

# **Project Experiences with Land Management in Countries in Transition**

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**Key words:** Land Management Projects, Land Administration, Cadastre, Georgia, Bosnia and Herzegovina, Technical Assistance

## **SUMMARY**

The process of managing resources on land is described as Land Management. The main challenge in Land Management is to manage the use of land resources in a way balancing the interests between owners, municipalities, state institutions and the whole society.

All Land Management projects in transition and developing countries require an effective system of Land Administration (LA). This system is responsible for managing the information on land resources and hence for achieving an efficient Land Management (LM). Efficient LM requires reliable data to provide correct and complete records for administrative decisions. Therefore, the essential task consists in the provision of a functioning system with complete and up-to-date data.

Both in Georgia and in Bosnia–Herzegovina, Land Administration and Land Management projects of considerable size have been carried out with the assistance of international consultants. The experiences and lessons learnt shall be spelled out in this paper.

Georgia, a country in transition to a market economy, has privatised a considerable part of agricultural land, housing estates and apartments in the first years after independence. Unfortunately, a land register and cadastre were not developed and the results of the privatisation were poorly documented, hampering the economic development. Since 2000, the consortium composed by GFA Consulting Group GmbH and GCI (Dr. Schindler Geo Consult International) is assisting the national authorities in establishing a unified cadastre and registration system, which is mainly financed through a credit by the German Bank KfW (KfW Entwicklungsbank).

Bosnia and Herzegovina (BiH) is currently overcoming the consequences of the war and is in transition towards a functioning market economy. The main problem is the limitation of economic and social development caused by non-secured property rights and the lack of up-to-date and clear planning and administrative information. The main focus of the GTZ-financed project is the provision of services for citizens (who expect the clarification of their legal rights and security on land and property), for the municipalities (right of disposal over own land resources / properties, planning and administrative information) and for the private sector (in particular ensuring legal security for investments).

This article presents and comments the experiences with LA and LM projects in the above-mentioned countries. Conclusions for the work of international donor organizations in Land Management projects are drawn.

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## **1. INITIAL SITUATION FOR REORGANIZATION OF LAND MANAGEMENT IN COUNTRIES IN TRANSITION**

In the context of social changes after the collapse of the socialistic system a totally new situation arose for the concerned countries. No experiences in the transition from a centrally planned economy towards the aimed social market economy were available. All countries in transition (CIT) had to build up a new legal framework in order to facilitate and to support the market economy.

Only the former GDR was in a different situation due to adoption of the existing civil code while joining the FRG. Here, temporary laws were implemented for particularities during the transition period, like e.g. the law on appropriation of assets (of the former state owned real estates). Further, for a limited time state authorities for the execution of the transition were established, e.g. the German trust company for privatization of former state immovable property.

Other CIT did not have these framework conditions. In a fairly quick process, the former public property like enterprises, land and apartments were distributed, often under concepts dominated by social considerations and sometimes under the 'old' socialistic values. In this context often only vouchers were distributed to document the new property rights.

The results – especially regarding privatization of enterprises – are well known. As most of the beneficiaries were not able to estimate the value of the vouchers, they got hold by a limited number of persons, who soon became so-called oligarchs.

Regarding the land and real estates a different process occurred. First, the apartments were privatized to the occupants. Later, the land in rural areas was transferred to the users / possessors. Agricultural land, especially in the countries of the former Soviet Union, was transferred to the former users in form of vouchers, respecting social aspects but without forming the real estates and without assigning them to the particular "owner". In addition, in many countries the restitution of former owners was started, causing additional problems.

The new societies still suffer from the consequences of these precipitant privatizations causing severe problems to the individual owners and to the economy as a whole:

- Privatization of apartments without contractual agreements relating to common responsibility for the condominium leads to systematic decay of privatized apartment buildings
- The missing real allocation of agricultural land to the new owners often caused a concentration of the best land in very few large enterprises. There, manual work is no longer required and agricultural jobs get lost. On the other hand, the land given to the peasants is too small for purposes other than subsistence, causing the impoverishment of the rural population.

- Restitution without clear contractual agreements leads to stagnancy in use and maintenance of many immobile properties. The consequences are vacancy, decay and social regress.
- The state lost a big share of its patrimony through unreasonable privatization without financial compensation. However, the new group of landowners will sooner or later claim improvements of the transferred infrastructure, a justified claim that the state is not able to finance.
- To realize infrastructure measures (e.g. roads), the municipalities respectively the state are now obliged to buy land from or to pay compensations to owners who received their land free of charge only few years ago.
- The new land owners, who used their land during years or decades for free – although officially being state owned land – shall pay real estate taxes or royalties after privatization; a fact they often do not understand.

All these aspects have to be taken into account while establishing the tools of LA and while implementing cadastre and land register in CIT. Then it will be possible to fulfil the tasks of communal and state LM under the new conditions of a market economy and private property.

## **2. GEORGIA - DEVELOPMENT OF A COUNTRYWIDE REAL ESTATE CADASTRE**

### **2.1 Initial Situation**

In Georgia, during the first years after independency (1992/93) agricultural properties as well as apartments were privatized. Depending on their professional guild and place of residence the families received in between 0,25 and 1,25 hectares of land. The land parcels were often not connected, but split in four parcels at an average. The only evidence of this land was an inaccurate land use map. Merely some new owners got a kind of delivery protocol, none of them disposed of a legal proof of his property.

Furthermore, the results of the distribution of land were neither documented in a legal nor in a reproducible form. Consequently, no reliable land register existed in the late nineties, no proper administration and taxation of properties was possible, neither in rural nor in urban areas. Due to the lack of valid and legally recognized property documents private transaction activities like buying, mortgaging or leasehold of land could not develop, as the partners were not able to prove their transactions and respectively their ownership rights.

### **2.2 Project Goal and Target Group**

Goal of the project is the establishment of a countrywide computerized and multi-functional cadastre and land registry system in Georgia in a time period of approx. 6 years.

It is foreseen that the creation of a cadastre and land registry in Georgia will contribute to an essential improvement of the development potentialities of the private economy, as proven ownership rights on land are an important prerequisite for investments. The project will also facilitate the access to loans in the agricultural sector as well as for small and medium

enterprises. Additionally, an efficient multifunctional cadastre and land registry is an income source on communal and state level that is not to be underestimated. Thus, even the macroeconomic impacts of the project are very positive, leading to indirect benefits for the poor population in Georgia. The project sets the basic stage for an efficient use of productive potentials and contributes therefore to combat poverty and to improve the living conditions for the poor population.

The main target group of the project are the owners of more than 3 million parcels, living both in rural and in urban areas in Georgia.

### **2.3 Project Partner Organization**

Initially, the State Department for Land Management (SDLM), established in 1993, was the partner organization of the project. This department acted similarly to a Ministry and reported directly to the President. The main task of SDLM as sovereign administration was to establish and to operate a countrywide multifunctional cadastre and real estate registry.

The SDLM employed approx. 1.800 persons, thereof around 150 in Tbilisi and the rest assigned to nine regional offices, six municipal offices and 70 offices spread over the rayons (provinces).

Due to a governmental decision in 2003, the SDLM was dissolved and the National Agency of Public Registry was created. During this substantial change the internal structure of the Agency was remarkably tightened and the personnel was reduced by more than 50 %.

From the beginning, the concept of the project foresaw a relatively high grade of executive responsibility for the Consultant. As result of a tender the consortium of GFA Consulting Group GmbH and GCI – Dr. Schindler Geo Consult International GmbH was contracted for the project.

After establishing a project office and executing necessary training courses for local staff the consortium employed up to 30 local engineers and experts for the project. This team is responsible for all project activities, starting from the training of 400 experts in surveying, over the organization and awarding of field survey contracts (via tendering), the revision of given quality standards and last but not least for the delivery of the complete cadastre and registry data to the project partner organization and the training of its staff. Thereby, only three international Long Term Experts worked in situ, supported by several international Short Term Experts when necessary.

This concept was chosen due to the very weak capacities of the partner organization at the project starting time. Only with the high responsibility assigned to the consultant it was possible to achieve the desired high quality results of the project within the limited time frame. The consultant assumed liability for achieving the results at the given quality standards.

## 2.4 Project Measures

The basic concept of the project aimed at four targets, which all conducted to secure the ownership on land, to accelerate the establishment of a land market in Georgia and to provide reliable information for the tasks of the state and municipal land management:

- Training for required experts
- Registration of more than 3 million parcels and apartments in the economically active areas of Georgia (first registration)
- Build-up of the necessary infrastructure on state and private level for a well organized and customer-friendly actualization of the cadastre and registry (institutional framework)
- Integration of data from projects financed by other donors into the uniform database.

Besides these core tasks the project created a nationwide database on land quality (soil data), which can be interlinked with the cadastre and land registry data. This integral concept was the basis for creating a multifunctional cadastre and land register in Georgia.

### 2.4.1. Training

Although Georgia disposed of classically educated surveying engineers and technicians, their knowledge about modern IT and GPS technology was only rudimentary. Furthermore, the establishment of the real estate cadastre was a totally new challenge requiring additional specialists and totally new skills. Consequently, more than 400 selected specialists have been trained in modern IT and GPS technology and for the later maintenance of the cadastre and land register offices as sovereign state function.

### 2.4.2. First registration

To execute the first registration of more than three million parcels in the project region, the following preparatory measures were necessary:

- Production of aerial photographs for the whole project area (economically active regions - approx. 24.000 km<sup>2</sup>); processing to digital orthophotos.
- Consolidation of the untended geodetic state reference point system in rural areas with two to three horizontal fixed points per township. These points served in the further project implementation as reference points for the cadastre surveying with RTK-GPS.
- Procurement of the necessary equipment for 25 surveying squads as well as task-oriented training for the required staff.
- Formulation of technical instructions for surveying and data entry for continuous quality assurance.
- Development of a database software for acquisition and governing cadastre and land register data.
- General public awareness campaigns in order to inform the population about the necessity of a well functioning cadastre and land register and to announce planned operations.

The real first registration is mainly field survey and was executed in each case for an entire Sakrebulo (comparable to a municipality) in form of a intensive campaign with the following measures:

- Information of all concerned owners in each Sakrebulo about the planned surveying works, including collection and documentation of all abstracts of titles.



**Picture 1.** taking a photograph of the ownership title

- Surveying of ownership and land servitude boundaries and additional relevant parcel related data with 25 surveying squads. For this purpose so-called Digital Plane Tables were used (DPT, robust Pen PC controlled via visual display unit in combination with differential RTK-GPS receiver). This technology enables the surveyors to enter the boundaries with high precision, overlaying them with the stored orthophotos in the PenPC and saving the related information in a pre-structured database. The surveying works were performed on-site in order to adjust and to agree upon every boundary with the concerned adjacent owners (under presence of a representative of the state department), avoiding possible conflicts or at least immediately documenting them for later juridical clarification by the responsible authorities.



**Picture 2.** DPT-base station on a temporary fix point in the field office of the surveying squad



**Picture 3.** Surveying of a boundary under presence of the owners

- Printing of a preliminary cadastre map with corresponding register of owners and public layout in the Sakrebulo. Clarification or documentation of possible inquiries or appeals.
- Delivery of data to the respective first registration centre. There, project staff checked for compliance and for quality standards. Afterwards, the data from the local surveying companies were formally approved and migrated into the developed database and delivered to the National Cadastre Agency (NAPR). The NAPR checks again the data for completeness and quality and afterwards starts the implementation process and use in the Rayons.
- The result is a digital, complete, multifunctional and geo-referenced cadastre with the corresponding digital land register.

### 2.4.3. Institutional Framework

The establishing of a cadastre and land register system only makes sense when the data collected during the first registration will be used accordingly and up-dated permanently. For this reason the Rayon-, municipal and regional offices of the NAPR had to be equipped appropriately and the staff had to be trained. In detail the following activities were executed:

- Training and further education of personnel in the Rayon, regional and central level offices with regard to their specific tasks
- Procurement of equipment for offices
- Support to NAPR in developing an adequate administrative structure
- Support to NAPR in creating the legislative framework for a financially semi-autonomous Agency and for an adequate remuneration of its personnel
- Support in developing an adequate quality management system
- Collaboration in developing the necessary technical regulations for cadastral survey and maintenance
- Assistance in establishing a professional association of state and private experts for cadastre and land registry

## 2.5 Economic Efficiency

Economic efficiency is a crucial factor for LM projects in Countries in Transition. In these countries tax revenues were reduced to a minimum after the collapse of the former planning economy, lacking specially of funds for new sovereign tasks like the establishment of a real estate cadastre. For this reason adapted methodologies for data acquisition, data processing and data management have to be applied. Therefore some specific requirements have to be abandoned (like redundancy measurements), which are indispensable in the systems of the developed European countries due to considerably higher land values.

In Georgia, the cost for each first registration summed up to approx. 7 EUR per unit. The overhead costs for the technical assistance are already included in this sum. With this cost it was able to create a countrywide reference system, which serves as the basis for various applications of state and communal LM.

## 3. BOSNIA AND HERZEGOWINA – SYSTEMATIC RENEWAL OF THE LAND ADMINISTRATION

### 3.1 Current Situation

BiH has made tremendous progress in post-conflict reconstruction, social integration and state building since the end of the 1992-95 war. However, the after-war transition period is not yet finished. Although there is a large majority in favour of fast access of BiH to EU membership, nationalism is still present and corresponding political parties are resisting to necessary reforms. After 10 years of application of the Dayton Peace Agreement, which put an end to the war, the constitutional system remains complicated, impeaching progress and efficiency in the reform process to market economy and generating too high costs in

multiplying the number of administrative authorities, including the responsible administrations for cadastre and land register.

Economic growth is highly dependant on the ability to occupy and use real estate for production, residence and as security for investment capital. In fully developed economies it has been estimated that between 50 and 80% of GDP is generated through the ability to utilize real estate in this way. It is therefore imperative that a secure and publicly accepted means of cadastre, registering and protecting property rights and transactions is in place. In BiH the taxes imposed during the communist period discouraged people from registering changes in ownership and even where the Land Books (LB) were maintained they are not up-to-date. Systems for securing property rights have been in disarray since World War II when many records and documents relating to property were destroyed. The situation became worse in the last war when more records were lost and people were displaced. So the legal records often no longer match the occupation. That makes it difficult for anyone wishing to be involved in the real property market or to borrow money based on property as collateral. An informal property market has developed in many places.

### **3.2 Project Objectives and Impact**

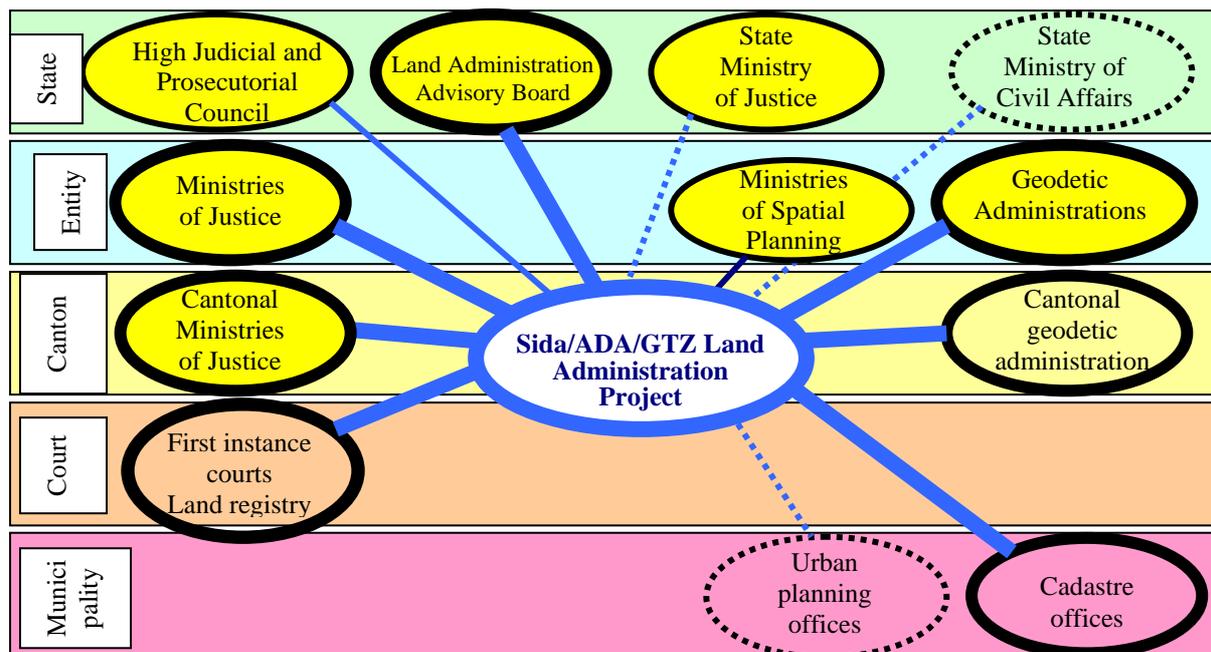
The overall objective of the project is to “Support the implementation of effective and efficient land administration in BiH, in contributing to establish appropriate legal, institutional, technical and operational framework conditions”. The expected main outcome of the project is that LA services will be widely used by the public as well as by the private sector for any land transaction and that land information provided by cadastre and land registry will be used to a wide extend for land use planning, urban planning and public administration.

The following impacts are to be expected:

- Essential improvement of ownership security for the citizens
- Improvement of mortgage lending facilities
- Facilitation of spatial planning for municipalities and infrastructural development
- More efficient execution of administrative procedures (e.g. building permits)
- Systematic and fair collection of land taxes
- Improved clarification, administration and rationing of communal properties
- Overall economic strengthening on state and communal level
- Sustainable use of land resources
- Improvement of efficiency of related LA authorities

### **3.3 Project Partners and Organization**

Capacity building and local ownership are key issues for the sustainability of LA developments. Hence all project activities involve the public institutions at all levels (state, entity, canton and municipality) as well as the private sector, as shown in the following picture.



The project supports the Land Administration Advisory Board established in early 2006 in developing strategy and policy in land administration, institutional and legal development, cadastre development, cooperation cadastre – land registry and cadastre – urban planning. The board is also used as coordination and advisory board of the different projects of the international community in LA issues (WB, EC, GTZ, USAID, etc.). The advisory function of the newly established and co-financed Sida/ADA/GTZ Land Administration project is also reflected in the fact that it is responsible for the further TA of the new WB land registry project, starting in autumn 2006. This will be crucial for achieving the aforementioned results of the projects in the LA sector.

The large panel of activities requires a specific internal project organization with the following permanent team units:

- **Economic unit:** development of service standards and business-plans, administrative and operational support to the WB PIUs, collection and processing of statistics
- **Cadastre unit:** development and implementation of law and by-laws, capacity building and training of specialists in both the public and the private sector, implementation of pilot projects within municipalities, development of data model and standards
- **Legal unit:** analysis of legal situation, development of proposals for adaptation or creation of laws or by-laws, training seminars and organization of state exams for land registry clerks
- **Administrative and PR unit:** management of the project's human and material resources, public awareness campaign and PR, development and maintenance of the web-site
- **Land registry help desk:** development of the manual of best practice, development and maintenance of the Land registry Software (LARIS), on-the-job training, hotline.

Additionally, the project is contracting local regional and international short-term experts for the support in specific matters, e.g.:

- Development of business-plans
- Translation services
- Software development and maintenance
- Cadastre data conversion and transfer
- Drafting cadastre by-laws and technical prescriptions
- Development of the cadastre data model

### **3.4 Project Activities**

The project is executed since 03/2006 as LA project to strengthen the whole sector as continuation of the former GTZ – cadastre project (since 2001) and the former GTZ – Land Registry project (since 1999). The first phase of the cadastre project was dedicated to prepare local staff in three pilot municipalities for their respective tasks. 27 local specialists have been trained in scanning, vectorising, field survey with modern equipment (e.g. RTK-GPS) and data processing. Additionally, the needs for modernising the legal, organizational and technical framework and modern LA were identified. By the end of 2002 the new law and land registry was introduced, changing the responsibilities for cadastre and land registry essentially. Since then the cadastre offices are no longer responsible for the land registry data.

Hence, the second phase of the cadastre project as well as the actual LA project concentrate on defining the new role of cadastre and land registry authorities, developing and implementing:

#### **3.4.1 Legal Framework**

- Drafting new modern cadastre laws in close cooperation with both entities
- Supporting the adoption of the law, creating an understanding for the legal and economical necessity
- Developing by-laws on public licensed surveyors (PLS), their qualification and additional required regulations (e.g. use of RTK-GPS for cadastre surveys).

The most important new contents of these regulations are the institution of PLS in the cadastre field. It is obvious in BiH and many other countries that the private sector has to be strengthened in order to improve the performance of the cadastre fieldwork and to accelerate the cadastre actualisation in close cooperation with the Geodetic Administrations.

#### **3.4.2 Institutional Framework**

The rational assignment of tasks to concerned institutions and coordination of activities is an essential part of the success for assuring ownership. Thus, the institutional development is supported through the following measures:

- Establishing of an inter-Entity LA Advisory Board

- Defining the leading role of Geodetic Administrations as provider of the geo-reference of the Land Information System and the basic geo-data
- Defining the task-sharing between Entities and municipal/cantonal governments
- Promotion and support the establishment of a professional association and chamber for PLS
- Supporting the existing and to be established Geodetic Administrations on regional (RS) / cantonal (FBiH) level (infrastructure, human resources, equipment)
- Supporting the state institutions for cadastre/geodesy/topography to define their role in LA

### 3.4.3 Methodologies and Procedures

- Transfer of developed procedures to pilot municipalities
- Developing and testing data exchange between land registry and cadastre, workflow, data actualisation and maintenance
- Establishing a modern integrated LIS and supporting the spatial data infrastructure
- Support to WB-project on systematic and countrywide covering cadastre and land registry
- Developing and testing common working procedures for cadastre and land registry and harmonising and interlinking both databases

## 4 EXPERIENCES AND CONCLUSIONS

The following conclusions and lessons learnt are mainly based upon the two projects described above (Georgia and Bosnia and Herzegovina). Furthermore, our accumulated experiences arising from the implementation of multiple land administration and land management projects in more than 10 countries in the last decade contributed to these findings:

- a) Large scale projects for the creation of registration and cadastre systems (often implemented via loan projects) should be prepared and accompanied using instruments of the technical co-operation. Especially the definition and development of an appropriate legal framework and the capacity building of the governmental and the private sector shall be mentioned in this context. As conditions differ from country to country, the appropriate technology and the legal aspects, as well as the administrative workflow should be tested first in smaller scale pilot projects.
- b) In Georgia, the prerequisites were partly created since 1994 with the assistance of the GTZ (German Development Cooperation), before the KfW co-financed countrywide project started in 1999. In spite of this preparation it should be mentioned that especially the legal framework was not sufficiently prepared, which hampered the project activities
- c) Even if preparations have been carried out through technical assistance (TA), large scale projects should still be accompanied by technical assistance measures during their operations. This is often neglected, so that despite the high costs the results do not meet the expectations.

In Bosnia and Herzegovina (BiH) the collaboration between TA and bank project is exemplary. From 2006 onwards the World Bank will support the systematic

renewal of cadastre and land book with a first credit. It was agreed that during the duration of the World Bank project the GTZ further supports the development of the respective general framework.

d) It is extremely important to consider the requirements for the future maintenance and update of cadastre and register already in the first project phase. Without a permanent update of the data the information in the register will lose their value over time and cannot be used according to their purpose. Although this point seems to be obvious, unfortunately it is (too) often neglected.

e) The local administration must first become familiar with and gain experience of working with a land management system in order to formulate its own requirements. Many details of the system are too abstract to be fully understood in theory. This relates not only to technical matters but also to issues concerning legal basis, workflow, quality and security. Therefore, the system – although eventually still not complete – should be put into practice. In this context a permanent communication with the local partners is indispensable, which will also lead to a gain of knowledge for both sides.

f) Highly qualified and motivated staff is rare and will always turn to better paid jobs in the private sector. If the local administration is not able to generate income for the maintenance of the system and for good salaries for qualified staff by providing services to their citizens, tasks will have to be outsourced or completely privatized in order to assure a properly functioning system.

For example, within the scope of the further development of the legislation in BiH, the institution of the chartered surveyors was initiated. There, cadastre-surveying works are delegated to private surveying engineers. Consequently, the advantages of the private entrepreneurship can be connected with the effective supervision by the cadastre authorities, speeding up the process of cadastre renewal.

In Georgia, the main programming tasks for the development of the software application for the cadastral database were given to a local private company like the surveying activities for primary registration. Through the creation of the NAPR (National Agency of the Public Registry), in a form of a public agency, it became possible to create semi-autonomous income possibilities.

g) It is a great advantage – if not indispensable – that the team leader of large-scale projects has strong management qualities. It can be accepted that the team leader is not necessarily a technical expert in Land Management. The missing knowledge can be compensated through additional short-term and long-term experts who dispose of the expertise and experiences needed. The lack of necessary management skills is more critical.

They are indispensables for tasks like human resources management within a team of experts of different cultural, professional and linguistic background, communication with the local project executing organization, communication with projects of other donors, management of procurements, execution of tenders, financial issues like fund management, supervision and integration of external short term experts, reporting of activities, etc.

h) It is reasonable to include the know-how and expertise of a consulting company for the project management and monitoring of activities. The consulting company will be bound by contract and will report to the local project-executing organization and to the

financing institution. Independently contracted external auditors for technical and financial matters may control the consultant.

The described organization of the management of the project has been very well proved in Georgia. The contracted consortium GFA/GCI could engage local experts and pay acceptable salaries, which at that time was impossible for the local project partner. Thus, local experts could be trained and deployed purposefully. These experts will take their knowledge and experience after the end of the project to the private sector or to the public administration, contributing significantly to the sustainability of the project. Even during and after the “rose revolution” in 2004 all project operations could be accomplished without major delays thanks to the organization of the project.

i) Mechanisms for effective and efficient donor coordination must be assured before starting operations at large scale. Strategies, methodologies and procedures, including accuracy and quality standards, must be agreed upon. In most cases the coordination will and cannot be organized by the local authorities and the international side should assume this responsibility.

In case of various donor organizations being involved in one country for the creation of a unified system, a rather technical division of tasks should be preferred instead of a regional division. Thus it can be avoided that different methodologies, technologies and standards are applied like the quality standards mentioned above. Furthermore, it is recommended that one of the involved donor organizations – in co-operation with the local project-executing organization – takes the leading role concerning the coordination of the activities.

In BiH such a co-operation was established in a brilliant way. SIDA and ADA agreed upon a co-financing of the LA-project with the GTZ. Thus a common strategy can be realised with joined funds.

In Georgia the situation was different. Several donors had executed different smaller projects, using different quality standards (e.g. accuracy), and data structure. Therefore, the data was not compatible and could not be fed into one common system. Only with an extension of the KfW co-financed project all data were integrated into a common database and can now be used.

j) The donor organizations should pay attention that the consulting service contracts are not split into too many small lots. Unfortunately, complex consulting tasks are often split into single contracts of only a few weeks and without clear links between them. Then it may easily occur that experts with different backgrounds and methods (e.g. central European or Anglo Saxon) will contribute with their knowledge and experiences subsequently to the project. Not only that valuable time will be lost, the Client will be confused by possibly contradictory advices. It can therefore be recommended that complex consulting tasks should be given to competent consulting companies in one single lot. Through a professional steering and management of the project and the planning of missions of the respective qualified experts the above-mentioned problems can be overcome. The potential risk of higher costs can easily be compensated by the more efficient project implementation.

## **BIOGRAPHICAL NOTES**

### **Dr. Gernod Schindler**

Academic experience:

Dipl.-Ing. in Geodesy, University of Geodesy and Cartography, Moscow, 1982

Ph.D. in Geodesy, University of Geodesy and Cartography, Moscow, 1990

Current position: Public licensed surveyor in Saxony, Germany

Founder and CEO of the GCI – Dr. Schindler Geo Consult International GmbH

Practical experiences: Cadastral surveying in Saxony with about 20 employees since 1993;

International expert in Land administration and GIS matters since 1996

International experience as a short time expert / project manager in: Georgia, Bosnia and Herzegovina, Ukraine, Russia, China, Romania, Montenegro, Mongolia and Slovakia

Activities in professional relations:

Member of the German Society for Surveying and Geoinformation (DVW),

Congress director of the INTERGEO 2007 in Leipzig,

Member of the Association of the Public licensed surveyors in Germany (BDVI)

### **Jasper Lauert**

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BSc in Agriculture at the University of Applied Sciences, Kiel – Germany, 1984

MSc in Agricultural Economics at the University of London – United Kingdom, 1995

Current position:

Director Maghreb and Middle East, GFA Consulting Group GmbH, Hamburg, Germany

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## Ronald Schmieder

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Dipl.-Ing. in Geodesy, University of Hanover, Germany 1996

Graduated assessor of surveying and real estate system, Lower Saxony, Germany 1998

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