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Strategy for Integration of Geospatial and Statistical Information: goals, objectives and expected results for the integration

Contents

Foreword

The Secretariat launched the United Nations Initiative on Global Geospatial Information Management (UN–GGIM) in 2011. The Initiative aims to set up a formal mechanism under the auspices of the United Nations to discuss and coordinate global geospatial information management (GGIM) activities, and involve Member States as key players.

Two key programmes – the 2030 Agenda for Sustainable Development, adopted in September 2015 by the General Assembly, and Agenda 2063, approved in January 2015 by the African Union – further emphasize the need for a global coordination mechanism for geospatial information management.
Although the two Agendas have much in common and are mutually supportive and coherent, Agenda 2063 is more specific on the needs of Africa. At the 2016 Conference of Ministers, held in Addis Ababa, the two Agendas were highlighted as key to the next phase of Africa's development, and the supportive relationship of the two was noted.

Geospatial Information for Sustainable Development in Africa, which is the African Action Plan on Global Geospatial Information Management, is an implementation tool of UN–GGIM: Africa.[1] It responds to the recommendation of the Africa preparatory meeting (GGIM Africa) held in Addis Ababa in August 2011, urging Member States, the Economic Commission for Africa (ECA) and the African Union Commission to finalize and implement an African Action Plan on Geospatial Information Management.

Geospatial Information for Sustainable Development in Africa focuses on five key areas:

- Geospatial information policy and governance
- Common framework and tools
- Capacity-building and knowledge transfer
- International coordination and cooperation in meeting global needs
- Integration of geospatial information and statistics

The last of the areas listed above is very useful to provide decision makers with sound information products and services adapted to the attainment of the Sustainable Development Goals and the objectives of Agenda 2063, based on a National Statistic Spatial Framework (NSSF).

Each focus area, and the chapter on integration of geospatial information and statistical information, is detailed in specific objectives, expected results, and estimated budget figures, with an idea of related activities.

I. Introduction

1. Over the years, there has been an exponential growth in the availability of detailed geospatial data and, in recent years, the interest and ability of Governments, businesses and the public to make practical use of such data has increased. This led to a focus on spatial data infrastructure, underpinned by data and metadata standards, at the national and transnational levels. There is an increasing focus by statistics agencies at the national and international levels on seizing the opportunities to define and promote interoperability between statistical and spatial data infrastructure. It has also been noticed that the key element of promoting interoperability is to promote better understanding, documenting and applying of the relationships between relevant frameworks and standards related to statistical and spatial information (data and metadata).

2. Regarding openness and cross-sector interaction and cooperation, ECA was not only a pioneer in Africa, but also a visionary. This can be illustrated by the decision taken to convene every two years an international conference in Africa for Africa, bringing together experts,

[1] UN–GGIM: Africa is the African component of the UN–GGIM initiative.

decision makers and policy-level actors from the information and communications technology domain, the geospatial information sphere and the statistics sector, under the initiative of the Committee on Development Information, Science and Technology. Since the first conference, in 1999, policy issues and strategies pertaining to the economic development of Member States in Africa, based on an intelligent coordination of efforts in these three sectors, have been discussed and resolutions adopted in order to take action on the various issues identified and their joint solutions.

3. In 2005, a study was conducted by ECA on the integration of the spatial data infrastructure development process into National Information and Communication Infrastructure (NICI) policies. The integration of geospatial information and statistical information was the missing link of the development information chain. An effort to ensure this integration can only optimize the impact of the UN–GGIM: Africa initiative on the sustainable development of Africa. This global picture should not overshadow initiatives in the field in Africa, in particular a best practice in Rwanda, and an ongoing project launched by the UN–GGIM: Africa Working Group 5 in Kenya and Namibia to generate spatially enabled population census data.

II. Rationale for integrating geospatial and statistical information

4. The integration of geospatial and statistical information will benefit Member States in the provision of services for the attainment of international and national agreed developmental goals. Geospatial information is a useful tool in many different areas of statistics, including population census, social and demographic statistics (health, justice, education and labour), economic statistics (business surveys, trade, transport, tourism, agriculture, etc.) and environmental statistics. It intervenes in all the different phases of statistical production, and is also useful in cross-sectoral and inter-agency projects. The value of geospatial data in statistics is not surprising, because most types of data (variables) studied by statisticians have a spatial component. Everything and everyone is somewhere, and statisticians are uniquely aware of how boundary conditions can affect sampling and therefore their results.

5. In local, national, subregional and continental levels of governance, statistical data are very important as sources of evidence-based decision-making. Geospatial information has the ability to enhance and expand this attribute, to transform the richness of a flat statistical table into visually expressive (and often impressive) fit-for-purpose information for development.

6. Seen from the geospatial information field, statistical techniques are very important as a means to solve issues or provide solutions to methodological options (e.g. in digital image processing and interpretation of classification results) using stochastic rules. In the design of geospatial information solutions, sampling techniques allow experts in this field to classify, for example, Member States, states within a federation, regions and communities, road networks and protected areas, according to criteria prone to statistical reasoning.

7. Fuzzy logic applied to accuracy representation allows for visualizing the quality of the data used to map a specific theme, and therefore to show areas where decisions can be taken with full certainty, and others where the level of error (due to the relative accuracy of the entry data) has to be taken into account. These few examples show the natural interaction between geospatial information and statistics, and the need to strive for a concerted action towards the delivery of information products and services bearing advantages and benefits from both sides.

8. The emergence of inexpensive computing power, expanding network bandwidth and sophisticated component-based software can potentially offer statisticians and geospatial information practitioners extraordinary opportunities for collecting, analysing and presenting statistical data from a spatial perspective, thus increasing the use of statistical data in geospatial information-based tools, and delivering products and services with added value.

9. Yet, in the past, there has been a limited number of statistical applications that integrate geospatial components; equally, geospatial information applications use little or no statistical applications. These limitations have led to:

- Lack of discoverable and available data

- Different processing approaches
- Different standards, formats and data dictionaries
- Different quality levels
- Lack of a common geospatial referencing framework
- Lack of consistent metadata and data quality and heritage information

10. Within the two communities, there has been diversity in data policy and its interpretation, in data specification, in pricing and access rules, and in private and public sector relationships. This has also inhibited wider use of spatial data, and limited the use of statistical data in spatial analysis.

11. Nowadays, the common benefits of integrating geospatial information and statistical information for smarter solutions in sustainable development justify the initiative to engage the two communities into a collaborative work towards the production of standardized spatially-enabled statistical datasets.

III. Status of geospatial information and statistical information integration in Africa

12. Globally, the use of frameworks has been limited to National Spatial Data Infrastructures (NSDIs) and a limited number of country-specific statistical spatial frameworks. Enumeration geography has been the main method used to geocode statistical unit record data (e.g. data relating to individual persons, households, dwellings, businesses or buildings); however, this method is a very traditional method and can limit the usefulness of data release by merging enumeration and dissemination geographies together.

13. National registers are the next most popular method of geocoding, followed by the related address coding. These methods provide highly accurate and flexible geocodes by producing location coordinates and small area geographic codes. Direct capture using the Global Positioning System or similar technologies in the field is being increasingly used, especially in Africa, which seem to be leapfrogging older techniques. The majority of countries use regional government administrative boundaries as the primary geography to disseminate and disaggregate statistics. These meet key client needs but are subject to change, which can affect time series comparisons. Other geography types being used alongside these administrative geographies include: enumeration geographies – linked to the geocoding approach mentioned above; function-based statistical geographies – to define urban, rural and remote areas; postal geographies; and grid-based geographies – growing in popularity in Europe as a means of providing small area geography.

14. In Africa, initiatives such as the LandScan global population project (showing population distribution by daytime and night-time) influenced the grid approach to population distribution representation. Nonetheless, the most common application of statistical information with the spatial dimension remains the use of the early “basic principle” (which will be discussed further in section IVA below). Poverty mapping in the beginning of the new millennium also had an impact on the introduction or use of geospatial information in statistical data production by a number of national statistics offices in Africa.

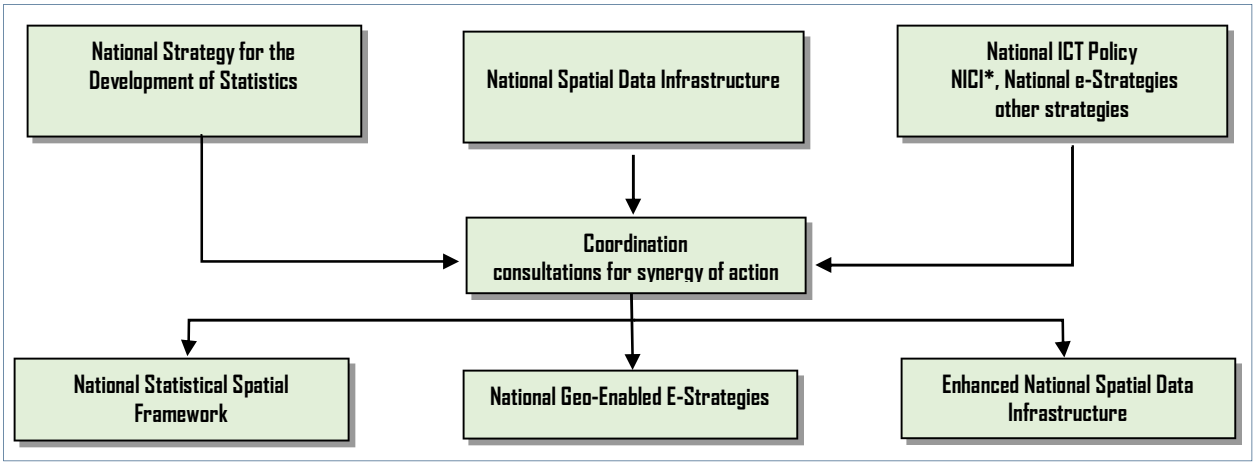
15. In 2005, a study carried out by ECA (with a total number of 28 African countries taking part in the survey) revealed that 18 Member States (representing 67 per cent of participating countries) used the geographic information system in their national statistics office. Eight others (representing 29 per cent) were planning, at that time, to introduce the system in their activities, in a two-year time period in average. The national registers approach was promoted recently by a publication of the African Development Bank in 2014, *Guidelines for Building Statistical Business Registers in Africa*. This is an indicator of a widespread need for this approach on the continent; however, the guidelines did not consider associating the spatial dimension to the process.

16. The 2011 population census of Namibia was used to develop an atlas designed to complement and enrich information on the figures and statistics using the geographic information system. Rwanda won the "Geospatial World Excellence Award 2014" for its successful fourth Population and Housing Census, conducted in August 2012 using geospatial information-based tools. The UN–GGIM: Africa Working Group 5 on Integration of Geospatial and Statistical Information for Sectoral Applications also recently launched a project related to population census in Kenya and Namibia.

17. These non-exhaustive examples show the existence of an integration momentum, still predominantly at the stage of post-production linkage between geospatial and statistical information in Africa. It is therefore time to turn this momentum into a formal and systematic process for the best of sustainable development on the continent.

IV. Basis for the integration of geospatial information and statistical information in Africa

Conceptual framework of the integration at the national level



* Abbreviations: ICT – Information and Communications Technology; NICI – National ICT Policy/Information and Communication Infrastructure.

18. The above conceptual framework for national level geospatial information and statistical information integration shows on the first row the current initiatives in most countries in Africa in the three key areas of development information, as defined under the Africa Information Society Initiative. It is true that the development of each strategy (National Strategy for the Development of Statistics, ICT Policy/NICI/E-Strategies and NSDI) is at a given level, varying from country to country. Nonetheless, these strategies constitute a basis in each Member State's development agenda regarding the provision of fit-for-purpose information for development.

19. The schema also shows the possible and advisable connection between the three types of strategies at the country level, in order to enhance their common contribution to a more productive and efficient effort toward the attainment of the Sustainable Development Goals and Agenda 2063 targets.

20. Under this conceptual vision of the future, the NSSF appears as the result of a national level effort in building synergies of action between the National Strategy for the Development of Statistics, the NICI/E-Strategies, and NSDI. It provides a way of enhancing each others' output on the sustainable development ground, and should guide the development and dissemination of the framework in Member States and its extension at the higher levels for the regional economic communities and Africa as a region.

A. Basic principle

21. To introduce the issue of geospatial information and statistical information integration, the following basic principle is exposed to help understand the process and guide its development.

22. In a vector-based geographic information system environment, just as a surrogate key allows one to join tables and perform Structured Query Language-based requests using chosen criteria in a Relational Database Management System, similarly a spatial code captured in a statistical table also allows to link that table – or the result of a request involving that table – to the tabular data of a spatial database. This process allows one not only to visualize the spatial distribution of the variable being analysed, but also to show the range of values the same variable takes for each linked spatial entity, using a colour-coded scale, resulting in the capacity to visually compare the state of that variable in each geographic unit on the output map.

B. Dimensions of integration

23. Applying this basic principle *stricto sensu* would be very restrictive in terms of practical applicability. Indeed, the type of basic analysis taken above as an example can only be widely used if all requests are performed in the same environment of a relational database and vector data model. In real life, there is a variety of database models and spatial data models. It is therefore necessary to take into account all dimensions related to the possible interactions between the statistics domain and the geospatial information sphere, and build by abstraction a generic integration model that is applicable irrespective of the type of technological environment prevailing. A successful integration of geospatial information and statistical information requires looking at the following dimensions: scale, policy, institutional and modelling.

1. Scale

24. The scale dimension means the scope of the geographic space in which the integration is due to take place. The scale of geospatial information and statistical information integration will start at the national level, including a downstream flow driven by the needs at subnational levels (state, region, district, etc.). The upstream direction, through aggregation at the data level and harmonization at the policy level, will meet higher dimension needs (regional economic communities and Africa as a region). At each key position on the scale axis (national and subnational, regional and subregional), the other three dimension elements (policy, institutional and modelling) have to be present or developed.

2. Policy

25. The policy dimension is what is necessary at all levels on the scale axis to initiate and harmonize the strategies and related regulations in order to smoothly achieve full integration. It will start at the national level to be demand-driven, but will take into account regional economic community level and continental level constraints. The national geospatial information policy, on the one hand, and the data policy sustaining the National Strategy for the Development of Statistics, on the other, will have to be critically reviewed and made compatible.

3. Institutional

26. This dimension has to do with the institutional arrangements necessary to achieve real integration, in accordance with the orientation of the two compatible policies (statistical and geospatial information). It starts at the national scale, and entails interaction between the geospatial information and the statistics communities and their leadership, but also the involvement of the institutional stakeholders from the other sectors of the national economy. The same inclusive approach to agreeing on sustainable institutional arrangements applies to the regional economic community and Africa levels.

4. Modelling

27. The modelling dimension is the component of the integration process dealing with the technical, technological, scientific abstraction and their related functional and procedural interactions. The United Nations Expert Group on the Integration of Statistical and Geospatial Information has already developed a Global Statistical Geospatial Framework that responds to the modelling dimension of the integration. This framework is based on the following five layers, from bottom to top: use of fundamental geospatial infrastructure and geocoding; geocoded unit record data in a data management environment; common geographies for dissemination of statistics; interoperable data and metadata standards; and accessible and usable geospatially-enabled statistics. A national model will be derived from this global framework – NSSF – to be adopted and adapted to each country's local conditions.

These four dimensions will generate a new field in the national landscape with implications on the financial and human resources of the Member State under consideration, the regional economic community, and Africa as a region.

C. Adaptation of the global statistical geospatial framework to Africa

1. Global interoperability efforts

28. The Open GIS Consortium is a global consortium of geo-processing technology providers and users. It has made important progress toward interoperability between geo-processing systems, employing practical test beds and a consensus specification development process to arrive at open specifications for standard interfaces and protocols that can be used by information technology suppliers for particular information communities. Simultaneously, data coordination efforts worldwide have made progress towards semantic interoperability based on standard data dictionaries, metadata profiles and geospatial data modelling schemas. All of this progress, when viewed together, benefits statisticians who seek to assimilate geospatial processing and geospatial data into their work. It has been noticed that the main obstacles to data integration are not technical but managerial, organizational and institutional. Nonetheless, it will be seen that advances in technology don't merely support managerial, organizational and institutional progress – they force such progress.

29. Fundamental datasets or spatial framework data (or core datasets) are a limited set of data layers – transportation, hydrography, cadastral and administrative boundaries, elevation, human settlements, digital imagery and geodetic control – which provide a base on which to collect, register, integrate and analyse statistical data. Fundamental datasets are meant to be publicly available, maintained for the common good, useful for many purposes, and each is likely to comprise at least a subset of that data layer, for any particular information community. The ISO TC/211 metadata standard (ISO/CD 19115 Geographic Information – metadata currently in a committee draft version) provides common schemas for describing these fundamental datasets, and ISO/CD 19107 Geographic information – Spatial Schema, provides standard definitions of the geometric and topologic characteristics of geospatial data, which can assist statisticians in the quest to produce reliable data for viable policy decision-making.

2. National Statistical Spatial Framework

30. From the Global Statistical Geospatial Framework – under discussion as this action plan is being consolidated – a national framework will be derived for application in Africa. The resulting NSSF is the integration model that will be promoted, adopted and adapted to each Member State's national environment and realities.

31. Efforts are underway for the design and refinement of NSSFs under the auspices of the United Nations, including UN–GGIM. In this regard, the Australian Bureau of Statistics (ABS) has published findings on "developing a statistical spatial framework in national statistical systems". The achievement of ABS in this endeavour motivated the United Nations in 2013, through the Security Council and the United Nations Committee of Experts on Global Geospatial Information Management, to consider a programme review, and accepted recommendations to develop better linkages between geospatial and statistics communities, and to develop a global statistical-geospatial framework based on the ABS Statistical Spatial

Framework. Both United Nations bodies agreed to establish a United Nations experts group and conduct an international discussion to pursue those aims.

32. In the African context, a major drawback of the current approaches in developing a National Strategy for the Development of Statistics and NSDI is that they are not linked to other initiatives related to other aspects of development information, notwithstanding the efforts invested by ECA under the initiative of the Committee on Development Information, Science and Technology. In keeping with global trends of bringing geography and statistics together, the continent should pursue the necessary dialogue initiated by ECA and develop the capacities of Member States to ensure that national statistical, planning and mapping authorities have effective collaboration between them in the development of respective data infrastructure and systems.

33. A National Strategy for the Development of Statistics is a strategic approach that aims at bringing together various stakeholders in a given national statistical system so as to strengthen coordination between the different users and producers of data.

34. NSDIs help information providers and users to participate in the growing (digital) spatial community at the national level. NSDIs establish connection for all users in the world to share and reuse the available datasets.

35. NSDIs and the National Strategies for the Development of Statistics have over the years been implemented separately by African countries, all aimed at the quality production of spatial and statistical data. Equally, these processes are being conducted without a framework, and a statistical spatial framework is needed to link these and other efforts.

36. To this end, the strategy consists of facilitating the establishment and implementation of NSSFs – geared to the NSDI/NICI/E-strategies agendas – in order to bring forth the integration of geospatial information and statistical information, with the support of the information and communications technology substratum and facilities, aimed at facilitating the attainment of the Sustainable Development Goals and other development goals in Africa, particularly Agenda 2063, through:

(a) Advocacy for linking the development of NSSFs to the NSDI, ICT policy/NICI/E-strategies' processes, to feed the various development agendas at national and subnational levels;

(b) Facilitating policy dialogue between the development actors of NSDI, National Information and Communication Infrastructure, e-Strategies and National Strategy for the Development of Statistics, with a view to raising awareness on the importance of tackling the challenges that hamper the appropriate utilization of geospatial enabled statistics;

(c) Coordinating and galvanizing partners towards effective synergies and partnerships for the implementation of NSSF, as a result of coordination efforts with the above-mentioned strategies;

(d) Facilitating capacity-building at all levels in support of NSSF development and implementation in Africa;

(e) Promoting networking and knowledge sharing at all levels in order to promote the formulation and implementation of evidence-based NSSFs;

(f) Developing and capacity-building for monitoring and evaluation tools and systems in support of NSSF policy development and implementation, in harmony with the other strategies mentioned above;

(g) Providing technical support and advisory services to regional economic communities and Member States on NSSF development and implementation;

(h) Facilitating resource mobilization in support of NSSF-related research, advocacy, capacity-building, technical support and advisory services.

D. Goals, strategic objectives and key expected results for integration

37. The integration process will be based on the following strategic objectives (SO) and expected results (R):

SO.1: Action is taken to design NSSFs for the integration of geospatial information and statistical information in Africa.

R 1.1 Africa, through the UN–GGIM: Africa Working Group 5 on Integration of Geospatial and Statistical Information for Sectoral Applications, is fully involved in the NSSF design and development process.

R 1.2 NSSFs are widely discussed, separately and jointly, and then commonly validated by the African geospatial information and statistics communities, and adopted and endorsed by the appropriate policy level organ.

SO.2: A strong advocacy action is taken to ensure policy–level engagement and user commitment to use NSSFs in African Member States and the regional economic communities.

R 2.1 The majority of African Governments support NSSFs and adopt them for application in their Sustainable Development Goals and Agenda 2063 activities.

R 2.2 NSSFs are adopted in the regional economic communities for their regional activities related to the Sustainable Development Goals and Agenda 2063.

SO.3: Action is taken to ensure preparedness for NSSFs at the UN–GGIM: Africa secretariat, Member States and partners levels.

R 3.1 Capacity of the NSSF secretariat is enhanced to facilitate the establishment and implementation of NSSFs.

R 3.2 Mainstreaming of NSSFs into Africa's agenda for sustainable development is successfully performed.

R 3.3 Synergies and coordination are enhanced, and resources mobilized in support of NSSFs.

SO.4: Action is taken to ensure effective implementation of NSSFs at the national, subregional and regional levels in Africa.

R 4.1 Knowledge generation and dissemination are enhanced to raise awareness and build evidence-based NSSF tools, products and services.

R 4.2 Capacity and skills are enhanced in support of NSSF policy development and implementation in Africa.

R 4.3 Coordination and harmonization are sought for the implementation of the continental statistical spatial framework with the Strategy for the Harmonization of Statistics in Africa, and the United Nations Group of Experts on the Integration of Geospatial and Statistical Information.

SO.5: Technological tools are designed and widely used to foster statistical spatial framework application in Africa.

R 5.1 Knowledge management tools are developed and their use popularized to facilitate evidence-based NSSF policymaking and implementation.

R 5.2 Monitoring and evaluation are enhanced in support of NSSF formulation and implementation in Africa.

E. Logical framework

	Strategic objectives and expected results	Duration	Estimated cost (US$)	Partnership
SO.1	Action is taken to design NSSFs for the integration of geospatial information and statistical information in Africa.	3 years	400 000	ECA, UN EG-ISGI,2 WG5, WG2, regional economic communities, African Member States, African Union Commission.
R.1.1	Africa, through the UN–GGIM: Africa Working Group on Integration of Geospatial and Statistical Information for Sectoral Applications, is fully involved in the NSSF design and development process.			
	Related activities for UN–GGIM: Africa WG 5 – assisted by WG 2 on Institutional Arrangements and Legal Frameworks – will consist of quality contribution to the design and development process of NSSFs (based on Africa's own experience in successful integration processes, such as in Rwanda, and reporting regularly to UN–GGIM: Africa, liaising with the United Nations Expert Group on the Integration of Statistical and Geospatial Information, scientific contribution, and partaking in technical meetings, to ensure that NSSFs are adapted to African realities and meet African needs).			
R.1.2	NSSFs are widely discussed, separately and jointly, and then commonly validated by the African geospatial information and statistics communities, and adopted and endorsed by the appropriate policy level organ.			
	Related activities will essentially consist of a broad user engagement consultation with regional economic community workshops and an Africa-wide forum to validate NSSFs, followed by its formal adoption and endorsement at policy level.			
SO.2	A strong advocacy action is taken to ensure policy level engagement and user commitment to use NSSFs in African Member States, and the regional economic communities.	1 year	120 000	ECA, regional economic communities, African Member States.
R.2.1	The majority of African Governments support NSSFs and adopt them for application in their Sustainable Development Goals and Agenda 2063 activities.			
	Related activities will focus on country-level workshops to inform, raise awareness and launch the use of NSSFs.			
R.2.2	NSSFs are adopted in regional economic communities for their regional activities related to Sustainable Development Goals and Agenda 2063.			
	The activities related to this result will be information, awareness-raising, and formal adoption of NSSFs for regional economic community development activities.			
SO.3	Action is taken to ensure preparedness for NSSFs at the UN–GGIM: Africa secretariat, Member States, and partners levels.	6 years	3 355 000	ECA, African Union Commission, African Development Bank and Member States.
R.3.1	Capacity of the NSSF secretariat is enhanced to facilitate the establishment and implementation of NSSFs.			
	Activities feeding this result include NSSF development planning and monitoring, funding mechanisms and regular implementation meetings.			
R.3.2	Mainstreaming of NSSFs into Africa's agenda for sustainable development is successfully performed.			
	Activities involved concern programme review with the African Union Commission, ECA, and the African Development Bank to mainstream NSSFs into their respective programmes and plans.			

[2] United Nations Expert Group on the Integration of Statistical and Geospatial Information.

R.3.3	Synergies and coordination are enhanced, and resources mobilized in support of NSSFs.			
	Related activities will target national coordination and synergy building for NSDI, ICT Policy/NICI/E-strategies, National Strategy for the Development of Statistics, and other strategies in support of NSSFs and resources mobilization.			
SO.4	Action is taken to ensure effective implementation of NSSF at the national, subregional and regional levels in Africa.	6 years	738 000	ECA, African Union Commission, African Development Bank and Member States.
R.4.1	Knowledge generation and dissemination are enhanced to raise awareness and build evidence-based NSSF tools, products and services.			
	Activities will focus on the production of NSSF-related research and development material and their dissemination (e.g. for address data collection following geocoding standards and procedures, common geographic boundaries, metadata standards for geospatially enabled statistics, privacy data confidentiality, mapping and visualization of statistics).			
R.4.2	Capacity and skills are enhanced in support of NSSF policy development and implementation in Africa.			
	Activities will target the formulation and implementation of an NSSF capacity development strategy, the review and improvement of curriculum on statistical spatial frameworks and learning facilities in institutions of higher learning in Africa, research to fill knowledge gaps on statistical spatial framework implementation-related issues, technical assistance to Member States, etc.			
R.4.3	Coordination and harmonization are sought for the implementation of the continental Statistical Spatial Framework with the Strategy for the Harmonization of Statistics in Africa, and the United Nations Group of Experts on the Integration of Geospatial and Statistical Information.			
	Related activities include consultations between the Strategy for the Harmonization of Statistics in Africa experts and the United Nations Group of Experts on the Integration of Geospatial and Statistical Information, an agenda for the design and development of the continental framework, wide review and adoption and assistance for its implementation.			
SO.5	Technological tools are designed and widely used to foster statistical spatial framework application in Africa.	6 years	320 000	ECA, African Union Commission, African Development Bank and Member States.
R.5.1	Knowledge management tools are developed and their use popularized to facilitate evidence-based NSSF policymaking and implementation.			
	Activities concern operationalizing the virtual NSSF database, and a biennial conference on statistical spatial framework policy in Africa.			
R.5.2	Monitoring and evaluation are enhanced in support of NSSF formulation and implementation in Africa.			
	Activities include the development of a framework with indicators for monitoring and evaluation, and reporting on the achievement of NSSF application.			

F. Conclusion

38. Considering the growing pervasiveness of geospatial information in modern society, geography is essential, and has now been acknowledged as needed (and should be incorporated) in all stages of statistical processes. ECA is engaged in leveraging the capabilities of geospatial information technologies in statistical data collection, processing, analysis and dissemination, while ensuring that spatial information infrastructures are harmonized with national statistical development strategies.

39. With significant advances made in geospatial technology, it becomes possible to retool cartographic methods and influence different stages of the statistical process through optimizing data collection, data processing and analysis, and by standardizing and integrating data from different sources. Mainstreaming geospatial technologies into national statistics office activities (for instance, census logistics, designing, planning and monitoring) will therefore allow them to contribute large amounts of spatial, thematic and socioeconomic data in support of evidence-based policy analysis and the locational management of information.

40. The present document discusses the desirable actions to be taken for the integration of geospatial information and statistical information in Africa. In summary, those actions are:

(a) Setting the dialogue to ensure that national statistical, planning and cartographic authorities have effective collaboration between them in the development of respective data infrastructures and systems;

(b) Revisiting the National Strategies for the Development of Statistics to incorporate NSDI with a focus on having national statistics and planning offices represented in the coordination arrangements for NSDI and National Mapping and Planning Agencies represented in the coordination of the National Strategy for the Development of Statistics;

(c) Providing technical support for the incorporation of the geographic information system, remote sensing and other geospatial information solutions, tools and techniques (including standard and interoperable common tools) in the analysis and presentation of statistical data to facilitate research and policy analysis work.