TRNC Cadastral Renewal and Automation Project

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Keywords: Cadastre, Renewal, Automation

SUMMARY

The ownership structure in TRNC dates back to the Ottoman Empire which dominated the island between the years 1570-1878. Cyprus came under British rule in 1878.
The land classification of the entire island and the first ownership determination maps for tax purposes were worked out in the said period by using such methods as simple triangulation, chain, plane table. The ownership registration system began to be created in the said period as well.

Only blueprint copies of the said maps are available, most of which being unusable.
There are no measurements, bench marks and coordinate values. Therefore, available map sections are considered as graphic sheets.
Since these sheets are the only source at hand, however, cadastral, municipal, urban planning, expropriation and similar studies are being carried out on the basis of these sheets. Therefore, boundary violations have taken place.
Land Registration is currently being executed under inappropriate conditions. Although a register of property owner is kept, it is not possible to have access to owner information in a sound manner.
With a view to remedying said deficiencies, Protocols were signed from 1998 onwards between the relevant Ministries of TRNC and Turkey, spelling out the principles of working «geared towards renewal».

Under a contract awarded by the General Directorate of Land Registry & Cadastre of Turkey at the beginning of 2013, works have commenced, covering up to 25 % of the project, envisaging renewal of 125 thousand parcels in the form of three packages.
Duration of the project is 1 year, and estimated cost of the project is approximately USD 5 million.

The first stage of the works covering 61 villages has been completed and related announcement has been posted. Related works will be completed in 5 months, and the cadastral maps newly prepared in metric system, digital and certified outputs thereof and the books of real estate registers will be prepared and delivered.

Furthermore, CORS-TR system surface network covering TRNC has been created, ensuring conversion from the British Imperial System into universal metric system.

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1. SYSTEM HISTORY AND PRESENT SITUATION

The roots of property structure in TRNC are based on mainly Ottoman Empire which dominated the Island between1570-1878. In 1878, Cyprus was dominated by British with an agreement.
The land classification of the whole island and first property mapping with the aim of tax were done with methods such as simple triangulation, chain, plan table etc. in this period. Property registration system was also started to be established in this period.
The cadastre of Cyprus was done between 1904 and 1960‘s by British, using various stages, different methods and accuracy. The system was established according to the British Measurement Units (1 inch=2.54 cm)
Only the blueprint copies of these maps are available and most of them are deformed and torn. Measurement, calculation, benchmark and coordinate values are not available. Because of this current layouts are considered as graphic layouts.
Still because of being the only source available; cadastre, municipality works, city planning, expropriation etc. works are tried to be carried out by these layouts.
There has been boundaries problem because of allocation of land and plots given to the holder of rights according to property of equal value without a precise application.
Land register is still carried out in improper conditions. While property owners registry is recorded, the information about owners cannot be reached healthfully.
Because “Surname Law” was accepted in 1983‘s. Before this, for men; father name, for women; first fathers name, then (after marriage) husbands name were used. Sometimes property belonging to same person was registered on different pages in owners registry.
After cadastre, land registry was done according to the requests of the owners. Because most of the land registry are not available for old Greek Cypriot villages, there are still plots without land registration.

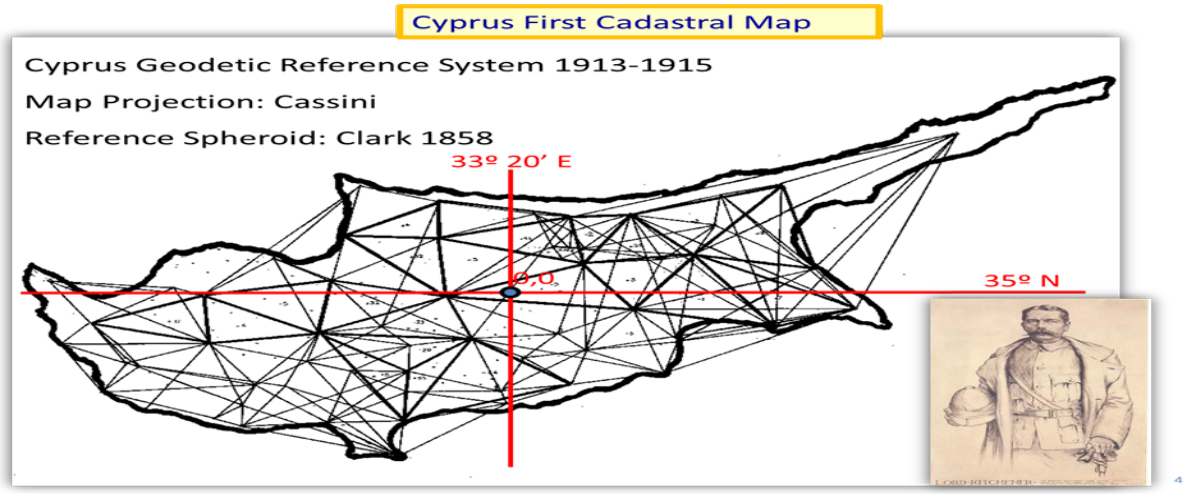

Figure 1.1: First network plan in Cyprus (Dr. Elia, E)

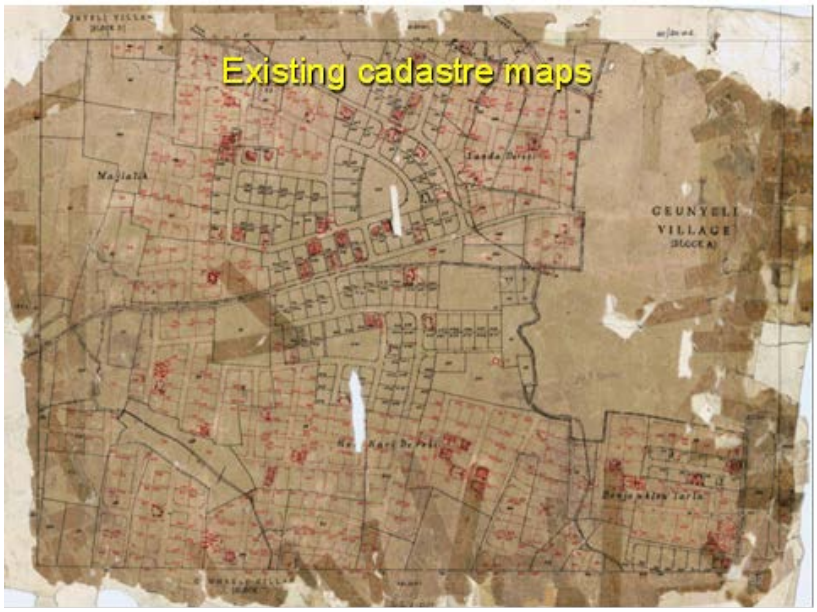

Figure 1.2: Existing map sample

2. OLD CADASTRE MAPS and PRODUCTION TECHNOLOGY

Before starting the work, determination of the situation of the layout and registry which will be renewed is important. Because there is necessity for protection of the information and rights deserved according to that information and regaining the information according to the new and modern technology.

Because of this, renewal work requires knowledge and experience. Holder of the rights informed about the subject and understanding the nature of the work carried out, necessity to work together, protection of current legal rights, announcement, if so objection, jurisdiction processes are the main operations of this work.

Even though old maps and registrations are accepted as the only legal basis, it is important to understand the precisions, needs, methods and production technology in the times they were produced.

There are many sources of error in the production of these maps. While doing the renewal work, it is necessary to know these sources of error well and do the evaluation according to the conditions which these maps were created in and what kind of errors might have been done.

Figure 2.1: Some of the basic tools and Plain table used in the first cadaster (Dr. Elia, E)

Some structural error sources of measure method and technology used

Random errors and errors that can be calculated in distance measures
Tape standard distance error, Slope, Stretch and slouch, Temperature, Deviation from direction (deviation from alignment), forgotten measure (tape length counting error), Zeroing (in the beginning of tape), Product length obstacle, Reading and writing errors Personal and other rough mistakes.

Before starting the renovation, it is very important for the continuation of work to learn about the production technology and quality of existing maps. In Surveying "margin of error" is defined as the measure of quality is a known fact that the most important information about that map. Therefore, training is given primarily to the renovation team on this map and possible sources of error.

3. CADASTRE AND PROPERTY RIGHT IN TURKEY

The understanding in TRNC is similar to the system in Turkey. Current legal arrangement is based on the past however new arrangements are considered with an understanding rooted from the system in Turkey. In this respect, if we look at the system in Turkey;
There is a system that's source is the Constitution and Civil code.
The foundation of the system is based on the ""**STATE GUARANTEE**" basic.
"Article 719 (previously 645) of civil code;"
"The boundaries of the immovable is determined by land register plans and boundary signs on land. If the land register plans and signs on land do not match each other, boundaries in the plan are valid."
In Turkey, state is unexceptionably responsible for the regulation of the land register.
If the immovable owners and the right holders are damaged because of a change in the land register plans without their allowance or court decision, this damage will be recovered by the state. "
The main difference between the systems is: In Turkey there is a cadastre concept and legal structure based on the central Europe system. There is a structure which is called "Fix Boundary" and it used with accurate measurements then bound to the cadastre map. In TRNC, there is the concept of "general boundary" which is based on the traditional British system.
While renewing the infrastructure with Cadastre Renewal Project on one hand, establishing a new system based on the one in Turkey in accordance with EU is aimed on the other hand.

Why and when the renewal is necessary?
If one or more of the following causes exist in the current cadastre maps, "Cadastre Renewal" is inevitable:

- Insufficient because of technical reason
- Losing the characteristic of being applicable
- Deficiency detection
- Not showing the real ground boundaries

May be like Limitation (usage), Measurement Map, Drawing Map, Calculation error, surface area error,
Ground usage might have been changed, in such cases, within the aim of cadastre renewal, some correction process is done legally.

3.1 Boundary Definitions in Renewal

Fixed boundary: The uncontentious boundary which exist in the ground and has not been changed since the cadastre.
Valid boundary: Boundary which is created according to the cadastre technical documents and in case of not finding any error in the amendment process measurements.
Valid like boundary: The boundary created by the owners and other related people without any conflict.
Indefinite boundary: Boundary which does not exist on the ground and is created according to the balancing areas of the parcel and plan.

Contentious boundary: Boundary which even exist on the ground but is a subject to conflict between the parties.
Changeable boundary: Boundary which exist on the ground and is adjacent to the places owned and controlled by State (like forest areas, ownerless land, sea sides, e.tc.).
Technicians are obliged to see these boundaries, to interpret and to measure accurately on the field. In these practices the most important thing is the boundary definitions. They are determined by village headman, local experts and property owners after detailed surveys on the ground. It must be done by very careful and well educated technical personnel.

3.2 Renewal Works and Obtained Results in TRNC:

Between related ministries from TR and TRNC, there were protocols signed between 1998 and 2008 aimed at the "Renewal activities". In these protocols there are the signatures of related Ministers from both countries.
As projected in the protocols, the renewal of TRNC's cadastral maps and carry over the land registers to automation practices were started in 1998 firstly by governmental personnel assigned from Turkey. However, in 11 years 21 thousand plots could be renewed.

To speed up the process, in the beginning of 2013, with a tender bid done by TKGM, in 1 year duration as 3 packages, 125 thousand plots were envisioned to be renewed.
Project Duration was 1 year and project cost is approximately 2.5 million USD
.
In TRNC in 246 villages, approximately 600 thousand plots and 1.5 million land registers are estimated. The tender bid preparations are going on for the rest.

4. SET-OUT STUDIES:

After a tender bid done by TKGM, contractor firm was determined and site delivery was done. In the first stage, the studies were started by the contractor by renting a hotel as a worksite. After that, a hotel (Kent hotel) was bought with the payment which is the 1/2 of the project cost. The hotel was restored and worksite building was formed.

Except this, computer system, drawing system and other hardware and software that the stuff of the contractor and TKGM need were provided.

Studies were carried out by;
TKGM; 1 general coordinator, 1 coordinator, 3 engineers and 25 technicians
TKMD; Consultative Committee (TRNC Land Register Managers, Coordinator, Engineers and Legists)
CONTRACTOR; 15 engineers, 60 technical personnel (35 technical personnel are TRNC citizens), 35 GPS and electronic measurement devices, 20 off-road vehicles)
Because it is a necessity to set the boundaries together in the villages and neighborhoods by firstly property owners and also village headmen (Muhtar) and local experts, at the outset there were informative announcements about the nature of the work before it starts.

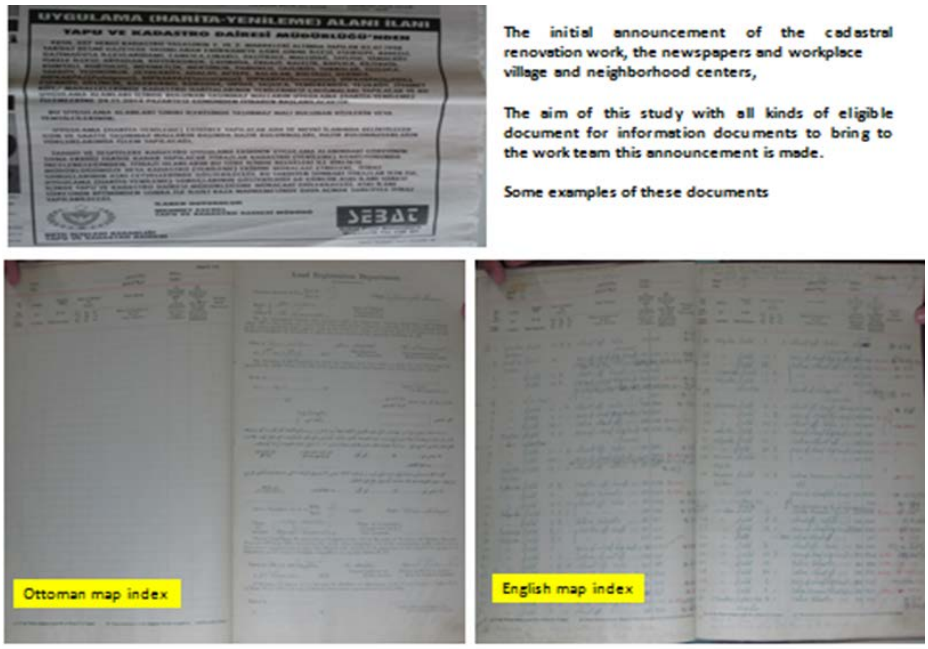

Figure 4.1: Map Index samples

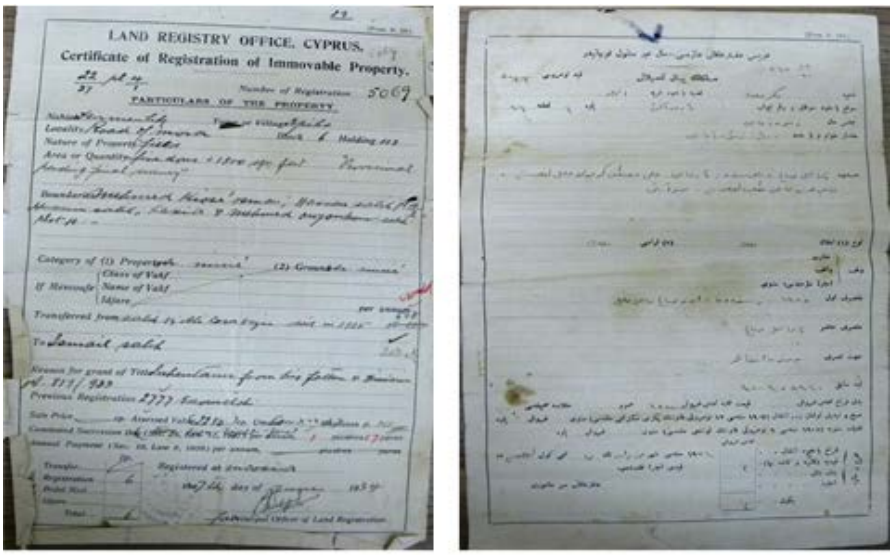

Figure 4.2: First land registry sample in Cyprus

When low attendance was observed, project was introduced to public and media to increase the awareness. İn addition, there were briefings given to the Municipalities, Legislators and related Ministry Representatives by honorable President and Prime Minister of TRNC aiming the project to be well understood and accepted by public

5. TECHNICAL WORKS:

5.1 Surface Network Formation Works:

Not only has the content of the tender bit but also the whole TRNC's surface network been formed in accordance with the system in Turkey.

Figure 5.1: GNSS survey on a pillar in TRNC

5.2. GNSS and Levelling Network (Surface Network) Statistics

It covers the whole TRNC. 4 CORS (GPS Stations which do continuous measurements) are available. Based on these, totally 105 ground control points were installed.
37 C2 (SGA)-pillar,
68 C3 (ASN)-Ground stones were installed.
TRNC Densification Network Accuracy:
Determining the spatial coordinates *1.55 cm*
2.08 cm accuracy in height determination (10, 6 cm in Turkey)
Within the borders of TRNC, at all hours of the day and night, the height and the coordinates will be able to be determined instantly in seconds.
It is open to all Public and Private sector users

Preparatory Studies Done:

Figure 5.2: Network plan sketch

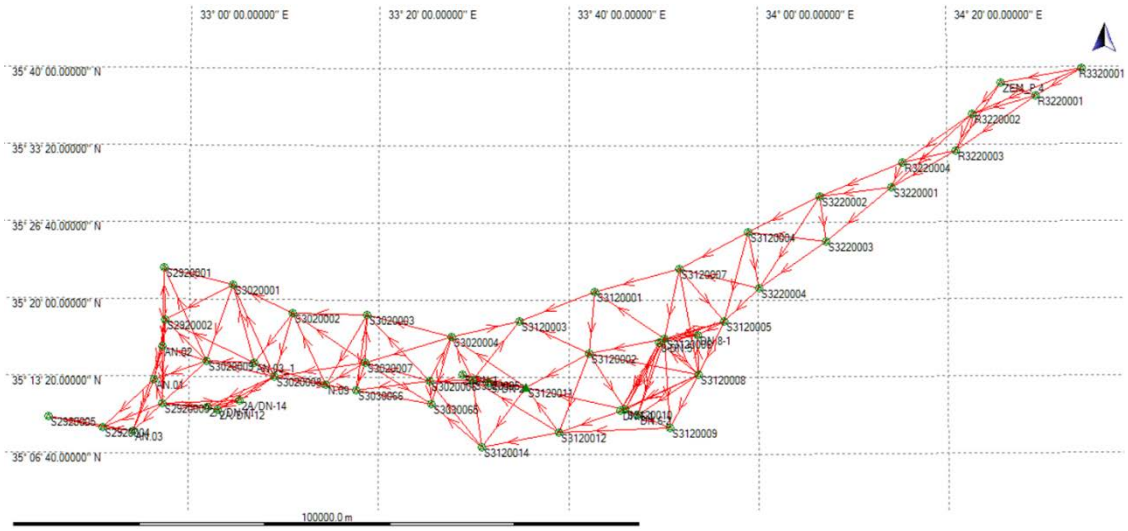

Figure 5.3: Network plan sketch

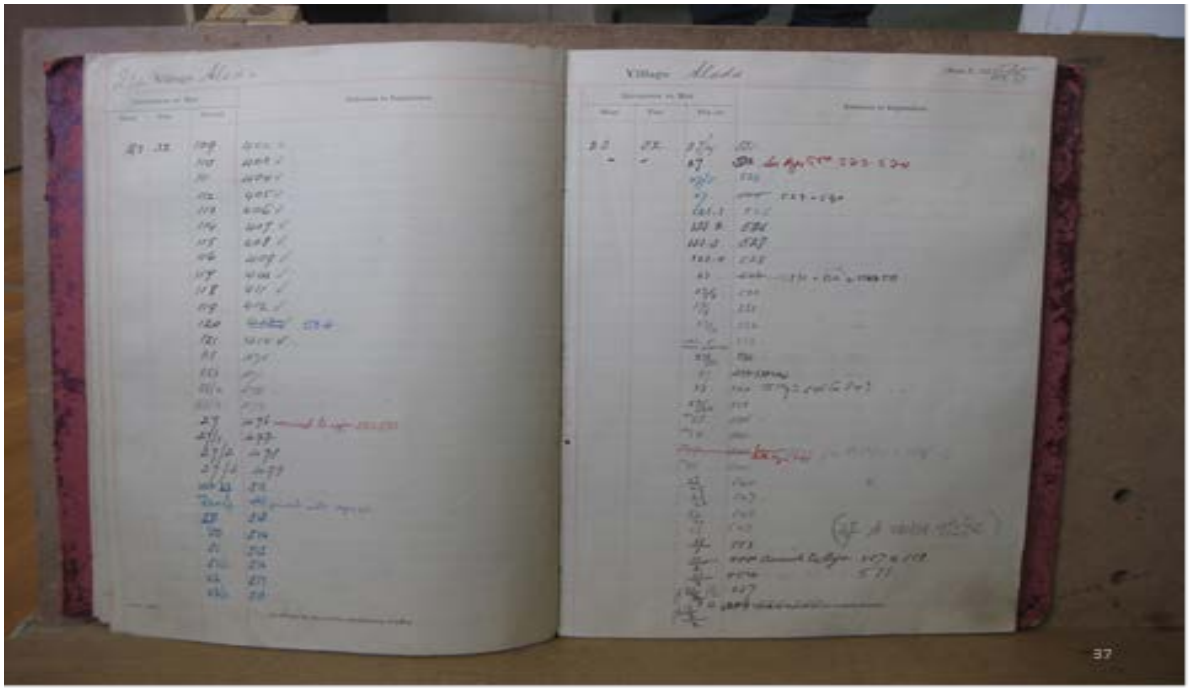

Figure 5.4: Map ındex sample

Automation studies which were started aiming to be archive were used in renewal. These studies consist of taking the photos of registers, indexing in computer environment and later inputting data by using the screen and some registers.

Koçan No	Pafta No	Harita No	Ada/Blok	Parsel No	Koçan Tipi	Ana Koçan Don	Ana Koçan Evle	Ana Koçan Ava	Dönüm	Evleyak	Kar	Metre Kar	Mal Katagorisi	Koçan Engel	
2	VII	8		2	ZEMİN KOÇANI				15	1			TARLA		(1/1)AHMET GÜZARI
3	VII	8		3	ZEMİN KOÇANI				2	1			TARLA		(1/1)KKTC (ANAYASANIN 159. MADDESİ UYARINCA)
4	VII	8		4	ZEMİN KOÇANI				7	3			TARLA		(1/1)KKTC (ANAYASANIN 159. MADDESİ UYARINCA)
6	VII	8		6	ZEMİN KOÇANI				2	3			TARLA		(1/1)GÜLÜMSER KORMAN
10	VII	8		8	ZEMİN KOÇANI				24	2			TARLA		(1/2)SEDA ÇAKMAK, (1/2)SİMLA TULGAR DANA
12	VII	8		9	ZEMİN KOÇANI				7	3			TARLA		(1/1)FİGEN TAŞ
15	VII	8		12	ZEMİN KOÇANI				4	3			TARLA		(1/1)HÜSEYİN ÖZTÜRK
16	VII	8		13	ZEMİN KOÇANI					2	2800		HALİ ARAZİ		(1/1)HALİ ARAZİ
18	VII	8		15	ZEMİN KOÇANI				5	3			TARLA		(1/1)TURAN KUMSAL
19	VII	8		16	ZEMİN KOÇANI				4	1			TARLA		(1/1)TURAN KUMSAL
20	VII	8		17	ZEMİN KOÇANI				3	3			TARLA		(1/1)EMİN MEHMET ŞENKAN
21	VII	8		18	ZEMİN KOÇANI				3	2			TARLA		(29871/36750)EMİN MEHMET ŞENKAN, (6879/36750)SAFİYE ŞENKAN

Figure 5.6: Land registry data sample for process

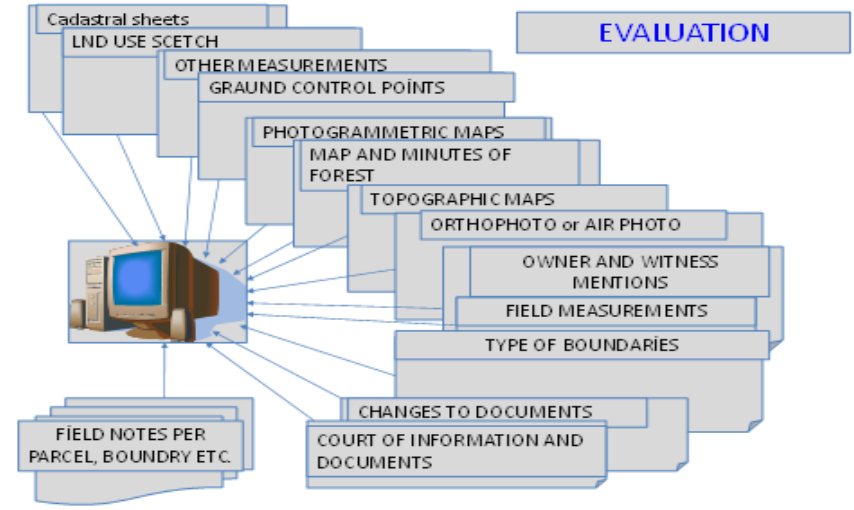

Figure 5.7: Evaluation and process diagram

Figure 5.8: ITRF96 TM33 produced new cadastre map sample

6. THE RESULTS WHICH WILL BE OBTAINED WITH THE COMPLETION of THE PROJECT

Project has the characteristics of property transformation in TRNC.
The cadastre layouts and property registrations which was formed by British measurement system is becoming available in metric system, updated, digitalized and legally valid to be able to be the base for the investments related to land.
Operations such as urbanization, development, expropriation, consolidation, urban transformation will be much more economical, effective and less time consuming.
Property cases will decrease substantially.
Renewal work will also help the development of related regulations in TRNC at the same time.
The low interest and attendance of the citizens to the land work was observed.
Because the one year duration for such a comprehensive project is very short, while trying to finish the work as soon as possible on one hand, it is aimed to inform and increase the attendance of the public and headmen, members and citizens of the related units on the other hand.
With the aim of taking the legal decisions to increase the attention and attendance of the citizens to the project, communication has been carried out with the local administrations.

7. CONCLUSION

For both countries completing the project which is carried out with labor-intense characteristics within the anticipated duration is important in the meaning of prestige.
Especially the number, quality, desire to work and efficiency of the engineers and technicians assigned by TKDM and TKGM and the continuity of the Core Project group is first priority matter.
The first three-four months period in the project could not be as efficient as intended because of the process of adaptation to TRNC and working environment.
But related to the process afterwards, parallel to the assignments, a work plan and daily observation program which covers the project duration were prepared by TKDM, project coordinator, engineers and technicians.
Sticking to the schedule rigorously was followed.
The studies were also supported by our Embassy and it is important to take precautions for provision of allowance in time and possible troubles which may happen about payments.
It is endeavored to have a harmony in the practices with informative activities, meetings, the need for the study apart from the daily working hours and ending the studies by TRNC regulations and attendance and approval of the legally assigned personnel.
Also to avoid changeover, the latest version of the licensed software that the studies are conducted were installed in three cadastre computers and trainings were given.

RESULT	TOTAL
NUMBER OF TENDER PARCEL	124910
NUMBER OF OLD MAPS	1471
OLD NOTE BOOKS	434
OLD RECORD	577
NUMBER OF NEW PARCEL	129962
NEW GROUND CONTROL POINTS	105
NUMBER OF MEASUREMENT POINTS	8681
NUMBER OF NEW MAPS (2000/1000)	686/521
NUMBER OF NEW LAND REG. NOTEBOOKS	1337
NUMBER OF NEW BUILDING UNIT BOOKS	94

2nd, 3rd, 4th, group scope of renovation work affected 177 800 parcel owners.
Commissions examined whole appeals have been concluded.

7.1 Some Structural Problems Encountered:

There were reproduced layouts after 1960 but most of them are not available.
Several copies of layouts have been used and this creates confusion and information pollution.
After the control, 18 thousand plot's measures were calculated again because measure quality, polygon measure, calculation and benchmarks were found to be insufficient.
By 27.02.2014, in all of the 61 villages, New Land Registers, Maps and numerical values were formed in the computer environment and delivered to TKDM. However, automation software is not capable of supplying this data.
Approximately 15 thousand plot measures were redone officially. (Because of the after hang objections etc. which were unanticipated in the contract)

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Ordnance Survey documents England from web side

Turkey and TRNC Land Registry and Cadastre legislation

Tender specifications and documents.

BIOGRAPHICAL NOTES

Nihat Şahin, Surveying Engineer, was born in the year 1955, 1978 KTU graduate, began in 1978 as an Surveying engineer TKGM, 1988 Netherlands ITC Land Information Systems diploma after training, In 1997 TKGM was Executive Vice President until 2011 on, TKGM in Information Systems and Automation, completion of the Cadastre, was the Chairman of the many projects Cadastre Modernization Project and the like. TKGM conducted the World Bank and International relations. Currently, the Ministry of Environment and Urban Planning serves as a consultant.

Baransel İZMİRLİ was born in 1987. He graduated from Geodesy and Photogrammetry Engineering Department of Ondokuz Mayıs University in 2010, Turkey
He worked on fiber optic infrastructure for a company in 2010 after this period he has started to work for Sebat Project and he has worked as Geodesy and Photogrammetry lead engineer in Nabucco, Iran-Turkey-Europe and Trans Anatolia Gas Pipeline Projects between 2010-2013 Currently he is leading “Turkish Republic of North Cyprus Cadastre Renewal and Automation Project” on behalf of Sebat Project (Construction Company)
Baransel is also member of Chamber of Surveying Engineers in Turkey

Sinan ÇOLAKOĞLU was born in 1969. He graduated from Geodesy and Photogrammetry Engineering Department KTU, Turkey. Currently He has worked as expert engineer for OMU between 1998-2000 after that he is working as surveying engineer for General Directorate of Land Registry and Cadastre Turkey. Currently he is leading and managing “Turkish Republic of North Cyprus Cadastre Renewal and Automation Project” on behalf of Ministry of Environment and Urbanization

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