

**UNITED NATIONS SECRETARIAT
ESA/STAT/AC.146**

**Department of Economic and Social Affairs
Statistics Division**

**December 2007
English only**

**Report of the Sub-regional Workshop on Census Cartography and
Management**

Port of Spain, Trinidad, 22-26 October 2007

INTRODUCTION

Objectives of the Workshop

1. The purpose of the Workshop was to highlight the significant additional capabilities of Geographical Information Systems (GIS) and other geospatial technologies in census mapping activities, including preparation for enumeration, enumeration operations, advanced analysis and dissemination of census data, and how to successfully implement and use these technologies. More specifically, the Workshop: (1) presented an overview of GIS fundamentals and census geography concepts, including geo-coding systems, (2) focused on practical data collection and conversion to digital format, and on GIS-based data analysis and dissemination; (3) showed practical examples of use with appropriate software; and (4) facilitated a dialogue among participants from Member countries on census mapping with GIS, experiences and practices, with a focus on institutional, organizational, financial, capacity building and implementation issues. The first part of the Workshop was dedicated to a review of the United Nations *Principles and Recommendations for Population and Housing Censuses, Revision 2*, a discussion on census planning and management, and on the 2010 World Programme for Population and Housing Censuses.

Attendance

2. Sixteen countries were represented in the workshop (Antigua and Barbuda, Bahamas, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Turks and Caicos Islands), as well as a number of international and regional organizations (UNFPA, ECLAC, and CARICOM) and commercial suppliers (ESRI and Trimble Navigation Limited). Overall, there were a total of 32 participants and 14 observers.

OPENING SESSION

Central Statistical Office of Trinidad and Tobago

3. Mr. Dave Clement, Assistant Director of Statistics for the Central Statistical Office (CSO) of Trinidad and Tobago, warmly welcomed the participants on behalf of the Director of the CSO Trinidad and Tobago. He extended his deepest regrets on behalf of the Minister of Planning and Development as well as the Permanent Secretary, who had previous engagements. He outlined the importance of this workshop in helping countries move towards implementation of GIS in their census-taking activities, as well as the importance of high quality basic statistics to monitor facets of the CARICOM Single Market and Economy. He then spoke of some of the recent developments within the CSO of Trinidad and Tobago, including a restructuring of the organization, and the opening of an office in Tobago, among others.

CARICOM

4. Dr. Philomen Harrison, Project Director for CARICOM, warmly welcomed the participants. She noted that the workshop was both timely and relevant given that it followed a UNFPA Census Advocacy Workshop in Panama in September 2007 and that it followed the approval of the second revision of the United Nations *Principles and Recommendations for Population and Housing Censuses*. She said that CARICOM, in collaboration with UNFPA, had a long history of assisting countries of the region in conducting censuses using a regional strategy. She noted that recently, funding for the 2010 Round had been obtained through the Inter-American Development Bank for a joint UNFPA/CARICOM Common Census Project to provide for the use of uniform concepts and definitions, a common questionnaire of core questions, as well as common methods of dissemination. The project would also support the collection of high-quality comparable data, and the promotion of technical cooperation and sharing of census expertise and facilities among countries.

United Nations Statistics Division

5. On behalf of Dr. Paul Cheung, Director of the United Nations Statistics Division (UNSD), Ms. Diane Stukel welcomed the participants to the workshop. She explained that this workshop is part of the 2010 World Programme for Population and Housing Censuses, as initiated by the United Nations Statistical Commission in March 2005 for the period 2005 to 2014. The three essential goals of the programme are: (i) to agree on a set of acceptable international principles and recommendations governing the conduct of a census; (ii) to facilitate countries in conducting censuses during the period 2005-2014; and (iii) to assist countries in their efforts to disseminate census results in a timely manner. Ms. Stukel informed the participants that as part of the 2010 world programme on censuses, the United Nations Statistics Division has conducted several workshops, in which participants expressed the necessity for countries to take into account the technological advances made since the previous round, especially in the area of GIS and Global Positioning System (GPS). Participants in those workshops requested UNSD to prepare specific guidelines, including best practices and the strategies for evaluation of different contemporary practices. The present workshop is a complementary activity in relation to this request. The representative reiterated the purpose of the workshop and the 4 objectives that were to be achieved. She outlined how the workshop would be structured and reviewed the agenda for the five days.

PRESENTATIONS AND DISCUSSIONS FROM THE VARIOUS SESSIONS

Review of United Nations Principles and Recommendations for Population and Housing Censuses

6. A representative of the United Nations Statistics Division presented on the United Nations *Principles and Recommendations for Population and Housing Censuses, Revision 2*. The presentation was focused on the main changes in revision 2 of the census recommendations compared to revision 1, which was for censuses conducted in the 2000 round. Three main areas of change were highlighted in the presentation – (1) the extensive consultative process for the revision of the Principles and Recommendations which entailed regional and international consultations; (2) the orientation of the revised

census recommendations with emphasis on production of outputs for evidence-based decision making, that recognizes the census as part of an integrated statistical system for the production of outputs - and the fact that various approaches of data compilations exist for the generation of these outputs including the traditional census, sample surveys, administrative data sources, or combinations of these sources; (3) other major changes including a section on the responsibility of governments to provide funding for the census, a section on contracting out, a definition of the place of usual residence, and changes in core topics.

7. One participant was interested to know why 25 countries of the world did not conduct censuses in the previous round. The speaker clarified that the reasons were mixed. One reason was lack of sufficient funds allocated by governments given that in the past they had been reliant on donor support - including support from UNFPA whose priorities had shifted in recent years to human reproductive health. Another reason was that several countries had either been in civil conflict or just emerging from conflict. UNFPA clarified that census is now a priority area once again for that agency, but more in a technical support capacity rather than through direct funding.
8. In regard to the part of the presentation on alternative approaches, one participant noticed with concern that with the rolling survey approach, the data was collected according to multiple reference periods, and therefore asked whether the principle of simultaneity was not being violated? One UNSD representative responded that in the US hybrid model, where the short form portion of the census is still used, the principle of simultaneity is still maintained for the core topics asked through this part. However, for the portion that is reliant on a rolling survey, it is felt that, although strictly speaking simultaneity might not be adhered to, estimates for some areas may be an improvement over those based on one point in time since seasonal effects could be taken into account by using moving averages over time.
9. A participant noted that efforts to collect information on census costs are often skewed because, although there is a peak in expenditure in the enumeration year, totals costs are spread across several years both preceding and following enumeration years. A participant from UNSD also noted that it could be difficult for countries to disentangle costs for certain items that are shared by both census operations and other household surveys for example. She further noted that while trying to track census costs in countries of the world would be an imperfect exercise, it would nevertheless be a vast improvement over the broadly used \$1 per capita rule-of-thumb that is often applied.
10. A question was raised regarding how many of the recommended tabulations set out in the Principles and Recommendations could be realized for countries using a register-based approach. It was explained that where information cannot be generated from registers, supplementary information is often gathered from household surveys and other auxiliary sources.
11. A participant asked for advice on behalf of countries that might want to consider using alternative approaches. Participants from both CARICOM and UNFPA noted that in many countries, traditional census-taking is enshrined either in the constitution or in the national statistics act. It was further noted that many countries of the region are small and

a decennial census is the only opportunity to collect total population counts, which could be an argument for maintaining the traditional approach. It was further noted that differing statistical cultures should be taken into account when deciding on the approach to use, acknowledging the limited capacity of many countries to undertake alternative approaches - and that it was the prerogative of each country to make an individual determination on the appropriateness of the method chosen. As a follow-up, the participant noted the need for international organizations and CARICOM to help member countries to enhance their survey-taking capabilities.

Census Management & Planning

12. A representative of the United Nations Statistics Division made a presentation on census planning and management, with emphasis on the need for census planning and management of the different inter-related phases of the census, the need for risk management and how adequate planning and management is critical to the success of the census operation. The need for close monitoring of census activities and for ensuring a sufficient budget for the census was particularly highlighted. The presentation covered the importance of quality assurance for the census in order to minimize error in census operations, attributes of quality and also how quality should be measured and monitored. Also discussed was the need for all aspects of the census program to be evaluated in terms of their strengths and weaknesses, and also the use of the post enumeration survey to evaluate census coverage.
13. One participant broached the topic of how to handle requests for dissemination of census results at levels of geography that are lower than have been planned for by the NSO. Although it was noted that in most cases, extensive consultations with user groups had taken place well in advance of the census, these groups were often not able to articulate their needs at that early stage. One country mentioned that to accommodate such needs, they assigned unique household identifiers which would permit aggregation at any level, provided confidentiality was not breached. It was broadly acknowledged that it would be a good idea for countries to develop strategies to deal with un-planned user requests in order to anticipate user needs to the greatest extent possible.
14. A question was posed in regard to suggested strategies that could be used to convince governments to invest sufficient budget for census-taking. A participant from UNSD replied that policy makers could be shown how census data had been used effectively in decision making or policy formation in previous rounds. The representative from ECLAC noted that the level of effectiveness of the use of data from previous rounds of census would drive the success of current rounds with regard to fund raising attempts. Another representative from UNSD suggested that countries could sponsor a variety of policy think-pieces showcasing analytical work that would provide evidence for economic growth and social well-being based on census data in the areas of education, health, labour, etc. The workshop was informed about the availability of a UNFPA document on advocacy and resource mobilization for the census – a “how to” guide for countries who wish to apply for financial support. It was further suggested that one way to improve the availability of government funding for census was to promote the use of census information for development planning including, for instance, through training of parliamentarians.

15. It was noted that the cost of census-taking could vary widely not just between countries but also within-countries – for example, people living in tribal conditions in remote areas could drive up the cost by a factor of almost 20 in comparison to urban areas, in some cases. Therefore, it was suggested that the notion of a universal per unit costs was not particularly useful, and could in fact be misleading.

Presentation of the 2010 World Population and Housing Census Programme

16. One of the participants from UNSD presented an overview of the 2010 World Population and Housing Census programme, highlighting in particular all the activities envisioned over the round in relation to the three main goals of the programme (stated in the opening address), the activities already achieved in relation to these in 2007, as well as those planned for 2008. The recently launched web-based World Programme Resource Centre, which contains a wealth of information including country census activities, census data, questionnaires and dates, was introduced. Particularly highlighted was the newest addition to the Resource Centre, the Knowledge Base, a repository of papers and documents on census methodology provided by countries and other experts. An off-line demonstration of some of the features of the Knowledge Base, including the search capacity, was given.
17. One participant was concerned about the development of the CensusInfo initiative (a version of DevInfo to be adapted for census use) because it was felt that no interface existed between DevInfo/CensusInfo and the CELADE product Redatam, which many countries currently use. The concern was that the adoption of CensusInfo by countries would then force them to choose between software.
18. A good deal of discussion was focused on the topic of the use of new technologies for data processing. One participant expressed the need for a regional approach or strategy with regard to this but it was noted by the participant from ECLAC that a regional strategy document already existed for the CARICOM region. In the paper, the use of scanning technology was advocated as a common approach. It was noted by several participants that, although scanning technologies had been adopted in their country, the timing of the data release and corresponding publications did not improve since data editing and cleaning often unduly delayed the process regardless.
19. One participant was interested to hear views on “how fast is fast enough” with regard to data and publication release. It was noted that there was no one answer to this question and that a multi-tiered dissemination strategy could be adopted by countries where preliminary estimates at high levels of geography could be released shortly after enumeration, with the understanding that the estimates might be amended later-and that estimates for lower levels would also follow at a later date. It was also noted that a multi-tiered approach which would see continuous releases of various topical profiles would help to maintain public interest in the census results.

Review of EGM on Contemporary Practices in Census Mapping and Use of GIS

20. A representative of the United Nations Statistics Division highlighted the main recommendations of the Expert Group Meeting on Contemporary Practices in Census Mapping and Use of GIS, held in New York in May 2007.

21. In the discussion that followed, participants highlighted the inability of NSOs to attract and retain highly skilled GIS staff as a chief concern. It was acknowledged that barriers to achieving this include the inability of NSOs to pay salaries commensurate with private sector. It was mentioned that one mechanism used to circumvent this was to hire GIS staff on a contractual basis to avoid union salary negotiation issues – but it was acknowledged that this was not a good long-term strategy. Instead, it was suggested that a holistic approach could be taken towards this issue – that an overall GIS strategy should be established within the NSO, including provisions for human resources and the formation of a permanent GIS unit within the NSO. In that regard, it was also noted that in addition to salary incentives, job satisfaction is a key factor towards the success at retention. CARICOM mentioned that there had been mechanisms to sponsor staff exchanges between countries in the past, but the ability to continue to do this was highly dependent on available funding.
22. On a related note, the issue of appropriate training was discussed. It was stated that given the highly dynamic nature of GIS developments in software packages, investments in long-term and continuous training of GIS staff is critical to the success of a GIS unit and to staff retention. It was acknowledged that adopting a strategy of utilizing external contractors for a few weeks was far from sufficient for these purposes. It was suggested that a mixture of approaches (long-term modular training, study tours, and NSO visits) should be considered. A final concern that was raised was that of potential dormancy and underutilization of skills after training takes place.

Evaluation and Discussion of the UNSD Questionnaire on the Situation of Census Mapping with GIS in the Participating Countries

23. UNSD gave a short presentation outlining the results of a questionnaire that it sent to all countries prior to participating in the workshop, with relation to the situation of census mapping with GIS. A global overview (3 regions of the world: Anglo-phone Africa, Asia and Caribbean) was given as well as some of the most relevant results for the region. After the presentation, the delegates were invited to participate in a round-robin where each of them was asked to briefly describe the state-of-play in their respective countries.
24. Indeed, participants stressed the fact that most Caribbean countries are small in size (population, land area) and the question of prohibitive costs of these new technologies, including aerial and satellite imagery, was emphasized. In that context, several participants noted that a harmonized regional approach across countries might help to circumvent the economies of scale issue in harnessing these technologies.
25. One participant noted that potential problems could result from political manipulation of ED boundaries between censuses. It was suggested that there was a need for an appropriate mechanism to manage change in Enumeration District (ED) boundaries over time, and that NSOs should adopt the policy that no one individual be responsible for making such changes. It was also noted that analytical capacity could be compromised

with respect to trend analysis between censuses unless there is a mechanism in place to allow for the identification of previous ED boundaries through the numbering system used after the changes are made. Thus, the need for a flexible system of ED numbering and an appropriate policy for ED delineation was highlighted.

26. It was acknowledged that most NSOs rely on national mapping authorities (often land and survey offices) for base maps, and that it was often the case that these authorities were less than forthcoming in terms of sharing the maps in a timely manner. Therefore, the need for NSOs to build and maintain good relationships with national mapping authorities was highlighted. To this end, it was also suggested that NSOs should consider establishing an independent in-house unit capable of producing necessary ED maps. It was also noted that NSOs should exhibit caution when using the base maps from these authorities since they often are not suitable for census and survey purposes given that they are designed for other purposes.

GIS Fundamentals/ GIS Database design

27. A representative of the United Nations Statistics Division made a presentation on GIS fundamentals and concepts, with a focus on the specific characteristics of geographic data and their dichotomous representation (raster/vector), geographic database structure and modeling, and GIS spatial analysis and visualization capabilities. Comments were made about the necessity to build geographic databases in order to integrate census data with geographic data and allow various spatial analyses.

Data Collection and Data Conversion

28. Spatial Innovision, a provider of ESRI products in the Caribbean region, gave a demonstration of ArcScan, an ESRI application for raster-to-vector conversion, as well as practical examples of “vectorization” of scanned maps. A hands-on exercise, overseen by UNSD, provided the participants with the opportunity to digitize on-screen enumeration areas from a satellite image using ArcMap.

Spatial Statistics Applications & Issues and the use of Geospatial Technologies

29. A representative of the United Nations Statistics Division made a presentation highlighting the concepts and methods for geo-coding and noted that each country has to develop its own geographical coding scheme taking into consideration the hierarchical structure of administrative and political boundaries as well as enumeration areas. The collection of data to be geo-coded may be realized through two main approaches: direct collection or matching approach. Some participants noted that the matching approach can be applied only in some cities where street names and addresses are known and available.
30. A regional representative from Trimble, a commercial supplier of PDAs, gave a demonstration of ArcPad, an ESRI application that permits the user to move GIS data from a mobile device to a desktop and vice-versa.
31. The participants took part in several hands-on exercises, administered by UNSD, using the ESRI software ArcMap to i) create new enumeration areas within established larger census areas; ii) visualizing GPS data by importing them into GIS software; and iii) producing thematic maps for dissemination.

32. A representative of the United Nations Statistics Division gave an overview of the major GIS software packages available in the market. While many commercial suppliers exist, only a few are used worldwide and tend to dominate the market. It was noted that some factors need to be taken into consideration when selecting commercial GIS software, such as: initial and upgrade costs, ease of installation, training needs, documentation provided, maintenance and vendor support. Participants outlined that cost can be a prohibitive factor particularly for small countries in the Caribbean region. The UNSD presentation also provided information on the available open source software, stating that these innovative solutions are cost-free and can offer an alternative to commercial GIS products, although lack of training, documentation and vendor support are a serious limitation.

Dissemination Issues

33. The UNSD presented some of the applications of geospatial technologies for the dissemination of a census using maps. Geographic selection, user-defined areas or interactive area delineation, for the definition of school or health districts boundaries, were given as examples of direct applications. Other examples given were the use of buffer zones and areas of influence. Buffer zones around a point, such as a hospital, can be used to calculate the population living within a certain distance from this point. An area of influence can be used to display daily commuter flow to allow for better urban planning. The CensusInfo project, based on the development of new functionalities for DevInfo, was presented as a possible country customizable tool for the dissemination of data collected during the 2010 round of censuses.
34. One participant enquired about the potential duplication of effort in having both ArcGIS software (which has powerful dissemination functionalities) and the adapted DevInfo (CensusInfo) software at countries' disposal. It was noted that the functionalities of the two were somewhat different and that the latter offered a cost-free alternative and would be beneficial to countries already using DevInfo. In a similar vein, it was noted that there was no duplication of effort between CensusInfo and Redatam since the former is more dissemination-oriented while the latter is more analysis-oriented.

Case studies of National Experience:

35. Trinidad and Tobago presented various uses of GIS software to disseminate census information for the purposes of informing policy. Some of the applications included: patterns of spread of Dengue Fever, mapping of crime "hot spots", delineation of school catchment areas, etc. The participant highlighted the importance of a flexible enumeration district (ED) coding system that would allow for changes in ED boundaries between censuses and would permit trend analysis between two censuses.
36. Saint Lucia discussed the evolution of the use of GIS in her country as well as some of the current applications such as a poverty index and crime analysis mapped by settlement, as well as the delineation of health regions and electoral boundaries.
37. Bermuda described a pilot study on the use of CAPI (computer-assisted personal interviewing) for the 2004 Household Expenditure Survey. He outlined some of the benefits (automatic editing and coding, high speed delivery of raw data) as well as some

of the lessons learnt (more training needed, excessive field contacts required, application likely better suited to a less complex questionnaire).

38. St Kitts and Nevis gave a brief history of the use of GIS in his country – as well as outlining some of the data constraints and some of the training constraints – and then gave a description of the current state-of-play of GIS in his country.
39. During the discussion on the presentations, one of the issues tackled was that of confidentiality protection with regard to identity disclosure and the associated elevation of risk using GIS technology. It was noted that although proper utilization of GIS and other geospatial technologies is the way forward, concerns about inadvertent disclosure of individual information (at the point-location level) were discussed and it was suggested that strict adherence to the prevailing disclosure prevention policy (or the adoption of an appropriate one if it doesn't already exist) would be recommended.
40. Participants were interested to know more about the CAPI pilot and asked about the types of automatic edits and coding that would be possible while in the field, as well as potential time savings in data delivery gained by harnessing this technology.

Census Planning and Management for the use of Geographic Information Systems

41. ECLAC gave a general overview of various themes in relation to census planning and management including: the planning process, questionnaire development, publicity, recruitment and training, data processing, dissemination.
42. CARICOM gave an overview of the use of GIS in the region as well as some of the benefit, challenges, constraints, and suggested “ways forward”. He mapped out three tiers of country development with regards to the use of GIS in countries of the region.
43. In the general discussion that followed, participants agreed that a “harmonized” approach to census taking would allow for economies of scale commensurate to those in larger countries in other regions of the world to be realized. It was also agreed that “standardization” (use of identical hardware and software for the different countries, for example) should be avoided since it would be too prescriptive an approach.

Commercial Suppliers Demonstrations

44. Spatial Innovision, the ESRI provider in the Caribbean region, gave an overview on the use of GIS for census mapping applications. The presentation emphasized their approach and practical solutions to census mapping issues such as: (i) scanning, geo-referencing, and vectorization of existing paper maps to develop digital datasets; (ii) converting of existing digital maps and datasets into the desired data structure; (iii) updating of digital datasets from the last census to ensure that new settlements and roads are included and obsolete settlements are omitted; and (v) collecting aerial or satellite imagery followed by digital feature extraction and “ground-truthing” with GPS.
45. The principles of the Global Positioning System (GPS) and the advantages of this technology were presented by the Trimble representative. It was noted that GPS offers a fast and easy way to capture data in the field, even if some problems remain in urban areas, due to multi-path interference, an obstruction to the signal caused by high buildings.

RECOMMENDATIONS & CONCLUSIONS

46. The participants highlighted the inability of NSOs to attract and retain highly skilled GIS staff as a chief concern. It was suggested that a holistic approach could be taken towards this issue – that an overall GIS strategy should be established within the NSO, including provisions for human resources and the formation of a permanent GIS unit within the NSO. It was acknowledged that barriers to achieving this include the inability of NSOs to pay salaries commensurate with private sector. In that regard, it was also noted that in addition to salary incentives, job satisfaction is a key factor towards the success at retention.
47. It was acknowledged that the area of GIS is highly dynamic and therefore an investment in long-term, continuous training is essential. It was suggested that there could be other mechanisms for training such as regionally coordinated training, bilateral exchanges between countries, and study tours.
48. It was noted that there was a need for an appropriate mechanism to manage change in ED boundaries over time. One suggestion was the development of a flexible system of ED numbering and an appropriate policy for ED delineation.
49. Most NSOs rely on national mapping authorities (often land and survey offices) for base maps, which sometimes may be difficult to acquire or may not be suitable for census and survey needs because they are designed for other purposes. Therefore, it was suggested that NSOs build good relationships with national mapping authorities. In addition, NSOs should consider establishing an independent in-house unit capable of producing necessary ED maps.
50. Although there was agreement that proper utilization of GIS and other geospatial technologies is the way forward, concerns about confidentiality were raised particularly with regard to inadvertent disclosure of individual information (at the point-location level). Therefore, strict adherence to the prevailing disclosure prevention policy is recommended.
51. Concerns were raised regarding the fact that alternative approaches such as rolling surveys would not be in accordance with the principle of simultaneity as elaborated in the UN Principles and Recommendations for Population and Housing Censuses, Rev.2. However, it was understood that those countries that use these approaches feel that other benefits are gleaned from them, such as mitigating against seasonal effects. It was noted that the implementation of alternative approaches in the region could be problematic because conducting of traditional censuses is often enshrined in national legal instruments.
52. Given the small size of many of the countries of the region, it was noted that economies of scale could not be achieved for many census operations, including GIS activities, and therefore, adopting a harmonized regional approach to some aspects of census taking might be beneficial. For example, satellite imagery and aerial photographs could be acquired collectively.
53. Participants expressed the need for concerted strategies for advocacy at regional and national levels to ensure appropriate and timely government support for all aspects of

EVALUATION OF THE WORKSHOP

54. On the workshop evaluation, many participants indicated that the most useful element of the workshop were the presentations made by countries on their experiences with regard to use of GIS. In this context, the demonstration on the use of GIS in census mapping, particularly with the analysis and dissemination of census data was highlighted as having been very useful. It was felt that country presentations enhanced the sharing of knowledge and experience among the countries represented at the workshop. Furthermore, many participants also stated that they found the practical exercises very useful as this enabled putting into practice the theoretical presentations. Also stated as being most useful by a number of participants were the demonstrations of the private companies, ESRI and also TRIMBLE as this contributed to learning about the capabilities of GIS and GPS in census mapping.

ANNEXES

Annex 1 Agenda of the Workshop

Annex 2. List of participants

United Nations Statistics Division
Central Statistical Office of Trinidad
CARICOM

 2010 World Population and Housing Census Programme
Sub-regional Workshop on Census Management and Mapping with GIS
Port-of-Spain, Trinidad and Tobago
22 – 26 October 2007

Final Agenda

Monday, 22 October 2007

8:00 – 9:00	Registration of participants
9:00 – 10:00	Opening remarks and administrative matters (CSO Trinidad, CARICOM, UNSD)
10:00 – 10:30	<i>Coffee Break</i>
10:30 – 12:00	1. Review of United Nations <i>Principles and Recommendations for Population and Housing Censuses</i> Presentation of revised international standards for conducting population and housing censuses. – Presentation by UNSD – General discussion
12:00 – 13:30	<i>Lunch Break</i>
13:30 – 15:00	2. Census Management & Planning Presentation of international recommendations on census management and planning, and quality assurance. – Presentation by UNSD – General discussion
15:00 – 15:30	<i>Coffee Break</i>
15:30 – 17:00	3. Census Management & Planning (continued) and the 2010 World Population and Housing Census Programme Continuation of last session and presentation on UNSD programme of work and web-site. UNSD questionnaire on country census activities distributed. – Presentation by UNSD

- **General discussion**

Tuesday, 23 October 2007

9:00 – 10:00

4. Review of Expert Group Meeting (EGM) on Contemporary Practices in Census Mapping and Use of Geographic Information Systems (GIS)

Presentation of the report of the EGM held in May 2007 in New York assessing the current state of the art of the use of contemporary technologies in countries

- **Presentation by UNSD**
- **General discussion**

10:00 – 10:30

Coffee Break

10:30 – 12:00

5. Analysis of Questionnaire sent to Countries by UNSD and Discussion on the situation of Census Mapping with GIS in the participating countries

Presentation of the findings from the questionnaire disseminated prior to the workshop followed by general discussion on the situation of census mapping using GIS in participating countries, as well as associated issues and difficulties and restraining factors for the use of this technology

- **Presentation by UNSD**
- **General discussion**

12:00 – 13:30

Lunch Break

13:30 – 15:00

6. Introduction to GIS Fundamentals/ GIS Database design

Presentation on GIS concepts, definitions, and characteristics, geographic databases modelling, and data structure (vector vs. raster); pre-requisites to and instructions on how to build a GIS project.

- **Presentation by UNSD**
- **General discussion**

15:00 – 15:30

Coffee Break

15:30 – 17:00

7. Data Collection and Data Conversion

Presentation on different data collection methods such as GPS, imagery acquisition, and local knowledge as well as data conversion such as scanning or digitizing; introduction to a GIS platform; exercise on Heads-up Digitizing.

- **Presentation by UNSD**
- **Participant Exercise #1**
- **General discussion**

18:00 – 20:00

COCKTAIL (hosted by CSO Trinidad and Tobago)

Wednesday, 24 October 2007

9:00 – 10:00

8. Spatial Statistics Applications & Issues and the use of Geospatial Technologies

Practical examples of delineating EAs (EA creation and splitting); advantages and constraints of these technologies with regard to the production of EA maps.

- **Demo by ESRI**
- **Participant Exercises #2 and #3**

10:00 – 10:30

Coffee Break

10:30 – 12:00

9. Demonstration of Spatial Statistics Applications

Presentation giving practical examples of geocoding from direct collection using GPS, geocoding features in a GIS, and establishing coding schemes; advantages and constraints of these technologies with regard to geocoding.

- **Presentation by UNSD**
- **Demo by ESRI**
- **Participant Exercise #4**
- **General discussion**

12:00 – 13:30

Lunch Break

13:30 – 15:00

10. Demonstration of Spatial Statistics Applications (continued)

Presentation giving practical examples of segmentation using object oriented technology, commercial GIS platforms as well open source technologies.

- **Presentation by UNSD**
- **Participant Exercise #4 (cont.)**
- **General discussion**

15:00 – 15:30

Coffee Break

15:30 – 17:00

11. Dissemination Issues

Presentation on the added value of GIS in relation to dissemination with maps, graphs and tables; DevInfo demonstration.

- **Presentation by UNSD**
- **Participant Exercise #5**
- **General discussion**

Thursday, 25 October 2007

9:00 – 10:00

12. Case studies of National Experiences:

Presentation of national experiences on the use of contemporary practices in census mapping using GIS, GPS, remote sensing or in other new technologies (PDA).

- **Presentation by Trinidad-and-Tobago**
- **Presentation by Saint Lucia**
- **General discussion**

10:00 – 10:30

Coffee Break

10:30 – 12:00

13. Case studies of National Experiences (continued)

- **Presentation by Bermuda**
- **General discussion**

12:00 – 13:30

Lunch Break

13:30 – 15:00

14. Case studies of National Experiences (continued)

- **Presentation by St Kitts & Nevis**
- **General discussion**

15:00 – 15:30

Coffee Break

15:30 – 17:00

15. Census Management & Planning for the use of geographic information systems

Presentation on the institutional and organizational issues related to commercial and non-commercial technologies and purpose and responsibilities in the selection of geospatial statistics technologies.

- **Presentation by ECLAC**
- **Presentation by CARICOM**
- **Presentation by Trinidad-and-Tobago**
- **General discussion**

Friday, 26 October 2007

9:00 – 10:30

16. Commercial suppliers' demonstrations

Presentation by commercial providers of GIS/Remote sensing solutions for censuses.

- **Presentation by ESRI**
- **Presentation by Trimble**
- **General discussion**

10:30 – 11:00

Coffee Break

11:00 – 1:00

17. Review and adopt report, conclusions and recommendations

- **Presentation by Rapporteur**

**Draft List of Participants
United Nations Workshop on
Census Cartography and Management for CARICOM**

**Port-of-Spain, Trinidad and Tobago
22-26 October 2007**

No.	Country Name	Contact Person/Address
1.	Antigua & Barbuda	Mr. Alphaeus Tonge Statistical Officer Statistics Division Ministry of Finance and the Economy 1st Floor ACT Building Church & Market Streets St. John's, Antigua
2.	The Bahamas	Ms. Tia Hinsey GIS Technician Department of Statistics Clarence Bain Bld. Thompson Blvd. P.O. Box N 3904 Nassau, The Bahamas
3.	Belize	Mr. Alain Robinson Statistical Institute of Belize 1902 Constitution Drive Belmopan, Cayo District Belize C.A.
4.	Bermuda	Ms. Judith Woodley Census & Survey Systems Officer Bermuda Government Department of Statistics P.O. Box H4M3015 Hamilton HMMX Bermuda
5.	Bermuda	Mr. Crispin Boney Statistician-Research Bermuda Government Department of Statistics 48 Cedar Avenue Cedar Park Centre Hamilton HM 11

No.	Country Name	Contact Person/Address
		Bermuda
6.	Cayman Islands	Mr. Ronnie Andersson Chief Statistician Economics and Statistics Office Cayman Islands Government Phase 4, Elisabethan Square George Town, Grand Cayman
7.	Cayman Islands	Mrs. Nicole Emmanuel-Jones Census and Surveys Supervisor Economics & Statistics Office c/o Government Administration Building Elgin Avenue Grand Cayman KY1-9000 Cayman Islands
8.	Dominica	Mr. Dwayne Dick Statistician Central Statistical Office Ministry of Finance and Planning Financial Centre Kennedy Ave. Roseau, Dominica
9.	Grenada	Ms. Rachel Jacob Ass. Statistician Statistics Department Ministry of Finance St. George's, Grenada
10.	Guyana	Mr. Bevan Fraites Statistical Officer Bureau of Statistics Lot1, Avenue The Republic & Brickdam Stabroek, Georgetown Guyana
11.	Jamaica	Ms. Merville Anderson Director – Field Services Statistical Institute of Jamaica 7 Cecelio Avenue Kingston 10, Jamaica

No.	Country Name	Contact Person/Address
12.	Jamaica	Mr. Mirko Morant Geographer Statistical Institute of Jamaica 7 Cecelio Aveue Kingston 10, Jamaica
13.	Montserrat	Ms. Angela Estwick Statistician Government of Montserrat Statistics Department Government Headquarters Montserrat
14.	Saint Kitts and Nevis	Mr. Graeme Browne Conservation Officer/GIS Physical Planning Department Bladen Commercial Development Wellington Road Basseterre. Saint Kitts
15.	Saint Lucia	Ms. Sherma Lawrence Statistical Assistant II Government Statistics Department Upstairs Chreiki Building Micoud Street, Castries Saint Lucia
16.	Saint Vincent & The Grenadines	Mr. Robert Robertson Statistical Assistant Statistical Office Ministry of Finance & Planning Administrative Building Kingstown, St. Vincent
17.	Suriname	Mr. Iwan A. Sno Director General Bureau of Statistics P.O. Box 244 Klipstenenstraat 5 Paramaribo, Suriname
18.	Suriname	Ms. Eartha Groenfelt Coordinator Social Statistics General Bureau of Statistics

No.	Country Name	Contact Person/Address
		P.O. Box 244 Klipstenenstraat 5 Paramaribo, Suriname
19.	Trinidad and Tobago	Mr Dave Clement Assistant Director Central Statistical Office Ministry of Planning and Development 80 Independence Square Port-of-Spain, Trinidad Trinidad and Tobago
20.	Trinidad and Tobago	Ms. Carol Salim Senior Statistician Central Statistical Office Ministry of Planning and Development 80 Independence Square Port-of-Spain, Trinidad Trinidad and Tobago
21.	Trinidad and Tobago	Mr. Harold Wall Manager Geographic Information Systems (G.I.S.) Central Statistical Office Ministry of Planning and Development 80 Independence Square Port-of-Spain, Trinidad Trinidad and Tobago
22.	Trinidad and Tobago	Mr. Adhar Beepath Chief Census/Surveys Officer Central Statistical Office Ministry of Planning and Development 80 Independence Square Port-of-Spain, Trinidad Trinidad and Tobago
23.	Turks & Caicos Islands	Ms. Tisa Lightbourne Mapping Technician Department of Economics, Planning and Statistics South Base Grand Turk Turks and Caicos Islands

No.	Country Name	Contact Person/Address
UN Agencies/ Private Companies		
24.	CARICOM Secretariat	Dr. Philomen Harrison Project Director Regional Statistics Caribbean Community Secretariat P.O. Box 10827, Greater Georgetown, Guyana
25.	CARICOM Secretariat	Mr. John Mensah Census Coordinator Caribbean Community Secretariat P.O. Box 10827, Georgetown, Guyana
26.	ECLAC	Mr. Sylvan Roberts Statistician ECLAC Sub regional Headquarters for the Caribbean 1 Chancery Lane Port of Spain Trinidad and Tobago
27.	UNFPA	Mr. Jamie Nadal-Roig UNFPA Deputy Representative Office for the English and Dutch Speaking Caribbean 60 Knutsford Boulevard Kingston 5, Jamaica
28.	ESRI	Ms. Kerry-Ann Mahabeer (ESRI Desktop Specialist) Jamaica
29.	Trimble Navigation Limited	Ms. Natalie Dobbs (Mobile GIS / GPS Mapping Specialist) Jamaica
United Nations Statistics Division		
30.	UNSD	Ms. Diane Stukel Interregional Advisor on Population and Housing Censuses Demographic and Social Statistics Branch

No.	Country Name	Contact Person/Address
		Statistics Division United Nations DC2-1546 New York, NY 10017
31.	UNSD	Mr. Amor Laaribi, Statistician Demographic Statistics Section Statistics Division DC2-1568 United Nations New York, NY 10017
32.	UNSD	Ms. Margaret Mbogoni Statistician Demographic Statistics Section Statistica Division DC2-1558 United Nations New York, NY 10017

OBSERVERS

No.	Country Name	Contact Person
1.	Trinidad and Tobago	Mr. Carmichael Ellis
2.	Trinidad and Tobago	Ms. Khadine Chai-Hong
3.	Trinidad and Tobago	Mr. Kevin Evans
4.	Trinidad and Tobago	Mr. Dion Ottley
5.	Trinidad and Tobago	Ms. Petronella Stewart
6.	Trinidad and Tobago	Mr. Jewan Maharaj

SECRETARIAT

No.	Country Name	Contact Person
7.	Trinidad and Tobago	Patricia James-Pontiflet Statistical Training Officer
8.	Trinidad and Tobago	Denille McMillan
9.	Trinidad and Tobago	Kino Sammy
10.	Trinidad and Tobago	Mr. Peter Chai-Hong
11.	Trinidad and Tobago	Mrs. Doreen Hadley
13	Trinidad and Tobago	Carol Charles
14	Trinidad and Tobago	Cheryl Ann Sealey