

The Nairobi Conference on Spatial Information for Sustainable Development

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ABSTRACT

The objectives of the Nairobi Conference on Spatial Information for Sustainable Development were to:

- Contribute to the international community's effort to advance the implementation of the Habitat agenda
- Understand the role of the surveying community in implementing the Habitat agenda
- Urge governments and stakeholders to implement integrated land information management
- Strengthen and promote the relevant information to support FIG Agenda 21

The conference recommendations are intended to support politicians, senior managers and professional organisations by providing greater understanding of the need for Spatial Data Infrastructures (SDI's) and how they can be used to support sustainable development.

The conference recognized that every National Spatial Data Infrastructure (NSDI) is different due to a variety of cultural, social and economic factors unique within each country. However, there are a significant number of common elements that can be shared. It is recognized that a key success factor of implementing NSDI is the management of information as an asset, just as finance and human resources. Mature NSDI's are complex solutions involving a number of stakeholders. However, those who have a NSDI have started with clear short-term objectives and corresponding simple solutions. The use of Spatial Information to support sustainable development will only be achieved if solutions start with realistic objectives and grow incrementally through political and market needs.

Many of the key infrastructure requirements of NSDI, e.g. pervasive telecommunications and internet access are not widely available in some countries, this limits the applicability of leading edge NSDI technical solutions. Vendors are encouraged to understand the needs of developing countries and design and market appropriate technical solutions.

NSDI's are underpinned by effective partnerships and co-operation amongst a wide variety of multi-disciplinary stakeholders in public and private sectors and the end user communities. Countries are encouraged to form appropriate policy and institutional frameworks and facilitate co-operation amongst stakeholders. The creation of a 'proof of concept application' can be used to gain and continue political support whilst feeding into the formulation of NSDI policy and strategy.

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1. INTRODUCTION

The International Conference on Spatial Information for Sustainable Development, held in Nairobi, Kenya 2-5 October 2001, was organized by the Institution of Surveyors of Kenya (ISK), the International Federation of Surveyors (FIG) and the United Nations Centre for Human Settlements (Habitat).

The conference recommendations are intended to support politicians, senior managers and professional organisations by providing greater understanding of the need for spatial data infrastructures and how they can be used to support sustainable development.

Sustainable Development is defined as "*development that meets the needs of the present without compromising the ability for future generations to meet their own needs*".

Experiences from the richer countries show that spatial information affects 80% of all human decision-making and is therefore strategically important to decision makers at all levels.

The American Federal Geographic Data Committee defined Spatial Data Infrastructure (SDI) as: *the technology, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve utilization of geospatial data.* / www.fgdc.gov /

A SDI consists of "*organizations and individuals who generate or use geospatial data, of the technologies that facilitate use and transfer of geospatial data, and of the actual data*".

The availability of and access to appropriate spatial information has a major role in supporting the information management needs of implementing and monitoring Sustainable Development policies. National Spatial Data Infrastructures (NSDI), information services and associated Spatial Information Systems (GIS) to manage and analyse spatial information have major roles in sustainable development.

The information requirements for supporting Sustainable Development involve the integration of a large number of different types of data from diverse sources, including: land administration, socio-economic, environment, and development. Through common spatial referencing standards enforced by NSDI, these data can be interchanged and integrated to encourage a more holistic approach to decision support involved in sustainable development.

The information requirements for managing Sustainable Development require datasets to be available at a number of levels, i.e. local, national, regional and global. There is therefore a need to create a 'vertical information highway' to allow transaction based information generated through administration activities at the local level, e.g. land registration, to be aggregated through the local - national - regional - global levels. This approach to recycling information through different levels of Spatial Data Infrastructures will ensure that datasets are current and compatible. The Spatial Data Infrastructures can be the 'land information engine' to support this vertical information highway.

Mature NSDI's are complex solutions involving a number of stakeholders. However, those who have a NSDI have started with clear short term objectives and corresponding simple solutions. The use of Spatial Information to support sustainable development will only be achieved if solutions start with realistic objectives and grow incrementally through political and market needs.

2. OBJECTIVES OF THE CONFERENCE

- Contribute to the international community's effort to advance the implementation of the Habitat agenda
- Understand the role of the surveying community in implementing the Habitat agenda
- Urge governments and stakeholders to implement integrated land information management
- Strengthen and promote the relevant information to support FIG Agenda 21

3. ORGANIZATIONS BEHIND THE CONFERENCE

The Conference was arranged and hosted by the International Federation of Surveyors (FIG), the Institution of Surveyors of Kenya (ISK), United Nations Centre for Human Settlements and sponsored by United Nations Environment Programme (UNEP), Institution of Quantity Surveyors of Kenya (IQSK) and co-sponsored by Metrocosmo Valuers LTD, Intergraph Mapping and GIS Solutions, Swedesurvey AB and University of Nairobi. Support from United Nations Economic Commission for Africa (UNECA) and United Nations Food and Agriculture Organization (FAO).

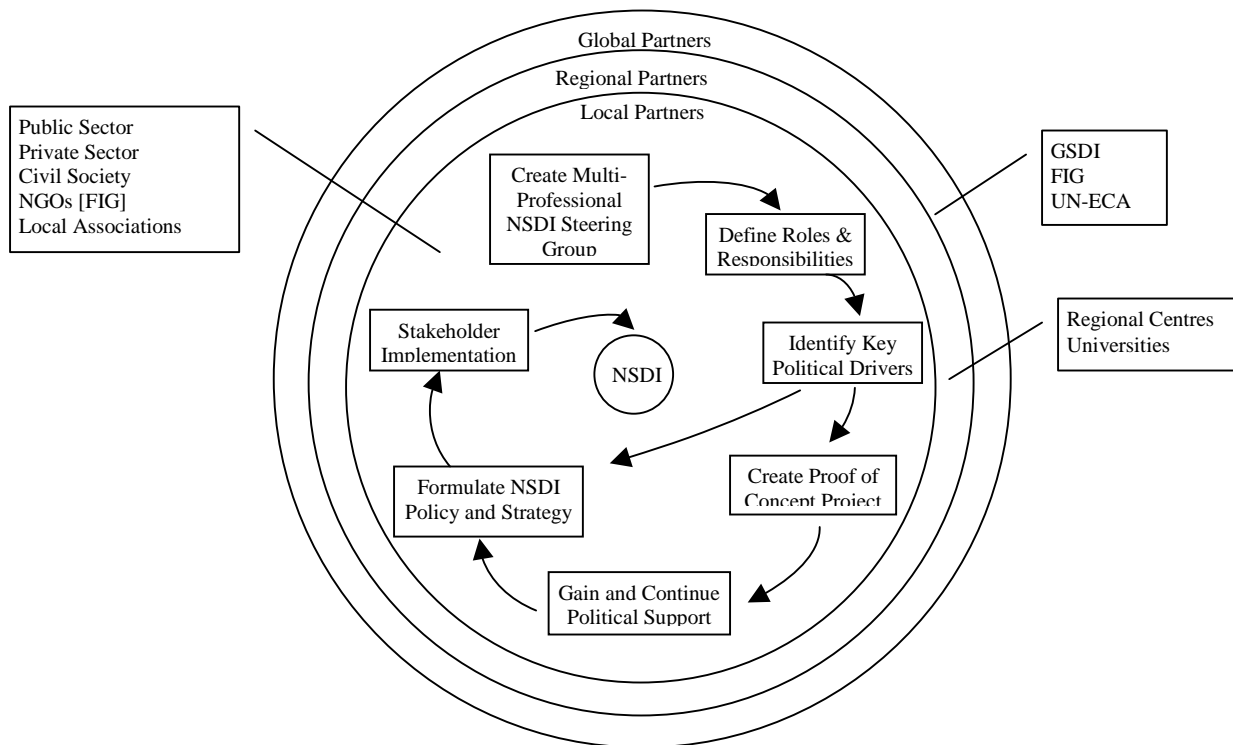
Further information: fig@fig.net or jr@kms.dk

4. RECOMMENDATIONS

The recommendations are designed to provide a practical way forward creating a National Spatial Data Infrastructure to support Sustainable Development. The recommendations are laid as follows:

- The National Perspective
 - National Organizations
 - National Policies, Strategies and Implementation
 - Legal Aspects
 - Capacity Building
- The Regional Perspective
 - Regional Strategies and Activities
- The Global Perspective
 - UN-ECA (www.uneca.org) and African Countries
 - Technology Transfer - The Role of the Vendors

The inter-relationship between the recommendations is shown in the figure.



In addition two FIG specific recommendations are formulated.

4.1 The National Perspective

4.1.1 National Organizations

1. NSDI's are underpinned by effective partnerships and co-operation amongst a wide variety of multi-disciplinary stakeholders in the public and private sectors and the end user communities.
African countries are encouraged to form National NSDI Steering Groups to formulate appropriate policy and institutional frameworks and facilitate co-operation amongst the stakeholders. These National NSDI Steering Groups should involve end user representation.
2. Experiences from those countries that have embarked on the NSDI process indicate that roles and responsibilities amongst the stakeholders are clarified at an early stage.
African countries are recommended to clarify the lead role and the responsibilities and roles amongst the other stakeholders – this will be an initial activity of the National NSDI Steering Group.
3. It is recognised that the rapid implementation of a NSDI must embrace all available resources within a country. This will be best achieved through partnerships between the public and private sectors.
Countries are encouraged to involve all sectors in implementing NSDI and ensure that appropriate business models are agreed to support these partnerships at an early stage.

4.1.2 National Policies, Strategies And Implementation

4. It is recognised that every NSDI is different due to varying cultural, social and economic contexts within each country. However, there are a significant number of common elements that can be shared. Countries should avoid re-inventing these common elements.
5. It is recognised that complete policy and institutional frameworks do not have to be in place before implementation of a NSDI can begin.
6. It is recommended that a top down approach is combined with a pragmatic bottom up approach. Short term bottom up projects will provide valuable experience and through proof of benefits, convince further funding of NSDI.
7. It is recognised that a mature NSDI will be a complex solution involving a large number of stakeholders and user groups. From experience the most effective examples of NSDI's are those that have started with clear short term objectives with corresponding simple solutions.
African countries are encouraged to design solutions that start with realistic objectives and grow incrementally through political and market needs.
8. The success of NSDI is dependent upon delivering products and services that are accepted and desired by the end users, both within Government, the private sector and citizens. This key objective will only be achieved if the requirements are clearly understood.
African countries are encouraged to provide for end user needs and ensure that appropriate products and services are provided.
9. It is recognised that a key success factor of implementing NSDI is the management of information as an asset, just as finance and human resources.
Countries are encouraged to adopt information as an asset and manage it appropriately, e.g. only capture data that is needed and can be maintained.
10. NSDI requires a culture of data sharing to exist within a country. Although data may be accessible for the common good, the organisations providing data must in return receive a benefit for their contribution.
It is recommended that countries research the benefits associated with data sharing to encourage wide participation.
11. It is recommended that all countries establish unambiguous naming conventions as a key component of their NSD, following the guidelines produced by the UNGEGN.

4.1.3 Legal Aspects

12. Experience has shown that issues associated with national security, data privacy and associated liability are potential show stoppers for NSDI initiatives.
African countries are recommended to establish legal frameworks to address these crucial legal issues as early as possible.
13. Although there will be significant benefits for the data producers and service providers, it is recognised that one of the main beneficiaries should be the citizen.
African countries are encouraged to formulate appropriate legislation to facilitate access to NSDI information and services by the citizen.

14. It is recognised that the benefits of an NSDI are significantly increased if it supports both niche and mass markets.
African countries are encouraged to ensure that the appropriate legislative business frameworks are established to facilitate support of mass markets.

4.1.4 Capacity Building

15. National organisations, with the support of FIG and sister organisations, are encouraged to organise regular Regional workshops to raise awareness and knowledge sharing of Spatial Information Management for Sustainable Development issues and solutions. This will be a significant contribution to capacity building.
16. African countries are encouraged to provide continuous capacity building. If this is applied at the management level then this will be a significant contribution to institutional building.

4.2 The Regional Perspective

4.2.1 Regional Strategies And Activities

17. It is recommended that African countries establish regional co-operation through joint initiatives that require regional information management to support common interests. This will encourage knowledge sharing and ensure common standards are implemented.
18. It is recommended that existing Regional centres of excellence in spatial information review their current services in the context of the NSDI agenda and ensure that appropriate services are provided to encourage the establishment and support of NSDIs.
19. Universities within Africa should be encouraged to work with the local survey associations in the provision of Continuing Professional Development.

4.3 The Global Perspective

4.3.1 UN-ECA and the African Countries

20. The Permanent Committee for NSDI in the Pacific and South-East Asia has been successful in promoting co-operation amongst the participating nations.
The Commission On Developing Information (CODI) proposal for UN-ECA to establish a **Permanent Committee for NSDI** in Africa is strongly supported.
21. It is recommended that a sub-group is established under the Permanent Committee for Africa focussed on the sharing of Education and Training resources and experiences (**Forum of Education and Training**).
22. Land administration in Africa faces specific, but common elements, e.g. variety of indigenous right, informal settlements, in relation to statutory tenure arrangements.

It is recommended that African countries share knowledge and experiences and develop guidelines within the framework of UN-ECA by the creation of a **forum of land administration** as a sub-group of the Permanent Committee for NSDI for Africa.

23. Land administration systems provide important foundation data for NSDI.
The sub-group of the Permanent Committee for NSDI for Africa (**Forum of Land Administration**) is recommended to identify the institutional and operational conditions for successful land administration in Africa.
24. As land tenure in Africa is varied, a good understanding of the concepts of land tenure and its impact on registration is important.
The sub-group of the Permanent Committee for NSDI for Africa (**Forum of Land Administration**) is recommended to aim for a concerted research effort on this subject.
25. It is recognised that ISO (www.iso.org) and the Open GIS Consortium www.opengis.org produce data and interoperability standards that should be adopted by NSDI stakeholders.
It is recommended that UN-ECA produce best practice guidelines providing NSDI implementors with practical advice on how to effectively implement these essential standards.

4.3.2 Technology Transfer – The Role of the Vendors

26. It is recognised that the majority of NSDI implementors within Africa have limited opportunity to be exposed to the technical options available to build NSDI.
Vendors are encouraged to support a new approach to technology transfer in Africa.
27. It is recognised that many of the key infrastructure requirements of NSDI, e.g. pervasive, effective telecommunications and Internet access, are not widely available in Africa. This limits the applicability of leading edge NSDI technical solutions in Africa.
Vendors are encouraged to understand the needs of African countries and design and market appropriate technical solutions.

4.4 The FIG Perspective

4.4.1 FIG Specific Recommendations

28. There is need for co-operation by FIG (www.fig.net) Ad hoc Commission on construction economic and management with other international and regional cost management associations, for research into cost management and community based driven organisational models for low cost housing and the publication of the results for dissemination.
29. There is need for FIG to establish a Cross Commission Working Group to harmonise land management and planning issues with construction and cost management of low cost housing delivery with holistic requirements and framework of FIG Agenda 21.

5. FINAL REMARKS

After the Conference a publication with the title: "The Nairobi Statement on Spatial Information on Sustainable Development" has been prepared. The publication contains an introduction to topics like sustainable development, spatial data and information, spatial information management and spatial data infrastructure as well as the recommendations.

This publication is intended to support politicians, senior managers and professional organisations by providing greater understanding of the need for spatial data infrastructures and how spatial data and information can support sustainable development.

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- International Conference on Spatial Information for Sustainable Development, Nairobi, Kenya, 2-5 October 2001. / www.fig.net /

LINKS

- The SDI Cookbook, version 1.1 15 May 2001: www.intl-interfaces.net/cookbook/WMS/
- Open GIS Consortium Web Mapping Testbed Public Page:
www.opengis.org/wmt/index.htm
- Open GIS Consortium Interoperability Program Page: ip.opengis.org
- Web Map Server Interfaces Implementation Specification Revision 1.0.0:
www.opengis.org/techno/specs/00-028.pdf