UN Stimulates African SDIs

In Addis Ababa, Ethiopia, the United Nations Economic Commission for Africa has a Geoinformation Support Team of a dozen people striving to develop spatial data infrastructures (SDIs) Africa-wide. “Progress on formal SDIs has been very slow, but the geospatial capacity is notably improving on the continent,” concludes team member Andre Nonguierma, who explains more in this interview.

What is the UN’s role in the development of SDIs in Africa?

At the regional level, we emphasise the development of the African Regional Spatial Data Infrastructure. We raise awareness among stakeholders and facilitate the formulation of policies and strategies to put in place co-ordination mechanisms, common frameworks, tools and suchlike. At the national level, we help to instate policy dialogue and institutional arrangements for co-operative production, management, dissemination and use of geoinformation resources. In general, there are three main stages of development for a national SDI (NSDI). In the first stage, stakeholders work out the policies and institutional agreements through a participatory process and consensus building. Secondly, during the implementation stage, stakeholders collaborate on standards and interoperability for common base themes, geodetic reference, metadata production, dataset building, capacity development, etc. The third phase concerns monitoring and adjusting the whole process. Our advisory services concentrate on the early stages, as was done for several countries such as Ivory Coast, Nigeria, Burkina Faso and Sierra Leone. The first phase is the most critical, since policy development is always a highly sensitive issue because it involves people: end users and decision-/policymakers, their influence and their privileges.

What is the most prominent stage?

Around 50% of the 54 African countries have formally taken steps to develop their national geoinformation policies. However, besides Nigeria and South Africa, the initiatives in many countries were stalled after setting up the management committee. Although we must acknowledge that the overall progress in developing integral, structured SDIs has been very slow, mainly due to poor awareness, we can equally recognise that the geospatial capacity on the continent is notably improving. Many countries participate in a variety of geospatial science and technology initiatives. A number of nations have established remote sensing centres and/or mapping agencies. Many universities are offering remote sensing programmes. Algeria, Nigeria, Egypt and South Africa have acquired Earth observation satellites. Furthermore, individual citizens are becoming more involved by creating and distributing their own geospatial information, and the use of spatially enabled services is rising across the continent.

Ultimately, will the African SDIs differ much from the ones we see elsewhere?

Technically: no – we’re catching up fairly quickly. For instance, the communication infrastructure is improving significantly. Although the electricity supply is still a challenge in many countries, we have more and more geospatial content in the cloud and therefore geospatial information and services are now broadly accessible. But on an institutional level: yes. Even when there is a good mass of infrastructure installed, the human capacity is still challenging. Firstly, many young Africans decide to study geoinformatics on other continents and end up staying abroad. Secondly, data sharing is very difficult in Africa because many decision-makers still think that sharing lessens their power. That stretches the agenda for building consensus and dialogue for data custodianship.

How do you cope with that resistance?

Our starting point is to ensure that the stakeholders see themselves and the others as an equally important part of the chain, and that the responsibilities are shared transparently. I know that the problem is not unique to the African continent, albeit that other continents face it to a lesser degree. For instance, a multidisciplinary study in Europe (‘Spatialist’ by the University of Leuven) has demonstrated that it could help to organise interest groups in 'vertical columns' around a chain of workflows in the same thematic area, crossing different policy levels and organisations. In Africa, that could work for focus groups on climate change, peace and security (border issues), trans-boundary transport modes, infrastructural development of cities, seismographic monitoring, water management and so on.

As with any strategy, if there is no professional group-based determination to implement it, no significant result will be achieved. Therefore it makes sense to start with a basic nucleus of key champions to craft the right set of integrated building blocks. Then, in the course of the process, it becomes achievable to incorporate more actors and evolve the SDI into an enabling platform that helps to link services across jurisdictions, organisations and disciplines. Obviously, a governance and policy mechanism is necessary to guide the process from start to finish.

Suppose a miracle happens: the most prominent professional problem reaches an acceptable level. How will you know that the miracle has occurred?

In that case, we will see functional clearing-house systems. With metadata clearing houses in place, users can know what information resources are available and where, and can appraise them in relation to their own needs. To make this dream come true, more policymakers must perceive the link between geoinformation products and societal benefits. They must fully understand that most of today's issues have a significant spatial aspect. Therefore, we promote prototyping of customer-focused and locally centred services. We don't emphasise that they must first create an optimal dataset or data warehouse; our motto is to start working with what you have. A functional prototype can be taken to Parliament or a local council to enlighten them on the connection between GIS and national social and

development issues. In Burkina Faso, for instance, a web service was developed in this way which is now used for many day-to-day decisions, including by companies and civilians, allowing them to see the relationships between mining mineral resources and impact on the landscape, economy, water resources and ecosystems. As a result, the application is becoming increasingly well known across the country and the underlying datasets are gradually improving.

Does such patience pay off in the field of mapping too?

Around 2.5% of the continent is mapped at 1:25,000 scale, and 15 countries currently have new mapping initiatives. That's why we initiated the Mapping Africa for Africa programme. One important component of that is the African Reference Frame Project (AFREF), which is aimed at setting up a unified geodetic reference frame so that maps and other geoinformation products can be represented on the same datum. AFREF is based on satellite positioning technologies, and forms the geodetic infrastructure for multinational projects. The first target is to establish at least one GPS/GNSS station in every country. When completed, users will not be more than 1,000km from such a station, which will considerably improve the precision of the results. Five years ago, there were very few reference stations – and most of those were military ones – because of the cost of a GPS/GNSS base station: more than USD10,000 each, not including the installation and operating costs. Now more than 115 stations are operational across the continent, broadcasting to our data centres in South Africa. Through AFREF, partners such as Trimble and Ordnance Survey are helping to improve the network density.

However, even though we must recognise that the continent is still poorly mapped at scales that are suitable for operational activities on the ground, numerous spatial datasets on Africa nevertheless exist both within and outside the continent. Again, the right approach would be to start with what exists and to incrementally accrue the databases as more dynamic and more highly accurate datasets become available.

How does that apply to geo web services?

It's essential that Africa takes advantage of existing operational data products and services. European programmes such as GMES_Africa, Galileo and Emetcast/Geonetcast are leapfrogging geospatial technology development on the continent. For example, to pave the way for the GMES_Africa programme, the African Union and the European Union have established the Monitoring of Environment and Security in Africa project. It is a stepping stone towards promoting the delivery of operational, space-based services, including land, marine, atmosphere, security, emergency and climate services. That continental programme started in 2013 for five years, with a budget of EUR40 million. While such opportunities are great, we must consider all projects within a holistic and purpose-driven vision and strategy towards African-led, African-managed and African-owned geospatial infrastructures, applications and services.

That sounds like a warning…

We need mutually beneficial partnerships with other continents to build sound geospatial applications. However, we must not give priority to piecemeal initiatives which stop after two to five years, when the financial support dries up, without proper ownership by Africans. It's not unusual to find that nothing remains at the end of such isolated projects, except a copy of the final report – if there is one.

Andre Nonguierma

Andre Nonguierma has focused for more than 20 years on leveraging the use of geospatial data, information and analytics for strategic decision-making across a range of applications, in the public sector, academia and the private sector. For the past eight years, he has been working with the United Nations Economic Commission for Africa (established in 1958) in support of the formulation of policies and strategies on spatial data infrastructures in Africa. Andre Nonguierma holds a degree in environmental engineering from the Polytechnic Institute of the University of Ouagadougou in Burkina Faso. He also holds an MSc in remote sensing and management from the Faculty of Agronomic Sciences, Gembloux/Liège, Belgium.

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