The Importance of NSDI – Case of Georgia

Ekaterina Meskhidze, Georgia

Key words:

NSDI, land administration, cadaster, geospatial data, disaster, land conflicts, gender equality.

SUMMARY

This is a summary on the paper on "The Importance of NSDI – Case of Georgia". This explains the status, capacity and importance of National Spatial Data Infrastructure (NSDI) to maximize the public benefits drawn from the geographic data available in Georgia. In particular, determine the disaster risk reduction and management capabilities using geospatial data. It highlights the importance of a transparent, integrated and coordinated National Spatial Data Infrastructure to the achievement of the Sustainable Development Goals.

Georgia is prone to disasters that pose a significant threat to different sectors of economy and to human development. Natural hazards, coupled with significant levels of exposure and vulnerability, have a substantial negative impact on the national economy. According to the government, over the last 40 years 70% of the territory of the country experienced natural hazards of hydro-meteorological and geological origin; economic losses exceeded USD 14 billion. If we use geographic data as a foundation for the creation of new and improved services and for decision making, better preconditions will exist for the sustainable development of business sector, government institutions and for state building in general.

The assessment of disaster damages and losses is an essential practice for developing the effective national system of disaster risk management. The examples of disasters, wildfire of the forests and flood in the capital of Georgia clearly showed that dedicated legislative and policy framework for disaster risk reduction has to be substantially and consistently strengthened and enforced. Institutional arrangements and multi-stakeholder coordination mechanisms require reinforcement. Technical, human and financial capacities exist; however, they need better coordination, prioritisation and systematisation across all relevant sectors, governance levels and institutions. Climate risk management and adaptation efforts require better alignment at institutional, policy and programme implementation levels, as climate and disaster-related risks can no longer be addressed separately.

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1. INTRODUCTION

Demand for geospatial information is growing in a society (real estate, insurance, tourism, transportation, agriculture, environment protection and other industries). There is also a need to implement effective management to solve many problems in the world through this information such as climate change, natural disasters (forest fires, floods, landslides, earthquakes), population migration and economic crises which in turn contributes to our lives and it is related to our geographical knowledge of certain aspects. The completeness and reliability of the information allows us to work more efficiently, plan and use our resources; avoid losses, calculate risks, carry out preventive measures.

Current access to the required spatial information is often hard to obtain and requires significant amount of time and money. Thus, spatial information is not being effectively utilized. Current circumstances have inspired us to transform the system through the creation and development of the infrastructure for national spatial information.

We live in a digital era and, therefore, spatial information is an important and inseparable part of our everyday life. Spatial data have a significant effect on many fields of public activity such as business, economy, social life and politics, especially, spatial data are of utmost importance during emergencies as well as when planning preventive measures. In emergency situations it is often critical to have information about the location of access roads, helicopter landing spots, nearest medical establishments, evacuation routes, buildings under threat (such as hospitals, gas stations, schools). The list of spatial data uses during emergency situations is almost endless. However, market of geographic data grows annually by 10-30%. It facilitates boosted demand on search services, location determination and navigation.

1.1 What is Spatial Data Infrastructure (SDI)?

Spatial Data Infrastructure (SDI) is a coordinated system of policy, technologies, standards, regulations, institutional agreements and rules that ensures the search and use of geographic information by customers for different purposes, allows the State Institutions, Municipal self-Administrations, Academic circles, business sector and citizens to inquire, evaluate, implement and share spatial data at the National level. It provides for the accessibility of spatial information created by means of Geographic Information Systems (GIS).

Perception of the surrounding world in some ways is related to a person's skill of orientation in space and time. Till the 20th century spatial data were associated with various types of maps, that couldn't respond to the challenges of reality. Fast development of spatial thinking and informational technologies, as well as accumulation of the solid information in various fields, raised issues of regular and systematic maintenance, management and change of data,

because often high quality spatial information was unavailable due to functional incompatibility, absence of data establishing, publishing, sharing, standards. Similar or same data were often collected and maintained in different state organizations, that caused unnecessary additional costs.

In other words, National Spatial Data Infrastructure is a system with geographic data and related electronic services in its centre, which are documented by metadata. Production of geographic data, electronic services and metadata is regulated by relevant Legal Acts, standards, regulations and methodologies in accordance with the principles of harmonization and interoperability. Data producing and sharing require technical infrastructure, human resources and experts in various fields. Existence of all abovementioned components provides successful implementation and establishment of National Spatial Data Infrastructure. SDI is not a program support or data, it is both. The existence of Spatial Data Infrastructure facilitates the smooth and effective communication and spatial data exchange. Therefore, it is a framework and a foundation for the spatial data, metadata consumer and GIS tools. SDI determines technology, standards and rules that provide the effective work with spatial data, their sharing, search, processing, use, storage and renewal.

In particular, determine the disaster risk reduction and management capabilities using geospatial data in the populated areas, using different kind of data layers to be created and tested such model of geospatial data infrastructure in the preliminary selected areas based on various criteria, which will facilitate the establishment of prevention and management mechanisms in these communities and sustainable development of these areas. If we use geographic data as a foundation for the creation of new and improved services and for decision making, better preconditions will exist for the sustainable development of business sector, government institutions and for state building in general.

It should also be noted that one of the main components of SDI is the legislative base. Establishment of National Spatial Data Infrastructure is the EU requirement. It is based on the European Union INSPRE Directive adopted by the European Parliament and European Council (2007/2/EC INSPIRE) on March 14, 2007 in order to create a spatial information infrastructure in the European Community with an initiative of the European Commission. It entered into force on May 15, 2007. It states that EU member states agree on free exchange and harmonization of basic geographical data within Europe. According to the INSPIRE Directive, each Member State shall adopt a national law in accordance with the INSPIRE Directive. It is rather important to study / analysis of this directive in the research process and to integrate it with the realities of Georgian legislation and public interests. Also, it is important to study and analyze the perspectives of correct understanding of need, perception and use of the SDI instrument as well as analyzing the Digital Single Market Strategy for Europe, the PSI Directive, Open Data Initiative Strategy and the E-Governance Action Plan (2106-2020).

For EU Member States the Directive INSPIRE is a foundation of National Spatial Information Infrastructure Development, one of the main tools of electronic governance in Europe and changes approach towards data sharing. The INSPIRE Directive defines principal, general regulations for development of European Unified Spatial Information Infrastructure, based on five main principles:

- Harmonized, standardized, systematized, reliable and accessible spatial data will be collected only once and properly maintained,
- Data produced by one entity will be shared at every level,
- Received from various sources data may be combined and shared for lots of users and software (Functional Compatibility Conception),
- Geographic information, required at every management level, is accessible and transparent,
- Geographic information is easy to inquire (data sets should be documented by metadata). The case of restriction is recorded, i.e. it's easy to identify terms of use.

The INSPIRE Directive defines 34 thematic groups of spatial data sets, which are distributed in three Annexes, starting with cadastral land plots and ending with species distribution areas. The Directive legally obliges the State Institutions, having relevant spatial data stated in the Annexes, to make information accessible in line with INSPIRE Specifications. INSPIRE allows to set up limited access or adequate service fee for certain group of users, there should be records in the metadata concerning special terms.

1.2 What effect does spatial information have on our lives?

Spatial data have a significant effect on many fields of public activity such as agriculture, business, economy, science, social life and politics. In the process of planning or management of each of this direction, one needs to consider numerous factors, including the population density, their income, distance that people cover to and from their work, location of the existing sites, cadastral and registered data, geodetic network and coordinate system; data on rivers, lakes and other hydrographical data including catchment basin, river-bed, depth, length, etc. One also needs to take into account the public transportation and potential customers. As a result, all this data becomes spatial. Through the analysis and modeling of this information, it is possible to determine the best location for constructing the buildings, spatial planning, study the surface of earth, etc.

In June 2014, the Association Agreement was signed, on the one hand, The European Union and the European Atomic Energy Union and their Member States, and on the other hand, Georgia. Cooperation between the parties with other important areas include environmental protection, climate change-related activities, health care, regional development, cross-border cooperation and regional levels, agriculture and rural development, cooperation on research, technological development and the field of civil protection.

Within the Association Agreement with the European Union, Georgia undertakes obligations to gradually close its legislation to the EU legislation and international legal instruments in the specified timeframe. The Association Agreement defines cooperation in the prevention, preparation and response of natural and technogenic disaster. Cooperation involves the following objectives: Cooperation in the disaster risk reduction format using such means as institutional relationships and advocacy; Information (geospatial), education and communications; best practices aimed at reducing natural disaster prevention or disaster impacts; cooperation to improve the information base on catastrophe, threats and risks assessment management; cooperation on environmental and public health in the direction of disaster assessment, as well as a cooperation towards reforms in the framework of EU Association Agenda which seeks to strengthen respect for democratic principles, the rule of law and good governance, human rights and fundamental freedoms, including the rights of persons belonging to minorities as enshrined in the core UN and Council of Europe Conventions and related protocols and to contribute to consolidating domestic political reforms, in particular through approximating with the EU acquis communautaire.

The historical aspiration of the Georgian state to become a fully fledged member of the European family, embodies the compatibility and integration with European standards in various areas. This list inter alia encompasses the geographic information. Currently, state and local self-governmental authorities, private, non-governmental or scientific sectors in Georgia mostly create and/or use spatial data, which do not allow their integration, joint use and creation of the unified geospatial information system. It is essential the implementation of legislative regulations in line with EU INSPIRE Directive in Georgia to support environmental policy and overcome major barriers still affecting the availability and accessibility of relevant data.

1.3 And still, why is spatial data so important?

Our everyday life is associated with different places, people, nature and other processes taking place around us. Spatial information makes it easy for people to comprehend the environment. We live in a digital age and we create abstract models of any object by means of digital data. We use the commonly accepted or formally agreed division of the space in order to determine the geographic location of a continent, a country, an administrative unit (such as a village, municipality, town, district), a statistical unit or land plot. Addresses are used in populated areas to determine the exact location. Consumers need to be have mail, newspapers, services and goods delivered to their addresses from within the country as well as from overseas. Accordingly, common spatial language is needed in order to simplify the services. It will need be common for all, easily understandable and comprehensive language for the people of different countries, it is important to implement effective management to solve many problems in Georgia through this information, such as climate change, agriculture, environment protection, natural disasters (forest fires, floods, landslides, earthquakes), solid waste management, pandemics, urban planning and municipal infrastructure development,

biodiversity, population migration, green economic crisis and other industries which in turn contributes to our lives and it is related to our geographical knowledge of certain aspects. The completeness and reliability of the information allows us to work more efficiently, plan and allocate our resources, deal with damage, calculate risks and implement preventative measures. The lack of effective disaster preparedness, policy, not enough geospatial data and infrastructure, no intergovernmental coordination, institutional and legal framework are the biggest challenges that Georgia faces today. It is an important instrument for the social and economic changes, state building and preparing relevant institutions for realizing the SDGs and making those effective, transparent, accountable and inclusive.

2. DISASTER RISK IN GEORGIA AND ACCESSIBILITY OF GEOSPATIAL DATA

Georgia is characterized by high frequency and risk levels of disasters that hinder the country's sustainable development and poverty reduction efforts and pose significant threat to different sectors of economy as well as human development. The country lacks a long-term preventive planning and prioritization at national, regional and local levels.

There is no Strategy or National Policy on Disaster Risk Reduction in Georgia. Therefore, there is no geospatial data and infrastructure. The clear example is the frequent landslides in the mountainous regions, massive wildfires in the forests as well as the disaster/flood and damage caused by the Vere River on June 13, 2015, struck the Tbilisi Zoo, leaving half of its animal inhabitants either dead or on the loose. Disaster took the lives of 19 people, with a handful still missing and left at least 280 others homeless, destroying and damaging houses, roads and buildings across the central areas of the city closest to the Vere River Valley, the usually calm waterway that swelled unimaginably, quickly breaking its banks. Landslides and mudflows in the catchment area of the Vere River, stretching as far as 30 kilometers away from the city, sent massive streams of mud, trees and other debris into the city which made the rising tides far more deadly. Unfortunately, the process of rescue works as well as the assessment process for the experts/scientists were very complicated due to lack of preparedness/plan and data. Such cases require special scientific research and preventive measures that require appropriate geographical data, but the correct use, education / knowledge (relevant resources) and experience of this data are one of the major problems for the country.

There is a good example of lack of knowledge and preparedness of the relevant institutions, when the Government of Norway offered the air photography of Vere Valley after the flood, in order to count the damage, make analysis of the situation and scientific research of disaster, in which the state failed to determine the correct readiness, knowledge, coordination and task correctly. Within the Project "Maps for Sustainable land Management – Georgian Orthophoto", the Norwegian side has implemented air photography of the Vere Basin with a resolution of 10 cm (approximately 200 sq.m.) and its processing, which was shared by various state institutions. However, the proper and appropriate use of this data for the purpose of scientific research has not been implemented by the Georgian side yet.

3. MAIN PROBLEMS AND CHALLENGES

Currently, public institutions, local self-governments, NGOs and academia, in most cases create and use unreliable, incoherent, unverified and outdated spatial data. Existing spatial data identification systems, including registries and cadastres kept by public institutions, do not provide for integration and joint use of data received from various sources. Consequently, there is no single spatial data identification system. That hinders use of spatial data - as a part of a link of different databases, and makes it impossible to develop one single geo-informational space in the country, which, in turn, negatively affects conducting planning and analytical activities and validity of the results.

> **We cannot stop natural disasters but we can arm ourselves with knowledge: so many lives and livelihoods across the World wouldn't have to be lost if there was enough disaster preparedness.**

This is an adaptation of a quote from a survivor of the 2004 Indian Ocean Tsunami. While humans will always be impacted by disasters to some degree, no matter what we do, preparedness and planning will reduce risks and levels of impact. It is not enough anymore to say that we can adjust to occurrences when they happen. Climate change is having an amplifying effect on disasters - meaning they are happening more frequently and their intensity appears to be strengthening.

Post-disaster assessments present alarming figures on the relatively higher vulnerability of women and girls in the context of natural disasters, severe weather events and climate change. For example, 70 per cent of all deaths in the 2004 Indian Ocean Tsunami were women and girls. Studies have shown that women's voices are largely marginalized in disaster policies and ignore specific vulnerabilities of women, such as their relatively lower access to means of communication, limited mobility and dependence on male family members for timely evacuation decisions and special relief needs. In result of the flood of Vere Valley 75 per cent of all deaths were women, one of them, a 56-year-old woman, had recently returned to work after having had an arm amputated two weeks earlier after a tiger mauled it.

While disaster risk reduction (DRR) is gradually becoming one of the key priorities for the Government of Georgia (GoG), and there has been an obvious progress in addressing prevention issues, yet DRR related legislation is more response and recovery rather than prevention and mitigation oriented. GoG recognizes the need for support to enhance the national DRR system in order to overcome its capacity gaps, particularly, in terms of prevention and risk reduction. Currently, national, regional and local development planning is not consistently informed by multi-hazard risk assessment and a unified hazard mapping methodology is missing.

As the experience of developed countries demonstrates, in order to systematically address prevention needs a unified hazard mapping methodology regulated through a dedicated legal framework needs to be developed and introduced.

Decision-makers at central and local levels seem to need improved understanding of hazard and risk concepts and their application. Roles and responsibilities of national institutions on hazard mapping and risk assessment are not clear. Different institutions like the National Environmental Agency (NEA), the Institute of Earth Science - Seismic Monitoring Centre of the Ilia State University, the Institute of Geophysics are mandated to collect, analyze and disseminate data and information on natural hazards in Georgia.

The Emergency Management Agency (EMA) of the Ministry of Internal Affairs receives hazard maps from NEA, and seismic hazard maps from the Institute of Geophysics in order to develop GIS risk maps based on the cadaster maps from the National Agency of Public Registry of the Ministry of Justice. However, scale and quality of the maps are unclear.

Establishment and development of National Spatial Data Infrastructure of Georgia is one of the challenges of GoG which will function at the national, sectoral and municipal levels, ensure optimal planning of resource use and efficient management of processes throughout the country; Facilitate development of E-governance policy and capacity building of public institutions in the field of spatial data; Reduce costs of spatial data creation, increase the quality through the exclusion of duplicated work in the process of spatial data creation; Systematization, standardization and approximation of the basic national spatial data and metadata to the European requirements; Integration of the National Spatial Data Infrastructure into regional and European (INSPIRE) infrastructures.

Establishment of the unified National Spatial Data infrastructure (NSDI) in Georgia, which will operate on governmental, sectoral and municipal levels, will ensure:

- Optimal planning for efficient use of the resources in the country and effective management of the processes;
- Support the development of e-governance and the state authorities in spatial data creation and management;
- Reduce costs for data collection and maintenance by avoiding duplication of work and establish efficient co-operation between data producers at local, regional and central level;
- Systematization and standardization of the national basic spatial data and metadata and making them as close as possible to the European requirements;
- Integration of NSDI in regional and European infrastructures.

The created NSDI will provide state authorities and municipalities with standardized, systemized, reliable, accurate and updated spatial data, which will increase the quality of decision-making. For efficient use of the resources, the NSDI will also be available for private

sector and general public. Free access to geographic data shall increase the efficiency of social functions, such as the response to catastrophes, rescue efforts, study of the environment, transport planning, security, postal and distribution services, etc. The companies engaged in this initiative will be able to develop new products and services in the fields of transport planning, navigation equipment, search services and decision making. The key element of NSDI is data sharing that provides reduction of costs of spatial data producing due to ruling out of doubled work; data quality increases, efficient planning of various areas makes accurate and actual information available. Such area as Defense and Security, Economics, Energy, Health, Real Estate Market, Land Management, Transport, Tourism, Agriculture, Education, Culture etc. require availability of harmonized geographic data, e.g. existence of transport, addressing network spatial data is crucial for optimal managing of fire, road accidents, natural disasters, accidents, crisis situation, rescue operations, for valuation of environmental impact risks, for planning tourist routes, new medical, educational and other organizations. Establishment of the foregoing system will benefit all society. This system will support optimal planning of resource use and efficient management of processes, as well as increase quality of decisions made by State Institutions and Municipal Administrations on the basis of standardized, systematized, valid, reliable and current information. It will also promote development of Electronic Governance and will be another step towards integration with European structures.

4. SDI FOR EFFECTIVE LAND ADMINISTRATION

Historical Overview – Challenges in data accuracy

Throughout the various phases of development of Georgia – due to the existence of different legal regulations, approaches, and methodologies– the identification of individual land plot locations and precise cadastre borders for registration resulted in inaccuracies that technically did not permit registration. Specifically, Cadastral surveys and land registration was conducted with significant deficiencies and without a systematic and uniform approach and methodology.

At the initial phase of land privatization (1992-1998), procedural and qualitative mistakes were made. Throughout the 1990s, land privatization was implemented quickly, but with some inaccuracies. For example, land plots were allocated without field surveys, which resulted in significant number of mistakes in the documents confirming ownership rights.

Additionally, over the years, the registration body of the GoG had been collecting the cadastral data of individual land plots according to the legislative requirements applicable at the time of registration (e.g., based on survey drawings with or without coordinates and without on-site verification). Furthermore, there was no defined common technical standard for surveying activities, resulting in surveying results from different periods being implemented according to various methodologies and with various levels of accuracy. The standards of surveying activities varied not only for different time periods but also for different regions of Georgia.

Based on the order No. 800, dated 13 December 2006, on "Approval of Instruction for the Registration of Rights on Real Estate" by the Minister of Justice of Georgia, the electronic cadastre system was established and it became mandatory to prepare survey drawings in WGS 84 coordinate system and UTM projection (state geodesic coordinate system) formats. Furthermore, it became mandatory to present electronic and paper versions of cadastre survey drawings to the registration body of the GoG.

Still, there is noncurrent mechanism to verify the accuracy of submitted survey drawings in Georgia. Instead, the responsibility for the accuracy of the survey drawings is assigned only to the owners and private survey companies, meaning that the GoG registration body was not able to determine the accuracy of cadastre survey drawings submitted by interested parties and in this regard, the registration body was fully dependent on the objectivity and fairness of surveyors and interested parties.

Based upon the aforementioned, even if land plots are already registered in legal terms, registration can still be defective, that will give rise to property and administrative disputes.

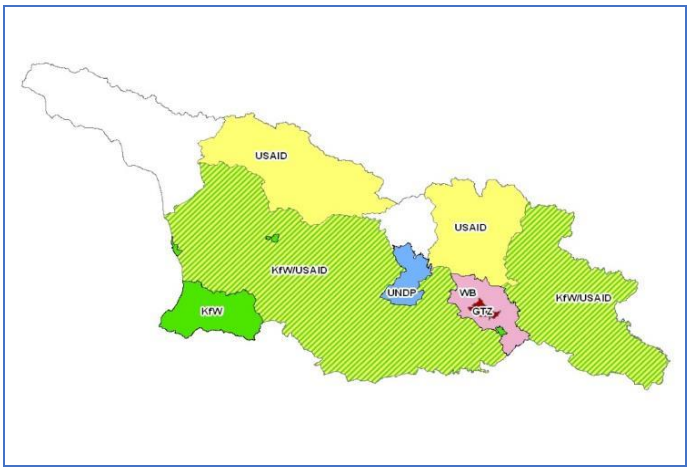
As mentioned in the previous section, different reforms and projects were implemented at different phases. From 1999 to 2006, several donor-supported projects were implemented to support the State Department of Land Management (and later NAPR under the Ministry of Justice) in collecting information related to land plot registration and relevant property rights.

The donor-supported land registration program activities were often not sufficiently coordinated between the donors or with the registration body of the GoG and the implemented programs were not harmonized with a common development concept, which caused data produced under one program to conflict with the same of another program. The results of cadastre planning campaigns implemented under donor projects were not subject to systematic verification via field works and these campaigns were implemented with different approaches and utilized different technologies, which resulted in overlaps of land plot boundaries. While the actual owners may not have any boundary line conflicts, inaccuracies of the boundary lines in the databases cause problems in the registration process and accordingly, they give rise to disputes.

Despite of the fact that results of donor-sponsored projects implemented in 1999-2006 are not reliable, these programs did, however, in later years, provide crucial data that was leveraged for the improvement of the present property registration system of National Agency of Public Registry (NAPR).

The map of Georgia in Figure 2 indicates the locations where donor-sponsored land registration programmes were implemented:

Figure 2. Locations where donor-sponsored land registration programmes were implemented



The GoG faces one of the significant national problems to land registration in rural communities across Georgia, in that rural land registration of both agriculture and urban lands remains very low, less than 50% registered based on municipalities (ranging from less than 5% for most municipalities of some mountanious regions, 20-30% in West Georgia and 25-50% in East Georgia). As for the cities, there were about 30% of lands registered in Kutaisi while in Tbilisi the rate was about 70% as of September 1, 2015.

Of the estimated 4 million land plots in Georgia, approximately 1, 2 million (30%) land plots are registered properly, based on verified data. According to current statistics, the number of registrations of non-agricultural land significantly exceeds the number of registrations of agricultural land. The relatively low occurrence of registration in rural areas is the reason for concern, as the above indicates that land utilization in legal terms is not sufficiently provided for and agricultural development still faces significant obstacles.

Lack of Economic Incentives – In areas of recent economic development, there were some signs of land market development observed. This occurred in those municipalities that have significant growth in wine making or tourism, or that are close to major cities. In other areas that do not have substantial official transaction volumes or economic incentives to register their land, the vast majority of land plots still remain unregistered. Providing economic incentives are important for land owners to justify the cost of surveying and registration.

4.1 Land conflicts

Since the reintroduction of private property and the privatisation of agricultural land, land disputes occur due to the absence of a systematic first registration and shortcomings in the privatization and registration approach. As it is mentioned above the majority of rural land plots in Georgia are not registered in the national land registry and cadastre and registered data is partly unreliable.

When agricultural land in Georgia had been privatized, no adjudication of the boundaries took place. Rural citizens received agricultural land in a clearly defined size, but there was no

indication of the location. A systematic initial registration never took place. Only sporadic registration happened. Some people registered their land, others did not.

Due to an absence of surveying standards and certification of surveyors in the past, surveyors used different surveying methods, sometimes even measured the land without the presence of the owner and rarely asked the neighbours to confirm the boundaries. As a result, much data in the national cadastre is incorrect.

Now, the Georgian government prioritized the completion of the initial registration – still applying a sporadic approach. The completion of the initial registration is, however, hampered due to the numerous land disputes that occur.

The most common land dispute in rural areas of Georgia is about parcel overlapping either between two private parties or between a private and a public party. Some of the land disputes are due to incorrect data in the cadastre since previously there were no standards for surveying, which sometimes led to low quality of data. Other land disputes are due to the fact that the boundaries have never been clearly established since the re-privatization of agricultural land. Still, other very widespread land disputes result from the fact that many farmers farm (slightly) more land than they have been granted during privatisation. The reason is that people only received the right to a clearly defined size of land, but the location of the land has never been defined, let alone its boundaries. Farmers shaped their fields according to the conditions on the ground, simply dividing all agricultural land among them and using existing and natural boundaries. As farmers have not been allowed to register more than the granted standard amount of hectares, plots on the ground are (slightly) bigger than the registered plots in the cadastre. This leads to real boundaries being inconsistent with registered ones and leaving many small unowned and seemingly unused pieces of land in the cadastre, which are actually used on the ground.

Therefore, the incomplete database of land cadastre and registration prevents the effecting functioning of land administration system and land market, creates problems in many aspects and shows us clearly the importance of a well-functioning SDI with efficient data sharing mechanisms has many benefits such as:

- Better planning of investments (access to information about restrictions and possible zones of conflict leads to better decision about investments having territorial effects, such as agriculture, tourism, mining, exploitation of natural resources etc.)
- Better management of facilities (having access to the location of cables and pipes of other utility companies leads to reduced number of accidents of cutting of such pipes and cables)
- Better emergency management (in case of accidents, information from different authorities is needed rapidly. For instance, in case of flooding, information is needed

about industries with dangerous material an information about hospitals and elderly care centers for evacuation of people.)

- Supporting cooperation among public agencies (by starting sharing data, other types of cooperation often emerges)
- Supporting the development of e-services to the citizens
- Avoidance of duplicate work within the public sector (data acquired at one agency can be reused by another agency instead of having to recollect data)
- Monitoring the implementation of policies, for instance the environmental policies of the European Union.

For many reasons, the SDI development in Georgia is at a very rudimentary level. This problem is recognized at the highest political level. Key problem areas for demonstrating the benefits of data sharing were identified.

a) Demonstrate the benefits of data sharing and a NSDI
b) Setting up the initial components of a NSDI, assuring the project results to be sustainable, including
    a. Organizational framework including roles and responsibilities for the full implementation and operation of NSDI
    b. Legal framework
    c. Technical framework
    d. Data sharing principles and data security management
    e. Initial business model and commercial vision
c) Identify current limitations in data (availability of data, data quality, usability of information etc.).

SUMMARY

From birth we acquire a perception of the time and space that surrounds us. Often, we do not even realize that we solve spatial problems and use spatial discussion as a means of orienting ourselves in the environment we are in every day. The question “where?” is one of the questions that we ask ourselves everyday in different situations. Where is the meeting? Where is the nearest hospital? Where is the store I need to visit? In such situations we give spatial marks to different events without realizing it. When emergencies such as a forest fire or a flooding occur, the actual presence or availability of spatial data in usable form is essential. Fire fighters, ambulances, civil defense, water and forest management services, local self-governments, environment institutions, utility and transportation operators and others all need this information. The public loss caused by frequent disasters and the difficulty of emergency

management have emphasized the importance of this data and the need to research the chosen field as well. Unfortunately, today there is no complete geospatial database or access to the required spatial data is often difficult, it is related to the lot of time and costs, so we do not effectively use them. Availability of proper access to geographic data is a precondition for healthy and sustainable public development. That is why Georgia has to follow the path of EU member states by creating and developing the infrastructure for national spatial information, in order to facilitate and improve the access to geographic data.

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BIOGRAPHICAL NOTES

My professional background covers more than 20 years of work experience. I have worked both for governmental agencies and international organizations. In recent years my major field was land administration related issues, however, my main duties included the coordination and monitoring of donor-funded projects, which were focused on creation of a well-developed land and property market in Georgia, providing the basis for the economic development, establishing a stronger democratic society with reduced poverty and equal rights, enhanced economic integration with the EU and development of market economy. Currently, I am a Program Expert of GIZ Programme ”Private Sector Development and Vocational Education and Training South Caucasus” and at the same time I am PhD student of Doctoral Program of Human Georgraphy, Faculty of Social and Political Sciences of Tbilisi State University. The topic of my thesis is the ”National Spatial Data Infrastructure as an Instrument for Disaster Risk Reduction and Management”.

CONTACTS

Ekaterina Meskhidze
Tbilisi State University
Social and Political Sciences
Human Geography
1 Ilia Chavchavadze street, 0179 Tbilisi, Georgia
Tel. +995 599 411 211
Email: emeskhidze@yahoo.com
www.tsu.ge