Tabular comparison: stakeholders in the spatial data infrastructures of South Africa, Namibia and Ghana

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This report presents a tabular comparison of the stakeholders in the SDIs in Namibia, South Africa and Ghana using the ICA's stakeholder typology (see Table 1). The stakeholder typology for each country was informed by a review of relevant documentation (e.g. legislation, project reports) and scientific literature; direct observations by the authors who have been directly involved in SDI developments in their countries; and workshops of the collaborative project reviewing elements of the targeted national SDIs, variably including geospatial practitioners and scholars from Namibia, South Africa and Ghana, as well as members of the ICA Commission.

Table 1. Stakeholders in the ICA SDI model (Source: Cooper et al., 2011)

Policy Maker
The *Legislator* is an "external" authority that determines the framework within which the SDI has to exist. The *Legislator* does not necessarily understand anything about the SDI.
The *Decision Maker* makes policies and understands geospatial data and the applications, constraints, etc. It is often a committee of representatives of stakeholder communities.
The *Secretariat* is the 'glue' of the SDI. It is often a government department with the mandate and budget to support the SDI.
The *Champion* promotes the SDI and does not necessarily have a mandate, but could be motivated by the need to promote social justice, by environmental awareness, or by commercial interest. The *Champion* could be the initiator of the SDI.

Producer
Status: Official Mapping Agency, Commercial Mapping Agency, Community Interest, Crowd Sourcer
Motivation: Special Interest, Economic, Process
Role: Captor of Raw Data, Submitter of Revision Notice, Passive Producer, Database Administrator
Skill: Neophyte, Interested Amateur, Expert Amateur, Expert Professional, Expert Authority

Provider
Data Provider: A Producer that is its own Data Provider, a Data Distributor or a Data Arbiter
Service Provider: A Producer that is its own Service Provider, a Service Distributor or a Service Arbiter.

Broker
A *Crowd-sourcing Facilitator* which provides access to on-demand, scalable resources.
A *Finder* is a 'Clients/user Finder' who promotes and sells a portfolio of data and services from *Producers*, *Providers* and *VARs*, to *End Users*; or it is a 'Providers Finder' who sources data or services for an SDI.
A *Harvester* harvests metadata on data and services and integrates them.
A *Cataloguer* builds and maintains a catalogue.
A *Negociant* brings *End Users* and *Providers* together and assists in the negotiation of contracts between them.

Value-Added Reseller
A *Publisher* takes data from various sources, and integrates and edits them to produce a new product, such as an atlas or a location-based service (LBS). A *Publisher* could add some of its own data.
An *Aggregator/ Integrator* is a 'Service Integrator' or a 'Data and Metadata Aggregator/Integrator'.

End User
The *Naïve Consumer* uses whatever is available with limited ability to determine the quality of the data or services.
The *Advanced User* has expert domain and/or geospatial expertise and hence can make informed decisions about the data and services to use and can provide informed, technical criticism of the data and services.

Table 1. Policy Maker (Legislator)

South Africa
– The South African SDI Act No 54 of 2003 was promulgated by Parliament. Parliament has also established the legislative framework for SASDI, amongst others, through the Constitution, the Promotion of Access to Information Act the Copyright Act and the Spatial Planning and Land Use Management Act.
– Regulations to implement SASDI were prepared by the responsible national department (at the time of writing, the Department of Rural Development and Land Reform).
Namibia
– The Parliament of Namibia promulgated the NSDI legislation as part of the Statistics Act No.9 of 2011.
– The Namibian government gazetted the spatial data policy to be implemented through the CSD at the NSA.
Ghana
– To date, no SDI legislation and no evidence of a bill being initiated for SDI development in Ghana
– The Parliament of Ghana was not involved in NAFGIM and LAP.

Table 2. Policy Maker (Decision Maker)

South Africa
- The Minister makes decisions regarding SASDI and appoints the CSI.
- The Director-General of the responsible department administers the Act and SASDI.
- Apart from representatives of the responsible department, members include Statistics South Africa, provincial government, local municipalities, public entities, data custodians, academia and the professional body.
- CSI advises the Minister, the Director-General and organs of state dealing with spatial information; CSI implements SASDI; and in terms of the Act, CSI members represent data custodians, industry and academia.
- Data custodians (organs of state) are assigned responsibility for base datasets and make decisions about the capture, maintenance, management, integration and distribution of such datasets. A custodian may appoint an independent contractor to perform their function as a custodian.

Namibia:
- The Minister for Economic Planning and the Director General in the Office of the President are vested with the powers to make decisions regarding the NSDI and to appoint the CSD.
- The Statistician General administers the Statistics Act and the NSDI.
- CSD is chaired by the Surveyor General (SG). The Surveyor General's Office (SGO) and NSA are permanent CSD members.
- CSD advises the Minister and government institutions dealing with fundamental spatial data sets; CSD implements the NSDI framework and protocols; and its members represent custodians, industry and academia.
- Custodians of spatial data make decisions about their spatial datasets based on the NSDI statutory provisions, NSDI policy and standards.

Ghana:
- The NAFGIM Steering Committee made decisions regarding the implementation and development of SDI activities within NAFGIM.
- The NAFGIM Steering Committee was an informal assembly of stakeholders without governmental statutory powers and authority, but custodians of spatial data were on the Committee.
- Decision making for NAFGIM was non-governmental and without any legal basis or mandate; LAP-1 and LAP-2 are led by the Ministry of Lands and Natural Resources with a mandate to develop the official SDI for Ghana.

Table 3. Policy Maker (Secretariat)

South Africa:
- The responsible department acts as Secretariat of SASDI. To date, this has been the NSIF Directorate in the Department of Rural Development and Land Reform.

Namibia:
- NSA acts as NSDI Secretariat.

Ghana:
- The NAFGIM secretariat was the operational and technical coordinator of all SDI activities within NAFGIM. It included a secretary, coordinator and technical staff, and was located at the Environmental Protection Agency (EPA).

Table 4. Policy Maker (Champion)

South Africa:
– A number of individuals promoted the establishment of an SDI by sharing data and metadata even before the Act was drafted, and then later by establishing the NSIF Directorate, developing and contributing to legislation, and finally, to its promotion and implementation.

Namibia:
– A number of individuals and organizations promoted the inclusion of the NSDI in the Statistics Act, and promoted the Namibian SDI by encouraging citizens to contribute.
– The Central Bureau of Statistics (now NSA) within the NPC sponsored the Act and promotes the sharing of spatial data in Namibia.

Ghana:
– The government of Ghana, DANIDA and the World Bank promoted NAFGIM. They were motivated by the need to share data for sustainable development of the country. The two LAP projects have championed the SDI policy framework.

Table 5. Producer (Status)

South Africa:
1. *Official mapping agencies*: data custodians, e.g. National Geo-spatial Information (NGI), Department of Environmental Affairs, and the Metropolitan Municipality of the City of Johannesburg.
2. *Commercial mapping agencies*: Many, but they are not part of SASDI. They are sometimes contracted by government
3. *Community interest*: none at this stage
4. *Crowd sourcer*: none at this stage.

Namibia:
1. *Official mapping agencies*: a number of government agencies have the budget, resources, expertise and mandate to perform mass data production for the NSDI.
2. *Commercial mapping agencies*: companies are contracted by government institutions/agencies e.g. capturing aerial photography for municipalities or town councils.
3. *Community interest*: none at this stage.
4. *Crowd sourcer:* crowd sourcing was done for the Environmental Information System (managed by a private entity, Research and Information Services of Namibia (RAISON).

Ghana:
1. *Official mapping agencies*: a number of government agencies had the budget, resources, expertise and mandate to perform mass data production for NAFGIM.
2. *Commercial mapping agencies*: in NAFGIM, spatial data and products were produced for their identified markets by companies such as CTK Aviation Ltd.
3. *Community interest*: none.
4. *Crowd sourcer*: crowd sourcing of e.g. rainfall statistics was done.

Table 6. Producer (Motivation)

South Africa:
1. *Special interest*: not applicable.
2. *Economic*: Data custodians use budgets assigned to them to produce base datasets. Private companies are profit-driven.
3. *Process*: not applicable.
Namibia:
1. *Special interest*: A number of organizations are involved due to their special interests/process in spatial data production.
2. *Economic*: Official mapping agencies produce data by virtue of their mandate or due to their reasons for existence. Private companies are profit-driven.
3. *Process*: not applicable.
Ghana:
1. *Special interest*: There were such producers, e.g. CERSGIS produces community-based social infrastructure mapping and flood hazard and health risk maps for selected districts in Ghana.
2. *Economic: Official* mapping agencies produce data by virtue of their mandates or due to their reasons for existence. Profit generation was the motivation for commercial mapping agencies in NAFGIM.
3. *Process*: none.

Table 7. Producer (Role)

South Africa:
1. *Captor of raw data*: All data custodians.
2. *Submitter of revision notice*: This part of the Act was enacted in 2015. Implementation to follow: the Secretariat will provide a mechanism to submit such notices.
3. *Passive producer*: none.
4. *Database administrator*: Secretariat and data custodians.
Namibia:
1. *Captor of raw data*: Official mapping agencies.
2. *Submitter of revision notice*: Individuals notify the NSDI Secretariat directly for revision notices
3. *Passive producers*: none.
4. *Database administrator*: Data producers and NSDI Secretariat
Ghana:
1. *Captor of raw data*: All data producers in NAFGIM.
2. *Submitter of revision notices*: Notices were submitted to the NAFGIM Secretariat.
3. *Passive producers*: none.
4. *Database administrator*: the NAFGIM Secretariat.

Table 8. Producer (Skill)

South Africa:
1. *Neophyte*: none.
2. *Interested amateur*: none.
3. *Expert amateur*: none.
4. *Expert professional*: Employees of data custodians who are generally professionals registered with relevant South African professional bodies.
5. *Expert authority*: Senior professionals at data custodians.

Namibia:
1. *Neophyte*: none.
2. *Interested amateur*: none.
3. *Expert amateur*: none.
4. *Expert professional*: Employees at official spatial data producers for the NSDI.
5. *Expert authority*: Senior technical staff at official data producers.

Ghana:
1. *Neophyte*: none.
2. *Interested amateur*: none.
3. *Expert amateur*: mainly involved in crowd sourcing e.g. rainfall statistics.
4. *Expert professional*: Employees at official and commercial spatial data producers for NAFGIM.
5. *Expert authority*: Senior technical staff at official and commercial spatial data producers for NAFGIM.

Table 9. Data Provider

South Africa:
1. *Producer that is its own data provider*: It is expected that most data custodians will also be providers once they have their processes up and running (custodians were identified in 2014; they are not yet appointed).
2. *Data distributor*: Secretariat and selected commercial organizations licensed as data distributors of base datasets.
3. *Data arbiter*: none at the moment.

Namibia:
1. *Producer that is its own data provider*: All official and commercial mapping producers are providers and distributors of their own data.
2. *Data distributor*: All official and commercial mapping producers are distributors of their own data.
3. *Data arbiter*: none at the moment.

Ghana:
1. *Producer that is its own data provider*: All official and commercial mapping producers were providers of their own data by virtue of their mandates.
2. *Data distributor*: All official and commercial mapping producers were distributors of their own data by virtue of their mandates.
3. *Data arbiter*: NAFGIM Secretariat acted as data arbiter.

Table 10. Service Provider

South Africa:
1. Producer that is its own service provider: Many data custodians provide web map services, other services are limited.
2. Service distributor: none.
3. Service arbiter: none.

Namibia:
1. Producer that is its own service provider: Many official and commercial mapping producers provide web map services.
2. Service distributor: none.
3. Service arbiter: none at the moment.

Ghana:
1. Producer that is its own service provider: Many official and commercial mapping producers were providers of web map services.
2. Service distributor: none.
3. Service arbiter: NAFGIM secretariat acted as service arbiter

Table 11. Broker (Finder)

South Africa:
1. *Clients/user finder*: Many consultants and commercial mapping agencies promote and sell portfolios of SASDI data and services to end users.
2. *Providers finder*: Some organizations source data and services for SASDI, the custodians or both. For example, the State Information Technology Agency (SITA) has the mandate to procure data and services for Government of South Africa.

Namibia:
1. *Clients/user finder*: All commercial mapping agencies are finders of data and services for end users.
2. *Providers finder*: The role of finders of spatial data and services is not regulated under NSDI.

Ghana:
1. *Clients/user finder*: All commercial mapping agencies were finders of data and services for end users in NAFGIM.
2. *Providers finder*: None.

Table 12. Broker (Harvester)

South Africa:
None (yet).
Namibia:
The NSDI Secretariat may harvest metadata in future.
Ghana:
The Secretariat was the harvester of metadata about data sets within NAFGIM.

Table 13. Broker (Cataloguer)

South Africa: The Secretariat has established an electronic metadata catalogue. **Namibia:** Previously the EIS was the cataloguer. NSDI Secretariat is mandated by the Act to create a metadata catalogue, but it does not exist yet. **Ghana:** NAFGIM Secretariat was the cataloguer of data sets for NAFGIM.

Table 14. Broker (Negociant)

South Africa: None at the moment. There might be négociants in future, once custodians and datasets are more established. **Namibia:** Some private companies or consultants, e.g. GeoBusiness Solutions, bring End Users and Providers together and assist in the negotiation of contracts between them. This function is executed within the framework and spirit of NSDI. **Ghana:** In NAFGIM, some private companies/consultants, e.g. Rudan Engineering, CTK Network Aviation Ltd and GeoTech, brought End Users and Providers together and assisted in the negotiation of contracts between them.

Table 15. Value-added reseller (Publisher)

South Africa: Various organs of state and private companies, e.g. 1:50,000 maps are published by NGI and include data from other custodians. **Namibia:** Some official and non-profit data producers, e.g. Surveyor General's Office, Geological Survey of Namibia, Namibia University of Science and Technology, take data from various sources, integrate and edit them to produce new products, such as 1:250 000 maps, topographic maps, etc. This is done within the framework and spirit of NSDI. **Ghana:** Some official and commercial data producers, e.g. CERSGIS, processed, integrated and edited satellite imagery from various sources to produce new products, such as an atlas or a location-based service.

Table 16. Value-added reseller (Aggregator/Integrator)

South Africa:
1. *Service integrator*: None at the moment.
2. *Data and metadata aggregator/integrator*: some organs of state and private companies, e.g. land cover datasets produced from raw satellite data.
Namibia:
1. *Service integrator*: None at the moment.
2. *Data and metadata aggregator/integrator*: official data custodians and private companies select, edit, enhance and combine data into new offerings. Examples of include the Namibian Population and Household Census Atlas and a Poverty Atlas for Namibia.
Ghana:
1. *Service integrator*: None at the moment.
2. *Data and metadata aggregator/integrator*: Some official and commercial data producers e.g. EPA, CERSGIS, Soil Research Institute selected, edited, enhanced and combined data into new offerings. Examples include the land cover atlas for Ghana in 1998; land cover/land use data in 2003; and a land suitability atlas and bulletins produced for Ghana SDI.

Table 17. End User (Naïve Consumer)

South Africa:
– There will be naïve consumers, but they will typically use the data and services through VARs and not through SASDI directly.
Namibia:
– Some citizens and visitors, government employees, consultants and private companies use whatever is available with limited ability to determine the quality of the data or services within NSDI.
– Data and service custodians are directly feeding the general (naïve) consumers of spatial data sets and services.
Ghana:
– There were no naïve consumers within NAFGIM.

Table 18. End User (Advanced Consumer)

South Africa:
Generally, users of base datasets would do so in their professional capacity and would therefore have at least some expertise and abilities in using spatial data.
Namibia:
Generally, all data and service custodians, CSD members and the Geoinformation Society of Namibia members have advanced user capabilities and expertise in using spatial data.
Ghana:
Generally, NAFGIM Steering Committee/Secretariat and members had advanced user capabilities and expertise.

Acknowledgements

References

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