Productive agriculture with GPS and databases

Land reform and privatisation are seen as a vital basis for economic growth in both the transition countries and some developing countries. As the example of Georgia shows, however, reforms which initially seemed to be so positive may for many reasons actually obstruct economic development. Information and Communications Technology (ICT) can be of enormous help in ensuring that land reforms are successful.

During the course of privatisation in Georgia in 1992/93, the ownership of housing and land was transferred to residents, and state-owned companies were sold. Depending on personal situation, each household received between 0.25 and 1.25 hectares of land free of charge. When the wave of privatisation was complete, Georgians owned over three million parcels of land in the built-up areas of cities and villages and also in heavily-utilised agricultural areas. On average each inhabitant owned four fragmented plots sometimes several kilometres apart.

A lack of statutory provisions, shortcomings in the way privatisation was carried out and, importantly, the lack of a land registry or cadastral system led to a situation where the new owners were unable to trade their land. The consequences were far-reaching:

- The flaws in the privatisation process restricted the development of a private property market. The legal uncertainty meant that property could neither be used as collateral nor sold.
- Efforts to develop a modern and efficient agriculture were hugely frustrated. Legal uncertainty also made it impossible to reallocate and consolidate the agricultural land holdings. Moreover, there was a lack of information on soil quality as a further prerequisite of a fair reallocation of the land.
- This situation also negatively impacted on state finances and public planning. As information on the exact size and position of the land parcels was as uncertain as the legal situation, many people paid no taxes. Public planning for specific land uses (e.g. industrial estates) was therefore virtually impossible.
- An inefficient agriculture led to the increased overexploitation and destruction of Georgia's natural resources. Under the prevailing conditions, it was not feasible to effectively protect these resources (e.g. from deforestation and erosion).

Photo: Koblo

Digital plan tables and a solar receiver operating on site.

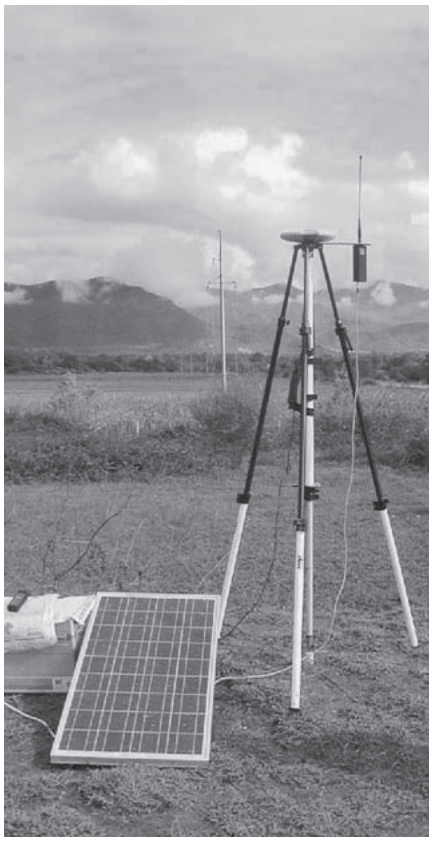

Photo: Koblo

ICT central to the solution

With the support of German financial co-operation, an up-to-date cadastral system and land register have been set up in order to resolve these obstacles to development. A multifunctional spatial database is an important technical element of this system. The geo-data it contains was taken from aerial photographs of 30,000 square kilometres of urban commercial and rural land. Digital plane tables (DPT) were used to assemble the data. These are purpose-built laptops which allow data points to be carried over and inserted into the aerial photos to produce digital ortho-

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Zusammenfassung

In den Ländern der ehemaligen Sowjetunion, aber auch in einigen Entwicklungsländern werden Landreformen und Privatisierung als Heilmittel und Grundlage für wirtschaftliches Wachstum gesehen. Das vorgestellte Beispiel aus Georgien zeigt, dass diese zunächst positiv erscheinenden Reformen der Privatisierung aus verschiedenen Gründen die Wirtschaftsentwicklung sogar blockieren können. Um Landreformen doch noch zum Erfolg zu führen, können IK-Technologien einen wichtigen Beitrag leisten.

Resumen

En las antiguas repúblicas soviéticas, al igual que en algunos países en desarrollo, las reformas agrarias y las privatizaciones son vistas como remedio universal y fundamento para un crecimiento económico. El ejemplo presentado de Georgia muestra que las reformas de la privatización – aparentemente positivas en un inicio – pueden llegar incluso a bloquear el desarrollo económico por distintos motivos. A fin de llevar las reformas agrarias finalmente hacia un resultado exitoso, las tecnologías de información y comunicación (TIC) pueden prestar un aporte importante.

photographs. The co-ordinates were provided by GPS receivers drawing their signals from a web of 24 satellites circling the Earth at an altitude of about 20,000 kilometres. To reduce the normal tolerance of several metres to the required 15 centimetres, a highly accurate georeferencing system was constructed temporarily. Apart from the exact parcel boundaries, the co-ordinates of utility providers (water, power supply cables and roads) were also entered into prestructured databases.

The database is a multifunctional tool designed to operate at different levels. A database was set up per rayon (district), each of which is maintained decentrally, in both the local administrative offices and the head office of the organisation executing the project. Alterations to any of the 42 rayons in the project must be authorised by the head office. The information contained in the database system can be used to officially register land ownership and issue the relevant documents.

While the technical infrastructure was being expanded, a system of institutional and regulatory conditions was also established. The Georgian government was advised to formulate appropriate laws and provisions to ensure that the legal rights of the owners were protected.

The next logical step was to extend the database by including information on soil quality. Such information is vital if agricultural land is to be reallocated and consolidated to form the basis of sustainable land-use planning and management.

Apart from a new survey of 5,000 square kilometres of environmentally-sensitive land bordering on forested areas, old data on soil quality from the Soviet era was edited, updated and assimilated in the database. The database has thus been expanded to function as a soil atlas.

The details on soil quality are crucial for land exchange purposes – in high demand, especially among small farmers – and the planned reallocation and consolidation of agricultural land holdings. At-risk areas can now be more easily identified and designated as protected zones, and monitored accordingly.

Conclusion

Modern ICT technologies allow cost-effective geo-data capture and administration. Land surveys can be carried out much faster and more affordably with GPS receivers than by traditional methods. The spatial database allows a very efficient land title registration. Both private investors and public land-use planning benefit from this fast and comprehensive source of information.