

Developing an Automated Cadastral Information System in Egypt

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Key words: cadastre, GIS, land registration, certificate of title, security of tenure

SUMMARY

The Egyptian Cadastral Information Management Project (ECIM), working since March 2002, is funded by the Ministry for Foreign Affairs of Finland, to support the computerisation of the cadastral system in Egypt. The project owner is the Egyptian Survey Authority (ESA), but the Real Estate Publicity Department (REPD), in the Ministry of Justice, is also concerned, because they are responsible for the juridical land registry.

The project's pilot area was Damanhour district in Beheira province, a rural area approximately 160 km north of Cairo and 60 km south of Alexandria. The initial system was only concerned with rural lands, which are included in the Title Registration System. The approach adopted was to build a unified cadastral database and to convert and migrate there all existing analogue and digital data, both map data and the corresponding attributes. The GIS chosen (Oracle, ArcSDE, ArcCadastre, and MapObjects) was customised to include automated procedures to continuously update these data. Computerising the day-to-day cadastral work of ESA was seen the most secure way of keeping the database up to date. Simultaneously the selected approach will streamline the previously varying work procedures, as the system will guide ESA staff thorough the workflows. This has been seen important, as good governance is a significant sub-goal of the project.

Considerable time was spent in analysing the current manual updating system, which was made more difficult because of the lack of an agreed practice manual. Egypt also still runs two land registration systems in parallel, namely the old Deeds Registration System in urban areas, and still about 20% of rural areas, and the new Title Registration System, that has been built by systematic adjudication since 1976, and currently covers approximately 80% of rural areas. The fact that two fundamentally different systems are run in parallel in same offices and by same staff has made it confusing for the involved persons to distinguish between the procedures.

It was also found out that the results of the systematic land adjudication, run since 1976, were not nearly as expected, i.e. the adjudication didn't succeed in establishing the reality into the legal registers. Informal ownership thus dominates.

Despite of the challenges ECIM has made significant progress in developing a computerised cadastral information management system in the Egyptian Survey Authority.

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1. PROJECT ENVIRONMENT AND PURPOSE

Egypt's area is 997 739 km², but only about 5%, Nile valley and delta, and some newly reclaimed areas in the desert, is inhabited and cultivated. The population being about 72 million leads to a very high population density, about 1 440 inhabitants per sq.km, in these areas. Thus all land is used intensively and the value of land is considerably high. The number of land parcels is estimated to be 15-20 million, and the average area of a parcel for agricultural use is less than half a hectare.

The project owner, Egyptian General Survey Authority (ESA) is a nationwide organisation under the Ministry of Water Resources and Irrigation. It is responsible for measuring and describing of all land parcels for land registration. Registration takes place in the land registry offices under the Real Estate Publicity Department (REPD) within the Ministry of Justice and in co-operation with local offices of ESA. Real estate tax collection is the responsibility of the Real Estate Taxation Department (RETD) under the Ministry of Finance.

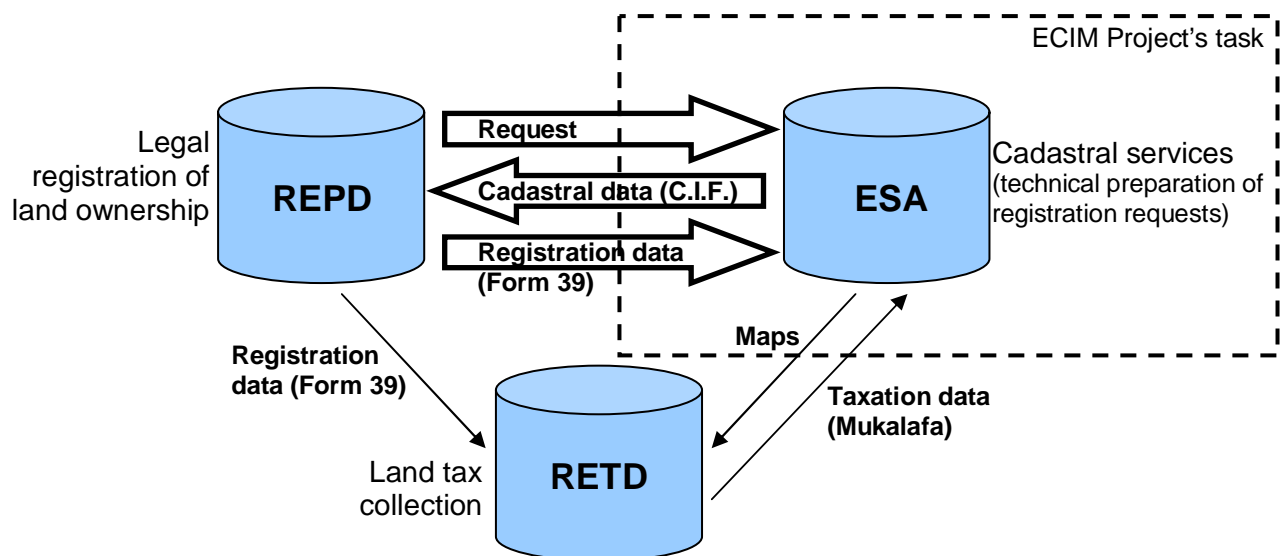


Figure 1 ECIM Project develops a computerised system for cadastral work, data storage and updating. The system consists of ESA's data and workflows, and the information exchange links between ESA and land registration and land taxation.

The three-year project started in March 2002. Project builds a pilot system in one province that can, if successful, be applied nationwide. The project's pilot area, Damanhour district in Beheira province, is a rural area approximately 160 km north of Cairo and 60 km south of Alexandria. The project's purpose is improvement of land information system for cadastral services and its links to land registration and land taxation. This in turn, aims at better

security in land ownership and transaction and a more sustainable management of the nation's land resources, and eventually at reducing poverty.

As proved in a number of countries around the world, an efficient and fully used formal real property system containing information of all properties is a cornerstone for the society to be able to make use of the wealth and values, which are hidden in real properties. One of the most well-known promoters of formal, registered real property ownership is the economist Hernando De Soto from Peru, who argues that the poor in developing countries own more assets than is generally believed. But this capital is "dead" because its ownership cannot be readily traced, validated, and exchanged legally. As a result, the poor cannot use their assets in efficient and legally secured market transactions, like securing a bank loan or guaranteeing the payment of water, electricity, or other infrastructure services. De Soto asserts that a formalization process would benefit both the poor and society at large (De Soto, 1997). Also Rabley and Falk state: "Securitisation of commercial interests in land mobilises funding and further develops and strengthens capital market formation. Therefore, the wealth multiplier effect of good governance and sound land administration is potentially enormous." (Rabley, Falk, 2004)

The ECIM Project has faced an enormous challenge in analysing the current analogue system, its conditions, data and workflows, varying from office to office and continuously changing. The work processes in land registration were much more complex and unclear, and the relationship between ESA and REPD much worse than what was expected in the beginning of the Project in 2002. Far more analysis than was initially expected was needed to understand the existing procedures. This has been mandatory however, to be able to build and introduce a computerised cadastral information and management system. ECIM Project has worked hard to consolidate ESA's internal instructions and legislation governing cadastral procedures. The project has highlighted a number of problems with the existing systems, which have to be dealt with by ESA and the other stakeholders in order to make a successful computerisation.

1.1 Legal framework

It was also a challenge to understand the law affecting title registration and the implementation of that law. It has only been at the end of 2004 that the relationship between law and practice has become to be fully understood. This includes understanding the fact that REPD and ESA still continue working with Deeds registration law and procedures in spite of that they should be following Title registration law.

The laws affecting title have now been identified and it is now understood that the title system is not always following the appropriate laws. It appears that this is due to a failure to explain the fundamental difference between deed and title systems when the title system was introduced.

The original 1946 (no. 114) law was for a Deed system and this system still continues to operate in the urban areas. In 1964 (law no. 142) a Title law was introduced, but it was not started to be implemented until 1976. When it was implemented it appears that there was no awareness programme for those operating the system. Because of the lack of awareness of the difference between Deed and Title systems the Title system has been operated using

procedures that apply to Deeds. The result is that both REPD and, to a lesser extent, ESA have not been following the law. For example, REPD receives and approves requests of subdividing land parcels, and forwards them to ESA's technical processing, without ensuring that the applicant has the right to apply for such a procedure (i.e. is the owner). This happens despite the fact that the Title registration law clearly states that only requests by rightful applicants (legal owners or claimants of rights) should be allowed (Myles, 2004). The consequences of possible failing to guarantee the land to the registered title holder could have resulted in Government being forced to pay compensation to the rightful owners of land, had their interests been affected by not following the correct procedures.

Deeds registration system is a process of registration of the transaction document itself and serves as evidence of this specific agreement only. It is not a proof of the legal right of the transacting parties to enter into the agreement.¹ The Deeds registration system is being replaced, since 1976, by a Title registration system. The transfer process (systematic land adjudication, "Sigueal El Ainee") has so far been done to approximately 80% of the rural areas of Egypt. Title registration is a process of registering transactions regarding a real property in a way that the registration itself gives full proof and legal value of the transaction against third party. The result of the registration is the Certificate of Title, which is a document containing the registered object and all registered rights in it.² It seems that the procedures still applied in REPD require time consuming searches of the seller's right to sell to a "good root of title" (Rabley, Falk, 2004), and this search is done only after ESA performs the field work and submits the so called Cadastral Information Form (CIF) to REPD. This is a correct way to work in the Deeds system. But in a Title registration system, the Title registry, and only the Title registry, should be the evidence that approves or disapproves a person's right to sell. And the registry should be investigated before accepting any requests on actions on land, simply because the state guarantees the correctness of the registry, and is liable for it. Should there be something wrong with the state guaranteed register, the claimant should file a court claim against the state.

2. THE TECHNICAL SOLUTION: UNIFIED CADASTRAL DATABASE AND AUTOMATED UPDATING PROCEDURES

One of the main outputs of ECIM Project is the Unified Cadastral Database (UCD), which combines the map data with the attributes, and which is designed to cater for the end user needs: continuous and automatic updating through day-to-day cadastral work, senior management monitoring, and printing out of different map outputs, reports and statistics.

The unified cadastral database, being converted from analogue to digital (and from numerous existing digital environments of different quality) as a part of the project, will be updated by automated workflows of all cadastral activities. ArcCadastre, developed by ESRI, Leica Geosystems and Lantmäteriet, the National Landsurvey of Sweden, was selected in thorough tendering process to form the software platform of the new system together with Oracle 9i database, ArcSDE and customised applications made by Visual Basic, using MapObjects.

¹ UN Ad Hoc Group of Experts on Cadastral Surveying and Mapping, 1973

² UN Ad Hoc Group of Experts on Cadastral Surveying and Mapping, 1973

Automating the cadastral work step by step has been seen as a best way to ensure that the database is up to date all the time. Also this is the way to streamline the currently varying cadastral procedures, when in the future the system guides users through work. ESA management also wanted to have the possibility to monitor the work and to produce different statistics of the number, type, handling time etc. of the requests.

Due to the current level of communication infrastructure in Egypt, de-centralized system architecture was chosen. Each EDO, ESA District office (totally 180 of them in Egypt) will have spatial and attributes data from its jurisdiction in a database in Oracle 9i Personal Edition. The server containing the UCD in Oracle 9i Standard Edition, will be placed in the EPO, ESA Province office (26 in Egypt), and will contain the data of all the districts under it. During each night, there will be automatic data synchronisation done between Province and District databases by exchanging database updates via dial-up modem connection.

All map updating is under responsibility of the Province, and it'll be done by customised ArcCadastre software. District office performs its tasks using customised light GIS application with map viewing and printing, but not spatial updating facilities.

ECIM Project is computerising ESA's cadastral work procedures and information. A computerised system requires defined inputs and outputs, establishment of which need co-operation and an agreement between ESA and REPD in the three main information exchange interfaces between them (see also Figure 1):

- Standardised information content of Request (REPD to ESA)
- Standardised information content of CIF, the Cadastral Information Form (ESA to REPD)
- Standardised information content and continuous supply of registration information, Form 39 (REPD to ESA)

Standardisation of these information exchange interfaces is however important not only for a computerised system, but to an efficient and successful running of analogue activities as well.

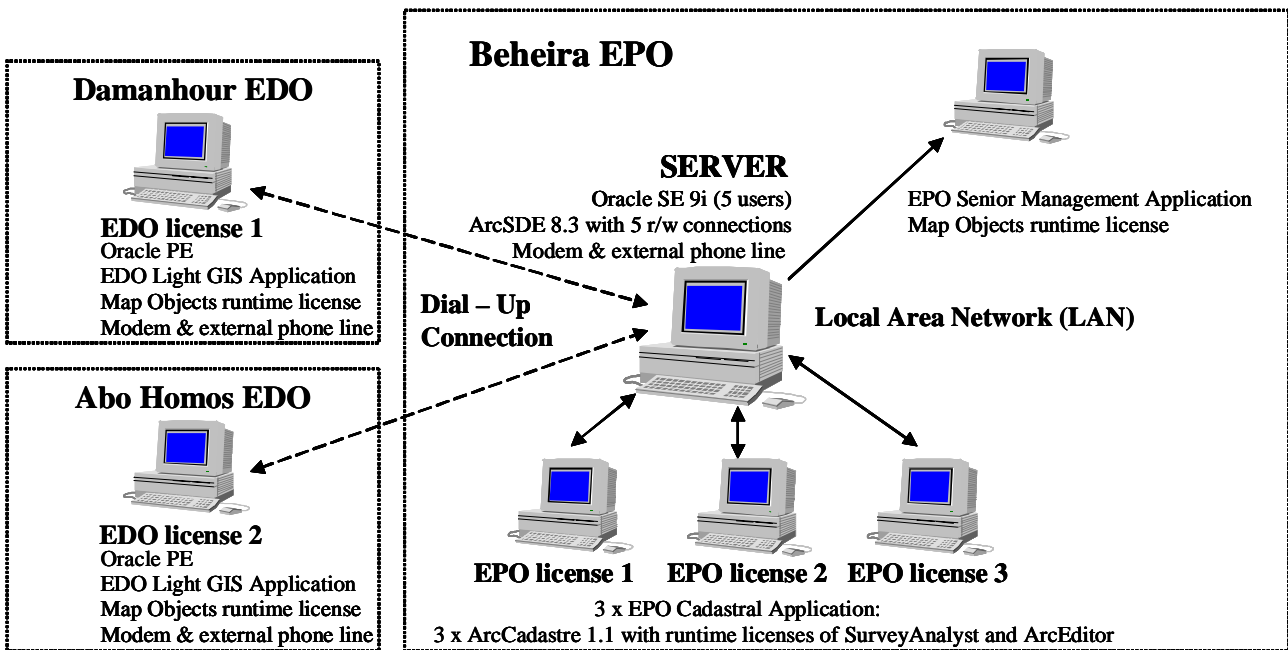


Figure 2 The pilot project consists of Beheira province office, and Damanhour and Abo Homos district offices. Damanhour district contains 52 villages, all of which are converted and migrated to the pilot database. From Abo Homos district only two villages are taken into the pilot, just to see that the architecture solution chosen will work.

2.1 Data – cornerstone of the system

In ECIM pilot area, ESA had cadastral data in different formats. Cadastral maps of the villages in Damanhour district that were not covered by the so called “Modern Cadastre” have been established during an American development co-operation project in the beginning of 1990s. These maps were stored, and have to some extent been updated also, in AutoCAD. The corresponding text registers were kept in a DOS-based Paradox database and not updated at all. Text registers thus didn’t match with the graphical information. The maps and text registers for the remaining villages were analogue and can date back to 1924, when the “Modern Cadastre” was started to be established in Damanhour. These maps were used in the systematic registration (“Siguel El Ainee”) that converted Deeds into Titles, and are after that kept up-to-date by drawing on the maps the new boundaries and parcel numbers, by pencil as long as the request is unregistered, and by ink, after REPD has informed ESA that the transaction has been registered.

As the quality of the cadastral data kept by ESA has not been taken complete care of for a long time, because of various reasons, one of them the lack of continuous registration information from REPD; it has been and still is a huge task for ECIM to remedy this situation. Both existing digital data and the analogue data being converted have been subject

to a thorough procedure to bring it up-to-date with the registered information. The main source has then been the Title certificates at REPD, which the project has got access to.

3. REGISTERED AND NON-REGISTERED LAND OWNERSHIP – FORMAL AND INFORMAL SECTORS

Unfortunately only a minority of the real property ownerships belong to the formal, registered system, and are thus included in the legal registers of REPD and ESA.

In the formal system, real a property right (e.g. ownership, mortgage) as well as the object of the right (e.g. an agriculture land parcel, a flat) are secured through a registration process. With informal real property system is meant a system containing also the real property rights, which are not registered in the formal system. The informal system is very common in Egypt and is also used as a base for several activities managed by the public sector, such as agricultural services and land expropriation compensation. Several studies, e.g. by Hernando De Soto, reveal that in Egypt the informal system dominates. De Soto presents surprisingly large numbers: “92 percent of real estate and land in the urban sector and 87 percent in the rural sector in Egypt are informal – over 70 percent of which belong to the poor. This is equivalent to some US\$240 billion of dead capital, suggesting that a process of formalisation would do much to eradicate poverty and strengthen support of economic reforms.” (De Soto, 1997) A common estimation is that 90% of the real properties exist in the informal system and only 10% in the formal system³.

Even though the Title registration covers 100% of the areas it has been implemented on (by now about 80% of the rural areas of Egypt), i.e. every square meter of land belongs to a registered parcel in REPD’s register and ESA’s maps, the information in the Titles is often not matching with the situation on the ground. REPD’s and ESA’s information is thus legally correct, but the land ownership and division, as perceived by the public, are largely different from the legally correct registers and maps.

The impact of the Project on tenure security was found to be somewhat limited, when a baseline study compared registered title to occupancy and de facto ownership (or strictly speaking perceived ownership). Two villages from Damanhour district were randomly selected. In one village only 24% of the people who were in occupation and claiming ownership were registered. In the other village only 2% of de facto owners were registered! Although the original Project Document, 2000, the basis for ECIM Project’s work, had suggested that informal land ownership was rather common, it was not suspected that there would be such a huge discrepancy between de facto and registered ownership. The results are even more dramatic when it is noted that the 2% village was subject to systematic registration as late as in 1997 (ECIM, 2004).

The findings suggest that where systematic registration took place, rather than following the standard approach used in other countries, where title has been introduced, Egypt basically converted existing Deeds, some of them dating back to the beginning of the 20th century, to Titles. This despite the fact that at the time of systematic registration the land was already

³ El Akhbar newspaper, 1st October 2003

occupied and owned (informally) by others and that many of the owners of the original Deeds were probably long dead.

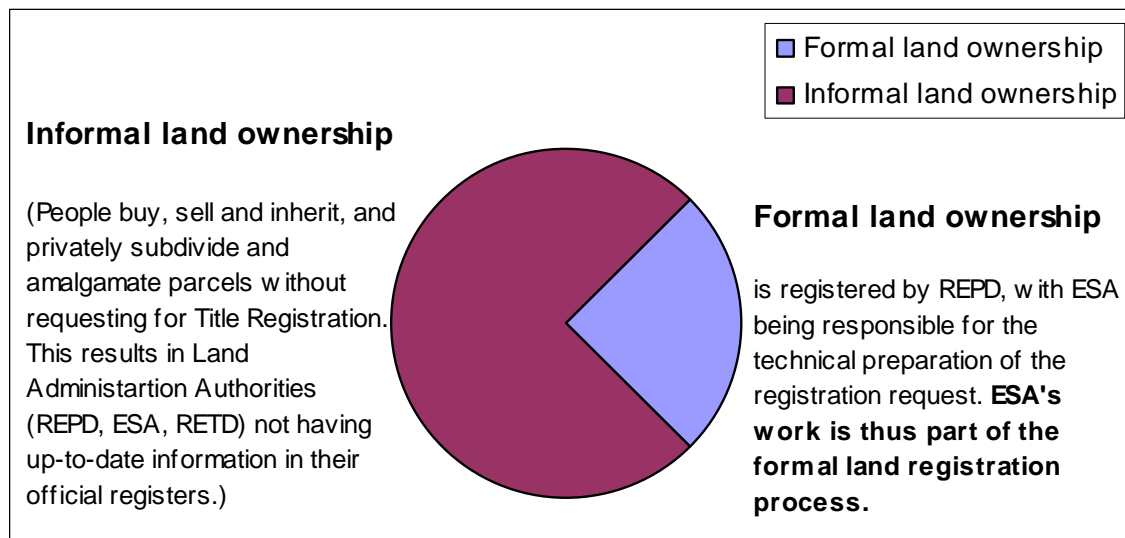


Figure 3 ECIM Project's main task is to computerise ESA's cadastral work (this includes designing and populating the unified cadastral database, and to computerise the procedures to keep it up-to-date), and to assure that the information exchange links between ESA and REPD will work properly. This is part of the registration process of the Formal land ownerships, i.e. minority of all land ownerships (ECIM 2004).

In the light of the findings described above, one could claim that no matter how successfully implemented, the system built in ECIM will enhance the tenure security of the registered, formal land owners only – who represent a minority of total. It could be claimed that the tenure security in Egypt would probably be increased more by reducing the unofficial ownership and establishing this 80-90% of ownerships into the formal system, and getting the formal system to be used by every public authority, rather than by computerising the procedures and data inside ESA, which deal with the registered 10-20% of lands only. Anyhow, the project aims at *contributing* to increased tenure security, by working with ESA's part of the registration process (which is the technical preparation part or cadastral part) and the links between ESA and REPD.

4. FUTURE BENEFITS FROM ECIM SYSTEM

ESA is responsible for identifying and describing the real estate and its geometry and location in the registration process for both in Deeds and in Title registration systems, both in rural and in urban areas. ESA is thus the very source of all cadastral information, which is absolutely vital for land registration and taxation. In general, information on real estate units: The Cadastre and The Land Register, are often seen as one vital component of the Base Registers, which form the core for any Information Society (Kokkonen, Vahala, 2002).

After the development done in ECIM Project, ESA will be able to provide all the information needed by the other land administration authorities, and the society in general, faster, more

efficiently, more correctly and as clear print-outs (or digitally, if the other authorities computerise their systems) from the computerised system.

It can thus be stated that at minimum ECIM will greatly enhance ESA's part of the land registration process. ESA's work will be automated and thus faster. ESA management can monitor the work, and thus recognise any delays in handling the requests. The computerised system will guide users through the work and thus minimise the possibility of any malpractice. Search of information will be very fast and efficient from the database. Modern GIS will give possibility to produce print-outs, maps, forms, reports and statistics easily, accurately and fast.

With ECIM computerised system in practice, ESA can provide REPD the CIF faster than before, with correct information, and as a clear print-out from the system. If REPD will computerise its procedures, ESA can also start providing CIF digitally.

Computerisation is however not the only aim of ECIM Project. An important goal is to enhance ESA's internal instructions, and the co-operation and the information flow between ESA and REPD, in order to rationalise the work and make it more efficient – regardless of whether the work is done in an analogue or in a digital environment. The ultimate purpose is to enhance tenure security and facilitate land transactions.

If ECIM manages to make at least ESA's part of the procedures easier to follow and more streamlined, it could also attract more owners to register, since complicated procedures are seen as a major obstacle in registering lands today.

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