

Application of New Technology Envisaged for the Population and Housing Census of Bangladesh 2001

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1. Introduction :

Bangladesh, a deltaic region of South Asia, is situated between 20°34' and 26°38' north latitudes and between 88°01' and 92° 04' east longitudes. The country is bounded on the north and the west by India, on the east by India and Myanmar and on the south by the Bay of Bengal . It has a total area of 147,570 sq.km. of which 8236 sq.km. is riverine and 1971 sq.km. is under forest. In Bangladesh there are 156 Municipalities. Among them Dhaka is the Megacity with population more than 8.00 m, Chittagong, Khulna and Rajshahi are three Metropolitan Areas with population more than 0.5 m. There are 14 class I cities with population more than 0.1m. In all, there are 522 urban areas in the country covering 9577 sq.km area (6.51%) and 22,455,174 population (20.14%).

The region comprising Bangladesh entered into the decennial periodicity of census taking in 1872. From then onward 9 censuses were conducted in the pre-liberation periods in the years 1881, 1891, 1901, 1911, 1921, 1931, 1941, 1951, and 1961. The first Census of Bangladesh could not be conducted in 1971 because of liberation area. It was conducted 3 years later in 1974. The second and the third censuses of Bangladesh were conducted in 1981 and 1991 respectively. To maintain decennial periodicity the 4th Population Census of Bangladesh will be conducted in the year 2001. Population and Housing Census is very important for two reasons :

- i) It provides frames for all the subsequent censuses and surveys; and
- ii) it provides benchmark information for micro, meso and macro level planning and investment programme.

As per decision of the National Statistical Council 3 national censuses of Bangladesh will be conducted in succession in the first decade of the twenty first century i.e. Economic Census in 2000, Population and Housing Census in 2001 and Agriculture Census in 2002. To reduce net under coverage to 2.0% and to ensure cost effectiveness and timeliness in dissemination of census results i.e within 2 years from the date of conducting the census, taking of fresh aerial photographs and use of computerized maps and GIS are essential.

2. Conceptual Framework for Population and Housing Census 2001

As per recommendation of the National Statistical Council, the 4th Population and Housing Census of Bangladesh which is 14th in the series will be held in the second week of March 2001. It will satisfy all the four essential conditions of a modern census-

Defined geo-graphic boundary : Everybody found within the boundary of Bangladesh during the census night will be canvassed;

Method of Canvassing - DeFacto Method for the main censuses;

- DeJure Method for the sample census;

Fixed Reference Time - Zero hours of Tuesday of second week of 2001

Periodicity - Decennial.

Population Census and Housing Census will be conducted together using a **modular questionnaire**. The top module will contain questions about housing and household characteristics and bottom module will contain questions about the characteristics of individual members of the household.

One short and one long questionnaire will be used for the census. Both the questionnaire will be designed in such a way so that these can be read by both the OMR and ICR machines. The short questionnaire (annex-A) contains the basic characters of both the households and individual members of the households. The long questionnaire contains supplementary questions on the socio-economic characteristics of selected households and individual members of the households.

Both the main census and the sample census will be conducted on the same dates. Long questionnaire will be canvassed in the sample vital registration (SVR) areas. Each primary sampling unit of SVR will be divided into 3 census enumeration areas. Two enumerators one male and one female will be engaged in each of these areas.

Computer based training (CBT) will be used in all the areas having electricity. Training allowance will be given to the enumerators at the end of the training. Application CBT of in urban areas and rural areas depends on large monitor or video projector which is not feasible for thousands of training centre. Teachers and students of higher classes of different universities will be engaged in independent check and in conducting post enumeration quality check survey.

Census will be conducted in the time frame of 3 : 2 ½ i.e. 3 years for preparation 2 ½ years for processing and dissemination. Reports will be made available to all the users simultaneously and will be stored in homepage.

Both the OMR and ICR technology will be used to capture data. Data will be captured in 5 to 10 regional offices to save time in data capture and data validation. Intranet and dial-up network will be established for software and data communication.

Preliminary report will be published within 3 months of the census, PEC will be conducted within 3 weeks from the last date of counting for the main census and the results will be published within 6 months from date of conducting PEC. The national reports will be published within 2 years and the manuscripts of district reports will be completed within 2 ½ years. The reports will be stored in CDs and the summaries will be stored in homepage.

3. Use of Image Technology for Data Capture

Bangladesh first adopted OMR technology in Population and Housing Census 1981 and then used it in Population Census 1991, Agriculture Census 1983/84 and Economic Census in 1986. It has planned to adopt a comprehensive programme for conducting 3 national censuses in succession i.e. Economic Census in 2000, Population Census in 2001 and Agriculture Census in 2002. On the basis of users requirements it has planned to use both the OMR and ICR technologies for these censuses and has placed orders for 5 OMR and 10 ICR machines and a printing press alongwith quality papers required for printing of questionnaires in OMR/OCR readable format.

3.1 OMR : The OMR will be used for data capture from both the short questionnaires as well as the long questionnaires . Data capture from the long questionnaires will be done using the booklet system. Long questionnaires (annex-B) will be printed in one side of a sheet. Two types of OMR machines with two types of softwares will be used for data capture. Op.Scan 21 has the software “SCAN Tools” and CD800 has the software OCR for Forms. The questionnaires will be 40 track. Sufficient essential spareparts will be procured to keep the machines running. Pencils will be used for marking the questionnaire. Both the main census and sample census questionnaire will be printed in OMR and ICR format. New questions have been set in the new questionnaire. Data capture will be done in the selected field offices. Output of both types of machines will be in the same format.

3.2 ICR : Except for the name field, questionnaire will be read in OMR. The name field will be 10 characters long. Each of the short questionnaire will be read in ICR machines to capture short name of every individual in 10 characters. Long questionnaires will be read in OMR machines. ICR machines of Bell & Howell are likely to be procured. Each of the ICR machines will have 5 on-line Work Stations for editing the census results. The software to be used is OCR for forms. Thus each ICR system will have 5 work stations to verify and correct images. Out of 10 machines if 8 machines work for two shifts for 8 effective hours then data capture can

4. Use of GPS for digital Mapping and GIS

Population Census 1991 suffered from 4.86% net under coverage. In urban areas it was more. On evaluation it has been observed that the main reasons for the under coverage are poor EA maps and ineffective training. Maps are very important tools for enumerator for accurate identification of EA boundaries and for close supervision and effective control of field operations. Maps are very important tools for showing spatial distribution of population data. BBS has undertaken steps to use GPS to prepare digital maps with aerial photographs and satellite imageries. In reality, the aerial photographs found available in the country were 15 years old and the satellite imageries (annex-D) obtained from IRS were 5.67 meter resolution. These were clumsy and were not found usable. As an alternative, an arrangement has been made for taking aerial photography for the entire country during December 1998 and January 1999. At the same time attempts are being made to procure current satellite imageries from Russian and / or American satellite in 2 meter resolution. Bangladesh has been selected by ESCAP to do a pilot study on the use of GPS for making GIS based EA maps for the next census. Implementation of pilot activities are going on.

So far two pretests were done in consultation and participation of the GIS experts of EGIS and Survey of Bangladesh. This project has been scheduled for completion in 8 phases :

Phase1: Formation of technical committee and development of detailed conceptual framework of the study;

Phase2: Pre-testing and development of design and implementation strategy;

Phase3: Acquisition of resources;

Phase4: Preparation of base maps and unification of scales & digitization for development of digital coverage;

Phase5: Preparation of EA maps of scale 1:10000 for rural area and 1:5000 for urban area through ground truthing of aerial photograph with the base map.

Phase6: Updating of digital coverage and EA maps using satellite imageries of 2 meter resolution ;

Phase7: Arrangement of local workshop on the outcome;

Phase8: Revision of a maps and GIS and preparation of report.

Demonstration sample maps (annexure-E)

5. Use of Intranet and Internet for Storage and Dissemination of Census Results.

Census data will be captured at the regional centres and will be transported to the central database through dial-up network. Relational database will be developed under client/server environment. Census results will be disseminated within defined time in both on-line and off-line homepage so that all the users get access to the results simultaneously. Java and updated version of Frontpage 97 will be used for development of homepage. Homepage will have both the micro data (without identification) as well as the reports. Ofcourse, the micro data will be in off-line homepage and its back up will be in the CDs.

6. Conclusion :

Twenty first century is confronted with the Y2K problem in the hardwares, softwares and also in the operating system. Just prior to the beginning of twenty first century Bangladesh Bureau of Statistics (BBS) is being reorganized. Under the dynamic leadership of the present Secretary and the Director General three structural and functional changes have taken place in BBS:

BBS will be reorganized by 1998 with stronger field level data collecting staff members and sufficient number of data analyst;

SNA/93 has been adopted in Bangladesh. From now on BBS will be SNA led; and

BBS has participated in the GDDS programme of IMF. It is the second country of the world where GDDS will be introduced with Srilanka as the first.

On the basis of the past experience and on the consideration of the technology it is felt that if technology can be applied properly for preparation of improved maps for enumeration, administration and dissemination of results, CBT for effective training to enumerator, OMR/OCR for fast & accurate data capture and Intranet and Internet technology for data communication and dissemination then the first census of Bangladesh of the twenty first century will get the flavor of accuracy, and timeliness in dissemination and its utility will be multiplied.