



**METADATA FOR  
NATIONAL AGRICULTURAL STATISTICS**

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**BANGLADESH**

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### **List of Acronyms**

BBS	-	Bangladesh Bureau of Statistics
BARI	-	Bangladesh Agricultural Research Institute
BADC	-	Bangladesh Agricultural Development Corporation
BRRI	-	Bangladesh Rice Research Institute
BSIC	-	Bangladesh Standard Industrial Classification
BSOC	-	Bangladesh Standard Occupational Classification
CIF	-	Cost Insurance Freight
CPI	-	Consumer Price Index
CLI	-	Consumer Living Index
DOF	-	Directorate of Fishery
DOF	-	Department of Forest
DAM	-	Department of Agricultural Marketing
DG	-	Director General
EPB	-	Export Promotion Bureau
EB	-	Enumeration Block
EA	-	Enumeration Area
FAO	-	Food and Agriculture Organization
FOB	-	Free on Board
FTS	-	Foreign Trade Section
GNI	-	Gross National Income
HIES	-	Household Income and Expenditure Survey
HES	-	Household Expenditure Survey
ILO	-	International Labour Organization
IMF	-	International Monetary Fund
IMPS	-	Integrated Multipurpose Sample
LFS	-	Labour Force Survey
MDG	-	Millennium Development Goal
NSO	-	National Statistical Organization
NSC	-	National Statistical Council
NGO	-	Non-Governmental Organization
NBR	-	National Board of Revenue
NCLS	-	National Child Labour Force Survey
PAB	-	Pesticide Association of Bangladesh
PRS	-	Poverty Reduction Strategy
PSU	-	Primary Sampling Unit
SC	-	Steering Committee
SMA	-	Statistical Metropolitan Area
TC	-	Technical Committee
UN	-	United Nations
VAT	-	Value Added Tax

## **CHAPTER 1. NATIONAL SYSTEM OF AGRICULTURAL STATISTICS**

### **1.1 Legal Framework and Statistical Advisory Bodies**

#### **Statistical Laws**

There is no comprehensive statistical law for Bangladesh Bureau of Statistics. A comprehensive statistical law is planned to prepare in the model of Common Wealth and to enact.

However, some acts are in force to conduct the national censuses and these include the following:

1. Agricultural Census Act XLI, 1958 (Amended in 1983)
2. The Census Order, 1972 (Amended in 1980)
3. The Industrial Statistics Act, 1942, Act No. XIX of 1942, 3<sup>rd</sup> April, 1942

#### **Independence of Statistical System**

Bangladesh Bureau of Statistics is the National Statistical Organization (NSO) of the country. According to the allocation of business of the government, Bangladesh Bureau of Statistics is assigned to collect, compile and disseminate agricultural, social and economic statistics through surveys and censuses. Data published by BBS are considered as the official statistics for the country. There is no outside interference on BBS and it enjoys the independence in its work on data production and publication.

#### **Confidentiality**

Individual information in the questionnaires is kept confidential. Only summarized data are released. Regular data collection programmes of the Agriculture Wing of Bangladesh Bureau of Statistics are implemented through Regional and Upazila (sub-district) level offices by its regular staff. In case of any special large-scale survey, outside enumerators are hired from the locality. Then, the hired persons are trained properly at Upazila level and engaged into the survey or census works. For special case studies, specialized firms are hired through an open advertisement.

#### **Legal Basis for Conducting Agricultural Censuses and Surveys**

The legal basis for conducting agricultural census in Bangladesh is the Agricultural Census Act XLI of 1958 amended in 1983. The act, inter-alia, authorizes the Government to appoint the Director General of Bangladesh Bureau of Statistics as the Census Commissioner and other required staff for conducting the Census.

Respondents were required to answer questions put to them by authorized census enumerators. At the same time, the Census Act ensures strict confidentiality of the information collected from individual holders. The Act authorizes the collection of information of some broad items in the agriculture sector as specified below:

1. Land ownership and land tenure
2. Land unit and sub division of land
3. Land utilization
4. Crop acreage and production
5. Livestock and poultry
6. Employment in agriculture
7. Agricultural production
8. Agricultural equipment and machinery
9. Irrigation and drainage
10. Fertilizers and soil dressing
11. Wood and fishery products
12. Agricultural credit
13. Agriculture and sericulture
14. Fruits and vegetables products

And such other matters which the government may deem fit to include as census items for collection of information in Agricultural Census.

### **Statistical Advisory Bodies**

The highest advisory body of BBS is the National Statistical Council. The Minister in the Ministry of Planning is the chairman of the council, while the secretaries of the other relevant Ministries and the head of the related Departments are the members of the Council. Usually, the Council sits once or twice in a year and broad policy decisions are examined and recommended regarding collection, compilation and dissemination of statistics. Before conducting a national census, the recommendation of the National Statistical Council is necessary.

Moreover, there is a Steering Committee (SC) headed by the Secretary, Planning Division which approves the broad technical and policy issues. There is a Technical Committee (TC) headed by the Director General, BBS that looks into technical details and operational issues.

### **1.2 Structure and Organization of the Major Agricultural Statistical Agencies**

According to the allocation of business of the government, the BBS is assigned to collect, compile and disseminate agricultural, social and economic statistics through surveys and censuses. Data published by BBS are the official statistics for the country. BBS functions through 8 wings. Agriculture statistics consists of structural and annual statistics. For structural statistics, the Census wing of BBS conducts the decennial agricultural census, whereas the Agriculture wing is responsible for

compilation of current agriculture statistics. Agriculture is one of the functional wings of BBS. There are sub-national level offices of BBS. There are Regional Statistical Offices and 476 Upazilla (Sub-District) Statistical Offices. Officers and staffs of Upazilla offices are mainly responsible for collecting the data from the field and these are sent to regional statistical offices. Regional offices scrutinize and edit the filled up questionnaires and send them to the headquarters (agriculture wing). In the agriculture wing, the officers and staffs compile, finalize and release the data after taking the approval of the proper authority.

The current programs of Agriculture wing are the following:

1. estimation of the area and production of 6 major crops and 115 minor crops;
2. estimation of the production cost of major crops;
3. conduct of special survey for some important crops;
4. estimation of agricultural wage rate at monthly basis;
5. collection and compilation of land use and irrigation statistics;
6. collection and finalization of the area and production forecast report of 6 major crops;
7. collection and compilation of the area of crop damaged due to various natural calamities, e.g. drought, flood, hailstorm, cyclone etc.
8. estimation of the annual fish production in the country;
9. compilation of the annual livestock and poultry statistics; and
10. survey and finalization of the annual forest statistics

Although in Bangladesh, the Directorate of Fisheries and Department of Forest compile the fishery and forestry statistics, respectively but last year BBS introduced the system of compilation of these data.

In Bangladesh, the most important department in generating Agricultural Statistics is the BBS which is headed by the Director General with the following contact details:

Mr. A Y M Ekramul Hoque  
Director General  
Bangladesh Bureau of Statistics  
Parishankhyan Bhaban  
E-27/A, Agargaon, Dhaka-1207, Bangladesh  
Ph. (88-02) 9112589  
Fax: (88-02) 9111064  
E-mail: [dg\\_bbs@yahoo.com](mailto:dg_bbs@yahoo.com)

Mr. Satya Ranjan Mondal (Focal Point Officer)  
Deputy Director  
Agriculture Wing  
Bangladesh Bureau of Statistics  
Parishankhyan Bhaban  
E-27/A, Agargaon, Dhaka-1207, Bangladesh  
Ph. (88-02) 9138641  
Fax: (88-02) 9111064  
E-mail: [mondalsatyanjan@yahoo.com](mailto:mondalsatyanjan@yahoo.com)

Mr. A M Saidur Rahman  
Director  
Agriculture Census Project  
Bangladesh Bureau of Statistics  
Parishankhyan Bhaban  
E-27/A, Agargaon, Dhaka-1207, Bangladesh  
Ph. (88-02) 9114910  
Fax: (88-02) 9111064  
E-mail: [ndbp@banqla.net](mailto:ndbp@banqla.net)

### List of Agencies Responsible for Compilation of Agricultural Statistics

Agency	Type of Agricultural Statistics
1) Bangladesh Bureau of Statistics (BBS)	: Agricultural Census data - Land ownership, Land use, cropping pattern, irrigation, livestock & poultry, agricultural inputs, agricultural land holding by sex, farm population, etc.
2) BBS	: Current agricultural statistics – crop production estimates, yield rate, acreage of crops by types of 121 crops.
3) BBS	: Land use and irrigation statistics
4) BBS	: Agricultural wage rates and production cost of major crops.
5) BBS	: Livestock and poultry, forestry (extrapolated data)
6) Directorate of Fisheries (DOF)	: Fish production/catches, marine, inland catches
7) Directorate of Forest (DOF)	: Public forestry (revenue earned, forest products, etc.)
8) Directorate of Agricultural Marketing (DAM)	: Wholesale Prices of Agricultural Products
9) Ministry of Agriculture	: Production and price data of agricultural inputs
10) Bangladesh Rice Research Institute (BRRI)	: Input costs, yield rate, cropping pattern
11) Bangladesh Agricultural Development Corporation (BADC)	: Seed, Irrigation & others
12) Pesticide Association of Bangladesh (PAB)	: Pesticides statistics
13) Bangladesh Tea Board	: Tea production
14) Bangladesh Sericulture Board	: Sericulture production
15) Cotton Development Board	: Cotton production and related statistics
16) BBS and Export Promotion Bureau (EPB)	: Exports and imports of agricultural products

### 1.3 Outputs and Dissemination of Agricultural Statistics

The BBS is the focal point for dissemination of agricultural statistics. The contact details of the Director General of Bangladesh Bureau of Statistics is as follows:

AYM Akramul Hoque  
 Director General  
 Bangladesh Bureau of Statistics  
 E-27/A, Agargaon, Dhaka-1207, Bangladesh  
 Ph: (88-02) 9112589  
 Fax: (88-02) 9111064  
 E-mail: [dg\\_bbs@yahoo.com](mailto:dg_bbs@yahoo.com)

#### BBS Major Statistical Reports and Publications

Agricultural Statistics of Bangladesh are released through the following publications.

Title of Publication	Domains/Contents	Medium	Format	Periodicity/Frequency	Release Calendar
Yearbook of Agricultural Statistics of Bangladesh	Production, area, crop damage, land use, irrigation, inputs etc.	English	Book	Annual	December
Statistical Yearbook of Bangladesh (Ag. Chapter)	Production, area of crops, land use and irrigation statistics, production and price of fertilizer, structural statistics, fish, livestock and poultry production, Agriculture sector contribution in GDP	English	Book	Annual	March
Statistical Pocketbook (Ag. Chapter)	Agriculture census data, classification of Ag holding, ownership of land, production, sowing and harvesting period of different crop	English	Book	Annual	January

### BBS Major Statistical Reports and Publications (cont'd...)

Title of Publication	Domains/Contents	Medium	Format	Periodicity/Frequency	Release Calendar
Advance Release of Major Crops	Area, yield rate and production of crops by district	English	Book	Annual	After the completion of harvest
Monthly Statistical Bulletin (Food & Ag. Chapter)	Area and production index of crops, land use, means of irrigation, irrigated area, area and production, production and sales of inputs, import, procurement and distribution of food	English	Book	Monthly	Four (4) months time lag
Agricultural Census Reports	Structural statistics like land ownership, tenancy, number of farm and non-farm household, classification of farmers, area of different crops	English	Book	Adhoc	After the completion of census
Report on Cost of Production of Major Crops	Cost of cultivation, labour, fertilizer, harvesting, caring etc.	English	Book	Seasonal	Two months after survey

### Time Lag, Pricing and Distribution of Publications

Time lag of yearly publications is about one year and that of the monthly publications is 4-5 months. Prices of the publication are fixed at production cost. Complementary copies are also distributed to the Ministries, relevant Departments, University libraries and UN agencies etc.

## **1.4 Dialogue with Data Users and Cooperation with International Organizations**

The users of agricultural statistics include representative officers from the Ministries (Planning Commission, Ministry of Agriculture, Food, Relief and Disaster Management, Forestry, Fisheries and Livestock, etc.), University teachers, Research Organizations, NGOs, Donor agencies, Exporters, Importers etc.

In most cases, the users of the BBS data are knowledgeable, eminent scholars and accomplished persons in their respective fields. Bangladesh Bureau of Statistics appreciates to have dialogue and exchange views to fulfill the users needs and to improve the quality of works. The Agriculture Wing of BBS utilizes the advantage of the following forums to communicate and interact with the data users.

### **Seminar**

BBS arranges data dissemination seminars to explain concepts, definitions, methods and data trend etc. and to have users views and suggestions to improve future works.

### **Workshop**

Prior with the adoption of new method or programme, BBS organizes workshop inviting the experts of the relevant field. Outcome of the workshop provides useful input in finalizing the issues in question.

### **Council and Committee Meetings**

The National Statistical Council is the highest policy forum for Bangladesh Bureau of Statistics. The NSC provides broad policy guidance to undertake major statistical operations.

The Steering Committee headed by the Secretary, Planning Division and comprising members from the donor agencies, universities and research organizations provides broad technical decisions.

The Technical Committee headed by the Director General, BBS, comprising members from the Directors, BBS, representative from the donor agencies, universities, research organizations, experts of the relevant fields and stakeholders. The Technical Committee provides detailed technical and operational guidance to undertake statistical programmes.

## 1.5 Strategic Framework

Following its strategic framework, the Agriculture Wing of BBS, conceptualized a development project and submitted it to the government entitled “Updating and Extension of Agriculture Cluster Plots and Survey of Cost of Production”. The specific objectives of the project are:

1. Updating of 9345 existing clusters of agriculture plots (Updating of sketch maps, preparation of list of cultivators, updating or replacement of non-operational clusters, triangulation and determination of effective area);
2. Selection and triangulation of 1000 new clusters (preparation of sketch map and list of cultivators and computer station);
3. Conducting of surveys on cost of production of major crops (Aus, Aman, Boro, Wheat, Jute and Potato);
4. Conducting of 4 seasonal surveys on minor crops (Onion, pulses, oil seeds, maize);
5. Supply of instruments and tools to all Upazila offices for preparation of reliable estimates on agriculture statistics;
6. Holding of training and re-orientation sessions, seminars, workshops on the procedures and new methods for BBS concerned officers and staff members.

### Future Statistical Action Plan

The BBS has planned to implement a development project to strengthen its capability to produce timely and quality statistics. It has planned to reorganize and strengthen the headquarters, as well as, the district and sub-district level offices and to train the junior and mid-level officers. This will enhance the capability of Agriculture Wing to collect timely and reliable data from the field.

### Challenges Ahead

The main challenge of BBS is to provide timely data to monitor progress of Poverty Reduction Strategy (PRS) and Millennium Development Goals (MDG). Moreover, new horizons of statistical data needs are unveiled to meet the challenges of the new millennium. Some of these are environment statistics, participation, empowerment and gender disaggregated statistics. Special care is taken to provide necessary data for PRS and MDG monitoring and to fill up the data gaps.

### Need for Technical Assistance

Technical Assistance is urgently required for the proposed project on “Updating and Extension of Agriculture Cluster Plots and Survey of Cost of Production” in respect of training, expert service, transport and equipments, etc.

Since the clusters were formed 20 years ago, these need to be updated and expanded for reliable district level estimates.

## CHAPTER 2. MAJOR DOMAINS AND SELECTED INDICATORS OF AGRICULTURAL STATISTICS

### 2.1 List of Major Domains and Selected Statistics and Indicators

Domain	Statistics/ Indicators
<b>PRODUCTION</b> <ul style="list-style-type: none"> <li>▪ Crops</li> <li>▪ Livestock and Poultry</li> <li>▪ Fishery</li> <li>▪ Macroeconomic indicators</li> </ul>	Volume of all crops produced in Bangladesh Area harvested Value of crops Cost of production of major crops Crop damaged by natural calamities Area forecasts of Major Crops Yield and Production forecasts of Major Crops  Volume of livestock and poultry Value of livestock and poultry Volume of fishery production Value of fishery production  Gross National Product Gross Domestic Product Gross Value Added in Agriculture Growth Rate in Agriculture Sector
<b>TRADE</b>	Total Quantity of Export and Import Total Value of Export and Import Total Value and Quantity of Agricultural Export and Import
<b>FOOD CONSUMPTION</b>	Food Balance Sheet
<b>PRICES</b>	Average monthly prices of selected agricultural commodities Producer Price Index Consumer Price Index
<b>AGRICULTURAL LABOUR WAGE</b>	Daily Agricultural Labour Wage by male and female disaggregation
<b>FERTILIZER</b>	Total domestic production, Import, Sales and Prices

Domain	Statistics/ Indicators
PESTICIDES	Quantity and prices
LAND USE AND IRRIGATION STATISTICS	Total cultivated land, Irrigated area, Area harvested of crops
LABOUR FORCE	Percentage of Labour Force in Agriculture Sector Employment Trend in Agriculture Sector Child Labour Force by Industry Active Population in Agriculture Sector
OTHERS	Income and Expenditure, Nutritional, Health data of Rural People

## 2.2 Metadata for Each of the Major Domains

The BBS follows the concepts and definitions of the UN and in particular, the FAO guidelines for agricultural statistics.

### 2.2.1 Production

#### 2.2.1.1 Concepts, Definitions and Classifications

##### CROPS

**Volume of Crop Production:** Total production for 6 major crops and 115 minor crops are published by metric tons. Per acre/hectare yield is also released in kilograms. For major crops, average yield rates at district level are computed through crop cutting experiment. Crop cut experiment are conducted within the sample cluster plots over the whole country. Data are produced by district and number of cuts is dependent on the size of the district.

**Area Harvested:** For area estimation, constituted 9348 clusters are visited four times a year and acreage under different crops in each plot are recorded by the field staff in the prescribed forms. The completed forms are sent to Dhaka from the Upazilla Statistical Offices through the Regional Statistical Offices. These forms are scrutinized, checked and then processed for acreage estimation. The acreage estimates by crop by region are obtained by ratio method of expansion as follows:

$$\boxed{\text{Area for a crop}} = \boxed{\text{Effective area}} \times \boxed{\text{Area ratio devoted to}} \dots(1.1)$$

for the region

for the region

the crop for the region

Where,

Effective area  
for the region

=

Total Land Area  
for the region

-

Area not utilized for Agricultural  
purposes for the region

Area ratio devoted to  
crop for the region

=

Sum of area devoted to the crop from crop for the  
plots within the clusters for the region

Sum of areas of corresponding cluster for the region

**Value of Crop:** Valuation of the production of crop is done by multiplying the volume of production by the producer's price.

**Cost of Production of Major Crops:** For 6 major crops, costs of production survey are carried out separately just after completion of harvest of each crop. From each Upazilla (sub- district) 6 farmers are selected (1 large farmer, 1 medium farmer and 4 small farmers) by simple random sampling for interview. Average cost of production (cultivation, plantation, harvesting, caring, etc.) is estimated.

**Crop damage:** Upazilla statistical offices collect the information regarding any natural calamities just after the incident. Area damaged and estimated production lost of the crops are computed.

**Forecasting of major crops:** For 6 major crops (three rice, wheat, jute and potato) area and production forecast reports are prepared. For each crop, forecast data are compiled twice. Firstly, just after completion of the plantation of the crop, Upazilla offices collect the area of the crop and secondly before three weeks of the harvest of the crop, yield of the crop are forecast.

## LIVESTOCK AND POULTRY (ANIMAL FARMING)

**Volume of Livestock and Poultry:** Agriculture and Livestock census are the basic sources of data of this sub sector. Periodic surveys on livestock and administrative records of the Livestock Directorate are also used for current estimation. Estimates of animal farming populations are made on the basis of inter census growth rates (1983-84 and 1996 Agriculture Census) of livestock population and then adjusted in the light of the current livestock surveys.

The following products of livestock and poultry populations are included in the output estimates.

1. Meat
2. Milk
3. Hides and Skins
4. Cow dung
5. Animal fats and others
6. Eggs

Annual flows of these products are obtained by applying specific yield coefficients established through special studies, field investigations and consultations with the experts of the Directorate of Livestock.

The following coefficients have been used to estimate the outputs:

Livestock and Poultry	Major Coefficients	
	Annual average extraction rate (% of stock slaughtered)	Meat rate per animal (kg)
Cow	23	55.0
Buffalo	10	75.0
Goat	50	6.0
Sheep	33	6.0
Chicken	120	0.6
Duck	120	0.9

*Source: Survey on Selected Economic Activities, 1994-95 and Directorate of Livestock*

**Value of Livestock and Poultry:** Prices used for valuation of these products are collected from Department of Agricultural Marketing (DAM). On an average 26.6 percent of the value of output is deducted as intermediate consumption or input cost to obtain the value added in the animal farming sub-sector.

## FISHERY

**Production of Fishery:** The activities in fishing sector include a) commercial fishing in high seas, coastal and offshore waters and catching and gathering fish from inland rivers, canals, lakes, haors (wet land), bils (low lying area), ponds, etc. and subsistence fishing in inland waters.

Estimates of the aggregate fish production both inland and marine are obtained from the Directorate of Fisheries (DOF). The fish production obtained from the DOF is further validated with Household Income and Expenditure (HIES) data (per capita fish consumption) and availability estimated by total production plus exports minus presumed imports. Estimated fish production (inland and marine) are disaggregated by major fish species by applying the species ratio obtained from the DOF and ad-hoc Fish Species Survey of 1993-94 conducted by BBS.

The following species' ratios are applied on the Inland and Marine Fish catches:  
Proportion of Fish Catches Distribution by Selected Species:

Major Species	Proportion of Total Catch
<b>Inland</b>	
Hilsha	6.4
Ruhi / Katla / Mrigel	15.9
Shrimp	6.4
Boal / Pangash etc.	2.7
Live fish	5.6
Exotic Carp	5.5
Snake head fish	5.4
Other Carp	1.2
Other inland fish	50.9
<b>Total Inland</b>	<b>100.00</b>
<b>Marine</b>	
Hilsha	37.9
Bombay Duck	5.9
Jew fish	3.9
Shrimp/ Prawn	7.2
Others	45.1
<b>Total Marine</b>	<b>100.00</b>

**Value of Fishery Products:** To convert the output figures into value terms, wholesale prices by species types, obtained from Directorate of Agricultural Marketing (DAM) are converted into producer prices by deducting trade and transport margins. The gross value of production thus arrived at is then reduced by the following input proportion or intermediate consumption.

Fish type	Proportion of input costs as % of output
Inland fish	13.68
Marine fish	17.59

The proportions of intermediate consumption were determined by the Fishery Study which were commissioned by BBS in 1993 to 1994.

## MACROECONOMIC INDICATORS

**Gross Domestic Product (GDP) at Market Price:** Gross domestic product at basic prices plus indirect taxes minus subsidies on products.

**Gross National Income (GNI):** Aggregate Value of the gross balances of primary incomes for all institutional sectors of the economy is defined as Gross National Income.

Thus,  $GNI = GDP \text{ at basic price} + \text{net primary incomes from abroad}$

**Value Added:** Gross Value Added in the value of output less the value of intermediate consumption. Net value added in the value of output less the values of both intermediate consumption and consumption of fixed capital.

### 2.2.1.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agencies
<b>CROPS</b>				
Value of rice and wheat production	national level	1981-2005	Wholesale and Retail Price Survey	DAM
Rice and Wheat Inventory	national and district levels	1981-2005		Food Planning & Monitoring Unit
Volume of Jute Production	national and district levels	1981-2005	Jute Production Survey	BBS
Value of Jute Production	national and district levels	1981-2006	Wholesale and Retail Price Survey	DAM
Volume of Crop Production (Other than Rice and Wheat)	national and district levels	1981-2006	Crop Production Survey	BBS
Value of Crop Production (Other than Rice and Wheat)	national level	1981-2005	Price Survey	DAM
<b>LIVESTOCK AND POULTRY</b>				
Value of Livestock and Poultry Production	national level	1981-2005	Price Survey	DAM
<b>FISHERIES</b>				
Value of Fishery Production	national level	1981-2005	Price Survey	DAM
<b>MACROECONOMIC INDICATORS</b>				
Gross Domestic Product	national level	1975-2005 (national level) 1990-2001 (Regional level)	BBS	BBS
Gross Value Added in Agriculture	National and sub-national levels	1975-2005 (national level) 1990-2001 (Regional level)	BBS	BBS

### 2.2.1.3 Data Processing, Estimation and Revision Methodology

#### CROPS

#### Volume of Rice, Wheat and Potato Production

##### Data Processing

Upazilla Statistical Offices fill up the forms/schedule and send it to the head quarter through regional statistical offices. In the head quarter, the filled in schedules are edited, scrutinized and manually processed. After finalization of data, approval of proper authority is needed.

##### Estimation and/or Compilation Procedure

**Area estimation:** The acreage estimates by crop by district are obtained by ratio method of expansion as follows:

$$\boxed{\text{Area for a crop for the district}} = \boxed{\text{Effective area for the district}} \times \boxed{\text{Area ratio devoted to the crop for the district}} \dots(1.1)$$

Where,

$$\boxed{\text{Effective area for the district}} = \boxed{\text{Total land area for the district}} - \boxed{\text{Area not utilized for Agri. purposes for the district}}$$

$$\boxed{\text{Area ratio devoted to crop the for the district}} = \frac{\boxed{\text{Sum of area devoted to the crop from crop for the plots within the clusters for the district}}}{\boxed{\text{Sum of areas of corresponding cluster for the district}}}$$

**Production Estimation:** District level Production are estimated by the formula given

$$P_i = Y_i * A_i$$

Where:

$P_i$  = Production of ith district.

$Y_i$  = Per unit yield of ith district

$A_i$  = Harvested area of ith district

$$P = \sum P_i$$

Where:

$P$  = Total country production

## **Volume of Other Temporary Crop Production**

### **Data Processing**

Please refer to the discussion in Rice, Wheat and Potato Production

### **Estimation and/or Compilation Procedure**

#### **Area estimation**

Current year Area of the union = X \* Last year area of the union

Where:

X = Ratio of the area of 5 farmers of this year to the area of last year

#### **Production estimation**

Current year Production of the union = Y \* Last year Production of the union

Where:

Y = Ratio of the production of 5 farmers of this year to the production of last year

## **2.2.2 Trade**

### **2.2.2.1 Concepts, Definitions and Classifications**

**Volume of agricultural exports and imports** – both quantity and value of agricultural import and export data are compiled. Export of jute goods, raw jute, mesta, tea, fish, raw cotton, spices are expressed in metric tons

**Value of agricultural exports and imports** – F.O.B value for export and C.I.F value for import are used.

**Free on Board (F.O.B) value** - The value in the market at the customs frontier of a country of her exports merchandise and other goods including all costs of transporting the goods to the custom frontier, export duties and the cost of loading the goods on the carrier unless the later cost is borne by the carrier.

**Cost Insurance Freight (C.I.F) value** - The value in the market at the custom frontier of a country of her imports of merchandise, other goods etc. including all charges for transporting and insuring the goods from the country of export and the given country but excluding the cost of unloading from ship, aircraft etc., unless it is borne by the carrier.

### 2.2.2.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agency
Total value of exports and imports	International (by country of origin and destination)	1977 – 2005 (annual)	Foreign Trade Statistics	BBS
Total volume of agricultural exports and imports	International (by country of origin and destination)	1977 – 2005 (annual)	Foreign Trade Statistics	BBS
Total value of agricultural exports and imports	International (by country of origin and destination)	1977 – 2005 (annual)	Foreign Trade Statistics	BBS

### 2.2.2.3 Data Processing, Estimation and Revision Methodology

The Foreign Trade Section of BBS collects data in CD-ROMs from National Board of Revenue (NBR) on monthly basis. On receipt of export and import information from NBR, the said CDs are sent to BBS computer section for rearranging, processing etc. After completion of the job, data are sent to Foreign Trade Section, BBS which does the work of correction, compilation and editing and then these are sent to computer section for rearrangement of the said data. Again, the computer section will send the printed export and import data to Foreign Trade Section (FTS). Finally, after correction and amendment by FTS these are again sent to the computer section for printing of the final data.

On receipt of trade bills from Burimari (Land Customs) and shipping bills from Khulna, entries are made in the control register and the bills are sorted out according to the date and type of trade. After sorting, the documents are bound in the form of a book which is known as batch. Each batch consists of 50-60 bills covering the bills of a particular date. The batch is distributed among the coders for coding the information. The basic information, such as commodity specified by type, quantity of each commodity according to the units prescribed in the HS, value, export destination and other relevant information are coded, checked and edited properly on the documents. On the completion of coding work, the value is taped from the documents. Batch totals are entered in the control register for subsequent matching with computer totals. Batches are then sent to the Computer Wing of BBS for capturing data in diskettes.

Though most of the tabulations are made according to Harmonized commodity description and coding system, selected tabulations are made on the basis of category of goods by different exporting or importing accounts. The tables are published in Foreign Trade Statistics (annual) and in other publications of BBS. Foreign Trade Statistics are published on fiscal year that is July 1 to June 30.

## 2.2.3 Food Consumption

### 2.2.3.1 Concepts, Definitions and Classifications

**Foodgrain Balance Sheet** - It covers major foodgrain consumed by the people of Bangladesh.

**Domestic Production** - Total domestic production of rice and wheat.

**Net grain production** - Total production - (deducting 10% as seed, feeds and wastage)

**Mid year population** - estimated mid year population

**Food consumption on requirements (453.6 g/cap/d)** - according to the household income and expenditure survey.

**Foodgrain gap:** food availability - consumption

## 2.2.4 Prices

### 2.2.4.1 Concepts, Definitions and Classifications

**Farmgate prices** - prices received by farmers for the sale of their produce at the first point of sale that is at farm or home of the farmers.

**Wholesale prices** - prices for wholesale buying or wholesale selling.

**Producer's price** - price receivable by the producer from the purchaser for a unit of a good or service produced as output minus any VAT or similar deductible tax invoiced to the purchaser.

**Purchaser's price** - prices at the point of delivery to the purchasers which also include trade and transport margins appropriate to the commodity being purchased.

**Consumer price index** - The CPI measures changes in prices paid by consumers for consumption of goods and services. CPI does not cover all household expenditure, it excludes investment, saving and transfers.

### 2.2.4.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agencies
Average monthly prices of selected agricultural commodities	National, Rural and Urban	1995-2006	Price Survey	DAM
Monthly Consumer Price Index	National, Rural and Urban	1972-73 to February 2007	Prices of all Commodities and weights used	BBS

### 2.2.4.3 Data Processing, Estimation and Revision Methodology

#### Data Processing

##### A. Prices of Agricultural Commodities

Immediately after receiving the filled in price returns from the field, the data are scrutinized and edited by the respective data compilers under the supervision of two/three officers. Verification letters are regularly issued to different Regional/Upazilla statistical offices for verification of wrong and inconsistent price data.

##### B. Consumer Price Index (CPI)

The CPIs are compiled on monthly basis. Monthly prices of various items are used for computation of the indices. Annual indices are also computed by averaging the 12 months indices. The reference groups of the indices are the average urban and rural households of Bangladesh. Three principal consumer indices (CPIs) are produced and disseminated i.e. National, all urban and all rural. The national CPI is calculated by combining the urban and rural indices using as weights, the country-wide urban and rural households expenditure multiplied by the total number of urban / rural households as available from population Census data. For computing the three CPIs all goods and services included in the index baskets were classified under eight commodity groups following the ILO standard and recommendations of the IMF mission. The indices covered eight commodity groups which are:

1. Food, beverage and tobacco
2. Clothing and footwear
3. Gross rent, fuel and lighting
4. Furniture, furnishings, household equipment & operation
5. Medical care and health expenses
6. Transport and communications
7. Recreation, entertainment, education and cultural services
8. Miscellaneous goods and services

## Coverage and Source of Data

The price data are collected from the selected markets and outlets by the trained field staff of Bangladesh Bureau of Statistics.

1. **Market:** For price data collection, 140 markets have been selected all over the country. The selected number of urban markets are 76 and the number of rural markets are 64. The field staff of BBS collect the price data from 64 urban and 64 rural markets (One urban and one rural market from each district) all over the country. The prices and wages section of National Accounting Wing collects the price data from selected 12 markets in different parts of Dhaka metropolitan city.
2. **Outlets:** For each item, price is collected from three selected outlets. There are some big outlets in a market which have varieties of consumer items, generally that type of outlets is selected to collect the price data. Prices of different commodities and services included in the index baskets are collected by BBS personnel from selected outlets. For example, for CPI Dhaka SMA, 12 representative markets in Dhaka SMA have been selected. These are big markets but not Super markets. Similarly for other areas price data are collected from selected outlets of 64 urban and 64 rural markets all over the country by BBS field staff. These are also big markets but not like as Dhaka metropolitan Area markets. There are many outlets in a market, among them three big outlets are selected to collect the price data of individual item. The locations of outlets are in different areas like the urban, rural, District and Divisional Head quarters.
3. **Collection Procedure:** Prices are collected during the peak hours of transaction. During the process of data collection, the price collectors are supposed to act as a true buyer, to act and bargain like a true buyer and to make an actual purchase. Price collectors should make sure that they are pricing the correct product based on the product specifications in the CPI product list. Price data are properly scrutinized in immediately after collection.

## Selection of Items

The items selected should be as representative as possible. In the case of cost of living index, the items selected should represent the consumption habit of the people. To achieve this, the total number of items is divided into groups and subgroups and then from each group a representative sample is selected for inclusion. The BBS regularly (after certain interval), conducts the Household Expenditure Survey (HES). HES data can be used for this purpose. Expenditures incurred in various items based on 1995-96 HES was the basis of determining weights for the selection of items in the index basket. The earlier price schedules

were updated on the basis of 1995-96 HES as suggested by the IMF mission (December 29, 1997-January.1998).

The CPI items for the National index and its regional components have been classified into 8 majors groups. Some new items are incorporated in the new five price schedules in the index basket. There is no selected item for National basket that is priced all over the country. National basket comprises of urban and rural.

Price schedules and items number:

Sl. No	Name of price schedules	Number of items	Remarks
1.	Price schedule-1, weekly/Monthly retail (Urban)	469	CPI
2.	Price schedule-2, Monthly retail (Rural)	341	CPI
3.	Price schedule-3, Monthly wholesale (Urban)	112	WPI
4.	Price schedule-4 Monthly BMP, wage & salary charge and quarterly house rents	161	BMPI, WRI, HRI
5.	Price schedule-5 Monthly retail prices of Durable & Capital goods.	138	DCI

The National market basket consists of urban and rural market. baskets. A detailed list of index basket with classification item number and weights including all specifications such as brand names, weights are in Table A.

Number of items index basket (Base: 1995-96=100):

Sl.No.	Name of index	Number of items	Remarks
1.	CPI Rural	215	
2.	CPI Urban	302	
3.	CPI National	-	

### Selection of Base year

Index numbers are designed to make comparison between prices with reference to different time periods. For any index number computation there must be a base year/reference year for comparison. The base year should be a year of economic stability or in other words, a normal year. The base year should be a normal year and it must be free from economic, political and Social disturbances and as far as possible. Under the recommendation of IMF mission (December 29, 1997-January, 1998), the year 1995-96 has been selected as the base year for the computation of

consumer price index (CPI). The BBS has been regularly compiling the following consumer price index numbers on the basis of 1995-96 as the base year.

1. Consumer price index, all urban areas
2. Consumer price index, all rural areas
3. Consumer price index, National

### Determination of Weights

The BBS conducts the Household Expenditure Survey (HES). Consumption patterns were determined on the basis of the results of the 1995-96 HES based on a sample size of 7420 households of which 5040 were rural and 2380 are urban households. Item weights were devised to reflect the significant changes that had occurred in the consumption pattern. Almost all the item weights have been taken from tabulation of HES data. In calculating the National CPI, all urban and all rural indices have been combined using as weights the total country wide urban and rural household expenditure i.e. average monthly urban/rural expenditure multiplied by the total number of urban/rural households as available from population census data. The weights of national CPI, all urban and all rural have been derived from the computer data sheets of 1995-96 HES. The base year was 1995-96 and the basket and weights were determined on the basis of the 1995-96 HES.

### Weighting patterns of CPI National, Base year 1995-96=100

Locality	Average monthly household Expenditure (Tk.)	No. of households (Million)	Total monthly Expenditure (Million Tk.)	Weight (%)
Bangladesh	-	22.13	90630.66	100
Urban	7274	3.63	26383.56	29.11
Rural	3473	18.50	64247.10	70.89

The National CPI was derived from the indices compiled separately for the urban and rural households, based on the new weights calculated by the IMF mission using the 1995-96 HES. BBS revised the new weights to better reflect the consumption patterns of household. The weights of individual items, groups and sub-groups of CPI, all urban and all rural were derived from the 1995-96 HES and are presented below (*Table A*).

**Table A. Group Weights, Base year: 1995-96=100**

Group		Weight Rural (100)	Weight Urban (100)
I.	Food, Beverage And Tobacco:	62.96	48.80
	Non-Food	37.04	51.20
II.	Clothing and Footwear:	6.88	6.79
III.	Gross Rent, Fuel & Lighting	14.69	22.17
IV.	Furniture & Furnishing Household Equipments & Operations	2.70	2.58
V.	Medical Care and Health Expenses:	2.79	2.97
VI.	Transport & Communication:	2.98	7.07
VII.	Recreation, Entertainment Education & Cultural Services:	3.20	6.40
VIII.	Miscellaneous Goods & Services	3.80	3.22

**Formula Used**

For computation of the indices, Laspeyres formula is used. The formula is given below:

$$I = \frac{\sum_i \frac{P_n}{P_o} \times W_i}{\sum W} \times 100$$

- where, 1 = Consumer price index.  
 $P_n$  = Price in the current year  
 $P_o$  = Price in the base year  
 $W_i$  = Weight at the ith item  
 $W$  = Weight of the group

**Price Consideration**

1. Special offer prices are not considered.
2. Three price quotations are collected for each of the items in the market basket.
3. There is a two price schedule for CPI, one for urban and one for rural areas. The urban schedule is collected from 64 urban area containing 469 items, of them 302 are index item. Where as rural schedule is collected from 64 rural areas which contain 341 items, of them 215 are index items.

## Recommendation for the Improvement of Price Statistics

To improve quality and timelines of CPI data some issues need to be resolved relating to price collection procedures, coverage of products, treatments of seasonal products, adjustment of quality change and the substitution of CPI products and updating the CPI list of items and weights.

1. **Re-basing of CPI:** There are some basic reasons for re-basing of consumer price index (CPI). Such as structural changes in production structure, structural changes in consumption patterns, structural changes in relative prices, appearance of new products, disappearance of old products and larger quality changes. Goods and services are not comparable between periods that are too far apart. So, the present base year may be changed on the basis of latest HES..
2. **Updating of price schedules:** The re-basing also offers an opportunity to update the list of items and outlets. Quality adjustment and item substitution are big problems in CPI compilation. Item substitution may occur due to changes in fashion, tastes, income and technology.

There can also be substitution of outlets where consumers purchase products. Quality adjustment is difficult for statistical agencies to carryout, because it cannot be done mechanically in a routine way; each quality change requires individual attention. CPI staff is often put in a situation where they have to make subjective judgment about the extent of quality change and statistical agencies are uncomfortable making such judgments. So, the price schedules may be updated on the basis of latest HES.

3. **Computerization:** The standard Laspeyres formula used in the data processing and compilation of the current CPI remain essentially manual. This makes it difficult, for instance, to check inconsistencies in the relatively large amount of basic data and delays publication of the index. So, the process of computerization of consumer price index (CPI) activities may be expanded up-to District/Upazilla level offices.
4. **Training:** Computer and statistical training is essential for price collectors, compilers and supervisors to produce quality statistics. There is need for adequate training facilities for price collectors, compilers and supervising officers on regular basis.
5. **Supervision:** Price collectors, compilers and supervisors of the price index should meet regularly for seminars at which the supervisors would give instructions on how to deal with the practical problems encountered in the data collection process. Supervisors should verify the work of the price collectors on a regular basis.
6. **Financial incentives:** The working conditions of price collectors should also be improved i.e. by giving them monetary allowances for travel and other minor items of expenditure.

#### 2.2.4.4 Other Reference Information

Collected price data are analyzed and prepared by the price section of BBS for regular publication. Analyses of some price data are regularly published in the Monthly Advance release and Monthly Statistical Bulletin of BBS for general use.

#### 2.2.5 Fertilizer

##### 2.2.5.1 Concepts, Definitions and Classifications

**Fertilizer** - a substance used to make the soil more fertile.

**Fertilizer Prices** - are the retail selling prices of different types of fertilizer. Data are collected fortnightly in different places of the country.

**Fertilizer Production** - total volume of production of fertilizer by local company.

**Imports** - total volume of fertilizer imports

**Export** - total volume of fertilizer exports.

**Domestic sale** - total volume of chemical fertilizer sold in the domestic market.

##### 2.2.5.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agency
Domestic Production	national	1981-2005	Records of the Ministry of Agriculture	Ministry of Agriculture
Imports	national	1981- 2005	Records of the Ministry of Agriculture	Ministry of Agriculture
Sales	national	1981-2005	Records of the Ministry of Agriculture	Ministry of Agriculture
Prices	national and sub-national levels	1995-2006	Records of the Ministry of Agriculture	Ministry of Agriculture

### 2.2.5.3 Data Processing, Estimation and Revision Methodology

Data on production, sales and imports are collected and compiled from the official records of fertilizer factory and National Board of Revenue by the Ministry of Agriculture. The prices data are collected fortnightly in different places of the country.

### 2.2.6 Pesticides

#### 2.2.6.1 Concepts, Definitions and Classifications

**Pesticides** - are substances or mixtures of some chemical substances which are used for preventing the pest attack of crops or destroying the insects of the crops. Data of several types of pesticides are compiled by Bangladesh Crop Protection Association. Those are insecticides, fungicides, herbicides and rodenticides.

#### 2.2.6.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agency
Volume of consumption	national	1989 - 2005	Administrative records	Bangladesh Crop Protection Association
Import	national	1981 - 2005	Administrative records	BBS

#### 2.2.6.3 Data Processing, Estimation and Revision Methodology

Bangladesh Crop Protection Association and Bangladesh Bureau of Statistics compile the data from the administrative records.

### 2.2.7 Land Use

#### 2.2.7.1 Concepts, Definitions and Classifications

**Total Area** - the total geographic area of Bangladesh

**Forest area** - the area of government reserve forest. Private forests are not included.

**Not available for cultivation** - urban area, big river area, important high ways etc.

**Cultivable waste** - cultivable but never cultivated

**Currently fallow** – means that the area can be cultivated but for one or two seasons the land is kept fallow.

**Single cropped area** - produced only one crop in a year.

**Double-cropped area** - produced two crops in a year.

**Triple cropped area** - produced three cropped in a year.

**Net-cropped area** - summation of single cropped area, double cropped area and triple cropped area.

**Total cropped area:**  $\text{sum}(\text{single cropped area} * 1 + \text{double cropped area} * 2 + \text{triple cropped area} * 3)$

**Irrigated area** - area under the artificial irrigation system. Irrigated area by means of irrigation; irrigated areas by crops and regions are compiled.

#### 2.2.7.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agency
Total area	national and sub-national levels	1981- 2005	Administrative records	BBS
Forest area	national and sub-national levels	1981- 2005	Administrative records	BBS
Not available for Cultivation area	national and sub-national levels	1981- 2005	Administrative records	BBS
Cultivable waste area	national and sub-national levels	1981- 2005	Administrative records	BBS
Current fallow area	national and sub-national levels	1981- 2005	Administrative records	BBS
Single cropped area	national and sub-national levels	1981- 2005	Administrative records	BBS
Double cropped area	national and sub-national levels	1981- 2005	Administrative records	BBS

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agency
Total area	national and sub-national levels	1981- 2005	Administrative records	BBS
Triple cropped area	national and sub-national levels	1981- 2005	Administrative records	BBS
Net-cropped area	national and sub-national levels	1981- 2005	Administrative records	BBS

## 2.2.8 Labour and Employment

### 2.2.8.1 Concepts, Definitions and Classifications

**Rural population** - population living outside the declared municipal area.

**Employment** - persons in the labour force who are reported either at work or with a job or business although not at work during the reference week.

**Employment in agriculture sector** - persons who are employed or engaged in agriculture sector.

**Agriculture Labour Wage Rate** - daily wage rate of agricultural laborer.

### 2.2.8.2 Coverage, Availability, Data Sources and Responsible Agencies

Statistics/ Indicators	Coverage	Availability	Data Source	Responsible Agency
Rural population	national and sub-national levels	1974, 1981, 1991 and 2001	Population Census	BBS
Employment	national and sub-national levels	2005	Labour Force Survey	BBS
Employment in agriculture sector	national and sub-national levels	2005	Labour Force Survey	BBS

<b>Statistics/ Indicators</b>	<b>Coverage</b>	<b>Availability</b>	<b>Data Source</b>	<b>Responsible Agency</b>
Agriculture Labour Wage Rate	National and subnational levels	1981- 2006 Monthly	Agriculture Labour Wage Survey	BBS

## CHAPTER 3. MAJOR DATA SOURCES FOR AGRICULTURAL STATISTICS

### 3.1 List of Major Agricultural Censuses and Surveys

#### Census

1. Agriculture Census of Bangladesh, 2007

#### Surveys

1. Labour Force Survey, 2002-03
2. Livestock Survey

### 3.2 Metadata for Each of the Major Censuses

#### 3.2.1 Agriculture Census of Bangladesh, 2007

##### 3.2.1.1 Overview

#### Legal Basis of Agriculture Census

The Agriculture Census operations in Bangladesh have been carried out under the Agriculture Census Act XLI of 1958 (as amended in 1983). The Act, inter-alia, authorizes the Government to appoint Director General of Bangladesh Bureau of Statistics (BBS) as the Census Commissioner and other required staff for conducting the census. The Act makes it binding on the respondents to answer questions put to them by authorized census enumerators. At the same time it ensures strict confidentiality of the information collected from individual holders. The Act authorizes the collection of information of some broad items in the agriculture sector as specified below:

Land ownership and land tenure;	Agricultural equipment and machinery;
Land unit and sub-division of land;	Irrigation and drainage;
Land utilization;	Fertilizers and soil dressing;
Crop acreage and production;	Wood and fishery products;
Livestock and poultry;	Agricultural credit;
Employment in agriculture;	Agriculture and Sericulture;
Agricultural population;	Fruits and vegetables products; and

such other matters which the Government may deem fit to include as census items for collection of information in Agriculture Census. The Census Act is placed in Chapter-III.

## Agriculture Censuses in Bangladesh

The first Agriculture Census was held in the territory now comprising Bangladesh in 1960 covering 10% cadastral mauzas. The 1<sup>st</sup> Agriculture Census of Bangladesh was undertaken in 1977 in 14% rural mauzas. The first 100% Census of Agriculture and Livestock which is second in order, was undertaken in 1983/84. The 3<sup>rd</sup> full count Agriculture Census in rural areas of Bangladesh was undertaken in 1996/97. To meet the immediate data needs of the Three-year Re-rolling Plan of the Government, Agriculture Sample Survey 2005 was undertaken during May 17-31, 2005. However, to continue the decennial periodicity of the Agriculture Census it is decided to conduct the 4<sup>th</sup> Agriculture Census of Bangladesh in 2007.

A statement of the major activities of the past censuses of agriculture in Bangladesh is shown below:

### Comparison of Activities of Agriculture Censuses of Bangladesh, 1960 - 1997

Activity	1960	1977	1983/84	1996/97
Enumeration Dates	15 <sup>th</sup> February to 21 <sup>st</sup> March, 1960	24 <sup>th</sup> April to 31 <sup>st</sup> May, 1977	April, May & June of 1983 and 1984	25 <sup>th</sup> December, 1996 to 25 <sup>th</sup> January 1997
Census Methodology	10% sample of rural mauzas using a book type questionnaire for each farm household.	14% sample of rural mauzas using a listing form and a census questionnaire.	Complete count in both rural and urban areas using short questionnaire and long questionnaire	Complete count in rural areas only using both short and long questionnaire.
Field Personnel	1881 Assistant Tehsildars worked as enumerators who were supervised by 485 officers at different levels.	4300 primary school teachers and 2000 Asst. Tehsildars worked as enumerators	66,493 worked as enumerators	25 RCCs, 92 DCCs, 466 TCCs, 1,967 Zonal officers and 98,353 worked as enumerators

**Comparison of Activities of Agriculture Censuses of Bangladesh, 1960 - 1997  
(cont'd...)**

<b>Activity</b>	<b>1960</b>	<b>1977</b>	<b>1983/84</b>	<b>1996/97</b>
Training of field staff	Enumerators were given intensive training including classroom lectures and practical training in field.	Training was given in two phases- 1 <sup>st</sup> phase for Master trainers in Dhaka for three days and 2 <sup>nd</sup> phase for enumerators and supervisors in 83 centres for 7 days.	Two tiers training at Dhaka for Master trainers and for Zonal officers who were trained Division-wise. Zonal officer then trained enumerators and supervisors at Union levels in 1125 center for two days.	Three tiers of training: 1. Dhaka for RCCs & DCCs 2. District HQ for UCCs & Zonal officers 3. Zonal centres for supervisors and enumerators for two days at Zone level.
Data Dissemination	East Pakistan Census data were published in three reports- Report-1 giving data by Districts, Report-2 giving data by sub-Division and Report-3 providing Analytical notes.	The preliminary results were published in November, 1980 and the final results were published in one National Volume giving summary results for Districts.	Census data were published in 6 National Volumes and 64 Zila. Reports. The National Volumes were subjects-wise viz agriculture holding cropping pattern, sample enumeration characteristics Municipal Areas, Institutional holdings etc.	The results of the full count census were published in one National Volume and 64 Zila Reports and those of the sample enumeration were published in one National Volume. Preliminary Report was published in July, 1997.

### 3.3 Metadata for Each of the Major Surveys

#### 3.3.1 Agriculture Sample Survey of Bangladesh

##### 3.3.1.1 Overview

In order to meet the growing national and international demands for data on structural changes in agriculture, censuses have become important for providing data on the structure of agriculture within the country in an internationally comparable form.

It includes various characteristics of agricultural holdings and their operation, distribution of agricultural assets among different classes of farmers, auxiliary occupation of farmers, farm production, livestock, poultry, forest, and fishery, etc. Emphasis is also given on other economic activities of the farm households.

#### Comparison of Activities of Agriculture Sample Survey of Bangladesh, 2005

Activity	2005
Enumeration Dates	17 <sup>th</sup> May to 31 <sup>st</sup> May 2005
Census Methodology	10% sample EAs in both rural & urban areas using short questionnaires. Long questionnaire will be canvassed in October-November 2005.
Field Personnel	312 Coordinators at various levels, 1193 Zonal officers and 13,539 worked as enumerators
Training of field staff	Three tiers of training: 1. Dhaka for RCCs & DCCs 2. Zila for UCCs & Zonal officers 3. Zonal Centre (Upazila) for supervisors and enumerators for two days at Zone level
Data Dissemination	A preliminary report was released in July 2005 basing on the summary control forms. A <b>National Volume-1</b> based on the short Questionnaire data by Zila and 64 Zila Reports of Zila level data and the <b>National Volume-2</b> basing on the long Questionnaire data are planned to be published by Zila.

### 3.3.1.2 Survey Design

#### **Sampling Design / Statistical Unit / Selection Procedure:**

A Technical Sub-committee was formed with experts from the universities and government departments to develop the sampling design for the survey which is reproduced below.

The sampling design in this case is taken as stratified cluster sampling with Mahallah/Mauza as cluster of household.

#### **Stratification**

Primarily, the whole country is divided into 3 strata: (i) Metropolitan area consisting of municipalities of 6 Metropolitan cities, (ii) Urban area consisting of municipalities of other zila towns, (iii) Rural area consisting of remaining areas of the country.

For each stratum, sampling design is basically a single-stage cluster sampling with Mahallah as cluster for first 2 strata and Mauza as cluster for third stratum. A fixed number of clusters (10%) will be selected in each zila/city and agricultural households will be interviewed in each selected cluster. This means that about 10% Mahallah will be selected in samples for first 2 strata and about 10% Mauza will be selected in the third stratum. For selected larger clusters having >500 households, sub-sampling is done in order to keep sample size of households to around 10%.

#### **Allocation of sample size**

Approximate proportional allocation may be used with some higher proportion for first 2 strata since agricultural farmer is a rare item and larger sample is needed there. In actual practice, 10% clusters are selected in all strata systematically.

For the rest of this note, Rural area (third stratum) is considered. The other 2 strata can be dealt with in a similar way with selected households of livestock and poultry also included in the sample for interview.

#### **Selection of Cluster (Mauza)**

Mauza of Rural area varies in size. So, these are to be selected in a zila with probability proportional to estimated size (PPES) systematic sampling without replacement. The number of households of a Mauza, obtained from the report of 2001 Population census, is considered as the estimated measure of size. For selection of Mauza, the numbers of households are to be cumulated in computer over all Mauza of the zila. Then taking a random start, the interval is applied. Here the interval is the total number of households in the zila divided by the number of mauza to be selected in that zila. Random start is a random number between 1 and the calculated interval. Since zila estimates are needed, this selection process is to be carried out independently for each zila. In actual practice, one random start and

one interval are considered for each stratum and the same interval is applied to all zilas/cities one after another.

In the selection process, if a selected Mauza is small (having  $\leq 500$  households), the EA's touched by the Mauza will be enumerated. If a selected Mauza is large having  $> 500$  households, one third of the EA's in the Mauzas will be enumerated in each Mauza. This combining and splitting of selected Mauza are done in order to reduce wide variation in size of selected Mauza so that standard error of the estimate is reduced and to have roughly uniform load for the interviewers.

**Main Data Items and Variables for Operational Purposes:**

The schedule-1 (short questionnaire), which was canvassed and used for collecting data on agriculture in the 10% sample enumeration contains the following information:

Land ownership	Cultivated land
Land use	Commercial farms
Area under permanent crops	Loan taken and use of loan
Area under temporary crops	Livestock and poultry
Area under bamboo bushes	Use of agricultural equipments
Area under ponds	Employment in agriculture
Homestead area	Farm transports
Current fallow area	Farm population, etc.

The items of information included in the short questionnaire were finalized by the Technical Committee formed for the purpose after considering the issues in a number of meetings.

Another long questionnaire (Schedule-2) was used to collect detailed information from the selected households through sub-sampling from the enumerated households of the sample survey for the schedule-1.

**Concepts and Definitions:**

**Urban area**

In the Agriculture Sample Survey 2005, urban areas constituted six metropolitan cities of the country (Dhaka, Chittagong, Khulna, Barisal, Sylhet & Rajshahi) and the areas within municipalities of other zila towns.

**Rural area**

The rest of the country including other urban areas were included in rural areas. Small growth centres with urban characteristics adjacent to municipalities and metropolitan cities were also included in rural areas in the 2005 agriculture sample survey.

### **Mauza**

Mauza is the demarcated lowest administrative territorial unit having separate jurisdiction list number (J.L.No.) in the revenue records. Every mauza has its well-demarcated cadastral map. Mauza should be distinguished from local village for a mauza may consist of one or more villages or part of a village.

### **Enumeration area (EA)**

An enumeration area means a well-defined and specified area of enumeration assigned to an enumerator to conduct the survey. It may consist of one or more than one mauza. It may also be a part of a mauza or a mahallah. It may be a part of the mauza/mahallah or a complete mauza which consisted of 200 households on an average in the rural areas. In case of a selected mauza having less than 175 households, required numbers of households were included from adjacent mauza. Similarly in case of a mahallah in the urban areas consisting of 300 households on an average considered an enumeration area for this agriculture sample survey. Each enumeration area was identified by a specific number.

### **Household**

A household means a group of persons normally living together and eating in one mess (i.e. with common arrangement of cooking) with their dependents, relatives, servants etc. A household may be a one-person household or a multi-person household. In other words, when a group of persons living together generally maintains a family or family like relations and take meals from the same kitchen is termed as a household. Popularly, it is described as “Khana”. In some cases there may be more than one household in a single house or in one dwelling arrangement, a household may have more than a house or structure or shed. The household must be distinguished from a family which consists of blood related members who may live in different places but members of the household must share the same kitchen and live together.

### **Holder**

The holder is the member of the household who exercises management control over the operations of the agricultural holding and takes the major decisions regarding the utilization of the available resources. He has technical and economic responsibility for the holding, which he may operate directly as owner or tenant or through a manager (hired person) to whom he has delegated the responsibility for day to day management of the work.

### **Agriculture holding**

An agriculture holding is a techno-economic unit of agricultural production under single management comprising of all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size. Single management may be exercised by an individual household, jointly by two or more individuals or households or a juridical person such as a corporation, cooperative or government agency. A holding may consist of more than one parcel (fragment) located in one or more separate areas or mauzas or in more than one administrative

unit or division provided that all the separate parcels or fragments form a part of the same technical unit under operational control of the same management. The definition covers practically all holdings or virtually all households engaged in agricultural production and includes livestock with no agricultural land. So, holdings may have no significant agricultural land area, e.g. poultry, hatcheries, holding keeping livestock for which land is not an indispensable element for their production. In the context of this report, a holding and a household may be treated as the same.

### **Agriculture Labour Household**

Agriculture labour household was defined as a member or members of a household who work most of the time in a reference year on land operated by other households in exchange for wages in cash or kind or both. The agriculture labour household may have some cultivated land and may possess some livestock.

### **Agricultural work**

Agricultural work on the holding refers to all activities of the holder and his/her labour force involving planning, management and operation of the holdings. It includes preparing land, sowing, weeding, harvesting, feeding and caring for livestock and poultry, collection of fodder, fertilizer and insecticide, working in the field or kitchen garden, supervising agricultural workers, keeping farm records and accounts, preparing agricultural products for marketing (including packaging), repairing fences, farm equipment, machinery etc. constructing farm building, cow shed and fences, and engaging in land reclamation and improvement and other related activities.

### **Farm holding**

The basic unit of enumeration in the survey was the household. The household could constitute a farm holding which is a techno-economic unit of agricultural production comprising all livestock kept and all the land which is used wholly or partly for agricultural purposes and is operated under a single management by one person alone or with others, without regard to title, size or location. Households with less than 0.05 acre of cultivated area were treated as non-farm households. Land operated more than 0.05 acre of cultivated area situated at different villages/mauzas but under the same operational control constitutes one farm holding.

### **Classification of farm holdings**

Farm holdings are broadly classified as (a) Marginal (b) Small (c) Medium and (d) Large.

1. **Marginal farm** is a farm holding having an operated area of 0.05 to 0.49 acre of land
2. **Small farm** is a farm holding having an operated area of 0.50 to 2.49 acres of land
3. **Medium farm** is a farm holding having an operated area of 2.50 to 7.49 acres of land
4. **Large farm** is a farm holding having an operated area of 7.50 acres and above

The cut-off point distinguishing farm holdings was fixed at 0.04 acre of cultivated area, and the holdings having cultivated area up to 0.04 acre were considered as non-farm household. Small cultivated area like 0.04 acre or less is generally utilized as kitchen garden. Vegetables are grown within the homestead area. Even the seeds of white gourd, water gourd, pumpkin etc. are sown by the side of the structures and house but keeps spreading on and around the roofs and the structures. Considering all these factors, the minimum cultivated area of .05 acre was fixed for qualifying to be a farm holding.

### **Owned land**

Owned land means the area of land owned by the holder including the members of his family having a title to the land with the right to determine the nature and extent of its use and to transfer the same. Moreover, there might be some land over which the holder or any member of his household has owner-like possession. This type of land was included in the area of owned land. The land held by the holder in owner like possession can be operated by him in the same way as owned land although the holder does not possess a title of ownership.

### **Land given to others**

This is the area of the holder's owned land, which is given out to some other persons/body on rent or on lease usually for a limited period of time on payment in cash or kind. The consideration for use of the land may vary from area to area.

### **Land taken from others**

The land taken from others on any basis including payment in cash or kind has broadly been sub-divided into two groups:

1. Land share cropped (barga) on different terms means the area of land leased from other farmer(s) or individual (s), or from any organization on share cropping basis and under operational control on the day of enumeration.
2. Land taken on any basis other than barga, such as lease, usufructuary right, mortgage etc. and under operational control on the day of enumeration.

**Tenancy Owner holdings** are those who own some land. May or may not lease out some land but they operate only on their own land.

**Tenant holdings** are those who do not own any land, but operate some land taken from others on share cropping basis or on other terms.

**Owner cum tenant holdings** are those who own some land may or may not lease out their own land to others but take some land from others on share cropping basis or on other terms.

### **Operated area**

Total operated area of a holding is the area owned by the household plus the area taken from others and minus the owned area given to others for operation. The operated area also includes uncultivated land operated by the household including homestead area.

### **Homestead area**

Homestead area means the area of residence of the holder's household with all its structures, courtyard and the land occupied by the passage for entrance and exit. It should be remembered that the adjacent land to the household used for temporary or perennial crops, ponds and tanks, compact plantations are to be excluded from the area of homestead.

### **Net cultivated area**

Net cultivated area is the area actually cropped during the census year regardless of the number of crops grown and it includes the area under temporary crops, current fallow and permanent crops (fruit and wood trees). In other words, it is the actual area or physical area occupying perennial and non-perennial crops and area under current fallow.

### **Area under permanent crops**

Area under permanent crops or fruits is the part of net sown area with permanent crops or planted with fruit trees which occupy the land for a long period of time and do not need to be replanted for many years after each harvest, e.g. mango, jack fruit, coconut etc. Area under permanent crops or fruit trees may be of two types, namely:

1. **Compact plantation**

Area under compact plantation means the area under fruit trees, plants and shrubs which are planted in a planned and regular pattern within a specified area of land; and

2. **Scattered plantation**

Area under scattered plantation means the area under fruit trees and shrubs which are scattered or located in such a way that it is not feasible to measure and record the aggregate area occupied by such fruit trees, plants and shrubs. Area under scattered plantation has not been accounted for.

### **Net area under temporary crops**

Net area of land under temporary crops is the physical area of land under temporary crops such as paddy, jute, sugar cane, pulses, potato, brinjal, vegetables etc., irrespective of number of crops harvested during the survey year.

### **Gross cropped area**

The gross cropped area represents the aggregate area of temporary crops raised in the same farmland during the survey year. If one acre of land is used for growing

Aus, Aman and winter crops in the same year, it is taken as one acre of "net cultivated area" but three acres of "gross cropped area."

**Intensity of cropping**

Intensity of cropping represents the ratio of the gross cropped area to the net temporary cropped area expressed in terms of percentage. It indicates the extent to which the same area is used for cropping. Thus, the intensity of cropping is determined as follows:

$$\text{Intensity of cropping} = (\text{Gross cropped area} / \text{Net temporary cropped area}) \times 100$$

**Diversification of Crop Cultivation**

Different types of temporary crops are grown by the farm holders. A farm holder dropped cultivation of any specific crop during the last five years or cultivated a new crop during the last five years. The data on crop diversification were also collected in the Agriculture Sample Survey 2005.

**Reference Period:**

The data collected in the survey referring the period from 14 April, 2004 to 13 April, 2005 corresponding to the **Bangla Year 1411** from 1<sup>st</sup> Baishakh to 30<sup>th</sup> Chaitra.

For the items of information on holder, size of land holding, land tenure, operated land and farm population the reference time was the day of enumeration. For some major items of information reference period is shown below:

Survey Year	14 <sup>th</sup> April, 2004 to 13 <sup>th</sup> April 2005 i.e. 1 <sup>st</sup> Baishakh to 30 <sup>th</sup> Chaitra 1411 BS
<u>Information on:</u>	
Holdings	<u>Reference Time:</u>
Size of farm	The day of enumeration
Land tenure	The day of enumeration
Farm population	The day of enumeration
Livestock, poultry and other inventory	The day of enumeration
Items	The day of enumeration
Operated land	
Employment in agriculture	Survey year Survey year

**Date of Data Collection:** Agriculture Sample Survey 2005 was undertaken during May 17-31, 2005

### 3.3.1.3 Conduct, Operations, Data Quality Control

#### Estimation Formulae for Single Stage Cluster Sampling

Since the method of selection is the same for each zila and for each thana in the zila, following estimation formulae will be applicable to both zila and thanas.

Let  $y_{ij}$  be the measure of a variable  $y$ , for  $j$ th farmers in  $i$ th cluster or Mauza  
 Let  $y_i = \sum y_{ij}$  be total of  $y$  for all farmers of  $i$ th selected cluster (Mauza),

$$y = \sum y_i = \sum y_{ij} \text{ be total of } y \text{ for the whole sample of a zila} \\ (j=1, 2, \dots, k_i \text{ \& } i=1, 2, \dots, n),$$

Let  $k_i$  be number of farmers in  $i$ th selected cluster (Mauza) obtained from sample,  
 $m_i$  be number of households in  $i$ th selected Mauza ( $m_i \geq k_i$ ) obtained from 2001 Census,  $n$  be total number of clusters (Mauza) in the sample of the zila  
 $N$  be total number of clusters in the whole zila.

$$Y = \sum_i \sum_j y_{ij} \text{ be the total of values of } y \text{ for all farmers in the whole zila ,}$$

$M_0 = \sum m_i$  be total number of households in the zila obtained in 2001 population census and  
 $p_i = m_i / M_0$  be the probability of selection of  $i$ th Mauza.

#### Estimate of Population Total, Y

The estimated total is given by

$$\hat{Y} = (1/n) \sum (y_i / p_i), i = 1, 2, \dots, n$$

This is an unbiased estimate of population total  $Y$  of variable  $y$ . Since sampling fraction is small (0.1), the variance of  $\hat{Y}$  can be estimated by with - replacement formula. This is as follows:

$$V(\hat{Y}) = \sum (y_i / p_i - \hat{Y})^2 / n(n-1) \text{----- (1)}$$

with  $p_i = m_i / M_0$  as probability of selection of  $i$ th cluster.

Standard error of  $\hat{Y}$  is

$$SE(\hat{Y}) = \sqrt{\sum (y_i / p_i - \hat{Y})^2 / n(n-1)}$$

$2 SE (\hat{Y})$  is the error of the estimate,  $\hat{Y}$ , which means that population total,  $Y$ , is expected to lie within this error of the estimate in 95% cases.

**Ratio Estimate of Population Mean, Y, of variable y**

Since  $M_0 = \sum m_i$  is the total number of households in the zila for the year 2001 when the population census was taken, this cannot be used to obtain estimate of mean from estimated total. Instead, total number of farmers ( $K_0$ ) in the zila for current year is estimated as follows for the purpose since  $K_0$  is unknown.

The number of farmers,  $k_i$ , of  $i$ th sample Mauza is known and it varies from Mauza to Mauza. Hence, total number of farmers in the zila can be estimated by the formula as:

$$\hat{K}_0 = \sum (k_i / p_i) / n$$

This number of farmers  $k_i$  for  $i$ th selected mauza, is obtained from survey data. The estimated variance of  $\hat{K}_0$  is obtained by with - replacement formula, as

$$V(\hat{K}_0) = \sum (k_i / p_i - \hat{K}_0)^2 / n(n-1)$$

The ratio estimate of population mean:  $\bar{Y}$ , is then given by

$$\hat{Y}_R = \hat{Y} / \hat{K}_0$$

Its estimated variance by ratio method is

$$V(\hat{Y}_R) = \left\{ V(\hat{Y}) + \hat{Y}_R^2 V(\hat{K}_0) - 2\hat{Y}_R \text{cov}(\hat{Y}, \hat{K}_0) \right\} / \hat{K}_0^2 \dots\dots\dots(2)$$

with  $\text{cov}(\hat{Y}, \hat{K}_0) = \sum (y_i / p_i - \hat{Y})(k_i / p_i - \hat{K}_0) / n(n-1)$

Estimated standard error  $SE(\hat{Y}_R) = \sqrt{V(\hat{Y}_R)}$

**Estimated variance of total  $\hat{Y}$ , by ratio method**

Multiplying both sides of (2) by  $\hat{K}_0^2$  the estimated variance of estimated total

$$\hat{Y}, \text{ by ratio method is given by } V_R(\hat{Y}) = V(\hat{Y}) + \hat{Y}_R^2 V(\hat{K}_0) - 2\hat{Y}_R \text{cov}(\hat{Y}, \hat{K}_0)$$

This estimated variance of  $\hat{Y}$  is likely to be smaller than that obtained from (1) of section 2(a) when there is high correlation between  $y_i$  &  $k_i$  which is likely.

In actual practice estimated variance of estimated total  $\hat{Y}$ , may be obtained by both the methods of 2(a) and 2(c) and smaller one of the  $\hat{Y}$  may be accepted for finding standard error.

### Estimate of population (zila) proportion, P

Proportion is a special case of mean when the variable  $y$ , is defined by

$$y_{ij} = \begin{cases} 1 & \text{if (i,j) th farmer possesses the characteristic under consideration} \\ 0 & \text{otherwise} \end{cases}$$

With this definition of variable  $y$ , the estimating formulae in 2(b) can be applied for estimation of proportion.

In this case, if  $y_i = \sum y_{ij} = r_i$  is the number of households having the characteristic under study for  $i$ th Mauza, then  $r_i$  can be used in place of  $y_i$  in the above formulae for estimation of mean and its standard error to obtain estimates for proportion.

### Estimates for metropolitan and urban strata

The above formulae can be used for other 2 strata with Mahallah as cluster. In these strata, there may be few households in the sample, which rear livestock & poultry only. So data on livestock should be collected from such sample households also. The data on livestock & poultry may be analyzed using above formulae.

### Sub-sampling for larger Mauza/Mahalla in the Sample

After selection of Mauza by PPES, it is observed that many large Mauza having more than 500 households are included in the sample of rural area with the result that about 35% households are included in the sample instead of required 25%. So, sub-sampling is needed for the selected large Mauza in order to reduce the sample size of households and the cost.

### Post –stratification

In order to solve the problem, all the sample Mauza of each zila are divided into 2 sub-strata as follows:

#### Sub stratum –I

This sub stratum contains those Mauza each of which has 500 or less number of households.

#### Sub stratum –II

This sub-stratum contains those Mauza each having more than 500 households. For sub-stratum II, sub-sampling is done with one third of the EA (Enumeration Area) having around 200 households each, randomly selected with equal probability for each selected Mauza at the second stage. Here Mauza is primary sampling unit (PSU) and EA is second-stage unit. This sampling procedure reduces the total sample size of farmers of Rural area to about 10% of total number.

## Estimation Procedure

Post stratification divides the whole sample of a zila into 2 sub-strata as stated above. This stratification also divides the whole zila into similar implicit and artificial 2 sub-strata depending on size of PSU. So, estimates for these sub-strata of population (zila) are provided below so that zila estimates can be obtained from these sub-strata estimates.

### Sub-stratum- I

For this sub-stratum, sampling procedure is single-stage cluster sampling. All farmers in each selected mauza are investigated here. Hence, estimating formulae of section 2 are applicable for this sub-stratum.

### Sub-stratum II

For this sub-stratum, sampling design is 2-stage cluster sampling with constant sampling fraction (1/3) at the second stage. Estimating formulae for this sub-stratum are as follows:

#### Estimate of total for 2- stage cluster sampling in sub-stratum II

Let  $y_{ijk}$  be observation for  $k$ th farmer in  $j$ th EA of  $i$ th selected Mauza (PSU)  
 $(i=1, 2, \dots, n_1, j=1, 2, \dots, n_{2i}$  and  $k=1,2,\dots,t_{ij})$

Let  $n_1$  be number of PSU in the sample of the stratum  
 $n_{1i}$  be number of EA in the sample of  $i$ th PSU  
 $N_{2i}$  total number of EA in whole of  $i$ th PSU  
 $t_{ij}$  be number of farmers in  $(i,j)$ th EA in the sample

It is assumed that sampling fraction  $f_2=N_{2i}/N_{2i}$  at the second stage is constant (1/3).

Let  $y_{ij}=\sum y_{ijk}$  be sum of observations for  $(i, j)$ th sample EA and  $y_i=\sum y_{ij}$

Then  $\hat{Y}_i = \frac{N_{2i}}{n_{2i}} \sum y_{ij} = y_i / f_2$  is as an unbiased estimate of total

$Y_i=\sum \sum y_{ijk}$  of  $i$ th PSU

Also,  $\hat{Y} = \sum (\hat{Y}_i / p_i) / n_1$  is an unbiased estimate of total  $Y$  of intrinsic sub-stratum II in the zila.

Estimated variance of  $\hat{Y}$  by with-replacement formula is

$$V(\hat{Y}) = \sum (\hat{Y}_i / p_i - \hat{Y})^2 / n_1 (n_1 - 1) \text{-----} (3)$$

**Estimation of mean of the sub-stratum II**

The total number of farmers, in the sub-stratum is not known. This is estimated as follows.

An unbiased estimate of number of farmers ( $T_i$ ) in  $i$ th PSU in the sub-stratum II of the zila, is

$$\hat{T}_i = \frac{N_{2i}}{n_{2i}} \sum t_{ij} = t_i / f_2 \quad \text{with } t_i = \sum t_{ij}$$

Then  $\hat{T}_0 = \sum (\hat{T}_i / p_i) / n_1$

is also unbiased for,  $T_0$ , the total number of farmers in the sub-stratum II, of the zila. Its estimated variance by with-replacement formula, is

$$V(\hat{T}_0) = \sum (\hat{T}_i / p_i - \hat{T}_0)^2 / n_1(n_1 - 1)$$

The ratio estimate of sub-stratum mean,  $\bar{Y}_R = \hat{Y} / \hat{T}_0$

Its estimated variance by ratio method is

$$V(\hat{Y}_R) = \{V(\hat{Y}) + \hat{Y}_R^2 V(\hat{T}_0) - 2\hat{Y}_R \text{cov}(\hat{Y}, \hat{T}_0)\} / \hat{T}_0^2 \dots\dots\dots(4)$$

Where  $\text{cov}(\hat{Y}, \hat{T}_0) = \sum (Y_i / p_i - \hat{Y})(\hat{T}_i / p_i - \hat{T}_0) / n_1(n_1 - 1)$

The proportion can be estimated using the above formulae following the procedure of section 2(d).

**Ratio estimate of variance of estimated total**

Multiplying (4) by  $\hat{T}_0^2$  variance of estimated total  $\hat{Y}$  by ratio method is

$$V_R(\hat{Y}) = V(\hat{Y}) + \hat{Y}_R^2 V(\hat{T}_0) - 2\hat{Y}_R \text{cov}(\hat{Y}, \hat{T}_0)$$

This estimate is likely to be smaller than that obtained by (3) of section 3(a).

### Estimates for whole zila and Rural Area

For each zila, the estimation formulae of section 4 below for stratified samples are to be used to obtain zila estimates from the two sub-strata estimates. The population weight  $W_h = N_h/N$  is based on number of households ( $N_h$ ) for hth sub-stratum  $h=1,2$ . The numbers,  $N_h$ , of households are to be obtained from census report of the zila.

The estimated total and mean for whole of Rural area and their estimated variances, can similarly be obtained from corresponding zila estimates following the method of section 4.

### Estimates for other 2 strata

The above procedure is applicable to other 2 strata: Metropolitan area & Urban Area with similar definition of sub-strata in order to deal with selected large Mahallah for reducing sample size of households.

### National estimates

National estimates can be obtained from those of 3 strata-Metroplitan area, Urban area and Rural area.

### Estimation of Total

For estimating national total of a variable, stratum totals of the variable and their estimated variances are added separately to get the national estimated total and its estimated variance respectively.

### Estimation of Mean and proportion

The estimated mean of a variable for whole country is the weighted mean of 3 stratum means. Let  $N_h$  and  $N$  be the number of households of hth stratum and that of whole country respectively. The estimated mean of  $y$  for whole country is given by

$$\hat{Y}_{st} = \sum N_h \hat{Y}_{ppsh} / N = \sum W_h \hat{Y}_{ppsh}$$

where  $W_h = N_h/N$  is the weight for hth stratum,

$$\hat{Y}_{ppsh} = \text{estimated mean for hth stratum, } h = 1,2,3$$

$N_h$  = number of households in hth stratum &  $N = \sum N_h$

The estimated variance  $\hat{Y}_{st}$  is

$$V(\hat{Y}_{st}) = \sum W_h^2 V(\hat{Y}_{ppsh}) \quad \text{where } V(\hat{Y}_{ppsh}) \text{ is estimated variance of mean for hth stratum.}$$

These formulae can be used for estimating national proportion replacing  $\hat{Y}_{ppsh}$  by proportion,  $p_{ppsh}$  of hth stratum.

## Pre-testing of survey Schedule-1

The 1996 Agriculture Census Schedule-1 that was used to collect information from farm households was taken as the basis for developing the 2005 Agriculture Sample Survey enumeration schedule. In addition to the 19 items of information contained in the 1996 agriculture census Schedule-1, a few more items viz number of owned ponds, loan taken (credit), commercial farms operated and preservation of seeds were included in the draft enumeration Schedule-1 for the sample survey 2005. Thus, the draft Schedule-1 for the Agriculture Sample Survey 2005 was developed containing the following 23 items of information:

1. Identification number of the holding and head of the holding
2. Sex of the head of holding
3. Agriculture labour holding
4. Owned land (of all members of the holding)
5. Land given to others (rented out)
6. Land taken from others (rented in)
7. Total operated area of land
8. Homestead land area
9. Net cultivable land (permanent cropped area, temporary cropped area and current fallow)
10. Permanent cropped area
11. Temporary cropped area
12. Irrigated area of cultivated land
13. Net area of land using chemical fertilizer
14. Number of livestock and poultry
15. Number of commercial farms (fishery, dairy, fattening cows and buffaloes, sheep-goats, poultry and silk worm)
16. Uses of agricultural equipments
17. Agricultural population engaged in agricultural work (10 years and above)
18. Preservation of seeds
19. Cottage industries (holding based)
20. Rural transports
21. Number and area of ponds
22. Agricultural loan (rural credit)
23. Area of land under temporary crops

This draft enumeration schedule as prepared including 23 items as mentioned above was pre-tested in the field in a few spots with respect to their feasibility of inclusion in the survey. The results of the pretest were reviewed and another version by the enumeration schedule was prepared which dropped some old items viz. net irrigated land, net land under chemical fertilizer and holding based cottage industries and included some new items viz. members of holding below 10 years and above 10 years, agricultural workers below 10 years and above 10 years, persons engaged in others' agricultural farm, persons engaged in agricultural farm and non-agricultural farm in other zilas, land under bamboo bushes and land under current fallow.

Commercial farms which were absent in 1996 Agriculture Census were included in the 2005 sample enumeration schedule. Pigeons and poultry farms were also included as additional items in 2005 sample enumeration. Land area under fishery, sericulture/silk worm, flower nursery and tree nursery were also added in the 2005 enumeration schedule. Ownership of agricultural equipments viz. owned, jointly owned and hired and some new items of equipments viz. weeding machine, spray machine, threshing machine and plough were also newly added to the 2005 sample enumeration schedule. The draft enumeration schedule after incorporating these new items and approved by the Technical Sub-committee was pre-tested in various spots and the results were analyzed and revised and were placed before the Technical Sub-committee for consideration and approval. Finally, the Technical Sub-Committee approved the sample enumeration schedule-1 with 24 items.

### **Zonal Operations**

Two zonal operations were undertaken primarily with the zonal officers and coordinators of the Agriculture Sample Survey Programme. The first zonal operation was conducted during 21-31 December 2004 and the second zonal operation was organized during the period 28 March–10 April 2005. The activities done in the zonal operations include the following:

1. Forming and demarcating enumeration areas (EAs) and showing location of the EAs in the sketch maps;
2. Preparing a list of enumerators and supervisors from local unemployed educated youths;
3. Preparing a list of training centres for training of enumerators and supervisors;
4. Formation of survey committees and contacting local administrative authorities;
5. Preparing a list of survey control rooms; and
6. Preparing a list of Sonali Bank branches for disbursing remuneration through cheques.

The zonal operations and their dates of operation are shown below:

<b>Zonal operation</b>	<b>Date and duration of operations</b>
1 <sup>st</sup> zonal operation	21-31 December, 2004
2 <sup>nd</sup> zonal operation	28 March-10 April, 2005
Final enumeration	17 –31 May, 2005

## **National Technical Committee**

A 22 - member Technical Committee headed by the Director General of BBS was formed. The members are representatives of DG, IMED, DG Directorate Forestry, DG Directorate of Agriculture Extension, DG Directorate of Fisheries, DG Directorate of Livestock, DG BIDS, ISRT, Dhaka University, Agricultural University, Joint Chief, Planning Commission and Deputy Secretary, Planning Division. All the technical activities relating to the conduct of agriculture sample survey 2005 including design of questionnaire, pre-testing, sample design and survey operation were undertaken with the guidance and approval of this committee.

## **Formation of Survey Local Committees**

For successful implementation of enumeration Zila and Upazila Survey Committees were formed with member of parliament concerned as adviser vide notification No.PB/PM/4(494/94 (part-1)-401 dated 17 March 2005 issued by the Ministry of Planning with the approval of Hon'ble Speaker of the parliament. This notification was endorsed and circulated by the Cabinet Division to the members of parliament and to the field administration for carrying out the following assigned duties and responsibilities during the period of survey operation:

1. Supervision and extension of co-operation with necessary directions in controlling survey activities and their implementation properly;
2. Provision of necessary direction by the Chairperson (Deputy Commissioner for the Zila Survey Committee and Upazila Nirbahi Officer for the Upazila Survey Committee) in formulating survey committees and organizing orientation meeting, arrange publicity among the members of the public seeking co-operation and participation in implementation of the survey enumeration;
3. Cooperation for temporary employment of local unemployed educated enumerators and supervisors;
4. Active participation of the Government officers and staff in operation of the survey; and
5. Taking administrative actions in establishment of survey control rooms at Zila and Upazila levels

The committees were abolished automatically after completion of the sample survey. With the assigned duties and responsibilities of the committees formed at Zila and Upazila level including all the public representatives and local level heads of Government offices made the survey operation easy and well controlled which helped ensure the quality of collected data to a greater extent.

## **Publicity Programme**

A well-planned publicity campaign of the sample survey operation was launched with a view to generating public awareness. Posters and stickers were displayed and distributed at the Upazila and enumeration area levels. The Zila and Upazila

Committees were involved in the publicity campaign. The basic aim of survey publicity was to make people aware of:

1. Sample survey programme;
2. Need for providing correct information to enumerators;
3. Need for co-operation of mass people in survey work;
4. Keep confidentiality of the survey information; and
5. Providing total cooperation and assistance to enumerators and other survey officials

Big - sized posters carrying messages relating to the agricultural activities were distributed and pasted at public places. Stickers were also posted at appropriate places. Microphone announcements, drum beatings, etc. were undertaken at hats, bazaars and public places.

### **Organization Period of Training**

An elaborate training programme for imparting uniform and effective training to personnel of all levels on Agriculture Sample Survey was chalked out. A verbatim training manual was developed for this purpose. A field manual detailing every pros and cons of the field operations, collecting information, survey calendar, specifying duties and responsibilities of officers of all levels, supervisors and enumerators including the responsibilities of the survey committees were developed. The training programme of the survey was divided into three phases:

#### **Phase Wise Training on Sample Survey**

##### **1<sup>st</sup> zonal operation**

1<sup>st</sup> phase: Training of the Master Trainers at Dhaka Office  
(Divisional, Regional and Zila Co-ordinators)

2<sup>nd</sup> phase: Upazila Co-ordinators/zonal officers at  
Regional Statistical Offices/ Zila HQs

##### **2<sup>nd</sup> zonal operation**

1<sup>st</sup> phase: TOT for the Master Trainers at Dhaka office  
(Divisional, Regional and Zila Co-ordinators)

2<sup>nd</sup> phase: Upazila Co-ordinators/ Zonal Officers at  
Regional Statistical Offices/Zila HQs

##### **Final Enumeration**

1<sup>st</sup> phase: Master Trainers at Dhaka office  
(Divisional, Regional and Zila Co-ordinators)

2<sup>nd</sup> phase: Upazila Co-ordinators/ zonal officers at  
Regional Statistical Offices/ Zila HQs

3<sup>rd</sup> phase: Supervisors and Enumerators at Upazila HQs

Three days and two days training were imparted in 1<sup>st</sup> zonal operation and in 2<sup>nd</sup> zonal operation/final enumeration respectively at each level. In conducting the training in final enumeration verbatim manual of instructions were utilized in the classroom on the first day. On the second day of the training, the participants themselves conducted field demonstration practically. Survey kits containing survey materials including instruction manual of schedule-1 were distributed to enumerators and supervisors at the closing of the training programme. The instruction manual distributed at the field level enumeration areas played an effective role in collection of quality data.

## **Data Processing**

### **- At the Field Level**

Data processing virtually begins with the coverage and consistency checks of the information collected in the filled in questionnaires immediately after their receipt from the field staff. For such coverage and consistency checks, two forms were developed at the field level. A tally sheet to arrive at the total of some important items of information for the enumeration area as a whole was developed. These items of information such as number of households, number of farm households, etc. were enumerated in the Enumeration Area.

Another form to summarize some of the important information of the survey at the Enumeration Area level viz. Form No. 16 was also developed which provided indication of consistency of the information collected in the survey. This form contained 12 items of important information such as number of households, number of farm households, households working in another's farm, households having no land of their-own, agricultural farms run for business purposes only, farm households owning agricultural equipments, farm households owning transport, etc. Some of the selected and specially trained enumerators were asked to fill in these two forms after they were received by the upazila coordinators on completion of all assigned duties by the enumerators and supervisors.

The Zonal Officer received all filled in questionnaires of the EAs within his respective zone just after completion of enumeration as per schedule. Zonal Officers and supervisors were trained for manual editing and checking of the filled in questionnaires in the field. After such checks they submitted the filled in questionnaires to the upazila coordinators.

### **- At the Upazila Level (Editing of Filled in forms)**

A ten-day editing programme was organized at upazila coordinator's office where information from Form-1 (Short questionnaire) were transcribed to Form-16 by some selected and specially trained enumerators and supervisors. They were also trained to check and edit all items of Form-1 and also check their consistency with Form 16. In some identified cases

imputation of missing data in Form-1 as well as in Form-16 was made by them through spot verification. These edited data at the field level in Form-16 were quickly taken to Dhaka where special arrangement was made to process the data as quickly as possible.

**- At the Headquarter**

The information contained in Form-1 and Form-16 were again and edited at Dhaka by a specially trained group of editors. These editors were drawn from university students and unemployed educated youths and were trained by the master trainers. The editing of these forms were first completed manually. The edited data were entered into the computer in two shifts by entry operators and finally editing and imputation were done by computer. The whole data processing and production of 10 tables by Zila and 15 tables at National levels were completed in about six months and the process of data editing and tabulation were also done.

### **Data Dissemination Plan**

A wide variety of agricultural data was collected through Schedule-1 of the agriculture sample survey 2005 covering a bigger sample of 10% farm households. The results would thus be possible to be estimated up to Upazila level but would be of far lower precision. All the information collected in Schedule-1 would be tabulated at Zila level and the data be disseminated in one National Volume containing basic data by Zila and 64 Zila Reports, each containing detailed data by Zila be prepared.

As Schedule-2 of the survey was already canvassed to a sub-sample of the selected farm holdings the data can be estimated at Zila level and upward and so another National Volume containing detailed information of each Zila will be published.

### **Reliability and Standard Error of the 2005 Survey Estimates**

It is pertinent that the results obtained in a census or a survey be evaluated in respect of their reliability and acceptability. The estimates of various characteristics obtained from the 10% sample enumeration areas of the country apparently appear to be more or less consistent with those available in previous full count censuses of agriculture held in rural areas of Bangladesh, 1996 and in both urban and rural areas of Bangladesh during 1983-84. Some of these estimates of important characteristics are compared between the 2005 sample survey and the earlier censuses of 1996 and 1983-84 at page xiii of the report.

Standard errors have been calculated for some of the estimates of important items of the survey viz. All holdings (farm and non- farm), Farm holdings, Cultivated area, Aus crop and Aman crop and are produced below.<sup>1</sup>

Item	Area	Estimate	Standard Error	Relative error (%)
All holdings(number)	Total	28165700	278939	0.99
	Rural	24564210	237299	0.97
	Urban	3601489	213042	5.92
Farm holdings (number)	Total	15089087	133504	0.88
	Rural	14699811	135150	0.92
	Urban	389276	30370	7.80
Cultivated area (acres)	Total	18083529	186667	1.03
	Rural	17724806	188160	1.06
	Urban	358723	31181	8.69
Aus crop (acres)	Total	2671219	67310	2.52
	Rural	2603170	66600	2.56
	Urban	68048	11947	17.56
Aman crop (acres)	Total	10490337	128857	1.23
	Rural	10326378	129683	1.26
	Urban	163958	15312	9.34

The above figures show that the standard errors of the estimates of all holdings and farm holdings were less than 1% (0.99% for all holdings and 0.88% for farm holdings) of the respective estimates. For cultivated area (acres) and Aman crop (acres), the standard errors were slightly higher than 1% (1.03% for cultivated area and 1.23 % for Aman crop) of the respective estimates. For Aus crop however, the standard error was slightly higher at 2.52% of the estimate of Aus crop. It may however, be observed that by urban and rural breakdown, the standard errors are highly variable and are much higher in urban areas compared to those in rural areas. Thus while the rural area estimates are highly dependable, the urban area estimates are subject to some error and need to be used with some caution. This precaution applies to the estimates of all items of information in the urban areas of the report.

<sup>1</sup> In calculating these standard errors, the estimation procedures as suggested in the sampling design of the survey could not be applied due to some unforeseen reasons. The software STRATA have been used to calculate these standard errors which are believed to be very close to real situation. This software used the weight, stratum definition and PSU for the estimation of standard error.

### **3.3.2 Labour Force Survey, 2002-2003**

#### **3.3.2.1 Overview**

##### **Historical Background**

The BBS has been conducting Labour Force Survey (LFS) regularly since 1980. Although some of the previous surveys were not conducted at specific time intervals due to resource constraints. The report of LFS 2002-03 is the ninth in the series. To save time and resource, this survey was integrated with the National Child Labour Force Survey (NCLS), 2002-03. It covered all population of age 15 years and over who were engaged in economic activities as defined by UN system of National Accounts (SNA' 93). All persons covered by the survey are classified as usual into three direct categories, namely (i) employed or at work (ii) not in labour force or economically inactive.

The survey covered the whole country disaggregated by urban and rural areas as in the case of previous ones. International concepts and definitions have been followed and industry and occupation classifications are based on relevant Bangladesh standard industry and occupation classifications (BSIC, 2000 & BSOC, 1988), which are comparable to the corresponding international standard classification. The usual or conventional definition of labour force or economically active population of the population aged 15 years and over has been used in the LFS 2002-03. According to the usual definition any person aged 15 years and over who was either employed or unemployed during the reference period and any person of the same age putting in a minimum of one hour's work in family farm / enterprise for pay or profit during the reference period is considered economically active. But in the previous four consecutive surveys since 1989, two sets of definitions namely (i) usual definition and (ii) extended definitions of economically active population aged 10 years and over were used to estimate the size of labour force and other characteristics of the economically active population. The LFS 2002-03 did not cover the age group 10-14 because it is considered as child population. From now on, only usual definition of economically active population would followed for the population of age 15 years and over to estimate the labour force characteristics of Bangladesh.

The purpose of the survey, like those of earlier ones, is to estimate the size and composition of civilian labour force and its characteristics such as age and genders specific labour force participation rate, status in employment, hours worked, earning, unemployment and duration of unemployment etc. The major occupation and industry of employed person and the broad sector and place of employment are also presented in this report. In order to facilitate comparison of data of this survey with those of the previous ones, some of the basic tables on civilian labour force, employed and unemployed population have been shown covering population 15 years of age and over.

## Objectives

The main objective of the survey is to collect comprehensive data based on current activity status of the population 15 years and over. The specific objectives of the survey are as follows:

- to estimate the size of the labour force (economically active population) by age, gender, education and locality;
- to estimate the number of employed persons by occupation, industry and status in employment;
- to assess the demographic and socio-economic characteristics of labour force;
- to assess the average hours worked, earnings etc. of employed population;
- to assess the extent of unemployment/underemployment; and
- to estimate the number of educated unemployment by age and gender and locality etc.

### 3.3.2.2 Survey Design

#### **Sampling Design / Statistical Unit / Selection Procedure:**

The Labour Force Survey 2002-03 was undertaken using Integrated Multipurpose Sample (IMPS) design. The IMPS design is constructed on the basis of Population Census 2001. It consists of 1000 primary sampling units (PSUs) or enumeration blocks (EBs). Out of the total PSUs/EBs, 642 are selected from rural areas, 80 from statistical metropolitan areas (SMAs) and 278 from other urban or municipalities. In the rural areas, the PSU/EB is defined as a mouza or part of a mouza or the combination of neighboring mouza and in the urban areas as a mohalla or part of a mohalla with average household size 200.

The enumeration Block (EB) is constructed on the basis of contiguous census EAs such that each EB is comprised of 180 to 220 households. There are two stages of stratification. At first, 6 administrative divisions are treated as super strata and within these super strata there is a second stage of stratification comprising (i) rural areas (ii) statistical metropolitan areas (SMAs) and municipalities. The SMAs and municipalities constitute urban area or urban stratum. The IMPS design consist of 6 strata which are:

1. 6 rural strata for 6 divisions;
2. 6 urban strata for 6 division; and
3. 4 SMA strata for 4 metropolitan cities

The proportion allocation of 1000 PSUs/EBs for these strata are shown below:

Division	Rural PSUs	Urban			Total
		Total	SMA	Urban	
Barisal	55	25	-	25	80
Chittagong	116	63	14	49	179
Dhaka	174	115	44	71	289
Khulna	89	57	12	45	146
Rajshahi	170	81	10	71	251
Sylhet	38	17	-	17	55
Total	642	358	80	278	1000

### Sampling Scheme

The sampling scheme is PPS with proportional allocation within 16 strata at three stages with one unit selected at each stage. Three different stages are considered to select PSUs for each strata. Out of these three stages, two stages are dummy stages such that the selection of PSUs are essentially drawn by a single stage cluster sampling procedure.

These stages are:

1. Thanas are selected at first stage;
2. Unions/wards are selected at 2<sup>nd</sup> stage; and
3. Mouza/mohalla are selected at third stage

Then PSU are selected from the selected mouza by dividing a selected mouza or by combining a neighbouring mouza with the selected mouza so as to make the size of the PSU around 200 households.

### Probabilities of Selection of Units at Different Stages

The Probabilities of selecting units at different stages are explained below:

#### First Satge

- $N_k$  = total number of households in the kth primary stratum;  
 $N_{jk}$  = total number of primary stratum households in the jth thana of the kth strata;  
 $m_k$  = number of allocated sample PSUs to be selected in the kth stratum ;  
 $P_1$  = Probability of selecting the jth thana in the kth stratum  
 $P_1 = \frac{m_k N_{jk}}{N_k}$

### Second stage

- $N_{jk}$  = total number of primary stratum households in the  $j$ th thana of the  $k$ th strata;  
 $N_{ijk}$  = total number of households in the  $i$ th union/ word of the  $j$ th thana in the  $k$ th Stratum;  
 $P_2$  = Probability of selecting the  $i$ th union/ ward of the  $j$ th thana in the  $k$ th stratum  
 $P_2$  =  $N_{ijk} / N_{jk}$

### Third stage

- $N_{ijk}$  = total number of households in the  $i$ th union/ word of the  $j$ th thana in the  $k$ th Stratum;  
 $N_{hijk}$  = total number of households in the  $h$ th PSU of the  $i$ th union/ word of the  $j$ th thana in the  $k$ th Stratum;  
 $P_3$  = Probability of selecting a PSU  
 $P_3$  =  $N_{hijk} / N_{ijk}$

### Overall Probability

The joint probability for the first three stages of sampling is

$$\begin{aligned}
 P_{1,2,3} &= (m_k \cdot N_{jk} / N_k) \cdot (N_{ijk} / N_{jk}) \cdot (N_{hijk} / N_{ihk}) \\
 &= m_k \cdot N_{hijk} / N_k
 \end{aligned}$$

This indicates that the three-stage design is reduced practically to a single stage design and this has been carried out separately for each of the 16 primary strata.

Based on survey objectives it was decided that 40 households would be selected at random from each and every selected PSUs. Thus, a total number of 40,000 sample households were selected from 1000 PSUs.

The allocation of PSUs and number of sample households by administrative divisions are shown below:

Division	Rural		Urban		Total	
	No. of PSU	No. of sample households	No. of PSU	No. of sample households	No. of PSU	No. of sample households
Barisal	55	2200	25	1000	80	3200
Chittagong	116	4640	63	2520	179	7160
Dhaka	174	6960	115	4600	289	11560
Khulna	89	3560	57	2280	146	5840
Rajshahi	170	6800	81	3240	251	10040
Sylhet	38	1520	17	680	55	2200
Total	642	25680	358	14320	1000	40000

**Reference Period:** Reference period was one week preceding the day of enumeration. The survey year was the fiscal year that is July 2002 to June 2003.

**Date of Data Collection:** The period of field enumeration was done in October-November 2002 and about 15 days were required for data collection

### **3.3.2.3 Conduct, Operations, Data Quality Control**

#### **Data Collection and Supervision of Field Work**

The survey was conducted in 1000 PSUs/EBs spread all over the country. The period of field enumeration was done in October-November 2002 and about 15 days were required for data collection from 40 sample households of each of the selected PSUs.

#### **Data Processing**

Preliminary checking of entries in the filled in questionnaires were done by the supervisors and enumerators at the field level. Through manual editing was carried out by the trained editors under strict supervisions of the officers of the head quarter. Coding of occupation and industry was done as per Bangladesh Standard Classification of occupation (BSOC) and Bangladesh Standard Industrial classification (BSIC) at 3 and 4-digit level, respectively. Other items e.g. geo-code and open-ended answers were also coded in accordance with their respective code list.

The edited and coded questionnaires were sent to computer wing of BBS for data processing. Computer edit was done to check internal consistency, omissions and errors. The statistical tables were produced in micro-computer environment of the BBS. Each individual record was tailed and expanded using sampling weights to obtain national estimates. The weights were calculated on the basis of the estimated populations on January 1, 2003.

#### **Sample Weights and Limitations of Estimates**

The weights of sample households in the case of urban and rural areas were as follows:

Urban	1 : 462.651
Rural	1 : 814.935

#### **The LFS 2002-2003 has the following Data Limitations:**

- District estimates should be used with due caution because of relatively higher coefficients of variation;

- Labour force data by occupation and industry at 3-digit and 4-digit level, respectively may not be too realistic because of sample size. But at 1-digit and 2-digit level of both occupation and industry provide reliable estimates;
- Labour force survey data are not seasonally adjusted because it was assumed that all economic activities were performed in a homogeneous way throughout the year;
- Data on age recording and digit preference are as existing without smoothing

### **3.3.3 Livestock Survey**

#### **3.3.3.1 Overview**

##### **Objectives**

The main objectives of the survey were as follows:

1. To ascertain the number of livestock and poultry and their composition in terms of age, sex and breed;
2. To obtain the characteristics of cows and she-buffaloes, such as age at 1<sup>st</sup> calving, calving interval, lactation period, etc.;
3. To obtain information regarding the mode of acquisition and disposal of livestock and poultry;
4. To estimate the production of milk, milk products, eggs etc. and their value;
5. To ascertain through inquiry the expenditure incurred on feed, service charges and miscellaneous items; and
6. To obtain information regarding the amount of loan taken and interest paid thereof

##### **Scope**

The survey covered only the rural areas of the country. The municipal areas (i.e. urban areas); the hilly districts of Bandarban, Rangamati and Khagrachari, reserve forests and tea estates were excluded from survey. The municipal areas (urban areas) were excluded, because 1983-84 survey results showed the number of livestock and poultry owned by the urban households was very small and their sample did not provide any sound basis for making reliable estimates.

#### **3.3.3.2 Survey Design**

**Sampling Frame:** The list of 5992 enumeration areas (EA's) of the rural credit survey of 1987 which was drawn from 1,70,209 rural EA's of the Economic Census of 1986, was used as the sampling frame.

### Sampling Design / Statistical Unit / Selection Procedure:

A stratified two-stage systematic sample design was adopted for this survey. For the purpose of sampling, 61 zilas of the country (excluding 3 zilas of Rangamati, Bandarban and Khagrachari) were considered as 61 strata. The first stage-sampling units were enumeration areas (E.As) and the second stage units were households. Due to certain limitations, the sample size for this survey was fixed at 1469 E.As which were the first stage sampling units or primary sampling units (P.S.U). These P.S.U's were first allocated to 61 zilas in proportion to the number of households and then in each zila the allocated number of E.A's was selected systematically. Each E.A. consisted of about 100 households. All the households which constituted the second stage sampling units or secondary sampling units (S.S.U) were listed with some basic data relating to livestock and poultry. Thereafter, the listed households were classified on the basis of the following criteria:

1. Households having 4 or less than 4 poultry birds but no bovine of sheep/goat
2. Households having more than 9 bovine animals or more than 14 sheep/goat or more than 19 poultry birds
3. Households having 5-9 bovine animals or 7-14 sheep/goat
4. Households having 1-4 bovine animals or 1-6 sheep/goat
5. Other households

Breakdown of both first-stage and second-stage sampling units by division are shown below:

Division	E.A	Households
Dhaka Division	430	8,963
Chittagong Division	373	8,286
Khulna Division	282	6,817
Rajshahi Division	384	8,951
Total	1,469	33,017

No household was selected from amongst the households classified in category-A. All the households falling in category-B were selected and only 20 households were selected from the remaining 3 categories, namely, C, D and E taken together on the basis of probability proportionate to the number of households in each category and selection was made on the basis of the systematic sampling. In case, the total number of households in the three categories were less than 20, then all the households in three categories were selected.

**Geographical Scope:** Rural areas of the country

### 3.3.3.3 Conduct, Operations, Data Quality Control

#### Methods of Estimation

For each category, estimation was done separately. Estimate of the total for a category is given below:

$$\begin{aligned} \hat{Y} &= \frac{1}{n} \sum_{i=1}^n M_i \bar{Y}_i \\ &= \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^{m_i} \frac{m_i}{p_i} \cdot \frac{y_{ij}}{m_i} \\ &= \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^{m_i} \frac{1}{p_i} \cdot \frac{M_i}{m_i} \cdot y_{ij} \\ &= \frac{1}{n} \sum_{i=1}^n \sum_{j=1}^{m_i} R_i \cdot \frac{M_i}{m_i} \cdot y_{ij} \quad \text{Where, } R_i = \frac{1}{p_i} \\ &= \sum_{i=1}^n \sum_{j=1}^{m_i} \frac{R_i}{n} \cdot y_{ij} \\ &= \sum_{i=1}^n \sum_{j=1}^{m_i} A_i \cdot y_{ij} \quad \text{Where, } A_i = \frac{R_i \cdot M_i}{n \cdot m_i} \end{aligned}$$

- Here, n = Total number of selected E.A's.  
 M<sub>i</sub> = Total households in the i<sup>th</sup> E.A. of a category.  
 m<sub>i</sub> = Number of households selected in the i<sup>th</sup> E.A. of a category.  
 p<sub>i</sub> = The probability of selection of the i<sup>th</sup> E.A.  
 y<sub>ij</sub> = The value of the characteristic of the j<sup>th</sup> household.

Estimated variance of a total is given by:

$$V(\hat{Y}) = \frac{n}{n-1} i = \sum_{i=1}^n (A_i \sum_{j=1}^{m_i} (y_{ij})^2) - \frac{\gamma^2}{n-1}$$

and S.E. of  $\hat{Y} = \sqrt{\frac{n}{n-1} \sum_{i=1}^n (A_i \sum_{j=1}^{m_i} y_{ij}^2) - \frac{\hat{Y}^2}{n-1}}$

$$\hat{Y} = \frac{S.E. \text{ of } \hat{Y}}{\hat{Y}} \times 100$$

Therefore, coefficient of variation (c.v.) of