scale industries in Ghana [Steel, 1977] would indicate, however, that meaningful data on the stock of fixed assets can be obtained from small-scale industries in developing countries.

It is recommended that data on the inventory of buildings and land be obtained twice, at the beginning and end of the enumeration period, such a procedure would permit both the stock and flow of these assets to be measured.[1/]

1/ A separate building inventory questionnaire should be developed as shown in Appendix 4-1 Form I.

Information on the quantity and quality of the building that are owned by the proprietor can be derived by gathering information on its floor dimensions as well as its descriptive characteristics.[1] If portions of the building are used for residential purposes, the fact should be noted. Data should also be obtained on the year the building was erected. When combined with the characteristics of the building, these data may provide an indication of the useful life of the building. These estimates, however, will be at best only rough approximations. To provide a perspective on the value of the buildings and the accompanying land, it is further recommended that estimates be obtained of the original cost and also the current market value of the building and land if purchased now.[2] The experience from the Sierra Leone study indicates that while the full array of data are sometimes difficult to obtain, sufficient information can usually be obtained to indicate the quantity, approximate value, and approximate life of the buildings.

It should be noted, however, that the majority of small-scale industrial proprietors rent rather than own the buildings in which they operate. In the Sierra Leone study, for example, 70 percent of the industrial proprietors rented their buildings. In such cases, it is important to obtain information on the monthly rental value of these buildings.[3]

Data relating to the inventory of equipment, as with buildings, should also be obtained at the beginning and the end of the enumeration period.[4] Information on the quantity and source of each item of equipment should be recorded. In the small-scale industry sector, tools are an important equipment component that can often be easily overlooked. Consequently, it would be useful to provide enumerators with lists of the kinds of tools that are used by the major industries.[5] Data should be obtained on the year the equipment was purchased or made as well as an estimate of number of additional years that the proprietor expected this equipment to last.[6]

1/ Information such as whether the walls are pucca or kutcha or whether the workshop is temporary should be noted. The floor dimension should relate to the portion used by the establishment for business purposes.

2/ If the building is used for other purposes in addition to the business, the respondent should be asked to indicate what rent would be charged for that office space.

3/ It will be useful to insert a question on the monthly rental value of the monthly input questionnaire as well as the building stock questionnaire.

4/ A separate equipment inventory questionnaire should be developed as shown at Appendix 4-1 form II.

5/ Small tools are included as "materials and supplies" in the United Nations' industrial statistics recommendations [United Nations, 1971, p.28], but are more appropriately listed as equipment for small-scale industries.

6/ If the equipment was purchased used, the age of the equipment at that time should be determined.

Such statistics are needed to provide an estimate of the useful life of the equipment. Finally, it is recommended that several different data on the price or value of the equipment be obtained. Specifically, an attempt should be made to obtain estimates of the original cost as well as the current replacement cost of the existing equipment. Although admittedly these are rather difficult parameters to gather, the Sierra Leone small-scale industry study was able to obtain what appeared to be reasonably accurate figures for many of these items.1/ It should be noted, however, that equipment is sometimes rented, in which case the monthly rental value should be recorded.2/

The final capital stock data required are the inventory of output and inputs. If is recommended that data on the inventory of these items be obtained at the beginning and end of the period to ensure that both the initial stock and the change in stocks can be recorded. Both the quantities and values of these items should be noted, with the inputs valued at their purchase price and outputs valued at their expected sales price. The experience derived from the pilot study conducted in the Rangail and Chandina Thanas indicate that accurate measures of these commodities can be obtained, although the listing and valuing process can sometimes be rather time-consuming.

Measures of the service flows rather than the stock of capital, however, are needed in determining production costs and profits of these small-scale firms. The "rental costs for those establishments that rent their buildings and equipment are, of course, good measures of capital services, since the rent generally reflects both depreciation and the interest rate. For those firms that own their fixed assets, however, it is recommended that serious consideration be given to using the capital recovery formula or some equivalent procedure to convert the capital stock into equivalent capital services flows.3/ The reason is that reasonable and accurate measures of depreciation and the interest costs are difficult to obtain from

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1/ Steel [1977] was able to obtain data on these capital values from most of the small-scale firms he studied in Ghana.

2/ In Sierra Leone, for example, 36 percent of the tailors rented sewing machines. As with building rental, a question on monthly equipment rental value was inserted on the monthly input questionnaire as well as in equipment stock questionnaire in our Sierra Leone Study [Liedholm and Chuta, 1976, p.27]. However, the pilot study conducted in Tangail Kotwali and Chandina Thanas reveals that tailoring is not an important rural industry.

3/ The capital recovery factor is: $R = \frac{rV}{1 - (1 + r)^{-n}}$, where R is the constant annual capital service flow, V is the original cost of the asset, r is the discount rate and n is the life expectancy of the capital. These data are obtainable from the surveys conducted. The inventory is converted to flow by multiplying the stock by the interest rate. For more details of these techniques, see Liedholm and Chuta [1976, pp. 27-29]

small-scale industries. Depreciation, for example, is a concept that is alien to a great many small-scale firms and is generally neither consistently nor accurately reported even by those firms with detailed accounting records.1/ Accurate interest charges data are also hard to collect, due primarily to the fact that proprietors are quite reluctant to discuss matters that relate to their credit transactions. Indeed, the greatest data collection difficulties experienced in the Sierra Leone survey arose when financial information was requested. Specifically, data on the source, purpose, amount, duration and the stated interest of the loan should be gathered, as well as information on the downpayment, repayment schedule and the total amount to be repaid. The information on the latter three items is useful in determining the effective interest rate, since this figure will usually prove to be markedly different than the stated interest rate. The quality of the data collected, however, will depend importantly on the rapport which the enumerators are able to establish with the small-scale industry proprietor.

5.5 Output Data

It is possible to obtain reasonably detailed data on output and sales from small-scale industries in Bangladesh. If the measurement errors are to be kept within tolerable limits, however, it will probably be necessary, as pointed out in Chapter 4 to collect these data twice weekly 2/.

The quantities of all the differing types of commodities or services produced each day by the establishments should be listed separately 3/. In addition, the disposition of this output should be noted. A useful categorization of this output disposition would be: (1) sales, (2) gifts, (3) consumption within the establishment, and (4) daily storage.

The sales data, in particular, can yield several insights into the small-scale industry sector and thus should be subject to further classification. It is important, for example, to distinguish between cash and credit sales. This information will be useful in assessing the financial position of firms or industries being examined.

1/ See, for example, Child [1973, p.26] who reports that it was virtually impossible to obtain consistent, sensible and reliable (depreciation) figures from small-scale industries in Kenya. Steel [1977] makes the same point in his study of Ghanain small-scale firms.

2/ The daily recording will also permit seasonal variations in demand and productive activity to be ascertained. The types of output information which would be collected for agro-based industries will be different. See page

3/ See Appendix 4-1, Form 5, for an example of the recommended output questionnaire.

The sales data can also be classified by destination of the sales 1/ and type of purchaser 2/. The resulting information can provide useful indications of both the nature and extent of the market as well as linkages with other sectors of the economy 3/. Specifically, such information could be useful in revealing the kinds of small-scale establishments producing commodities that could be used in housing and road construction projects. By identifying the nature and extent of the market, these data could also identify the kinds of industries which might utilize such projects as well as indicate the potential efficacy of schemes to improve the transport or marketing system.

The various items of data on output should generally be valued at the sales price at the establishment. When output is not sold directly, it should be valued at its equivalent sales price. Some of the output of these rural industries, however, is in the form of industrial services rather than goods.

1/ From the data on destination of sales, locational demand patterns for small scale industry products can be quantified from the survey data. For example, a matrix can be developed and programmed for computer analysis such that

$$Dit = Yit - E^{d}it + M^{d}it - X^{c}it$$

$$Dir = Yir - E^{d}ir + M^{d}ir - X^{c}ir$$

$$Div = Yiv - E^{d}iv + M^{d}iv - X^{c}iv$$

Where D = demand

i = a particular small scale industry product

t = thana level

r = market town level

v = village level

E^{d} = domestic exports to either t, r or v

M^{d} = domestic imports from either t, r or v

X^{c} = exports of a particular product from t, r or v to the outside world

Y = output of a particular rural industry product at the thana, bazar or village.

For more information, see Chuta (1977)

2/ The type of purchaser might be government, farmer, other industry, etc.

3/ This is particularly possible if an attempt is made to construct an input-output table for the economy, involving a number of sectors.

Tailors, for example, often sew or repair cloth brought by their customers, blacksmiths repair the farmers' tools, and agro-based industries process grains brought by customers. In such cases, output value reported should be the total cost charged to customers for the work or service performed 1/.

5.6 Agro-based Output Data

In order to satisfy the unique needs of most agrobased rural industries, different questionnaires will have to be designed 2/accordingly (see form 5B). With particular reference to rice mills, information is required on the amount of down time of each mill i.e., the time such mills are down due to lack of spare parts, repairs, maintenance or shortage of electricity supply or fuel. Data will also be needed on the quantities of different paddy types processed, milling fee charged, local sources of paddy and the final destination of milled rice. In addition, it will be important to gather information on the types of byproducts originating from rice mills and the disposal of such byproducts

Furthermore, information will be needed to establish the existing rice recovery rates i.e. the milling percentages for the different types of rice and rice mills, and the percentage of broken grains. In order to obtain this information, the services of enumerators will have to be relied upon. First, the enumerator should visit each mill once a month to obtain approximately five random samples of rice (one bushel each time) and weigh the rice before and after milling. Second, during the same visit each month, the enumerator should take two small samples of milled rice (i.e. half of a handful) label each sample and send back to the head office for analysis. From these observations it will be possible to compute the weights of whole grains and broken grains so that these respective percentages of milled rice can be estimated.

5.7 Household Expenditure Data

Considering that demand is a potential constraint of some importance and that expenditure data is very deficient in Bangladesh with respect to rural industries, serious consideration should also be given to collecting household expenditure data. Since detailed literature exists relating to the collecting of household data 3/, only the aspects of generating data particularly relevant to rural industries will be discussed in this sub-section.

1/ This treatment is consistent with the United Nations Statistical Office's recommendations (United Nations, 1953, p.24). Their suggested breakdown of gross output into (a) goods shipped as received, (b) electricity sold, (c) fixed assets produced for own account, (d) industrial services, (e) value of all products and (f) increase in work-in-progress, however, is not particularly relevant for small-scale industries surveys.

2/ This is not applicable to the bakery industry.

3/ See, for example, Paris and Houthakker (1971).

One of the primary purpose of collecting these household data is to enable income elasticities of the demand for rural industry products to be estimated. Consequently, one needs data on either the total expenditure or total income of households as well as specific data on the households' purchases from the small-scale industry sector[1]. If income figures are not available, then a complete expenditure survey of a sample of households should be given serious consideration. If income data are available, then detailed expenditure data are required on only the rural industry commodities purchased Specifically, it is recommended that on such items information be collected on the quantity purchased, its origin, the place of purchase and its purchase price. The data on origin[2], which can often be determined by the brand, is of particular importance in ascertaining where the commodity was produced and whether it was produced by a large or a small-scale firm. Such detailed information is generally not collected in house-hold expenditure surveys, but is of central importance in analyzing specific demand constraints. The experience derived from the consumption component of the Sierra Leone study (Byerlee and King, 1976) indicates however, that reasonably accurate information on these items can be obtained.

Since most of the rural industry commodities are durable goods and are purchased rather infrequently, it is recommended that households be interviewed concerning these items only once a month. The exceptions would be such commodities as bread, drinks, rice and tobacco, all of which are purchased more frequently, for these items, twice-weekly enumeration might be required. By collecting such data over a one-year period, however, it will be possible to obtain important insights into the extent and nature of any demand constraint facing the rural industries.

5.8 Entrepreneurial Data[3]

Data relating to the entrepreneur can usually be obtained in a single in-depth interview with the proprietor of the rural enterprise. There are two major objectives to be derived from this type of interview. The first is to obtain information on the entrepreneur's characteristics in order to identify potential constraints and the need for policy interventions to affect directly the entrepreneur.

1/ The National Sample Survey of 1960 in Bangladesh yielded data only on women's, men s and girls clothings.

2/ This vital aspect of consumption survey was omitted during the 1960 National Sample Survey in Bangladesh (Second round).

3/ The questionnaire on entrepreneurship should be administered not only on manufacturing industries, but also on shops and construction workers in the various sample locations.

The second objective is to obtain information from the entrepreneur that will permit the identification of other rural industry constraints so that the efficacy of other types of policy interventions can be ascertained. The data needed to meet these two objectives will now be examined.

There are a wide array of socio-economic variables that might be collected to shed light on the performance of the entrepreneur. Therefore it is recommended that information on the general social background of the entrepreneur be collected. Specifically, data should be obtained on the nationality, tribe or ethnic group, religious group, age, place of birth, marital status, and number of children of the entrepreneur. In addition, data should be obtained relating to occupation of both the entrepreneur's mother and father as well as the entrepreneur's prior occupation as appropriate.

There is also a need to collect information relating to the educational background of the entrepreneur. In particular, data are needed on the entrepreneur's level and type of formal education, as well as the length and type of apprenticeship training received by the entrepreneur.

It is further recommended that data be collected which might shed light directly on the management ability of the entrepreneur. In this regard, data need to be gathered on the existence and extent of business records, the extent to which the entrepreneur is present at the enterprise and engaged in other activities, and the number of years the entrepreneur has been operating the firm.

The entrepreneur can also directly and indirectly provide information that can assist in identifying other constraints operating against the small-scale industries in developing countries. The methods and types of questions needed to obtain these insights must be specified.

One important method of identifying these constraints is to determine the entrepreneur's own conception of what constitute the most important rural industry constraints. This information could be obtained by asking, what have been the most important difficulties in building up the business? And then listing a series of alternatives such as: (1) insufficient demand, (2) lack of technical advice, (3) trouble with equipment, (4) lack of skilled labor, (5) difficulties with transport, (6) lack of capital for the purchase of building and equipment, (7) lack of capital for the purchase of input materials, (8) scarcity of materials, (9) scarcity of spare parts and (10) electricity supply. In addition, it is also recommended that information be collected that would indicate the entrepreneur's perception of types of governmental assistance necessary for development of rural industries and types of assistance, if any, received.

The entrepreneur's perception of both of constraints impending on the rural industrial sector and policy interventions required to overcome them also need to be compared with other measures or indicators of these constraints. Much of the information needed for this task can be obtained from the entrepreneur.

Insights into the degree to which different types of capital create constraints for example, can be obtained by posing several questions to the entrepreneur. It is recommended, for example, that information be collected on the magnitude and sources of the initial cash outlay obtained by the firm as well as the magnitude and sources of expansion capital. 1/ Such information can be related to the current size or profitability of these firms to provide an indication of the degree to which capital may be constraint. In addition, data on the amount of excess capacity in these firms can also shed light on the extent of the capital constraint. One method of measuring this excess capacity would be to ask the entrepreneur: (1) How many hours do you current work each day? and (2) If you had enough customers to purchase all your products and had all the raw materials you needed, with your existing equipment and building how many more hours would you work? 2/ Finally, it is recommended that the data should be collected on the extent to which the entrepreneur has used or attempted to use the commercial banking system either for savings or for the purpose of obtaining a loan. These various data relating to the capital input can then be analyzed in various ways to generate an assessment, which may differ from that of the entrepreneur, of the degree to which capital is a constraint on rural industries in Bangladesh. 3/

A perspective on the extent of the training or skilled labor constraint can also be obtained by means of the entrepreneurial questionnaire. Since the apprenticeship system provides the primary source of training within the small-scale sector of most developing countries, 4/ additional data to illuminate the functioning of this system and the potential constraints upon it should be obtained. Specifically, it is recommended that data be collected on the duration of the apprenticeship, as well as the existence and magnitude of any learning fee.

1/ Detailed questions concerning the source of these funds should be included to ensure that accurate responses are obtained. See Appendix 4 Form 7 for an example of the detailed breakdown proposed.

2/ A similar method of measuring excess capacity has also been used by Steel [1977] in Ghana.

3/ See Liedholm and Chuta [1976, pp. 107-110] as well as Chapter VI for examples of the analyses that might be undertaken for this purpose.

4/ See, for example, Liedholm and Chuta [1976, pp. 46-49].

Finally, some additional insights into the nature of the demand constraint can be obtained from questionning the entrepreneur. One perspective can be derived from an examination of the past rates of growth of the rural industrial sector. Since time-series data are generally not available on rural industries, however, it is recommended that the entrepreneurs be asked whether or not the number of firms in their industry in their localities as well their own outputs have increased, decreased or remained the same over the past year and over the past five years.

5.9 Case Studies [1/]

Since input-output data will not yield in-depth descriptive and historical and technological information needed to solve the practical problems of rural industries, it is recommended that individual case studies (or village studies) be undertaken to supplement the available input-output data. The questionnaire for the individual case studies will be designed during the study. The contents of such questionnaires will depend on the area of investigation and the background of the investigator.

It is recommended that case studies be undertaken in the following areas:

1. The role of women in rural industries and handicraft,
2. The silk industry,
3. Comparative cost study of large textile mills, power loom and handloom production of sarees,
4. Improved workshop layout in handloom factories,
5. Cotton production in Bangladesh
6. Accessibility of rural industry products to foreign markets,
7. Recovery rates in rice processing,
8. Electricity needs of rural industries, and
9. The impacts of road construction on rural industries.

1/ In carrying out these case studies, exchange of ideas, is encouraged between the USAID and IDA consultants. Areas of interest definitely overlap and consultations are encouraged to work out areas of collaboration and/or specialization.

The availability of consulting services from the UNIDO Clearing House on Industrial Information, India's Appropriate Technology Cell, and Pakistan's Appropriate Technology Development Unit should be evaluated [ILO, 1976]

In order to focus attention on particular aspects of case studies or feasibility studies to be carried out, a more detailed discussion of some of these studies will now be presented. The silk industry will first be discussed.

5.9.1 Improving the Cocoon Breed in Silk Industry

On the basis of the visit made to the silk factory in Ghoramara, Rajshahi, an important case study that needs to be undertaken is how to upgrade the mulberry cocoon variety currently being produced in Rajshahi District. In Chapter II, it was pointed out that while each Indian cocoon variety yields about 600 yards of silk yarn, the Rajshahi variety yields only 250 yards. Under this circumstance Bangladesh silk products cannot stand competition in international markets. Research is therefore needed to upgrade the existing breeds of already degenerated mulberry and silk worm varieties. Since the research capability at the Ghoramara factory is very limited, it is recommended that foreign and domestic experts be contracted for short periods of consultation and research.

5.9.2 Yarn Supply to Handloom Factories

A case study is needed to investigate the causes of the present shortage of yarn in handloom factories. Since local handloom weavers supply over 70 percent of cloth consumed in Bangladesh, the question of the yarn supply to and demand by textile mills, power looms and handloom weavers becomes an important topic of investigation. In addition, the various channels of yarn supply to hand-loom weavers, the factory, wholesale and retail licencing systems connected with the supply of yarn to local weavers need investigation. It is important to find out how many consumer cooperative shops exist in each Thana, where such shops are located and the adequacy of existing number of shops. It is also important to investigate how cooperators and non-cooperators receive their yarn supplies.

5.9.3 Sugar Processing

The existing technology of rural processing of sugarcane should be studied. Experience gained during site visits reveals that the method of using bullock-driven machinery to crush sugarcane to extract the sugar liquid which is then boiled for about three hours is wasteful since the bagasse (discarded cane fibre) still contains some sugar. The final product which is not in the form of crystals is not amenable to efficient storage and preservation. Machine fabrication research should be undertaken to develop more efficient extraction methods with simple chemical processes of crystalization of the sugar [1/].

1/ The small scale sugar processing plants used in Uttar Pradesh India are called open pan sulfitation units while the large sugar mills use the vacuum pan sulfitation [see Bhalla, p.179].

5.9.4 Cane Products

One critical problem in the marketing of cane products is the design of cane chairs and tables that can be more economically shipped to foreign markets. Cane products are light, durable and convenient for outside use in summer weather. However, present designs require considerable shipping space. Either products such as textile materials have to be stuffed into empty spaces of cane products during shipping, or a redesign of the products should be undertaken so that parts of the products can be folded or the legs of chairs and tables can be easily stacked.

5.9.5 Fruit Processing and Canning

Visits to Tangail, Mymensingh, Dacca Comilla and Rajshahi Districts in the months of June and July have revealed that pineapples, jackfruit, bannanas cucumbers and mangoes are harvested by farmers. During this period, supply is so abundant that existing demand is not able to clear the market. Thus, farmers suffer high financial losses. If surplus fruit production has to be processed for preservation and subsequent disposal, simple labor-intensive techniques should be developed for fruit processing in rural areas. Also, for adequate preservation of processed fruits the production of tin cans should also be promoted. Feasibility studies are needed for introducing rural small scale processing of surplus fruits and canning of the processed products. Tin-sheets are locally available for can-making, but simple labor-intensive techniques have to be developed for the sequences of operations necessary for making and testing the cans and for hygienic packaging [1]. Rural electrification program will no doubt facilitate these operations. Also local talents of metal and tin workers ought to be developed along these lines.

5.9.6 Fabrication of Machines which are Complementary with Labor

Feasibility studies are needed on local fabrication of less expensive simple machines such as charkha that is currently being used for spinning yarn from castor cocoon at Rajshahi machines to replace inefficience R.C.M. Indian Mills which result in a high percentage of broken rice; small scale sugar processing, wheat processing mills agricultural tools [2] etc. A detailed study of the existing techniques of production will highlight areas where simple machine fabrications should be undertaken.

1/ See Bhalla, p.88. Case studies in the areas of fruit processing should be coordinated with the efforts of Mr. Maxwell Phillip from the EEC who is currently investigating the possibility of constructing wooden casks (44 gallon capacity) for exporting semi-processed mangoes, a technique that is currently being utilized in India.

2/ See for example the papers written by V.P. Narwadirrani on Agricultural Machinery in Iran (ILO, World Employment Program, March 1977)

5.9.7 Tobacco Processing

The existing tobacco processing workshops visited in Daulatpur (Kushtia) are in a deplorable state. The floors of some of the workshops are flooded with water, rendering wood firing inefficient, if not impossible. The mud buildings are fragile and collapse frequently. The entire processing technology, including baling, needs improvement. Tobacco processing is an area where electricity supply can make substantial improvement if the workshop layout can be improved.

5.9.8 The Impact of Government Policies on Rural Industries

A detailed case study is needed to evaluate the effect of official policy on rural industries so that changes (if necessary) can be made to improve their role in the rural economy. A significant outcome of the site visits undertaken during this consultancy service revealed that the nationalization of the jute industry has resulted in the baling for exports of low quality jute, a commodity that contributes over 80 percent 1/ of foreign exchange earnings in Bangladesh. Secondly, existing policy allows the large scale textile mills to produce cotton sarees and lungis which are traditionally produced by handloom weavers who produce over 70 percent 2/ of textile needs in Bangladesh and constitute the highest percentage of rural employment in Bangladesh. The extent to which official government policy should be changed to encourage rural industrialization should be evaluated.

5.9.9. International Marketing of Rural Industry Products

An expert is needed to evaluate the activities of the Bangladesh Export Promotions Board, or other agencies such as the Trading Corporation of Bangladesh (TCB). The TCB, through newspaper advertisements, offers its export services for rural industry products. But, it is not clear how many rural producers avail themselves of this opportunity. Overseas importers are risk averters and therefore would not take responsibility for shipping products from Bangladesh. There is the need to ascertain how rural small-scale industry products can be practically and efficiently shipped abroad, what products can be marketed in large quantities abroad, avenues for advertising and sales promotion and channels for marketing the rural products 3/. Experience from site visits of rural industrial establishments and market centers reveals that the products of brass workers jute, cane, bamboo and germents have a great potential for marketing overseas. But, the market analyst should also evaluate the quality aspects of these products.

The number of case studies enlisted in this report is by no means exhaustive. Attempts should be made to identify new areas of research that should be investigated. The questionnaires that will be utilized for the case studies should identify infrastructural, technological, marketing, distributional, management and socio-cultural constraints that hamper the growth and development of rural industries.

1/ See IBRD, 1975

2/ See IBRD, 1975

3/ Some developing countries (such as Philippines) include trade promotion officers in their foreign embassies.

5.10 Non-Survey Data Recommended for the Rural Industries Study

The objective of this section is to outline briefly the major non-survey data recommended for rural industries study. The listing is not meant to be exhaustive, but rather is designed to focus on those data that will illuminate the policy environment in which rural industries operate. Such a focus is warranted, however, because, as noted in Liedholm and Chuta [1976, p.109], the policy framework in most developing countries is generally biased against small-scale industries and, consequently, can importantly affect the efficacy of rural industry programs or projects.

One of the highest priorities would be to obtain information on the government's foreign trade policies, specifically its system of protection. The system of protection in most developing countries, for example, tends to discriminate against the small-scale industrial firms, although this usually is not the result of any conscious design to penalize smaller firms.1/ To shed light on this issue, data should be collected on the import duties levied on the intermediate and capital inputs used by both small and large industrial firms as well as the import duties on commodities that are similar to those they produce. In addition, the extent and nature of the import duty exemptions should be determined, since these privileges are usually only accorded to the larger firms. The magnitude and composition of the quantitative import restrictions, such as import quotas, should also be examined since small firms often have less access to the required licenses. Finally, information on the extent of the use of export subsidies should be collected. This array of information will provide a good indication of the degree to which the system of protection operates for or against the smaller producer.

It is also recommended that some information relating to the government's domestic fiscal policy be gathered. Specifically, the rates and coverage for direct taxes on both enterprises and individuals should be ascertained as well as the rates and coverage of the indirect taxes, such as the local sales and excise taxes. The direct tax exemption and the cascading effect of those indirect taxes that apply at all stages of production will often operate to discriminate against the smaller establishments.

Information on the government's monetary policy and the structure and operation of financial institutions are also of use in providing a perspective on small-scale industry policies and programs. In particular the structure of interest rates should be noted as well as the extent and nature of any foreign exchange restrictions. In those countries where foreign exchange is rationed and interest rates are artifically low, for example, it is generally the larger, more established firms that obtained access to these funds.2/ Various types of information are also needed that will shed light on the operating characteristics of those financial institutions that are or potentially could provide funds to large and small industries. Of particular use, for example, would be data

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1/ See, for example, Chuta and Liedholm [1976, p.111] for a discussion of this issue.

2/ See Liedholm and Chuta [1976, p.107] for more details.

on the types of loans, (e.g., for fixed or for working capital), the recipients of the loans (e.g., large or small industrial firms, commercial or trading firms, agricultural firms, etc.) and the geographic coverage of the loans made by the different financial institutions operating in the country. Such information would be of particular use in ascertaining the small-scale industrial firms' access to the capital markets.

It is recommended that information should also be obtained on some of the policies specifically directed at the industrial sector itself. The degree to which the government exercises control over the entry of firms into specific industries or even the industrial sector as a whole, for example, needs to be ascertained. 1/ These controls are frequently exercised by means of production licensing regular, and commercial import licensing which, as several observers have noted, often operate to discriminate against small-scale firms. 2/ In other instances, however, governments have reserved certain industries for small firms. 3/ Consequently, it is important that information be gathered on the extent and nature of these entry controls. Information should also be gathered on the extent and nature of production standards and other legal regulations that apply specifically to industries.

Information on the government's labor policies can also provide useful insights into the efficacy of small-scale industry sector programs and projects. 4/ Specifically, it is important to ascertain, for example, whether or not a minimum wage exists and, if so, which industries are affected by it. It should be noted that in most countries the small-scale firms are generally not effectively subject to such legislation. In addition, the magnitude and nature of any wage subsidies offered by the government should be determined.

It is suggested that statistics illuminating the labor training and educational policies of the government should also be collected from secondary sources. Specifically, information should be obtained on the numbers enrolled in and the geographic coverage of primary and secondary schools, as well as formal vocational and technical training institutes. In addition, data should also be collected on the numbers and characteristics of those institutions or organizations providing technical or managerial services directly to the small-scale industrial proprietor 5/. Such education and training information will be useful in providing a perspective on the quality of the small-scale industrial labor force.

1/ The impact of the investment schedule on resource allocation needs to be investigated for Bangladesh small-scale industries.

2/ See Child [1973. p.42] for a discussion of the ways that licensing procedures have discriminated against small-scale industries in Kenya.

3/ Sierra Leone, Nigeria and India, for example, have reserved certain industries of small enterprises, a practice that is still non-existent in Bangladesh.

4/ The recent efforts of the Bangladesh Government to reserve 10% of jobs for women is a case in point.

5/ For example, the activities of the Institute of Business Administration Dacca University and the Management Development Centre in Dacca should be closely studied.

There is also a need for information on those facets of the infrastructure that importantly affect small-scale industry. Specifically, it is recommended that data should be gathered from the energy suppliers on the quantity, sources, and both the geographic and final user distribution of energy, particularly electricity and gas. In addition, information on the quantity, sources, and both the geographic and final user distribution of water should also be obtained. Finally, it would be important to collect information on the major characteristics of the transportation and communications system. Statistics are required on not only the quantities of the basic facilities, such as the miles of paved and non-paved roads and rails, but also data that provide information on the use of these facilities, such as the composition of motor vehicles or the amount of cargo handled. This information will be useful in assessing the extent and nature of the services available to small-scale industries.

Finally, it is recommended that various data be collected that will shed light on the local, rather than the national, policies that may importantly affect small-scale industry projects or programs. Information on the local government's policies with respect to land is of particular importance. Specifically, information should be gathered on the existing pattern of land use (e.g., residential, commercial, industrial, government etc.) as well as the extent and nature of any governmental controls on this use, such as through zoning laws (industrial estates). In addition, data on the nature of the land tenure system and the relative amounts of land subject to these various tenure arrangements should be determined. It is further recommended that data on the nature and extent of any local building or structural restrictions should also be gathered. Finally, data on the activities of institutions such as Bangladesh Small and Cottage Industry Corporation, Bangladesh Shilpa 1/ Bank, and the Export Promotions Board should be obtained.

1/ "Shilpa" is the Bengali word for industrial

6. DATA ANALYSIS GUIDELINES FOR IDENTIFYING AND DESIGNING RURAL INDUSTRIES PROJECTS IN BANGLADESH

The purpose of this section is to provide brief analytical guidelines on those procedures useful for quantifying and identifying small-scale industrial sector constraints. The analyses will make use of the data described in the previous sections and will be designed to enable these data to be meaningfully interpreted for the purpose of enhancing the formulation of these sectoral programs and projects. The analyses that illuminate the issues relating to the demand for small-scale industries will be discussed first, followed by a discussion of those analyses that will shed light on the issues relating to supply.

There are several analytical procedures that provide important insights into various facets of the demand for small-scale industry products. These demand analyses are important because it is frequently argued that the lack of demand is an important constraint from small-scale industries.[1/] Consequently, estimates of the existing and potential sources of this demand for the various industries must be generated if effective project interventions are to be identified and designed.

One of the primary sources of demand is that generated by rural and urban incomes. Estimation of the <u>income elasticity of demand</u> for these products is one important analytical procedure that can provide useful insights into the composition and potential strength of the demand from this source. The income elasticity coefficient, which will indicate the percentage change in quantity demanded of a specific commodity for a given percentage change in either income or expenditure, can be easily obtained by applying ordinary least squares regression techniques to any one of a number of alternative functional forms of the demand relationship.[2/]

The specific data needed for estimating this income elasticity of demand for small-scale industry commodities are: (1) the total income or expenditure of each household; (2) the individual household purchases of each commodity produced by small-scale industrial firms, parameters which can be obtained only if the origin of the commodity is ascertained, and (3) the household size. These data, however, would be available if the household expenditure survey that has been described in Chapter 5 is undertaken. The income elasticity coefficients should be determined for the individual small-scale industries, as well as

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1/ See, for example, the arguments of Hymer and Resnick (1969).

2/ An extensive literature on estimating demand functions exists, and thus the details will not be specified here. See, for example, Houthakker (1957) or Stone (1954). The double log (i.e., $\ln C = \ln A = b_1 \ln E + b_2 \ln S$, where C is the value of specific commodity purchase, E is the value of total cash expenditure, and S is household size) or the double log inverse functions are two forms that are commonly used. See Liedholm and Chuta (1976, p.50) for an example of this analysis applied specifically to small-scale industries.

for the industrial sectors as a whole. Moreover, for comparative perspective on the potential competition from other sources, it would also be useful to have estimates of the corresponding income elasticities of demand for the products of large-scale and imported industrial goods.

Another source of demand for small-scale industry commodities is that arising from its production linkages, both backward and forward, with other sectors of the economy. To provide insights into the nature and extent of this demand source, it is recommended that the relevant input-output coefficients linking the small-scale industries to the rest of the economy be constructed.[1] These coefficients can be derived for the individual small-scale industries, using the data on the quantity and source of their purchased inputs, total output, and the purchasers of their output. It would also be useful if similar data existed for other sectors, particularly agriculture and large-scale industry coefficients could be inserted into it and the effects of changes in other sectors on the intermediate demand for various small-scale products could then be ascertained.[2]

Moreover, it is recommended that the existing demand for small-scale industrial products should also be analyzed in terms of the destination of sales. The sales for each industry, for example, might be usefully classified into those that are local regional, national, and foreign. Such a classification not only would provide an important indication of the extent of the domestic market for various small-scale industries, but would also shed light on the degree to which these commodities are exported.[3]

1/ Since an extensive literature on input-output procedures exists (see, for example, United Nations (1964), the procedure will consequently not be outlined in great detail. See Liedholm and Chuta (1976, p.62) for an application of this procedure to small-scale industries. Also see Spencer (1976) for application in rice processing.

2/ See Liedholm and Chuta (1976, p.62) for some of the agricultural sector coefficients relevant for small-scale industries.

3/ The export market, as noted in Liedholm and Chuta (1976, p.57), already provides an important source of demand for certain small-scale industry commodities and is a market that should not be overlooked. Data on the extent of the market may provide insights into the effect on small-scale industry of interventions to improve the transport sector or improve the marketing or distribution system. See Spencer et al (1976) for the use of linear programming techniques for analyzing such problems in rice milling.

In addition, the seasonal variations in the level of demand and productive activity over the year need to be analyzed. Specifically, it is recommended that the mean monthly outputs over the year for the major small-scale industries should be computed from the daily output data that will have been collected. The magnitude of the monthly fluctuations over the year can then be ascertained.[1] This information is important because it will provide an indication of the magnitude and extent of seasonal bottlenecks as well as seasonal slack periods, seasonal phenomena that need to be reflected in the design and identification of small-scale industry sector programs and policies.[2]

A final analytical procedure that could also illuminate important demand issues involves the estimation of the <u>own-price elasticities and cross-price</u> elasticities of demand for small-scale industry products. Such an analysis would indicate how the quantities demanded of small-scale products respond not only to changes in their own prices, but also to changes in the price of close substitutes. The close substitutes would in many cases be commodities produced by large or foreign industries, and thus the analyses would shed light on the illusive "qualitative" differences in these commodities.[3] Such information would be important in ascertaining the marketing support required by small-scale industries. Although well-developed regression procedures exist for estimating these various price elasticities, it is in practice very difficult to obtain significant results when using only cross-section data from one country.[4] Unfortunately,

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1/ These monthly fluctuations over the year can be expressed in graphs and tables as in our Sierra Leone Study (Liedholm and Chuta, 1971, p.22) or in terms of a summary statistic such as the Pearson coefficient of variation (i.e., the standard deviation of monthly outputs over the year divided by the mean monthly output; a higher coefficient would imply greater seasonal variations.)

2/ The timing of projects, for example, could be adjusted to reflect the seasonal variations in activity. Projects using small-scale industry products might be designed to have orders placed during the slack period or new small-scale industrial enterprises might be designed to come into production just prior to the peak season. In addition, firms experiencing large seasonal variations might be appropriate candidates for the supply of working capital so that they could produce for inventory during slack periods and consequently be able to smooth their output over the year.

3/ Another approach to the "qualitative" differences would be to apply Lancaster's concept on the "characteristics" of the commodities to small-scale industry products. Bread, for example, could be examined in terms of such characteristics as whether or not it is wrapped.

4/ See, for example, the work of Stone (1954) and Goldberger and Gamalatsos (1970).

the surveys recommended in the previous chapters will generate only cross-section data and, consequently, the results of these analyses may not be conclusive.1/ If at least some of these analyses can be undertaken, however, they will provide important insights into the nature and extent of the small-scale industries' demand constraints and demand potentialities.2/

There are also a number of analytical procedures that can be recommended for providing insights into those issues relating to supply of small-scale industry products. By illuminating such important considerations as the nature of the production relationship, the profitability, the financial position, and the entrepreneurial or enterprise success characteristics of small-scale industrial enterprises, for example, these analyses can produce findings of importance for project design and indentification.

One of the procedures recommended for shedding light on the nature of small-scale industry production involves the construction of various economic ratios. Three ratios, the output-capital, out-put labor and the labor-capital ratios, should be determined. These various ratios are useful for providing measures of the factor intensity of production, the relative productivities of these inputs, and the amounts of output and employment generated per unit of the scarce capital input.3/ Additional ratios, such as, for example, the output workshop space or workshop space-labor ratios, might be useful for designing workshop layouts for handloom, silk and yarn twisting factories. The data needed for determining these various ratios would be available if the small-scale industrial surveys proposed in the previous sections were undertaken. It is recommended that the input variables used in these ratios be measured in flow rather than stock terms, since, as noted in Chapter 5, the flow data more accurately reflect the nature of the underlying relationship.4/

1/ Estimates of the own-price elasticities and cross-price elasticities of demand will shortly be attempted using the cross-section data generated in our Sierra Leone Study. Hopefully, there will be sufficient price variations within the country to permit statistically significant results to be obtained using regression analyses.

2/ Demand perspectives can also be obtained by analyzing the past growth in output. See Liedholm and Chuta (1976, p.56).

3/ See, for example, Liedholm and Chuta (1976, p.80), Steel (1977) and Child (1973) who have used these ratios for these purposes.

4/ The labor variables should ideally be measured in man-hours and the capital variable in terms of the capital service flow, which can be derived using the capital recovery formula (see Liedholm and Chuta (1976, p.27).

The analytical procedure of directly estimating the production functions for small-scale industries can also provide useful insights into the nature of the production relationships. The parameters of the production function can be estimated by applying multiple regression techniques to any one of a wide array of different specifications of the function. One of the most commonly estimated forms of the production functions is the Cobb-Doughlas which has many useful properties and can be easily estimated.[1/] Although capital and labor are generally the only inputs included in this formulation, its usefulness for small-scale industry studies can be extended if the labor inputs are further subdivided into proprietor and family labor, apprentices, and hired workers. The elasticity coefficients that are derived from the estimating procedure can indicate the nature of the returns to scale in each industry as well as the marginal productivities of the various inputs.[2/] The marginal productivity parameters, besides yielding an indication of allocative efficiency, can provide a useful approximation of the approximation of the opportunity cost of those labor inputs that receive nor formal wage. The data needed for the production function analyses are: (1) the value added for each firm, (2) the capital service flows, and (3) the man-hours actively worked for each category of labor. These data will all be obtainable from the small-scale industry survey described previously.

A final procedure recommended for illuminating the nature of the small-scale industry production relationships is some form process analysis. Although process analysis can cover a rather wide range of activities, it is recommended that the analysis should initially

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1/ The Cobb/Douglas production function is most usually estimated in the following log form: $\ln Y = \ln A + a\ln L + b\ln K$, where Y is value added, A is a constant, L is labor services, K is capital services and a and b are the estimated elasticity coefficients. See, for example, Liedholm and Chuta (1976, p.[illegible]) for a more complete description of the procedure as well as an empirical example applied to small-scale industries in Sierra Leone. The C.E.S. production function is another production function that can be used, but is more difficult to estimate directly than the Cobb-Douglas. It can, however, shed light on the elasticity of substitution between factors.

2/ The returns to scale can be ascertained by summing the elasticity coefficients. The marginal productivities can be determined by multiplying the elasticity coefficient for an input by its average productivity. See Liedholm and Chuta (1976, p.72) for an illustration of these calculations.

concentrate on identifying and classifying the range of alternative production processes or techniques existing in each industry.[1] These processes can generally be identified by the magnitude of their labor-capital ratios, since a process, which is a specific method of performing an economic task, is assumed to use the input factors in fixed proportions. Consequently, the previously collected data on the man-hours and the capital services can be used to assist in the determination of the processes. It will also, however be necessary to supplement the quantitative results with descriptive information, derived from personal visits, illuminating the characteristics of the processes within each industry. Once the processes have been identified, the array of process options can be determined and the economic viability of the various processes can be examined.[2] Such analyses are useful for project design and identification because they would indicate not only the extent of process or technical choice within each industry, but also which of the processes should be encouraged and promoted.

Profit analyses can also yield important insights that can aid in identifying and designing small-scale industry sector program and projects. To enable such analyses to be undertaken, it is recommended that budgets, in which total sales revenue, all individual costs and profits are systematically set forth, should be constructed for each

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1/ See Mann and Markowitz (1963) for an overall description and discussion of process analysis.

2/ The economic viability can be examined, for example, in terms of the magnitudes of the labor-capital and output-capital ratios or in terms of their relative "economic profitability". See below, as well as Liedholm and Chuta (1976, p. [illegible]). In addition, the process data can be analyzed in a linear programming model of the small scale industry sector. Such a model has been developed by Chuta (1977), a model which takes cognizance of the factor and product market interrelationships within the small-scale industry sector. This linear programming model can be used for undertaking sensitivity analyses (see below) as well as for analyzing the regional comparative advantage of processes and industries within a country.

enterprise.[1] The data needed for this purpose would be available if the small-scale industry surveys outlined in the previous sections were conducted. The individual enterprise budgets should then also be grouped and averaged by process and industry in order to shed light on the relative profitabilities of the different industries and production techniques.[2]

There are several profit measures that might be calculated and used for analysis, however. The standard profit measure is financial or commercial profits, where all inputs have been valued at costs actually incurred as determined by means of standard accounting methods. To facilitate comparisons, the total commercial profit figure, which is derived from the budget, is usually also expressed as a percentage rate of return on total capital costs, net worth or total sales. This profit measure is an indication of the ability of the enterprise to repay any incurred debt, to finance expansion, or to provide income to the owners and thus reflects the underlying commercial viability of the enterprise or activity.

Another useful profit measure that should be computed, however is the economic profit, in which all outputs and inputs are valued at their opportunity rather than their actual costs. To ascertain the total economic profits, the actual budget figures have to be adjusted to reflect any distortions in the exchange rate and domestic prices as well as the opportunity costs of the inputs provided by the proprietor or owner.[3] The total economic profit figure is usually

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1/ Value added and unit costs of production can also be derived from these budgets and used for various analyses (see Liedholm and Chuta (1976, p.39).

2/ By computing the mean value of the individual budget component for each grouping, one has created a form of "representative firm" for each process and industry. See Liedholm and Chuta (1976) for uses of these concepts.

3/ See Bryce (1960, p.143) or any standard project appraisal procedural manual for a discussion of the various methods of determining price distortions and adjusting for them. For small-scale industries, the adjustments for self-owned inputs are also of great importance. The opportunity cost for the proprietor, family, and apprentice labor could be determined from the estimates of their respective marginal productivities. Moreover, all capital costs should be included, irrespective of ownership or borrowing patterns, solely in terms of the total value of the flow of capital services; consequently, no individual rent, interest or depreciation figures should appear. See Liedholm and Chuta (1976, p.40) for a more detailed discussion of these procedures.

also expressed as a percentage rate of return on total capital, particularly when capital is considered to be an important constraint.1/ This measure is useful, however, in providing an indication of the overall economic, rather than the purely commercial, viability of an activity.

A final profit measure, and one particularly useful for assessing small-scale industries, is the return to the proprietor. The only difference between it and the economic profit measure is that the opportunity cost of the proprietor's labor is not included as a cost. One can express the measure in terms of the total return to the proprietor as well as the total return to the proprietor, per hour or per day of the proprietor's time.2/ The measure is useful, however, because it provides not only an indication of the income earned by the proprietor, but also, to the extent that the proprietor is a scarce factor of production, another indication of the overall economic viability of these activities.

It is recommended that all the profits of the individual enterprises, industries, and industrial process should be computed and compared with one another using all three measures of profit. Such analyses would indicate the relative commercial and economic viability of the various enterprises, processes, and industries and consequently would provide information useful in identifying candidates for small-scale industry sector programs and projects.

In addition to the previously described profit analyses, it is recommended that sensitivity tests be undertaken on the key variables affecting profits. Although sensitivity tests are usually applied in more formal project appraisal methods, these tests can be directly and usefully applied to the profit analyses as well. In this case, they would be indicated, through the previously constructed budgets, how profits would change as prices or some other parameters are varied.3/ The tests are useful in indicating which of the input and

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1/ In this formulation, the marginal firm would have zero economic profits.

2/ See Liedholm and Chuta (1976, p.91) for an example of the measure applied to Sierra Leone. The measure is frequently used in farm management studies.

3/ Linear programming models could be constructed that incorporate and reflect the product and factor market interactions within the sector. See Chuta (1977) for an example of sensitivity analyses applied to a linear programming model of small-scale industries in Sierra Leone. Also a linear programming model could be constructed to reflect the interaction between the small scale and large scale industrial subsectors. Also see Spencer et. al (1976) for the application of linear programming in rice processing in Sierra Leone.

output estimates or assumptions are most crucial in affecting profits. In addition, these tests can be used to provide an indication of how those potential policy interventions that work through particular parameters might affect the relative profits of enterprises, processes, or industries.

There are several parameters on which profit sensitivity tests might usefully be undertaken to facilitate the identification and design of small-scale projects and programs. For example, sensitivity tests could be undertaken to prices of capital, labor, and foreign exchange, facilities such as electricity, fuel, and transport, and policy variables involving changes in tariff structures, excise duties, subsidies, licensing, quotas and investment schedules. These sensitivity analysis can be conveniently handled in a linear programming framework.

There are also a few balance sheet or financial position analyses that might also be undertaken to facilitate small-scale industry project design and identification. Some of the standard financial ratios, such as the debt to net worth ratio and the current asset to current liabilities ratios, for example, should, if possible, be computed to provide indications of both the long and short-run financial positions of the enterprises or industries. The experience from our Sierra Leone survey indicates, however, that it is difficult to obtain some types of short-term financial data, such as cash balances, from the smaller firms and consequently it may not always be possible to compute or use these ratios.1/ Short-term or working capital may, however, be an important small-scale industry constraint and thus other measures should, if possible, be utilized. Two measures useful for this purpose and that can usually be constructed for most small-scale industries are the inventory to annual operating cost ratio and the inventory to sales ratio. Other ratios such as fixed assets - sales ratios and debt invested capital ratios, provide some insights into the asset positions and financial management problems of rural industries.

It is also recommended that an enterprise or entrepreneurial success analysis be undertaken in order to generate insights into the nature and extent of other small-scale industry bottlenecks or constraints, particularly these relating to capital and the entrepreneur. Specifically, in this analysis, various data on enterpreneurial or enterprise characteristics for each firm are correlated with each firm's profits in order to try to isolate those particular characteristics that seem to be associated with high levels of profits.2/

1/ One might, for example, omit cash balances from the current asset measure.

2/ See Chuta and Liedholm (1976, p.91) for details of such an analysis in which ordinary least squares regression techniques were used to estimate returns to the entrepreneur, the dependent variables, on the basis of specific enterprise or entrepreneurial characteristics, the independent variables. The computational details and methodological assumptions are also outlined in this source.

Some examples of the types of characteristics that might be included in the analysis are the entrepreneur's formal educational level, years of experience, previous occupation, keeping of records, or the enterprise's labor-capital ratio or excess capacity. These and other data would be available, however, if the small-scale industry survey recommended in the previous section were conducted.

The various analytical procedures outlined in this section have been designed to provide operationally guidelines useful for the identification and design of rural industrial sector programs and projects. Although the procedures mentioned are not necessarily exhaustive, they should provide a good foundation on which to make improved decisions on rural industries.

7. DATA COMPILATION

This section will outline how the data to be generated from the survey should be coded, keypunched, processed, and stored for retrieval and analysis. It is recommended that all data generated from both Phases I and II surveys should be coded, keypunched[1] and stored in Bangladesh either in computer cards and/or magnetic tapes. The procedures for coding all the relevant data will now be outlined in detail.

7.1 Data Coding

The initial step for facilitating the coding process is to develop codes for the different items involved in the analysis. Specifically, it is recommended that for the rural industries study, codes be developed for items such as specific Thanas, Districts and Unions involved in the study, equipment stock, output and material stock, etc. A list of the necessary master codes[2] have been presented in table 7-1.

TABLE 7-1

Sample List of Master Codes

Master Codes	Description	Range of Codes
RIS - Code 1	- Thana Identification	(001 -999)
RIS - Code 2	- Union Council Identification	(01 -99)
RIS - Code 3	- Village Identification	(001 - 999)
RIS - Code 4	- Questionnaire Type	(1 - 8)
RIS - Code 5	- Industrial Type	(01 - 99)
RIS - Code 6	Workshop Description	
RIS - Code 7	Source/Origin of Item	1 - 9
RIS - Code 8	Unit of Measure	01 -99
RIS - Code 9	Building Stock	01 - 99
RIS - Code 10	Equipment Stock	001 - 999
RIS - Code 11	Output, Material Supplies and Cash Stock	001 - 999
RIS - Code 12	Sources of Loan, Savings Institution, Recipient and Type of Purchaser	01 - 99
RIS - Code 13	Sellers of Miscellaneous Inputs	1 - 9
RIS - Code 14	Labor Types	1 - 9
RIS - Code 15	Districts	1 - 19

The detailed specification of each master code should also be outlined as follows:

RIS - Code 1

Thana Identification
(To be developed)

1/ The Bureau of Statistics in Dacca has good facilities for keypunching on cards or straight on tapes. The keypunching error rate is low (about 10%).

2/ This list is by no means exhaustive.

RIS - Code 2

Union Council Identifidation
(To be developed)

RIS - Code 3

Village Identification (Optional)
(To be developed)

RIS - Code 4

0 Questionnaire Type

0 Phase I Survey Form
1 Inventory of Buildings
2 Inventory of Equipment and Furnitures
3 Inventory of Materials, Output, Cash
4 Labor Input Data
5 Output Data
6 Miscellaneous Input Data
7 Financial Information
8 General Characteristics of Entrepreneurs

RIS - Code 5

00 Industrial Types

01 Handloom
02 Jute Baling
03 Silk Products
04 Brick Making
05 Dyeing of Yarn
06 Pottery
07 Leather Works
08 Blacksmithing
09 Jewelry
10 Jamdani
11 Hosiery
12 Printing
13 Locks
14 Miscellaneous Industries (umbrella etc.)
15 Farming
16 Grain Milling
17 Oil Milling
18 Rice Milling
19 Tobacco Processing
20 Cane Products

RIS - Code 6

0 Workshop Description

1 Pucca
2 Katcha
3 Temporary

RIS - Code 7

0 Source or Origin of Items

1 Rural
2 Thana Headquarter
3 Bazaar or Hat
4 Other Urban Area
5 Dacca
6 Imported

RIS - Code 8

00 Building Stock

(To be developed for each industry)

RIS - Code 9

00 Unit of Measure

(To be developed)

RIS - Code 10

000 Equipment Stock

(To be developed for each industrial type)

RIS - Code 11

000 Output, Material and Cash Stock

(To be developed for each industrial type)

RIS - Code 12

00 Sources of Loan etc.

(To be developed)

RIS - Code 13

0 Sellers of Miscellaneous Inputs

(To be developed)

RIS - Code 14

0 Labor Types

1 Male Proprietor
2 Female Proprietor
3 Male Family Labor
4 Female Family Labor
5 Male Hired Labor
6 Female Hired Labor
7 Male Apprentice Labor
8 Female Apprentice Labor
9 Child Labor

RIS - Code 15

0 Districts

1 Barisal
2 Bogra
3 Chittagong
4 Chittagong Hill Tracts
5 Comilla
6 Dacca
7 Dinajpur
8 Faridpur
9 Jessore
10 Khulna
11 Kushtia
12 Mymensingh
13 Noakhali
14 Pabna
15 Patuakhali
16 Rajshahi
17 Rangpur
18 Sylhet
19 Tangail

Although an attempt has been made to develop relevant codes (see for example RIS - Code 5), in many cases, such as RIS -Codes 3 and 9, familiarization with a cross-section of the data will be required before final codes can be developed. Appendix 7-1 is an example of equipment stock codes developed for the Sierra Leone Study. Codes for the Bangladesh Study can be developed along the same lines. After the codes have been developed, tabulated instructions will have to be prepared for enabling coders to transfer the information contained in each questionnaire on to the coding sheet. Such an instruction specifies the relevant columns of the coding sheet for entering the corresponding variables or information and additional information which specifies the sources of certain codes and units in which information have been measured. The following tabulated instruction has been prepared for coding the Phase I questionnaire1/

1/ Also see Appendix 7-2 for the tabulated instructions utilized for coding the Sierra Leone equipment stock items.

TABLE 7-2

Phase I Rural Industries Study Coding Instruction

Column	Variables	Comment
1 - 2	Thana identification	SSI - Code 1
3 - 4	Union Council identification	SSI - Code 2
5 - 7	Village identification	SSI - Code 3
8 - 10	Date Completed	Column 8 - 9 for month; column 10 for year. Number 7,8,9 for 1977, 1978, 1979 respectively.
11	Form Number	SSI - Code 4
12	Blank	
13 - 17	Serial Number	00001 - 99999
18	Blank	
19 - 20	Industrial type	SSI - Code 5
21	Blank	
22	Workshop description	1 for pucca 2 for katcha 3 for temporary
23	Blank	
24 - 25	Number of male proprietors	
26	Blank	
27 - 28	Number of female proprietors	
29	Blank	
30 - 31	Number of male family labor full-time	
32	Blank	
33 - 34	Number of female family labor full-time	
35	Blank	
36 - 37	Number of male family labor part-time	
38	Blank	

Column	Variables	Comment
39 - 40	Number of female family labor part-time	
41	Blank	
42 - 43	Number of male hired labor full-time	
44	Blank	
45 - 46	Number of female hired labor full-time	
47	Blank	
48 - 49	Number of male hired labor part-time	
50	Blank	
51 - 52	Number of female hired labor part-time	
53	Blank	
54 - 55	Number of male apprentices	
56	Blank	
57 - 58	Number of female apprentices	
59	Blank	
60 - 61	Number of children	
62	Blank	
63 - 65	Total labor stock	
66	Blank	
67 - 68	Number of powered machines	
69	Blank	
70 - 71	Number of non-powered machines	
72	Blank	
73	Keep records	1 for yes 2 for no
80	Study phase	1 for Phase I 2 for Phase II

7.2 Data Processing

Before any analysis of the coded data can be undertaken, it is recommended that a thorough processing of all coded data be made to check for wrong and missing item codes, missing dates, etc. For example, it is important to find out if output exists for which there are no labor data and to verify the consistency of establishment numbers and input-output data. In order to consistently check and correct such errors, it is recommended that edit programs be written by skilled computer programmers in Bangladesh. The results of such computer runs should indicate existing errors. Such errors should be corrected in the raw data file and the edit program rerun to ensure maximum accuracy of data.

The computer editing of the raw data should now be followed by the creation of standard data files for forms 0 to 8 (see RIS - Code 4 for the questionnaire listings). Such files can be set up by computer programmers in Bangladesh. It will be ideal to set up standard data files for each variable, and with different levels of data aggregation - weekly or monthly for labor output, material input, financial information and entrepreneural characteristics. In order to easily retrieve each file, it is also recommended that a description of each tape be prepared and filed by name of the research coordinator. A keypunched version of tape descriptions could be added to an existing card tray to provide a quick access guide to tape materials on file.

However, the standard data files cannot be set up without the help of the researcher. On the basis of the codes that have been developed (see Appendices 7-1 and 7-2), variables have to be constructed for each category of item, e.g. tools and equipment. Also, in order to create the variables, variable names and all codes to be utilized for constructing each variable will have to be defined. Appendix 7-3 is an example of such definition of variable names for tools and equipment items utilized for the Sierra Leone data. Appendix 7-4 presents in detail the necessary instructions which the computer programmer needs for constructing the variables. After the variables have been constructed and the Standard Data Files created, extrapolations and data indexing[1] should be undertaken by programmers to adjust for missing data. As soon as it is ascertained that the data in the Standard Data Files are accurate, different levels of analysis can be initiated by retrieving information from the different standard data files. Simple tabulations and/or summary reports could be undertaken in Bangladesh based on the standard data files. Other complicated analyses, such as production function, linear programming, and variance-covariance analyses, may require the shipment of the standard data files or summary report files[2] to the United States where higher levels of computer capability are available.

1/ Industry and location Indices should be created for firms for which reliable year-round information is available. Such indices should be utilized for developing twelve month data for firms with incomplete data.

2/ One such file that could be created should contain monthly and annual data for each firm and for variables such as labor, value of output and material input, value-added, value of capital services, financial and economic profits etc.

8. INSTITUTIONS FOR DEVELOPING AND IMPLEMENTING THE STUDY PLAN

There are at least seven research oriented institutions in Bangladesh which can contribute towards the development and implementation of the study plan. Four of these institutions -- the Universities of Dacca, Chittagong, Jahangirnagar and Rajshahi -- are not specialized in any one discipline but have bureaus or institutes with specific change to research orientation[1]. On the other hand, two of the institutions -- the Agricultural University at Mymensingh and the Engineering and Technology University in Dacca -- are highly specialized. The Bangladesh Institute of Development Studies (BIDS) in Dacca is the only institution in Bangladesh which has devoted full attention to the training and recruitment of highly skilled research staff and engaging in full-time economic research for the government and private agencies.

These institutions have different contributions to make at some stages of the study plan. For example, since the Universities of Rajshahi, Jahangirnagar and Mymensingh are located in rural areas and have on-going research activities in villages, these universities are better equipped for organizing field data collection and supervision. They equally have the intellectual capacity to undertake detailed analysis. The University of Dacca in particular has a number of highly skilled scholars in various disciplines who can be drawn upon for analysing the data which will be generated from the study. Finally, the Mymensingh Agricultural University and the University of Engineering and Technology in Dacca are well equipped for undertaking case studies in their specialized areas.

Hitherto we have focussed on academic institutions as sources of technical assistance for the proposed study. Government institutions however will also provide considerable technical assistance fo the development and implementation of the proposed study. For example, the Bureau of Statistics in Bangladesh is well staffed with keypunchers, programmers and a well qualified systems analyst, who can assist in both data editing and preliminary analysis. Also, the field staff of the Bangladesh Small and Cottage Industries Corporation, the Integrated Rural Development Program (IRDP), and the Planning Commission are indispensable agencies for the overall execution of the field study. Data collection in rural areas cannot proceed without the assistance of the field staff of the relevant government institutions.

8.1 Recommended Schedule of Work

In order to recruit competent field investigators, supervisors, and coders for the proposed rural industries study, it is recommended that the actual execution of field survey should be decentralized on a zonal basis. Thus, the recruitment of field investigators, supervisors and data coders for Rangpur, Bogra, Pabna, Kushtia and Rajshahi should be the responsibility of the Institute of Bangladesh Studies at Rajshahi

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1/ There is the Bureau of Statistics in the University of Dacca, Institute of Bangladesh Studies in the University of Rajshahi, and an Institute of Rural Studies proposed for the Jahangirnagar University.

University; the recruitment of field investigators supervisors and coders for the Tangail and Mymensingh areas should be the responsibility of Mymensingh Agricultural University; and the Institute of Development Studies (BIDS) and Jahangirnagar University should take responsibility for Dacca, Comilla and Sylhet Districts. It is recommended that the training of enumerators and coders be undertaken in Dacca at the BIDS or USAID office to ensure that instructions and conduct of data collection and coding are standardized.

8.2 Timing

Due to the decentralized nature of the proposed study, it is recommended that a meeting be held in September, 1977, comprising of USAID, government officials, heads of the different institutions (as shown in table 8-1) whose contributions will be required for the development and implementation of the study1/. An effort should be made to seek both the advice and cooperation of all concerned. Their cooperation will be needed for the use of faculty members, for recruiting supervisors, enumerators coders and consultants for the different zones.

TABLE 8-1

Recommended Schedule of Work

Period	Work Schedule
September 1977	1. Recruitment of research coordinators and research fellows. 2. Meeting between USAID, research leaders and zonal research associates as listed below: USAID Representatives Planning Commission Representative IRDP Representative BSCIC Representative Prof. C. Maloney, Institute of Bangladesh Studies Prof. Muazzem Hossain, Agricultural University Mymensingh Prof. Kayser Hussain, Jahangirnagar University Dr. Q. Ahmed, BIDS, Dacca Dr. S. M. Elias, BIDS, Dacca Mr. Abdul Baten, Bureau of Statistics, Dacca
October 1-14, 1977	1. Assembling of materials for survey 2. Revision of questionnaires 3. Writing of manual to accompany questionnaire

1/ It is recommended that before the invitees are notified, the various vice-chancellors and institute directors be written for the release of their officials.

Period	Work Schedule
October 15-31,1977	1. Recruitment of field coordinators, typist and messengers 2. Printing and distribution of questionnaire, etc. to different zones.
November 1-5, 1977	1. Recruitment of field investigators on zonal basis
6-21, 1977	2. Training of field investigators on zonal basis
22-30, 1977	3. Obtaining letters from Planning Commission and meeting with IRDP leaders at Thana headquarters
December 1-14,1977	1. Meet with IRDP project leaders, Circle Officers, and Union Council Chairmen at Thana headquarters
15-30,1977	2. Move field investigators to rural Thanas
Jan.-Feb. 15, 1978	Phase I Survey
Feb.15 - Mar.31,1978	1. Post-enumeration stratification of sample frame on zonal basis 2. Selection of firms for Phase II on zonal basis 3. Revision of coding procedures for Phase I and printing of coding manual
April 1, 1978 - end of Phase II (6 - 12 months)	1. Start Phase II data collection 2. Development of codes for data compilation 3. Coding of Phase I data starts 4. Programming and analysis of Phase I data 5. Continuous data gathering, editing, coding, setting up of standard data files and analysis.

According to the proposed schedule of work, it is strongly recommended that the actual execution of field survey be initiated no later than January 1, 1978. During this period enumerators can work without being interrupted by the rain, and nonfarm enterprises will be operating where they can be seen and listed. This schedule therefore requires that every preparation required for the field survey be started as early as September as outlined in Table 8-1. An attempt has also been made in Table 8-1 to outline the monthly tasks required for the implementation of the study. The Phase II Survey should begin around April, 1978, soon after the Phase I data have been stratified and sample of establishments randomly selected

from the sample frame for each Thana. The processes of data collection, coding, supervision and analysis should proceed as scheduled in Table 8-1.

Coding has to be initiated early as shown in Table 8-1. If completed questionnaires are allowed to pile up, the coding process is bound to become inefficient. In the last week of December, 1977 a letter should be written to Dr. A.K.M. Ghulam Rabbani, Director General, Bangladesh Bureau of Statistics, Secretariat, Dacca, notifying him of the keypunching and programming requirements (number of computer cards and types of editing and analysis) of the study and the corresponding timing. It needs to be pointed out that when coders are paid monthly wages, the pressure to code at a quicker pace is always lacking. Experience from Sierra Leone Study revealed that coders hid piles of completed questionnaires without coding them. But when a system of payment according to the number of accurately coded sheets was introduced, the pace of coding was accelerated. More effort however should then be put into detecting coding errors. Since coders will need to make frequent references to the supervisors who will be more conversant with the data, Field Supervisors and coders should be accommodated within easy reach of one another.

8.3 Supervision

Although it is recommended that the best field investigators be recruited for the Study[1/], there is no substitute for thorough supervision in field data collection. All field investigators should be checked on the spot while interviewing. This is essential in order to ensure that the right questions are being asked. Frequent supervision is needed to correct errors regularly made by most field investigators. Intensive visits are needed at the beginning of the survey when most errors originate. Log books should be provided for each Thana at the head office so that each field supervisor can observe the previous comments of other supervisors. Surprise visits should also be made to verify if field investigators are in fact doing their job. Routine visits will of course be made near the end of each month to pay salaries, collect completed questionnaire and deliver new ones.

It should be remembered however that effective supervision of field data collection depends on the extent to which the supervisor understands the questionnaire[2/]. Questionnaires which have been recommended for the study contain consistency checks. For example, there cannot be output for any day in which there are no labor inputs. Therefore daily labor input data cannot be checked in isolation from daily output data. Likewise, input purchases have to be consistent with daily or weekly sales or money borrowed. Questionnaires should be thoroughly checked in the village before they are returned to the office for coding in order to avoid unnecessary visits back and forth to correct errors that could have been avoided earlier.

1/ See page 82

2/ In fact, both the Research Coordinator and Research Fellows must have a thorough understanding of the structure of the questionnaires.

8.4 Expected Results

The task of analysing the data which will be generated from the survey should be performed as soon as possible during the survey period. Table 8-2 shows target dates for producing reports that are related to the various aspects of the study. It is recommended that any analyses undertaken concerning the study should focus on the identification of problems and constraints of rural industries, policy interventions needed for solving these problems, and fundable projects to improve the efficiency of production or processing, increase employment and output, develop rural areas, increase export potential, save foreign exchange, and increase the use of domestic raw materials etc. The details of how analytical results can be utilized for identifying projects have been outlined in the next chapter.

TABLE 8-2

Recommended Schedule of Expected Results

Period	Reports
May 31, 1978	Preliminary findings of Phase I survey - extent, kinds, magnitudes of rural industries in selected Thanas, details of employment, etc.
July 31, 1978	Report on factor proportions in rural industries (use stock data from Phase I and early part of Phase II).
September 1978 - October 31	Case studies - institutional, credit constraints, technological constraints, etc.
Nov.-Dec.,1978	Socio-economic characteristics of rural industry entrepreneurs.
	Constraints facing rural industrial entrepreneurs. Socio-cultural barriers to entry in certain industries.
June 1979	Preliminary findings on factor proportions (based on service flow data), linkages and growth potentials in rural industry, major constraints and policy implications, impact of the electricity project on rural industries, electricity and infrastructural needs of rural industries, project identification, types of policy interventions needed.

8.5 Personnel Needs of the Proposed Study

As Tables 8-3 and 8-4 show, two types of research personnel will be required for the proposed study. The full-time research personnel will be involved during all study stages of Phase I and Phase II. The part-time research personnel will participate in the project as the need arises. The part-time research staff will include research associates, appointed by the different participating institutions to supervise and cater to the successful completion of Phase I survey (See Table 8-4). The differenw staff positions, their qualifications and responsibilities have been outlined in detail in Table 8-3.

The person responsible for recruiting all research personnel and coordinating their activities is the research coordinator, whose responsibility it is also to ensure that the overall goals of the study are achieved. These responsibilities include, assembling of reasonably accurate primary data and compilation, thorough socio-economic and technical analyses, identification of constraints and fundable project areas, and preparation of draft and final reports. Apart from participating in the collection and analysis of data, the research coordinator is the major laison between the research staff and USAID. In addition, he is the manager of both the Study and all contracts approved for the conduct of the Study.

A constant exchange of ideas between the consultants, the senior research fellow and the field supervisors will be required. It is only through such interactions that problems of field survey can be identified and tackled, and useful analysis performed. It needs to be emphasised that the reliability of data to be generated depends primarily on the dependability of the field investigators. Every effort should be made to recruit intelligent, energetic, well informed and reliable field investigators. Experience gained during the pilot study revealed that enumerators should be recruited to work in their districts of origin. Such enumerators are trusted by the villagers, with accommodation and feeding becoming less of a problem. Second, field investigators recruited by university professors under whom they have studied prove to be more productive and loyal. Third, due to the nature of the questionnaire, field investigators with or working toward an M.A./M.Sc. easily understand the purpose of the Study and the structure of the questionnaire. Understanding the purpose of the study is necessary for convincing respondents to divulge information. Field investigators should be trained by the senior research fellow and supervisors in the theoretical and practical aspects of questionnaire administration for at least two weeks before being sent to the field, at which time they should also receive a copy of the instructions manual describing the different aspects of the questionnaire and the method of administering it. Coders should also be trained by the research fellow and supplied with coding manuals that spell out clearly what needs to be done1/.

1/ Copies of the Enumerator and coding manuals that were used in the Sierra Leone Study are in the custody of the USAID.

TABLE 8-3

Full-Time Research Personnel Needs of the Proposed Study

Staff Position	Qualification	Duties	Extent of Field Trips
1. Research Coordinator	1) Ph.D. economics, agricultural Economics or any of the social science subjects 2) 5-10 years experience in rural development research 3) Administrative capacity 4) Good writing skills 5) Knowledge of local language is an advantage	1) Act as Liaison between USAID and research staff 2) Take care of all administrative problems 3) Coordinate research efforts of consultants, research fellows, etc. 4) Identify special problems for case studies. 5) Ensure that research personnel are performing duties satisfactorily. 6) Participate in field research supervision and data analysis 7) Take responsibility for delivery of timely and good quality research products.	Undertake several field trips
2. Senior[1] Research Fellow	1) Ph.D. Economics or Agricultural Economics 2) At least 2-3 years research experience in manufacturing industries or/and food processing 3) Experience in LDC research 4) Good writing skills.	1) Initiate problem solving research or case studies 2) Direct field research and data analysis 3) Spend time to analyse field data and write reports 4) Construct questionnaire and write manuals for administering questionnaire.	At least one field trip a month to supervise field work.

1/ Dr. Q.K. Ahmad of the BIDS will be suitable for this position. Being the present Secretary-General of the Bangladesh Economic Association, he is in a position to recruit consultants for the Study.

Staff Position	Qualification	Duties	Extent of Field Trips
3. Research[1/] Fellow	1) Ph.D. in Economics or Agricultural Economics 2) Computer and programming background	1) Outline the coding procedure for data to be collected. 2) Supervise the coding of data 3) Outline data editing procedures 4) Write detailed instructions that will enable computer programmers to process data, construct variables, set up standar data files and carry out computer analysis 5) Supervise field work 6) Analyse data and write reports.	At least two trips a month to supervise field work.
4. Field Supervisors (4)	1) M.Sc. in Economics or Agricultural Economics 2) At least one year as field investigator.	1) Supervise the work of Field investigators to ensure accurate data are being collected. 2) Liaison between office staff and field investigators: - supplying of materials to the field - returning of materials to the office - etc. 3) Participate in data coding, processing, and analysis.	Will reside at the zonal head-quarters but visit the village at least three days a week.
5. Field Investigators (75)	1) B.Sc. in Economics, Agricultural Economics or any Social Science subject with survey training and/or experience 2) M.Sc. or close to M.Sc./M.A. in Economics, Agricultural Economics or Statistics 3) Good personal approach for surveying.	1) Collect reliable data 2) Code data	Will reside in the village
6. Coders (12)	1) B.Sc. in Economics, Mathematics or Statistics.	1) Code data 2) Tabulate data 3) Collate and staple questionnaire	No field trips.

1/ Dr. S.M. Eliac, now temporarily employed by the BIDS and seconded to the Water Development Board will be suitable for this position. His thesis involved building a Linear programming model of the Tubewell Irrigation in Bangladesh and took some computer programming courses while completing his Ph.D. programme at the University of New Delhi.

TABLE 8-4

Part-time Research Personnel Needs of the Proposed Study

Staff Position	Qualification	Phase of Study Involved	Duties	Duration
1. Research Associates 1/	1) Experience in rural economic research 2) Must be university professors 3) Major discipline has to be in the area of economics or agricultural economics or any of the Social Sciences	Phase I	1) Help to recruit enumerators or field investigators with enough familiarity with some localities. Such students should be unemployed M.Sc. students or research students. 2) Should be prepared to stay with field investigators to ensure proper enumeration of villages.	3 months
		Phase II	1) Undertake case studies 2) Help analyse data 2/	1-2 months
2. Consultants	1) Technical expertise in cotton and silk textiles, tobacco processing, jute, farm tools, etc.	Phase II	Advise on the improvement of existing efficiencies of production or processing.	1-3 months
	2) Economists, Agricultural Economists and Social Scientists	Phase II	1) Undertake Socio-economic analysis of data collected 2) Evaluate ongoing socio-economic analysis	

1/ Prof. Mustafizur Rahman and Md. Sadiq Ahmed of Bangladesh Agricultural University and BIDS did excellent jobs during the conduct of the pilot study. It is recommended that their experience be utilized in the proposed study.

2/ Examples of individuals who could be of much help in data analysis are Dr. Rezwanul Islam, Department of Economics, Dacca University, Dr. T. Mofizur Rahman, Institute of Statistics, and Dr. Mahbub Hossain of the Bangladesh Institute of Development Studies.

9. THE SCOPE OF WORK

9.1 Introduction

The purpose of the Rural Industries Study is to both generate an adequate primary data base and undertake in depth case studies which will yield analytical results sufficient to identify the major technological, infrastructural, supply, marketing, management, cultural and socio-economic constraints which hamper the development of rural industries in Bangladesh. On the basis of the data and analysis from the first stages of the proposed Study, the consultant (Research Coordinator) will develop the framework of a proposed follow-on AID-financial project, the goal of which will be to increase employment and the standard of living in rural Bangladesh.

The Study and all services will be financed, both US dollar and local currency (Bangladesh Taka) costs, by AID Grant 388-0031 to the Bangladesh Government, and will be carried out under AID approved contract(s) between the Government and the consultant(s). The implementing agency on behalf of the Government for the Study and all services above will be the Planning Commission.

9.2 Conduct of the Study

The entire Study will be conducted in three phases. In Phase I and II, survey and non-survey data will be gathered for generating analytical results to be utilized in Phase III for the development of a project to improve new and existing rural industries. The details of each Phase of the Study are as follows:

9.2.1 Phase I

The field data collection will be organized in two phases. In Phase I of the survey, efficient sample frames will be assembled for approximately fifteen thanas as set forth in the "Pre-Study Report for the USAID Rural Industries Study".1/ This analysis will serve to validate selection of industries which have been based on prior surveys and to determine sample sizes for Phase II surveys. The Phase I data collection and analysis will last for three months after which the Phase II survey will begin.

9.2.2 Phase II

The first task will be to undertake primary data collection and analysis on specific rural industries for which the selection and criteria for selection are to be approved by AID and the Government. A pretested survey questionnaire has been prepared for all structured

1/ Dr. E. Chuta, August 15, 1977, PP.

data collection under Phase II. The types of data to be collected will include stock data on buildings, equipments, tools and furniture, output and material input (which will be eventually converted into flow basis); daily labor inputs and outputs, weekly purchases of materials inputs, and monthly miscellaneous and financial inputs, case studies, to further investigate constraints on rural industries development, and entrepreneurship. Case studies will be conducted in areas such as, but not limited to, silk industry, handloom weaving, cane products, agricultural tools, tobacco, grain and fruit processing industries, and women in rural industries. Additional topics will be subject to approval by AID and the Government. Other non-survey data shall be collected concerning the role of Government institutions in rural industries development, systems of protection, and domestic fiscal, monetary, industrial, educational, infrastructural, and inheritance law policies. These data are expected to shed light on the policy environment in which rural industries operate.

In addition to collecting the relevant data, Phase II will involve coding and editing of all collected data per recommendations of the Pre-Study Report for the USAID Rural Industries Study, construction of all variables, and preparation of all information. Computer programmers will then set up standard data files and process all data. Following this a detailed socio-economic analysis shall be undertaken to identify the constraints and problems of rural industries. The type of analysis which the consultant will undertake will include, but not be limited to, production function analysis, sensitivity analysis, computation of basic economic and financial ratios, economic and financial profit analysis, identification of domestic and foreign market potentials and infrastructural problems, linkage and growth potentials, foreign exchange needs, fixed and working capital constraints, credit needs, and technological and socio-cultural bottlenecks. The results of these analyses will be presented by industry and location in order to focus attention on specific intervention measures. Table 9-1 summarizes the data and analysis requirements of the Study, and the likely project components which the various analyses will identify.

TABLE 9-1

Data Needs, Analysis and Project Identification

Types of Survey Data	Questionnaire	Type of Analysis	Result of Analysis	Project Identification
1. Sample Frame	Form 1 B	Tabulation Stratification	Percentages or order of magnitudes.	Major industries for generating employment and focus for detailed study. New industries for development.
2. Input-Output	Forms 1-4	Production Functions	Scale parameters	Efficient rural industries vis-a-vis large scale industries.
	"	"	Substitution parameters	Employment generating small industries.
	"	Sensitivity Analysis	Alternative levels of employment and output given different factor prices or project designs.	Choice of project.
	"	Linkages -Inter-industry	Forward and backward linkages	Industries for development.
		-Trade	Export orientation	Foreign Market Analysis Export Promotion
			Import content	Foreign exchange requirements.
		-Sectoral	Industry-agriculture	Farm tools.
	"	Economic Ratios and other ratios	Output-Capital ratios, Output-Labor ratios, Labor-Capital ratios, etc.	Employment generating projects.
			Workshop space-man ratios	Financing the construction of workshop layout.

2. Input-Output	Forms 1-4	Profit Analysis through Budgets	Financial rate of returns Economic rate of returns	Target for lending due to borrowing and repayment capacity. Management Improvement.
		Working capital position	Ratio of current assets to current liabilities	Working capital needs management improvement.
			Ratio of cash plus convertible assets to working capital	Liquid working capital needs management improvement.
		Asset Position	Fixed assets-sale ratio Debt-invested capital ratio	Management improvement.
		Seasonality	Monthly distribution of labor, output/sales	Timing for Rural Development Projects.
	Form 6	Tabulation	Cash& Credit purchases	Working capital needs.
	Form 7	Tabulation	Sources of borrowing etc.	Credit needs.
3. Case Studies	Special questionnaires to be designed	Descriptive Historical Quantitative	Constraints identification relating to technology, marketing & distribution, institutional & management setup.	Electricity needs, Cold Storage needs, Technology research, Rural cooperative shops, construction of rural warehouses.
4. Entrepreneurship	Form 8	Descriptive Regression/ Budgeting	Determinants of success in business Entry requirements Socio-economic characteristics etc Constraints identification	Education needs, Fixed and working capital needs Electricity needs Water development needs Road construct needs Raw material needs Management development needs.
5. Expenditure	Special questionnaire to be designed (if possible)	Regression	Income elasticities Expenditure elasticities Own price elasticities Cross price elasticities	Projects with growth potential.

9.2.3 Phase III

In Phase III study of rural industries, the consultant will undertake several tasks which will lead to the ultimate implementation of the USAID project on the development and improvement of rural industries in Bangladesh. The types of tasks which the consultant will undertake will include, but not be limited to, the following:

Task 1 Identify types of project by industry and outline the criteria for the choice of the project;

Task 2 Identify specific locations where the project is to be undertaken, specifying the details of criteria for choice of particular locations;

Task 3 Undertake cost-benefit analysis of the project to be able to identify the economic and financial justifications for embarging on the project and each location;

Task 4 Outline in detail, the economic, social and environmental impacts that the project will generate in rural areas;

Task 5 Carryout detailed sensitivity analysis to evaluate how the project design can be altered to yield different levels of results in the rural areas;

Task 6 Produce budget estimates needed to implement the project, allowing for inflation and other contingencies;

Task 7 Estimate a detailed time schedule for implementing the project;

Task 8 Identify agencies or institutions in Bangladesh which will undertake the implementation of the different aspects of the project;

Task 9 Specify the kinds of personnel, foreign and domestic, which will be needed for implementing the different aspects of the project;

Task 10 Outline in detail, the kinds of methodology which will be needed for monitoring the progress of the project over specified lengths of time; and

Task 11 Identify existing gaps in information base for needed project identification and implementation.

9.3 The Organization of the Study

In order to ensure high quality staff for undertaking data collection, analysis and project identification, a decentralized Study approach is recommended in which different universities and research institutions, specialized and non-specialized, and Government agencies, approved by the Government and AID, will be relied upon for recruiting enumerators, field supervisors, and coders and for undertaking the analysis of the data.[1/] The Research Coordinator (RC) will coordinate research efforts and standardize results by holding periodic consultative meetings and centralizing the training of enumerators and coders in Dacca respectively. The RC will compile the enumerators manual which should contain sufficient detail so that all survey components are uniquely identified and explained. The RC will also develope a coding manual which will indicate what items or item codes should be entered into specified column or columns of the fortran coding sheet. The programmer will also be provided with enough information as to variables to be constructed, what analysis are to be performed and how each operation is to be carried out. The consultant will supervise each aspect of data collection, coding, keypunching, data analysis and will be responsible for the delivery of good quality final products as scheduled by the Government and AID.

9.4 The Research Team

In order to develop and implement the study, the consultant will recruit both full-time and part time personnel. The research team will be made up of the following staff positions.

A. Full-time staff:

1 Research Coordinator
1 Senior Research Fellow
1 Research Fellow
75 Enumerators or Field Investigators
4 Field Supervisors
12 Coders

B. Part-time staff:

15 Research Associates
Several Consultants (foreign and domestic)

The responsibilities of each member of the research staff is as follows:

1/ The procedure for the decentralization of the rural industries study has been outlined in Section 8.1 of this report.

A. Full-time staff:

1. A Research Coordinator whose responsibility it is to:

   (a) act as liaison between USAID, Planning Commission and the research team,

   (b) take care of all the research administrative problems,

   (c) coordinate research efforts of consultants, research fellows, etc.,

   (d) identify special problems for case studies and recruit qualified personnel to investigate those problems and identify projects for development and improvement,

   (e) ensure that every research personnel is performing his duties satisfactorily,

   (f) participate in field research supervision and data analysis, and

   (g) take responsibility for delivering timely and good quality product.

2. A Senior Economic Research Fellow to:

   (a) initiate problem solving research or case studies, and identify projects for development and improvement,

   (b) direct field research and data analysis,

   (c) analyse field data and write reports,

   (d) construct questionnaires and write manuals for administering the questionnaire, and

   (e) train field investigators.

3. Economic Research Fellow to:

   (a) outline coding procedure to be utilized in coding all data to be collected,

   (b) supervise the coding of data,

(c) write instructions that would enable programmers to edit, construct variables, set up standard data files and analyse data,

(d) recruit consultants,

(e) supervise field work, and

(f) analyse data and write reports; and identify projects for development and improvement.

4. Field Supervisors to:

(a) supervise the work of field investigators to ensure that accurate data are being collected,

(b) liason between the office staff and field investigators in order to supply materials to the field staff and return materials to the office,

(c) participate in data coding, processing and analysis,

5. Field Investigators to collect reliable data and code data (if necessary).

6. Coders to:

(a) code data,

(b) tabulate data, and

(c) collate and staple questionnaire.

B. Part-time staff:

1. Research Associates will have the responsibility for:

(a) recruiting field investigators and,

(b) staying with field investigators in the field to ensure proper enumeration of villages.

2. Consultants to investigate and advise on:

(a) technical areas such as cotton, silk, tobacco, jute, farm tools, identify projects and,

(b) economists, agricultural economists, sociologists etc to undertake socio-economic research, evaluate on-going economic analysis and identify projects.

The full-time research staff will be involved in all aspects of Phases I, II and III study. But the part-time research staff will be involved in the different aspects of the entire study as will be deemed necessary by the research coordinator, solely, or in conjunction with the research fellows. The research coordinator will ensure that enough interaction exists between him and the research fellows, the field supervisors and the consultants so that all problems relating to field data collection, processing, and analysis are solved and that the goal of project identification for development and improvement is implemented.

9.5 Work Schedule

The consultant will start recruiting the senior research fellow, research fellow and supervisors in October 1977. By November 1, the enumerators should be recruited and trained for at least two weeks, tested in the field before being deployed in the villages. The coders should be recruited and trained around January 1977. The Phase I survey should start latest January 1 to take advantage of the favorable weather. Phase II survey should follow around April, immediately Phase I data has been analysed. Phase III study should be undertaken as soon as problem areas are identified and capable personnel recruited.

The coding and analysis of data to be generated should not be delayed till the end of the survey. The consultant should by the first week of May, submit a tabulated and analysed result of Phase I data, showing the kinds of rural industries, by location, the magnitude of each type, pointing out changes (if any) in previous sectoral ranking, and employment patterns, and identifying existing and new industries which need a more detailed study. By the end of July, the consultant will present another report showing the key economic ratios and the implications of such ratios for employment, choice of techniques of production in rural industry and project identification. In November 1977, the consultant shall have undertaken some of the case studies, and reports should be submitted at this time, highlighting the socio-economic, technological infrastructural and marketing constraints relating to rural industries. The implications of these analyses for project development should be emphasized as shown in Table 9-1. A few months after the input-output data shall have been assembled, coded, keypunched and analysed, the consultant will submit another report on the preliminary findings, relating to the growth and linkages and the implications of such findings for project identification. In addition the consultant will also present monthly progress reports to both AID and the Government concerning the conduct of the study. By the end of the study, projects that need AID financing for development and improvement should be identified as shown in Section 9.2.3 of this scope of work, and all the necessary information for implementing Phase III study should also be provided.

9.6 Funding and Support

1. As noted in Section 9.1 of this chapter, all funds for performance of the services hereunder, both for US dollar and Bangladesh Taka expenses will be financed by AID Loan 388-0031. Accordingly, the Consultant will be reimbursed by AID in US dollars for all authorized foreign exchange and Bangladesh Taka expenditures incurred in performing the above services, said Bangladesh taka expenditures to be reimbursed on the basis of the Consultant purchasing such Taka at a bank in Bangladesh and providing appropriate receipts therefor.

2. In addition the Government will provide the following support to the Consultant:

a. provide all available maps, drawings, data, reports and any other information pertinent to the services to be performed;

b. provide all necessary computer facilities for data editing, processing and analysis;

c. provide access to all areas in Bangladesh necessary for the Consultant to visit in performance of the services;

d. assist the Consultant and the Consultant's non-Bangladesh personnel in arranging for necessary permits for tax and Customs free import of spirits, food-stuffs, cigarettes and consumable personal effects up to the limits prescribed by the Government for persons of such privileged status under the laws of Bangladesh;

e. exempt any taxes, duties, fees, levies or other impositions imposed under Bangladesh laws and regulations on the Consultant and Consultant personnel and dependents (other than personnel or dependents who are citizens or permanent residents of Bangladesh) in respect of:

(i) any payments made to the Consultant or to such personnel in connection with the carrying out of the services;

(ii) any equipment, materials and supplies brought into Bangladesh for the purpose of carrying out the services and which will subsequently be withdrawn therefrom; and

(iii) any property brought into Bangladesh by personnel of the Consultant and dependents for personal use and which will subsequently be withdrawn therefrom upon departure of such personnel and dependents, however, to qualify for these exemptions, shipment of such property will have to be arranged no later than three months after the arrival of the Consultant personnel.

f. facilitate prompt clearance through Customs of any equipment, materials and supplies required for the services and of the personal effects of the Consultant's personnel and dependents;

g. ensure that the Consultant's personnel and dependents are promptly provided with any necessary entry and exit visas, residence permits, exchange permits and travel documents required for staying in Bangladesh; and

h. issue all necessary permits and authorizations for the carrying out of the services.

APPENDIX 3-1

Relative Magnitudes and Economic Ratios of Small Scale Industrial Sectors in Bangladesh, 1961

Sector	Number of Establishments %	Employment %	Value added[1/] %	Output-Capital Ratio[2/]	Labor-Capital Ratio
1. Agriculture & Food Products	40	30	37	1.3	.0004
2. Cane, Bamboo and Wood Products	5	5	4	1.8	.0009
3. Glass & Ceramics	3	13	9	5.2	.003
4. Leather, Rubber & Plastic Products	3	3	5	4.0	.001
5. Metal Works	10	11	10	.9	.0004
6. Paper & Paper Products	1	.9	.8	1.7	.0009
7. Pharmaceutical Chemical and Cosmetics	3	3	3	17.1	.0007
8. Textiles	34	33	29	2.9	.001
9. Miscellaneous	1	1	1	2.0	.001
Total Percentages[1/]	100	99.9	98.8		

1/ Owing to the deficiency of available data, the value-added figure utilized for computing the percentages in Appendices 3-1 to 3-11 refer to the difference between gross output values and values of raw materials.

2/ For Appendices 3-1 to 3-11 output and capital were measured in million Rupees.

3/ Due to approximations, the total percentages may not add up exactly to 100 for Appencices 3-1 to 3-11.

Source: East Pakistan, Government of, 1962. "Survey of Small Scale Industries in East Pakistan", Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-2

Relative Magnitudes of Small Scale Industrial Sectors by Number of Firms and Employment, 1969

Sector	Number of Firms		Employment		Value-added	
	Number	%	Number	%	Million Rupees	%
1. Food Manufacturing	86,002	26	206,038	24	237.5	17.4
2. Beverage	63	0	63	0		
3. Tobacco Manufacturing 1/	2,798	.8	5,720	.7	225.1	16.5
4. Textile Manufacturing	90,748	27	330,838	38	607.7	44.6
55. Footwear, Wearing apparel	19,418	6	30,550	4	11.4	.8
6. Wood Cork Manufacturing	49,921	15	100,060	12	2.9	.2
7. Furniture Manufacturing	16,999	5	31,910	4		
8. Paper and Paper Products	892	.3	2,303	.3	25.9	1.9
9. Leather Products	4,886	2	10,015	1	14.4	1
10. Chemical and Chemical Products	742	.2	1,186	0	131.2	9.6
11. Nonmetalic Mineral	25,198	8	84,207	10	16.9	1.2
12. Metal Products	11,535	3	20,635	2	14.6	1.0
13. Machinery	4,411	1	8,182	.9	14.4	1.0
14. Transport Equipment	5,490	2	14,212	2	19.1	1.4
15. Miscellaneous	11,327	3	17,659	2	40.5	2.9
Total	330,435	99.3	836,578	100.9	1361.6	99.5

1/ Figures refer to 1969/70 period. Source of data is Statistical Digest of Bangladesh, 1970-71, Census of Manufacturing Industries, 1969/70.

Source: Bangladesh, Government of, 1970. "Report on the Survey of Small and Household Industries in Bangladesh, 1970", Dacca-2: Bureau of Statistics.

APPENDIX 3-3

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types and Key Locations

Agriculture and Food Sector, 1961

	Industrial Type	No. of Establishment %	Employment %	Value Added %	C/K	L/K	Key Locations
1.	Cafeenus	.4	.4	.2	4.9	.004	Dacca, Pabna, Rajshahi
2.	Jute Baling	4	11	18	1.9	.0003	Rangpur, Bogra
3.	Lac and Shellac	.1	.1	0	2.3	.003	Rajshahi
4.	Dairy Products	.2	.2	0	2.1	.0008	Dacca, Mymensingh
5.	Ice Cream	.8	.8	1	.9	.0003	Dacca, Chittagong
6.	Fruit Canning	.1	.1	0	1.8	.0007	Chittagong
7.	Ginger Drying	1	.1	.2	1.0	.0002	Chittagong, Nilphamari
8.	Fish Canning	.6	.7	0	1.3	.004	Dacca, Khulna, Barisal
9.	Fish Drying	1	1	.3	4.3	.005	Chittagong, Khulna
10.	Dal Mill	.3	.4	.4	.8	.0003	Comilla, Dinajpur, Rajshahi
11.	Flower Mill	7	7	10	1.9	.0004	Dacca, Chittagong
12.	Other Grain Mills	18	17	18	.9	.0003	Faridpur, Chittagong
13.	Oil Mill	1	3	5	1.0	.0002	Comilla, Mymensingh Noakhali, Chittagong
14.	Rice Mill	42	31	14	.6	.0005	Comilla, Khulna All over
15.	Bakery	14	18	26	4.8	.001	All over
16.	Gur Making	.4	.8	.4	11.8	.004	Chittagong, Khulna, Rajshahi
17.	Sugar	.1	.1	.1	.4	.0002	Kushtia, Dacca, Barisal
18.	Confectionery	.7	1	.9	3.3	.001	Mymensingh, Chittagong, Pabna, Dacca
19.	Salt Crushing	.3	.9	1	7.8	.002	Chittagong, Noakhali
20.	Shoti Food	.1	.1	.1	6.2	.003	Mymensingh, Pabna
21.	Sweet Meat	.7	5	3	1.4	.001	
22.	Beverage	.3	.4	.4	1.0	.0004	Chittagong, Dacca, Comilla, Khulna
23.	Cigar & Cheroot	.3	.3	.3	1.1	.001	Chittagong, Haragacha
24.	Hukkah Tobacco	.1	.1	.1	7.6	.003	Sylhet, Bogra, Rangpur
25.	Zarda	.3	.3	.3	1.0	.0006	Dacca, Comilla, Rajshahi, Rangpur, Pabna
26.	Ice Factory	.2	.4	.4	.5	.0002	Dacca, Mymensingh Faridpur, Dinajpur
	Total Percentage	99.4	102	100.1			

Source: East Pakistan, Government of, 1962. "Survey of Small Scale Industries in East Pakistan", Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3.4

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types and Key Locations

Cane, Bamboo & Wood Products, 1961

Industrial Type	No. of Establishment %	Employment %	Value added %	O/K	L/K	Key locations
1. Bamboo products	6	7	2	3.2	.007	Sylhet, Mymensingh, Comilla, Dacca.
2. Boat Building	8	6	4	3.1	.002	Southern Districts.
3. Bobbins & shuttles	1	2	2	1.2	.0007	Dacca, Chittagong, Khulna
4. Cane Products	5	4	1	3.2	.006	Sylhet, Comilla, Chittagong, Vikrampur.
5. Hukka making	1	1	.5	1.2	.001	Dacca, Khulna
6. Other Wood Products	14	11	9	2.6	.002	Rangpur, Chittagong, Dacca, Comilla.
7. Saw Mills	22	30	55	1.5	.0004	Chittagong, Dacca, Khulna, Faridpur, Rajshahi.
8. Sports goods	.5	.3	.4	2.9	.001	Dacca
9. Umbrella handle	2	2	.8	1.1	.001	Comilla, Sylhet, Dacca.
10. Wooden Furniture	37	34	22	2.3	.002	Rajshahi, Khulna, Mymensingh, Comilla.
11. Bus, Rickshaw and Launch body building	3	2	4	2.4	.0007	
Total Percentage	99.5	99.3	100.7			

Source: East Pakistan, Government of 1962 "Survey of Small Scale Industries in East Pakistan".

Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-5

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types and Key Locations

Glass and Ceramics, 1961

Industrial Type	No. of Establishment %	Employment %	Value added	O/K	L/K	Key locations
1. Bricks and Tiles	58	89	87	6.9	.004	Dacca, Rajshahi, Faridpur, Comilla, Chittagong.
2. Sanitary wares	1	.5	4	7.2	.0006	Dacca, Chittagong
3. Glass, Mirror and Ampules	9	3	5	2.4	.0009	Dacca, Chittagong, Noakhali, Bogra.
4. Optical Glass	2	.6	1	1.5	.0004	-
5. Pottery	14	3	.7	1.5	.004	Pabna, Dacca, Chittagong, Faridpur, Khulna
6. Cement Products	14	3	2	.9	.009	Mymensingh, Rajshahi, Dacca.
7. Chalk manufacturing	.2	0	0	.4	.0005	Dacca, Bogra
8. Shill Patta	.1	0	0	21.7	.013	Noakhali
9. Slate and Slate Pencil	1	.4	.5	1.5	.0008	Dacca, Sylhet
Total Percentages	99.3	99.5	100.2			

Source: East Pakistan Government of 1962 "Survey of Small Scale Industries in East Pakistan".

Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-6

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types in Bangladesh and Key Locations

Leather, Rubber and Plastic Products: 1961

Industrial Types	No. of Establishments %	Employment %	Value added %	O/K	L/K	Key Locations
1. Footwear	42	38	36	6.9	.002	Dacca, Chittagong, Sylhet, Dinajpur
. Hides & Skins Curing	3	2	6	6.0	.0006	Chittagong, Mymensingh Rajshahi, Barisal
3. Tannery	18	22	25	2.6	.0004	Dacca, Rangpur, Chittagong
4. Other Leather products	22	21	23	10.3	.002	Dacca, Chittagong, Comilla.
5. Rubber Products	3	3	1	4.0	.003	Dacca, Chittagong, Barisal, Faridpur.
6. Comb and Button	3	4	6	.4	.0007	Dacca, Jessore
7. Plastic Products	8	10	4	1.1	.0007	Dacca, Chittagong, Rajshahi
Total Percentages	99	100	101			

Source: East Pakistan Government of 1962 "Survey of Small Scale Industries in East Pakistan",

Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-7

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types and Key Locations

Metal Works, 1961

	Industrial Types	No. of Establishment %	Employment %	Value added %	C/K	L/K	Key Locations
1.	Steel Furniture	3	4	4	.8	.0004	Dacca, Chittagong
2.	Printing Press	39	32	28	.6	.0003	Dacca, Chittagong, Mymensingh, Comilla Rajshahi, Noakhali, Khulna
3.	Aluminium Prc.	.6	1	.6	.6	.0004	Dacca, Sylhet, Bogra
4.	Blacksmithy	3	1	2	13.6	.006	Dacca, Chittagong Hill Tracts, Sylhet, Rajshahi
5.	Block Making	1	1	.9	1.1	.006	Dacca, Noakhali
6.	Bolts & Nuts	.1	0	0	.05	.0004	Dacca
7.	Brass Works	7	5	4	2.5	.002	Dacca, Mymensingh
8.	Buckets & Ridging	.8	1	1	2.2	.001	Dacca, Chittagong, Comilla
9.	Chalk making	.8	1	.8	2.6	.002	Dacca
10.	Electrc Plating	2	1	1	1.2	.0005	Dacca, Chittagong
11.	General Engineering	2	20	23	.7	.0003	Dacca, Chittagong, Khulna, Sylhet, Jessore, Kushtia.
12.	Huricane Lamp & Lantern	.1	0	0	1.7	.0009	Dacca
13.	Hair clips & needles	.1	.1	.3	5.9	.001	Dacca, Chittagong
14.	Locks &Padlocks	.1	0	0	1.9	.002	Dacca
15.	Other Metal Prod.	7	11	16	1.5	.0005	Chittagong, Dacca, Bogra, Pabna, Rajshahi.
16.	Trunk & Suitcase	7	5	4	1.1	.0006	Chittagong, Dacca, Mymensingh, Sylhet Jessore, Barisal
17	Tin container	1	1	.9	3.1	.002	-
18.	Wire Netting	1	1	.6	.7	.0007	Dacca, Chittagong
19.	Ag. Implements	.1	.1	0	1.1	.0002	Dacca, Chittagong
20.	Repairing of Rickshaw, Automobile	5	4	3	1.6	.001	Dacca, Chittagong, Sylhet, Jessore
21.	Watch repairing	2	1	.6	1.1	.0008	Dacca, Sylhet
22.	Jewelry	17	8	10	1.9	.0008	Dacca, Khulna, Kushtia, Comilla Rangpur, Barisal, Chittagong.
	Total Percentage	99.7	98.1	100.7			

Source: East Pakistan Government of 1962 Survey of Small Scale Industries in East Pakistan', Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-8

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types in Bangladesh and Key Locations:

Paper and Paper Products, 1961

Industrial Type	No. of Establishments %	Employment %	Value added	O/K	L/K	Key Locations
1. Hard Board and Box making	22	33	32	1.3	.0007	Dacca, Chittagong
2. Book Binding	67	59	58	2.6	.001	Dacca, Chittagong, Barisal, Sylhet
3. Other Paper Products	9	8	9	3.0	.001	Dacca
4. Playing Cards	.9	.5	.6	2.7	.001	Dacca
Total Percentage	99	100.5	99.6			

Source: East Pakistan Government of 1962 "Survey of Small Scale Industries in East Pakistan".

Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-9

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types in Bangladesh and Key Locations:

Pharmaceuticals, Chemicals & Cosmatics, 1961

Industrial Type	No.of Establish-ments %	Employ-ment %	Value added	O/K	L/K	Key Locations
1. Agar Bati making	1	2	.9	2.1	.002	Dacca, Rangpur, Mymensingh.
2. Boot polish	.3	.2	.1	5.0	.003	Dacca
3. Candle making	3	2	2	2.2	.0009	Dacca, Sylhet, Bogra.
4. Cosmetics	1	1	2	1.0	.0002	Dacca, Rangpur.
5. Fireworks	1	2	2	.4	.0001	Dacca, Mymensingh
6. Hair oil	3	2	4	3.4	.0007	Dacca, Sylhet, Comilla
7. Ink	3	3	2	1.0	.0006	Dacca, Bogra, Chittagong.
8. Lime & Lime Products	28	22	23	31.4	.012	Chattak in Sylhet
9. Medicine	15	20	19	1.8	.0008	Chittagong
10. Other chemical products	11	14	15	1.8	.0007	Dacca, Chittagong, Comilla
11. Paint and Varnish	.6	.6	2	10.4	.002	Dacca, Chittagong
12. Perfumery	5	4	2	.8	.0006	Dacca, Khulna, Mymensingh, Chittagong
13. Soap factory	26	26	24	1.1	.0005	Dacca, Mymensingh, Rangpur, Chittagong.
14. Battery	1	2	2	2.6	.0009	
Total percentage	99	100.8	100			

Source: East Pakistan Government of 1962 "Survey of Small Scale Industries in East Pakistan," Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-10

Relative Magnitudes and Economic Ratios of Small Scale Industries Types in Bangladesh and Key Locations:

Textile Sector 1961

Industrial Type	No. of Establi-shments %	Employ-ment %	Value added %	O/K	L/K	Key Locations
1. Silk Products	.5	.8	.9	3.3	.001	Rajshahi
2. Cotton Products	0	0	0	.4	.0003	Dacca
3. Dyeing of Yarn	5	6	10	8.2	.002	Dacca, Comilla, Chittagong
4. Handloom	68	68	59	2.8	.002	Narayanganj, Pabna, Tangail, Chittagong & Comilla
5. Jamdani Products	.3	.8	.4	4.9	.005	Nowapara and Rupsi areas of Narayanganj
6. Mantle Making	0	0	0	2.0	.0008	Dacca
7. Printing of Cloth	.5	1	.5	1.1	.001	Comilla, Chittagong and Dacca.
8. Tape and Braid	.2	.3	.3	.6	.0003	Dacca
9. Hosiery	9	9	13	1.7	.0006	Narayanganj & Pabna.
10. Socks	.3	.2	.1	2.0	.002	Dacca, Bogra.
11. Hemp Ropes	.6	.5	.3	12.9	.010	Dacca
12. Jute Products	0	0	.3	.5	.0002	Chittagong
13. Mosquito Net	0	.1	.1	.6	.0003	Barisal, Bogra
14. Coir Products	.2	.3	.1	1.4	.002	Chittagong, Barisal, Khulna
15. Thread Spinning	.4	.5	1	2.8	.0005	Chittagong, Dacca
16. Cap Making	0	.1	.2	1.8	.0007	Dacca, Chittagong
17. Ready made Garments	4	3	6	6.8	.002	Chittagong, Faridpur, Dacca, Bogra
18. Tailoring	10	8	6	3.6	.002	Khulna, Barisal, Dacca Jessore, Chittagong, Rangpur
19. Embroidery	.5	.4	.3	1.7	.001	
20. Laundary	.4	.4	.3	.5	.004	Dacca, Khulna, Mymensingh
Total Percentage	99.9	99.4	98.8			

Source: East Pakistan Government of 1962 "Survey of Small Scale Industries in East Pakistan," Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 3-II

Relative Magnitudes and Economic Ratios of Small Scale Industrial Types in Bangladesh and Key Locations:

Miscellaneous Industries, 1961

Industrial Type	No. of Establishment %	Employment %	Value Added %	O/K	L/K	Key Locations
Umbrella	39	57	61	2.7	.001	Chittagong, Dacca Khulna, Faridpur
2. Musical Instruments	2	2	2	5.4	.003	Chittagong, Dacca
3. Conch shell Products	2	2	.5	.5	.0008	Dacca, Khulna
4. Horn Products	3	1	.6	.6	.0006	Dacca, Sylhet
5. Art and Painting	10	7	6	2.4	.001	Dacca, Chittagong
6. Photo Binding	9	7	5	10.1	.007	Dacca, Rangpur, Barisal.
7. Photography	36	24	24	1.1	.0006	Dacca, Chittagong, Sylhet, Comilla.
Total Percentage	101	100	99.1			

Source: East Pakistan, Government of 1962 "Survey of Small Scale Industries in East Pakistan". Dacca: East Pakistan Small Scale Industries Corporation.

APPENDIX 4-1

QUESTIONNAIRE SET

FORM IA

Phase I Survey of Rural Industries in Bangladesh

Thana_____ Is there bazaar or hat? Name of Supervisor_____

Union Council_____ Yes/____/ No/____/ Name of Enumerator_____

Village_____ Date Started_____ Date Completed_____

Serial No.	Type of Industry	Household Identification (Name of Proprietor)	Workshop Description			Number of Workers 1/												Child	Total	No. of Machines used		Remarks
			Pucca	Katcha	Temporary	Proprietor		Family				Hired				Trainee Apprentice				Powered	Non Powered	
						M	W	FT		PT		FT		PT		M	W					
								M	W	M	W	M	W	M	W							

1/ M = Man W = Woman FT = Full-time PT = Part-time

Phase II Rural Industry Survey

Form I Inventory of Buildings (Twice Yearly)

Thana_____ Enterprise_____ Name of Supervisor_____

Union Council_____ Establishment No._____ _____

Village_____ Date of Visit_____ Name of Enumerator. _____

Dimension of Floor Space	Kinds of Material Built of or Description	Year Built	Value, when Built (Tk)	Value if Bought now (Tk)	Monthly Rental Value (Tk)	Do You Live in This Building or Premises of Building (Yes or No)
(a)	(b)	(c)	(d)	(e)	(f)	(g)

Phase I Rural Industry Survey

Twice Yearly

Form 2 Inventory of Equipment and Furniture

Thana_____

Union Council_____

Village_____

Enterprise_____

Establishment No._____

Date of Visit_____

Name of Supervisor_____

Name of Enumerator_____

Type	No.	Source of Equipment or Brand Name	Place of Purchase	Year Bought or Made: New Yr.	Year Bought or Made: Used Yr.	How Old When Bought	Unit Purchase Price If Bought (Tk.)	(Tk.)	How Many More Years Do You Expect to Use Equipment?	Price of a New One Purchased Currently (Tk.)	Monthly Rental (or Imputed) (Tk.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)

Phase I Rural Industry Survey

Form 3 Inventory of Materials, Output, Cash and Debt Obligations
Twice Yearly

Thana_____	Enterprise_____	Name of Supervisor_____
Union Council_____	Establishment No_____	Name of Enumerator_____
Village_____	Date of Visit_____	

Item	Quantity		Value	
	Unit	No	Tk	Paisa
(a)	(b)	(c)	(d)	(e)
Output				
Material Inputs				
Cash on hand				
Cash in Savings				
Outstanding debt				
Work-in-progress 1/				

Form 1 Labor Input Data (Twice Weekly)

Phase II Rural Industry Survey

Thana _____

Union Council _____

Village _____

Enterprise _____

Establishment No. _____

Name of Supervisor _____

Name of Enumerator _____

1st Day of Visit _____

2nd Day of Visit _____

Date	Time Opened	Time Closed	Name of Worker (List)	Type of Workers	Sex	Item 1/ or Activity (List)	Qt.	Date Begin	Date End	Hrs.	Item or Activity (List)	Qt.	Date Begin	Date End	Hrs	Item or Activity (List)	Qt.	Date Begin	Date End	Hrs.	Daily Wages Cash (Tk)	Kind Item	Kind Qt.
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)

1/ List item produced or worked on by each workers. 2/ Use P for Proprietor, F for Family Labor, H for Hired Labor and A for Apprentices

Form 5 Output Data (TWICE WEEKLY) Phase II Rural Industry Survey

Thana _____

Union Council _____

Village _____

Enterprise _____

Establishment No. _____

Name of Supervisor _____

Name of Enumerator _____

1st Day of Visit _____

2nd Day of Visit _____

Date	Item	Total Sales Output						Type of Purchaser	Destination of Purchaser	Consumption Within Establishment		Gifts				Amount	
		Quantity		Cash		Credit											
		Unit	No.	Qt.	Value (Tk)	Qt.	Value (Tk)			Qt.	Value (Tk)	Qt.	Value (Tk.)	Type of Recipient	Location of Recipient	Qt.	V
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(

Form 5B Rice Output Data (Twice Weekly)

Thana _____

Union Council _____

Village _____

Enterprise _____

Establishment No. _____

Name of Supervisor _____

Name of Enumerator _____

1st Day of Visit _____

2nd Day of Visit _____

Date	Down time a/ hr	Quantity of Husk Rice Milled			Milling Fee Tk.	No. of Custom-ers	Origin of Husk rice	Destination of Milled rice	Disposal of bye products b/			Purchaser of Bye-products	
		Type raw/boiled	Qty. Unit	No					Type	Quantity Unit	No	Type of purchaser c/	Destination

a/ Time mill under repairs, maintenance, without electricity etc. during that particular day

b/ Bran etc. c/ Farmer, Private Firm etc.

Form 6 Miscellaneous Input Data (WEEKLY) Phase II Rural Industry Survey

Thana _____

Union Council _____

Village _____

Enterprise _____

Establishment No. _____

Name of Supervisor _____

Name of Enumerator _____

Date of Visit _____

Item	Origin or Brand Name	Cash			Credit			Purchased From	Location of Seller
		Quantity		Value (Tk)	Quantity		Value Tk.		
		Unit	No.		Unit	No.			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
1. Raw materials.									
2. Lubricants									
3. Fuel									
4. Transportation costs									
5. Office supplies									
6. Repair & Maintenance									
7. Spare parts									
8. Commissions									
9. Bonus									
10. Other (specify)									

Form 6 - CONTINUED MISCELLANEOUS INPUT DATA (Monthly)

Item	Origin of Brand Name	Cash Quantity Unit	Cash Quantity No.	Cash Value (Tk.)	Credit Unit	Credit No.	Credit Value (Tk.)	Purchased From	Location of Seller
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
(Monthly)									
11. Electricity bill (How many kilowats?)									
12. Rent on equipment									
13. Rent on building									
14. Telephone bill									
15. Water rate									
16. Monthly wages and salaries									

Type of Worker 1/	Name of worker	SEX	Schedule 2/	Cash (Tk.)	Wages Paid In Kind (Check if Relevant) Lodging (✓)	Food (✓)

1/ Indicate whether hired or apprentice
2/ Indicate whether fulltime or parttime

Phase II Rural Industry Survey

Form 7 Financial Information MONTHLY

Thana _____ Enterprise _____ Name of Supervisor _____

Union Council _____ Establishment No. ____ Name of Enumerator _____

Date of Visit _____

Date of Transaction	Source of Borrowing	Purpose	Amount (Tk.)	Down-Payment (Tk.)	Stated Interest Rate	Duration Months)	Repayment Schedule (Amount Per Month)	Total Amount to be Paid (Tk.)

Phase II Rural Industry Survey

Form 8 General Characteristics of Enterprenaur

Thana _____ Enterprise _____ Name of Supervisor _____

Union Council _____ Establishment No. _____ Name of Enumerator _____

Village _____

Date Completed _____

Name of Proprietors (1) _____

(2) _____ (Name of Manager)

(3) _____

1. Nationality _____
2. Tribe _____
3. Age _____
4. Place of birth _____
5. Last place of residence _____
6. Hindu/Christian/Moslim/Neither _____
7. Single/Married/Separated/Widowed _____
8. Number of Children _____
9. Father's major occupation _____
10. Father's previous occupation _____
11. Mother's major occupation _____
12. Mother's previous occupation _____
13. Level of education:
    (a) No schooling Yes [ ] No [ ]
    (b) Level of primary school education completed _____
    (c) Level of secondary school education completed _____
    (d) Number of years of adult education _____
    (e) Other (specify) _____
14. What other training did you have?
    (a) Trade school? Yes [ ] No [ ]
    (b) Other specify _____

15. Which year did you establish this business? _____

16. What was your previous occupation, if any? _____

17. What were your reasons for joining this business?

(a) Hope of making more money (Profits)? Yes ☐ No ☐

(b) Family enterprise? Yes ☐ No ☐

(c) Previous experience? Yes ☐ No ☐

(d) Father's major occupation? Yes ☐ No ☐

(e) Prestige among my people? Yes ☐ No ☐

(f) Personal security? Yes ☐ No ☐

(g) Other (specify) _____

18. Were you apprenticed before? Yes ☐ No ☐

19. If yes, in which enterprise? _____

20. And for how long? _____

21. What form of ownership is your business?

(a) Individual Yes ☐ No ☐

(b) Partnership Yes ☐ No ☐

(c) Cooperative Yes ☐ No ☐

(d) Private company Yes ☐ No ☐

(e) Family Yes ☐ No ☐

22. What other business do you own or operate? _____

23. Does the owner manage the day-to-day operations of the firm? Yes ☐ No ☐

24. How much initial capital did you have to start this business? Tk. _____

25. What were the sources of this initial capital

	How Much?
(a) Personal savings from	
(i) Agriculture	Tk. _____
(ii) Government employment	_____
(iii) Trade	_____
(iv) Business	_____
(v) Other (specify)	_____
(b) Loans from	
(i) Commercial banks	_____
(ii) Janata Bank	_____
(iii) Bangladesh Shilpa Bank	_____
(iv) Bangladesh Small Scale and Cottage Industries Corporation	_____
(v) Friends	_____
(vi) Money lenders	_____
(vii) Family	_____
(viii) Cooperatives	_____
(ix) Others (specify)	_____
(c) Gifts	_____
(d) Partnership	_____
(e) Others (specify)	_____

26. Since you established this business, have you increased your original size? Yes ☐ No ☐

If yes, what were the sources of the funds used for the expansion and how much?

Source	How much?
(a) Reinvested profits?	Tk. _____
(b) Got loans from government development bank?	_____
(c) Got loans from commercial banks?	_____
(d) Got loans from the cooperatives?	_____
(e) Got loans from money lenders?	_____
(f) Other (specify) _____	_____

27. Do you plan to expand this business in the next one year? Yes ☐ No ☐

28. From what sources do you expect to get the funds for this future expansion?

(a) Reinvestment of profits _____

(b) Loan from the government _____

(c) Loan from commercial banks _____

(d) Others (specify) _____

29. How many hours do you work every day? _____

30. If you had enough customers to purchase all your products and you had all the raw materials you needed, with your existing equipment and buildings:

(a) How many more hours would you work? _____

(b) How many more workers would you hire? _____

31. Have you ever applied for government assistance? Yes ☐ No ☐

32. If yes, did you obtain the assistance? Yes ☐ No ☐

33. Into what uses did you put the assistance?

(a) Buy new equipment Yes ☐ No ☐

(b) Provide working capital Yes ☐ No ☐

(c) Set up buildings Yes ☐ No ☐

(d) Other (specify) Yes ☐ No ☐

34. If you have not applied for government assistance, why not?

_____

_____

35. What types of assistance do you think that the government should give to business men?

(a) _____

(b) _____

(c) _____

36. Has your output increased, decreased or remained the same compared with:

(a) Last one year? _____

(b) Last five years? _____

37. What of the following changes have taken place since your firm was established?

(a)	Established other branches?	Yes ☐	No ☐
(b)	Expanded your original size?	Yes ☐	No ☐
(c)	Rebuilt your establishment?	Yes ☐	No ☐
(d)	Bought better machines?	Yes ☐	No ☐
(e)	Introduced new products or activities?	Yes ☐	No ☐
(f)	Introduced better marketing arrangements?	Yes ☐	No ☐

38. What have been the difficulties in building up this business?

(a) Insufficient demand _____

(b) Lack of technical advice _____

(c) Troubles with equipment _____

(d) Lack of skilled labor _____

(e) Lack of good roads _____

(f) Lack of capital for building and equipment _____

(g) Lack of capital for purchasing materials _____

(h) Unfavorable weather _____

(i) Scarcity of spare parts _____

(j) Lack of materials (specify) _____

(k) High cost of equipment and materials _____

(l) Lack of electricity supply _____

(m) Other (specify) _____

39. Which of the above is the greatest difficulty? _____

_____

40. What is the duration of apprenticeship in this business?

_____

41. Do you charge any learning fee? Yes ☐ No ☐

42. If yes, how much? Tk. _____

43. Has the number of firms in your industry in this locality increased, decreased or remained the same compared with:

(a) Last one year? _____

(b) Last five years? _____

44. Do you keep record of your purchases and sales? Yes ☐ No ☐

45. If no, why not? _____

_____

46. If yes, what record books do you have?

(a) _____

(b) _____

(c) _____

47. Do you keep records of depreciation of your buildings and equipment? Yes ☐ No ☐

If yes, what was the depreciation figure for the past year? Tk. _____

48. What is the source of your electricity for your business?

_____

49. How many days during the past month were you without adequate electricity?

_____

50. What other difficulties have you experienced with your electricity?

_____

_____

51. What is the source of your water for your business?

_____

52. How many days during the past month were you without adequate water?

_____

53. What other difficulties have you experienced with your water supply?

_____

_____

54. How often do you try to find out if you are gaining or losing in your business?

(a) Every day? Yes ☐ No ☐

(b) Once a week? Yes ☐ No ☐

(c) Once every two weeks? Yes ☐ No ☐

(d) Once a month? Yes ☐ No ☐

(e) Other(specify) _____ Yes ☐ No ☐

_____

(f) None of the above

55. Do you have an account in any bank? Yes ☐ No ☐

56. If yes, what type of account?

Savings account? Yes ☐ No ☐

Current account? Yes ☐ No ☐

57. Have you ever attempted to obtain loans from any bank? Yes ____ No ____

58. If yes, did you get the loans? Yes ____ No ____

59. If you have not attempted to borrow money from any bank, why not?

_____

_____

60. Have you ever exported your products outside Bangladesh? Yes ____ No ____

61. If yes, through what channels did you export such products? _____

_____ and

to which countries? _____

62. What problems (if any) did you encounter while exporting your products? _____

_____

_____

63. If "No" to 60, why have you not exported your products to foreign countries?

_____

_____

64. Are you using any imported inputs for which there are local substitutes?

Imported Input	Local Substitute
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____

APPENDIX 4-2

Frequency Distribution for the total number of workers employed per enterprise in the fifteen union councils[1/] of Tangail thana, Tangail district

No. of workers	Pathrail	Charindra	Karotia	Alasdin	Dalmye	Sillimpur	Gala	Hogra	Baghil	Kakua	Hugla	Katuli	Fazilha	Atia	Dulduar	Sum of frequency	Product of sum of frequency & observation	Product of sum of frequency and square observation
xi	f_1	f_2	f_3	f_4	f_5	f_6	f_7	f_8	f_9	f_{10}	f_{11}	f_{12}	f_{13}	f_{14}	f_{15}	fi	fixi	$fixi^2$
1	-	-	32	23	7	16	5	3	15	1	2	-	-	2	8	114	114	114
2	75	80	86	42	59	30	52	14	71	34	45	6	1	31	19	646	1292	2584
3	33	99	68	28	44	72	30	7	42	9	34	16	12	37	22	603	1809	5427
4	59	89	40	17	33	83	25	11	38	69	33	7	34	35	23	605	2420	9664
5	20	71	21	12	11	85	16	10	27	72	28	6	19	35	20	453	2265	11325
6	1	45	6	14	12	45	11	8	20	16	18	7	15	30	11	259	1554	9324
7	1	19	2	3	3	36	4	4	15	15	3	3	11	15	10	145	1015	7105
8	-	13	2	4	2	15	1	3	9	17	4	2	11	8	7	107	856	6848
9	-	9	1	3	2	12	3	1	4	10	2	-	4	3	6	60	540	4860
10	-	5	-	1	1	3	-	-	2	13	2	-	2	3	4	37	370	3700
11	-	4	-	-	-	2	-	1	-	3	1	-	2	1	3	16	176	1936
12	-	-	-	-	-	4	-	-	-	5	1	-	-	-	-	11	132	1331
13	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	3	39	507
14	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	14	196
15	-	-	-	-	1	-	-	-	-	-	1	-	-	1	1	4	60	900
16	-	1	-	-	2	1	-	-	-	2	1	2	-	-	-	9	144	2304
17	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	17	289
18	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	2	36	648
19	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	1	19	361
20	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	2	40	800
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	25	625
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	28	784
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	36	1296
36	-	-	-	-	-	-	-	-	-							3082	13001	67501

Note: xi = observed employment for each enterprise;
fi = frequency of occurence for each observation

1/ In three of the union councils, only 80% coverage was actually carried out due to communication problems.

APPENDIX 4-3

Frequency Distribution for the total number of workers employed per enterprise in the 10 union councils[1/] of Chandina thana, Comilla district

No. of workers	Shuilpur East	Shuilpur West	East Chandina	West Chandina	Maizkhar	Barera South	Mohichail	Barera North	South Sollai	Borkorai North	Sum of frequency	Product of sum of frequency & observation	Product of sum of frequency & squared observation
x_i	f_1	f_2	f_3	f_4	f_5	f_6	f_7	f_8	f_9	f_{10}	f_i	$f_i x_i$	$f_i x_i^2$
1	4	30	80	80	52	3	144	31	63	29	516	516	516
2	12	42	105	108	84	8	70	50	69	48	600	1206	2412
3	1	9	47	56	42	2	40	22	52	67	345	1035	3105
4	1	6	21	21	42	6	35	28	16	11	187	748	2992
5	-	3	23	6	11	8	10	6	6	5	78	390	1950
6	-	3	15	7	12	3	9	5	1	2	57	342	2052
7	-	1	6	6	3	2	7	2	1	-	28	196	1372
8	-	-	4	-	5	-	2	-	-	-	13	104	832
9	-	-	7	1	2	-	2	1	-	-	13	117	1053
10	-	-	7	2	1	-	2	2	-	-	14	140	1400
11	-	-	-	-	1	-	1	-	-	-	2	22	242
12	-	-	-	-	-	-	-	-	-	-	1	13	169
13	-	-	-	-	-	-	1	-	-	-	1	14	196
14	-	1	-	-	-	-	-	-	-	-	2	30	450
15	1	-	1	-	-	-	-	-	-	-	2	32	512
16	-	1	-	1	-	-	-	-	-	-	2	36	648
17	-	-	-	-	-	-	-	-	-	-	1	20	400
18	1	-	1	-	-	-	-	-	-	-	1	45	2025
19	-	-	-	-	-	-	-	-	-	-	1	47	2209
20	-	-	1	-	-	-	-	-	-	-	1	50	2500
											1865	4961	20301

Note: x_i = observed employment for each enterprise
f_i = frequency of occurence for each observation

1/ It is estimated that only about ≈67% coverage of Chandina thana was actually enumerated due to time limitation.

APPENDIX 4-4

Formulas for obtaining variance estimates[1/] and determining sample size

Tangail thana mean $= \bar{x}_i = \frac{\sum^{15} f_i x_i}{f_i} = 4.2$

Variance $= V(\bar{x}_i) = \frac{1}{f_i - 1}\left[\sum_{i=1}^{15} f_i x_i^2 - \frac{(\sum^{15} f_i x_i)^2}{f_i}\right] = 4.1$

Where x_i = observed employment for each enterprise

f_i = frequency of occurence for each observation

Likewise Chandina thana mean = 2.7

" " variance = 3.8

On the basis of Tangail thana variance estimate thana sample size is

equal to $n = \left(\frac{ts}{d}\right)^2$

Where n = approximate sample size

d = 10% = degree of tolerable error for the mean value (4.2) of employment per establishment,

t = approximately 2 = value of the normal distribution corresponding to F = .05 i.e., the risk we are prepared to take for which the actual error is greater than the specified degree of error, and

s = the estimated standard deviation $= \sqrt{V(\bar{x}_i)}$

thus $n = \left[\frac{(2)\ (2.024)}{.42}\right]^2 = 93$

If a 10 % rate of non-response is allowed[2/] the actual sample size

becomes $\frac{93}{.90} = 103$

1/ See Cochran 1963, p.27

2/ See Warwick and Linmger, 1975, p.112

APPENDIX 7-1

SS1-Code 2.7 Equipment Stock used for the Sierra Leone Study

100 TAILORING EQUIPMENT

101 Sewing machine (new)
102 Scissors
103 Screw Driver
104 Tape
105 Iron
106 Ironing Table
107 Spaner
108 Table
109 Ruler
110 Stools
111 Mirror
112 Tapon
113 Cupboard/box
114 Staple
115 Chairs
116 Thimble
117 Plyer
118 Berniner
119 Show case/wordrobe
120 Basket
121 Coal Pot
122
123 Settle
124 Sewing machine (used)
125
126
127
128 Others general
129 Others (used)

130 WEAVING EQUIPMENT

131 Loam
132
133
134
135
136
137
138
139

140 GARA EQUIPMENT

141 Drums
142 Sticks (Wooden)
143 Gloves
144 Enamel pan
145 Mats
146 Kettles
147 Spoon
148 Buckets
149 Board
150 Stamp
151 Rubber Gang
152
153 Machine
154 Mat
155 Pot
156 Basket
157
158
159 Others

160 CARPENTRY EQUIPMENT

161 Square
162 Bevel
163 Gauge
164 Steel Fule (Rule)
165 Plane
166 Saw
167 Knife
168 File
169

200 BLACKSMITH EQUIPMENT

201 Anvils
202 Tongs
203 Chiesel
204 Punches
205 Harmers
206 Vise
207 File
208 Forge

169 Chisel
170 Drill
171 Harmer
172 Oil Stone
173 Vise
174 Clamp
175 Wood pick
176 Working bench
177 Screw driver
178 Saw Bang

179 Spraying machine
180 Pulping machine
181 Uphostry machine
182 Pinches
183 Sharpending Stone
184 Welding machine
185 Spoke shave
186 Machine (Combination)
187 Machine (Compressor)
188 Wood motiser
189 Bar
190 Brush
191 Axe
192 Brace
193 Punch
194
195
196
197
198

199 Others

209 Shovel
210 Poker
211 Square
212 Wrench
213 Grinding Stone
214 Welding Plant
215 Drilling machine/hand drill
216 Blowing Fan/Bellows
217 Table/work bench
218 Chairs
219 Saw
220 Axe
221 Coke-fire
222 Rods
223 Hardy
224 Baster
225 Thistle
226 Cutter
227 Rail Slippers
228 Stone
229 Dice
230
231
232
233
234
235
236
237
238
239 Others

240 GOLDSMITH EQUIPMENT

241 Anvil
242 Tongs
243 Punches
244 Hammers
245 File
246 Vise
247 Picker
248 Player
249 Plate
250 Blowing pipe
251 Lamp
252 Bellows
253 Milling machine
254 Growing plate
255 Mole
256 Melting pot
257 Scale
258 Brush
259 Sheors
260 Coke fire

261 Forge
262 Rake
263 Spaner
264 Chiesel
265 Box
266 Table
267 Chair
268 Poker
269 Others

270 TINSMITH EQUIPMENT

271 Scissors
272 Ball Iron
273 Pillian
274 Sodering Iron
275 Hammer (new)
276 Point
277 File
278 Harmer (used)
279 Plyer
280 Tape rule
281 Chiesel
282 Stone
283 Tool box
284
285
286
287
288
289 Others

290 BAKERY EQUIPMENT

291 Mixer
292 Oven (electric)
293 Oven (mud)
294 Hand Divider
295 Roler
296 Cutter
297 Scale
298 Tray
299 Refrigerator
300 Table
301 Chair
302 Bucket/kettle
303 Tank
304 Counter
305 Bong
306 Slicing machine and wrapper
307 Cup
308 Drawer/safe
309 Stool
310 Blanche
311 Paddle
312 Brush
313 Iron Bar
314 Basin pan
315 Kneader
316 Composite (oven, Kneading machine etc.)
317 Knife
318 Cupboard
319 Others.

320 WATCH REPAIRING EQUIPMENT

321 Peaker
322 Magnifying glass
323 Screw Driver
324 Brush
325 Cliper
326 Plyer
327 File
328 Glass Cleaner
329 Blower
330 Opener
331 Knife/Cutter
332 Cleaning machine
333 Vise
334 Chair
335 Table
336 Stool
338
339 Others

340 RADIO REPAIR EQUIPMENT

341 Cutter
342 Screw Driver
343 Sodering Iron
344 Avo-metre
345 Hammer
346 Table Lamp
347 Sight glass
348 Plyers
349 Turn table motor
350 File
351 Scissors
352 Pinches
353 Knife
354 Kerosine stove
355 Pinches
356
357
358
359 Others

360 MOTOR REPAIR EQUIPMENT

361 Spaner
362 Allan key
363 Screw Driver
364 Stump key
365 Vise
366 Rimmer
367 Chiesel
368 File
369 Plyer
370
371 Drill
372 Clutch extractor
373 Filler gange
374 Carbide pot
375 Iron Block
376 Crease gun
377 Griding stone
378 Saw
379 Composite
380
381
382
383
384
385
386
387
388
389 Others

390 SHOE REPAIR EQUIPMENT

391 Knife
392 Hammer
393 Plyers
394 Chair
395 Table
396 Box
397 Machine Sharpner
398 Stone
399 Laso
400 Saw lap
401 Screw Driver
402 Claw Hammer
403 Board/Slate
404 Awl
405 File
406 Black
407 Hammering base/anvil
408 Magnetic Steel
409 Others

410 PHOTOGRAPHY EQUIPMENT

411 Camera
412 Stand
413 Traw
414 Plate
415 Dryer
416 Cutter
417 Enlarger
418 Reflector
419 Background
420 Show case
421 Cupboard
422 Chair
423 Table
424 Stool
425
426
427
428
429 Others

430 MATTRESS MAKING EQUIPMENT
- 431 Knife
- 432 Needle
- 433 Knife
- 434 Cutlass
- 435
- 436
- 437
- 438.
- 439 Others

440 TILE MAKING EQUIPMENT
- 441 Machine
- 442 Moulder
- 443 Spoon
- 444 Shovel
- 445 Iron Box
- 446 Wiper
- 447 Drums
- 448 Bucket
- 449 Head pan
- 450 Box
- 451 Spinner
- 452
- 453
- 454
- 455
- 456
- 457
- 458
- 459

460 PRINTING EQUIPMENT
- 461 Printing Machine
- 462 Gelotin
- 463 Setting stick
- 464 Types
- 465 Brass rules
- 466 Galley
- 467 Metal Furniture
- 468 Stappler
- 469 Clipping Machine
- 470 Chase
- 471 Imposing surface
- 472 Tables
- 473 Chairs
- 474 Stool
- 475 Key
- 476 Numbering machine
- 477 Lock
- 478
- 479
- 480

500 POT MAKING EQUIPMENT STOCK
- 501 Saw
- 502 File
- 503 Plyer
- 504 Hammer
- 505 Tong
- 506 Shovel
- 507 Point
- 508 Spoon
- 509 Matchet
- 510 Pot
- 511
- 512
- 513
- 514
- 515
- 516
- 517
- 518
- 519

520 BARBAR EQUIPMENT STOCK
- 521 Clippers
- 522 Brush
- 523 Comb
- 524 Scissors
- 525 Knife
- 526 Chair/Stool
- 627 Table
- 528 Mirror
- 529 Others

530 WELDING AND METAL WORK EQUIPMENT STOCK
- 531 Spanner
- 532 Jack
- 533 Hammer
- 534 Welding Plant
- 535 Rule/Ruler
- 536 Chiesel
- 537 Tape Diet
- 538 Arksan frame
- 539 Oxygen bottle
- 540
- 541
- 542
- 543
- 544
- 545
- 546
- 547
- 548
- 549 Others

APPENDIX 7-2

Coding Instructs for Equipment Stock used for the Sierra Leone Study

Column	Variable	Unit / Comment
1-2	Identification of Locality	SSI-Code 2.1
3-4	Identification of Enterprise	SSI-Code 2.2
5-8	Identification of Establishment	Establishment No.
9	The number 2	
10-12	Date of valuation	10-11 month 12 year; 4 for 1974, 5 for 1975
13	B	
14-16	Serial number equipment stock	Use columns 15 & 14 for serial numbering; code the number 9 in column 16 for last item of equipment stock.
17	B	
18-20	First item of equipment stock	SSI-Code 2.7
21	B	
22-24	Quantity	No.
25	B	
26-27	Source or origin	SSI-Code 2.4
28	B	
29-31	Place of Purchase	Code 1.6 Farm level coding manual
32	B	
33-34	Age of Equipment	Round to the nearest year
35	B	
36-40	Value of Equipment	Leones
41-42	Value of Equipment	Cents
43	B	
44-45	Time expected to last	Round up to nearest year
46	B	
47-51	Value of a new one in 1974	Leones
52-53	Value of a new one in 1974	Cents
54	B	
55-59	Value if sold now	Leones
60-61	Value if sold now	Cents
62	B	
63-65	Rental Value	Leones
66-67	Rental Value	Cents
68	B	
80	The number 2	

The next card continues with the second item of equipment

APPENDIX 7-3

Definitions for Tools and Equipment Stock used for the Sierra Leone Study

	Names		Codes from SSI - Code 2.7
1	TSM	Tailoring sewing machine	101, 124
2	TRT	Tailoring iron tools	102, 103, 105, 107, 112 116, 117, 118, 121, 123
3	TNT	Tailoring non-iron tools	104, 109, 114
4	TFT	Tailoring furniture	106, 108, 110, 111, 113 115, 119, 120
5	TER	Tailoring other equipment	128, 129
6	WLM	Weaving loom	131
7	OTW	Weaving others	132-139
8	GSM	Gara sew machines	153
9	GDM	Gara drums	141
10	GMT	Gara metal tools	144, 146, 147, 148
11	GWT	Gara wooden tools	142, 149, 150
12	GER	Other gara equipment	143, 145, 151, 154, 155 156, 159, 157, 158
13	CSM	Carpentry spraying machines	179
14	CPM	Carpentry pulping machines	180
15	CUM	Carpentry upholstry machine	181
16	CWM	Carpentry welding machine	184
17	CCM	Carpentry combination machine	186
18	CCP	Carpentry compressor machine	187
19	CWM	Carpentry wood motiser	188
20	CPS	Carpentry saws	166
21	CPP	Carpentry planes	165

	Names		Codes from SSI - Code 2.7
22	CRT	Carpentry other iron tools	161-164, 167-171, 173-174, 177-178, 182, 185, 189 191-192
23	CWB	Carpentry working bench	176
24	CER	Carpentry other tools	172, 175, 183, 190-193
25	BWP	Blacksmith welding plant	214
26	BDM	Blacksmith drilling machine	215
27	BBL	Bellows	216
28	BAV	Blacksmith annvils	201
29	BHM	Blacksmith harmers	205
30	BRT	Blacksmith other iron tools	202-204, 206-213, 219-239
31	BWT	Blacksmith wooden tools	217-218
32	GMM	Goldsmith machine	253
33	GRT	Goldsmith iron tools	241-251, 254-264, 268-269
34	GBL	Goldsmith bellows	252
35	GWE	Goldsmith wooden equipments	265-267
36	TTE	Tinsmith tools and equipments	271-289
37	BMX	Bread mixer	291
38	BEO	Bakery electric oven	292
39	BMO	Bakery mud oven	293
40	BRL	Bread roller	295
41	BCT	Bread cutter	296
42	BSW	Bread slicer and wrapper	306
43	BKD	Bread kneader	315
44	BCE	Bakery composite equipments	316
45	BTP	Bread trays and pans	298, 314

	Names		Codes from SSI - Code 2.7
46	BRE	Bakery other iron equipments	294, 297, 299, 302, 303 307, 308, 313, 317
47	BWE	Bakery wooden equipments	300, 301, 304, 305, 309 310, 311, 312, 318 319
48	WRE	Watch iron and metal equipments	321-323, 325-333
49	WWE	Watch wooden equipments	324, 334-339
50	REQ	Radio equipments	340-359
51	MRQ	Motor equipment	361-389
52	SRQ	Shoe iron tools	391-393, 397-398, 400-401, 404-409
53	SWQ	Shoe wooden tools	394, 395, 396, 399, 402-403
54	PHE	Photographic equipment	411-418
55	PHF	Photographic furniture	419-429
56	MMT	Mattress making tools	431-439
57	TLM	Tile machines	441-442
58	TLT	Tile tools	443-459
59	PRM	Printing machines	461, 469, 476
60	PRT	Printing tools	462-468, 470-471, 475 477-480
61	PRF	Printing furniture	472-474
62	PET	Pot making equipment and tools	501-519
63	BRT	Barbers' tools	521-525
64	BRF	Barbers' furniture	526-529
65	WDM	Welding machines	534, 539
66	WDT	Welding tools	531-533, 536-538, 540-549
67	TTE	Total value of tools and equipment	

Appendix 7 - 4

Information necessary for Constructing Tools and Equipment Stock Variables for the Sierra Leone Study

1. Tools and equipment items have been coded in cols. 18-20 of Table 2.

2. Categories of tools and equipments have already been defined.

3. The following variables will be constructed for each tools and equipment category and enter price as defined.

   a. Total quantity - see cols. 22-24 of Table 2 - sum numbers.

   b. Weighted average age - see cols. 33-34 and calculate variable as follows:

   $$\text{Weighted average age} = \frac{B_1C_1 + B_2C_2 + \ldots + B_nC_n}{B_i + B_2 + \ldots B_n} = \frac{\Sigma(B_iC_i)}{B_i} \quad \text{for } i=1,\ldots,n$$

   where B_i = quantity of an equipment item and C_i = age of such equipment.

   c. Total acquisition cost - see cols. 36-42 of Table 2.

   Extract the value coded for a single item of equipment or sum values for a group of equipment items.

   d. Expected life - see cols. 44-45 of Table 2 and proceed as follows:

   Expected life = Weighted average age, i.e., $\left[\frac{\Sigma(B_iC_i)}{B_i}\right]$

   plus

   Weighted additional life, i.e., $\left[\frac{\Sigma(B_iE_i)}{B_i}\right]$

   for $i = 1,\ldots,n$

   where B_i = quantity of equipment item

   E_i = additional life as reported in cols. 44-45 of Table 2.

4. Construct variables as follows:

   a. Scan cols. 18-20 of Table 2 and count the number of different code numbers that occur for each firm. Label that variable 2001.

   b. Proceed to construct equipment by enterprise by establishment variables; label as follows and store.

c. We omit (a) variables for equipment category that are heterogenous such that total number for such equipment group is meaningless.

d. If operation is to be performed on a col. which is blank, indicate that variable cannot be constructed because of missing data and store using a * or some such designation.

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
1	TSM	101, 124	2002 2003 2004 2005	(a) Total quantity (b) Weighted avr. age. (c) Total acq. cost (d) Expected life
2	TRT	102, 103, 105, 107, 112, 116, 117, 118, 121, 123	2006 2007 2008	(b) (c) (d)
3.	TNT	104, 109	2009 2010 2011	(b) (c) (d)
4	TFT	106, 108, 110, 111, 113, 115, 119, 120	2012 2013 2014	(b) (c) (d)
5	TER	128, 129	2015 2016 2017	(b) (c) (d)
6	WLM	131	2018 2019 2020 2021	(a) (b) (c) (d)
7	CTW	132-139	2022 2023 2024	(b) (c) (d)
8	GSM	153	2025 2026 2027 2028	(a) (b) (c) (d)

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
9	GDM	141	2029 2030 2031 2032	(a) (b) (c) (d)
10	GMT	144, 146, 147, 148	2033 2034 2035	(b) (c) (d)
11	GWT	142, 149, 150	2036 2037 2038	(b) (c) (d)
12	GER	143, 145, 151, 154, 155, 156, 159	2039 2040 2041	(b) (c) (d)
13	CSM	179	2042 2043 2044 2045	(a) (b) (c) (d)
14	CPM	180	2046 2047 2048 2049	(a) (b) (c) (d)
15	CUM	181	2050 2051 2052 2053	(a) (b) (c) (d)
16	CWM	184	2054 2055 2056 2057	(a) (b) (c) (d)
17	CCM	186	2058 2059 2060 2061	(a) (b) (c) (d)

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
18	CCP	187	2062 2063 2064 2065	(a) (b) (c) (d)
19	CWM	188	2066 2067 2068 2069	(a) (b) (c) (d)
20	CPS	166	2070 2071 2072 2073	(a) (b) (c) (d)
21	CPP	165	2074 2075 2076 2077	(a) (b) (c) (d)
22	CRT	161-164, 167-171, 173-174, 177-178, 182, 185, 189, 191-193	2078 2079 2080	(b) (c) (d)
23	CWB	176	2081 2082 2083 2084	(a) (b) (c) (d)
24	CER	172, 175, 183, 190-199	2085 2086 2087	(b) (c) (d)
25	BWP	214	2088 2089 2090 2091	(a) (b) (c) (d)
26	BDM	215	2092 2093 2094 2095	(a) (b) (c) (d)

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
27	BBL	216	2096 2097 2098 2099	(a) (b) (c) (d)
28	BAV	201	2100 2101 2102 2103	(a) (b) (c) (d)
29	BHM	205	2104 2105 2106 2107	(a) (b) (c) (d)
30	BRT	202-204, 206-213, 219-239	2108 2109 2110	(b) (c) (d)
31	BWT	217-218	2111 2112 2113	(b) (c) (d)
32	GWM	253	2114 2115 2116 2117	(a) (b) (c) (d)
33	GRT	241-250, 254-264, 268-269	2118 2119 2120	(b) (c) (d)
34	GBL	252	2121 2122 2123 2124	(a) (b) (c) (d)
35	GWE	265-267	2125 2126 2127	(b) (c) (d)
36	TTE	271-289	2128 2129 2130	(b) (c) (d)

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
37	BMX	291	2131	(a)
			2132	(b)
			2133	(c)
			2134	(d)
38	BEO	292	2135	(a)
			2136	(b)
			2137	(c)
			2138	(d)
39	BMO	293	2139	(a)
			2140	(b)
			2141	(c)
			2142	(d)
40	BRL	295	2143	(a)
			2144	(b)
			2145	(c)
			2146	(d)
41	BCT	296	2147	(a)
			2148	(b)
			2149	(c)
			2150	(d)
42	BSW	306	2151	(a)
			2152	(b)
			2153	(c)
			2154	(d)
43	BKD	315	2155	(a)
			2156	(b)
			2157	(c)
			2158	(d)
44	BCE	316	2159	(a)
			2160	(b)
			2161	(c)
			2162	(d)
45	BTP	298, 314	2163	(b)
			2164	(c)
			2165	(d)

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
46	BRE	294, 297, 299, 302, 303, 307, 308, 313, 317	2166 2167 2168	(b) (c) (d)
47	BWE	300, 301, 304, 305, 309, 310, 311, 312, 318-319	2169 2170 2171	(b) (c) (d)
48	WRE	321-323, 325-333	2172 2173 2174	(b) (c) (d)
49	WWE	324, 334-339	2175 2176 2177	(b) (c) (d)
50	REC	340-359	2178 2179 2180 2181	(a) (b) (c) (d)
51	MRC	361-389	2182 2183 2184	(b) (c) (d)
52	SRC	391-393, 397-398, 400-401, 404-409	2185 2186 2187	(b) (c) (d)
53	SWC	394, 395, 396, 402-403	2188 2189 2190	(b) (c) (d)
54	PHE	411-418	2191 2192 2193	(b) (c) (d)
55	PHF	419-429	2194 2195 2196	(b) (c) (d)
56	MMT	431-439	2197 2198 2199	(b) (c) (d)

	Equipment Category as Defined	Corresponding SSI - Code 2.7	Variables to be Constructed	Calculation Needed
57	TLM	441-442	2200 2201 2202	(b) (c) (d)
58	TLT	443-459	2203 2204 2205	(b) (c) (d)
59	PRM	461, 469, 476	2206 2207 2208	(b) (c) (d)
60	PRT	462-468, 470-471, 475, 477-480	2209 2210 2211	(b) (c) (d)
61	PRF	472-474	2212 2213 2214	(b) (c) (d)
62	PET	501-519	2215 2216 2217	(b) (c) (d)
63	BRT	521-525	2218 2219 2220	(b) (c) (d)
64	BRF	526-529	2221 2222 2223	(b) (c) (d)
65	WDM	534, 539	2224 2225 2226	(b) (c) (d)
66	WDT	531-533, 536-538, 540-549	2227 2228 2229	(b) (c) (d)

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