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HISTORY OF THE CADASTRE IN TUNISIA

Submitted by the Government of Tunisia

1. The origins of the cadastre

The origins of the cadastre in Tunisia go back to the Roman occupation. The vestiges of a Roman cadastral system were first brought to light through examination of plans and topographical maps established from ground surveys; from this examination, it was possible to determine the characteristics of both the orientation of the lines and the dimensions of the grid.

With the first use of aerial photographs, numerous Roman centuriations were discovered in the course of archaeological research and work on the revision of the 1:50,000 map.

2. Cadastral systems

In 1924, the Topographical Service was instructed to establish a dimensioned plan of an area of 25,000 hectares for irrigation.

In order to determine the rights of ownership of the occupants of the numerous parcels to be irrigated, it was decided by the order of 25/3/24 to conduct a trial cadastral survey of the region.

Following this trial, the cadastral survey was extended to cover larger areas and it has since been observed that these surveys were inadequate since no provision had been made for registration and since the joint tribunal acted only after applications for registration had been made.

A new procedure was introduced by the order of 10/7/47 which instituted the cadastral survey of 28,000 hectare area. The essential characteristics of this procedure are as follows:

- Judicial inquiry covering the whole of this area;
- On-the-spot hearing;
- Establishment of a large-scale plan using simplified topographical procedures;

- Institution of two types of property title:
 - (a) "Blue" titles issued following an application for registration and after presentation of documentary proof of ownership;
 - (b) Titles of possession issued for the remainder of the parcels.

The cadastral survey of this area was followed by similar surveys of the lower Mcdjerdah Valley, Sfax, Nefza, Zaghouan, Sousse and Cap-Bon.

See graph A

Following the promulgation of the order of 20/2/64, compulsory and free registration was instituted with a view to carrying out a property check of the entire area to be surveyed.

An order of priority has been provided governing the choice of the regions to be surveyed with each region corresponding to the territory of a governorate, which is itself divided first into districts and then into sectors.

In short, then, three types of cadastral survey have been implemented:

- (1) Without registration and without any action by the joint tribunal (1924-1941);
- (2) optional registration (1948-1959);
- (3) free, compulsory registration (1964 to the present day).

See graph B

We shall consider this last type of cadastre in detail. In accordance with the order of 20/2/64, cadastral operations were begun on 20/4/64 in the Governorate of Nabeul and on 9/11/67 in the Governorate of Sousse.

These operations were closed in June 1968 in the former and are still continuing in the latter governorate.

3. Essential characteristics

A cadastral commission consisting of a magistrate and a technician marks out the boundaries of each parcel with wooden pegs.

The magistrate directs the investigation to compile the legal dossier for each parcel.

The technician establishes the outline of the parcel on photographs enlarged to the scale of 1:5,000.

A survey crew follows the cadastral commission and, using topographical procedures, records the data necessary for the establishment of a cadastral plan of the area.

Upon the completion of the judicial enquiry, free, compulsory registration is instituted.

With the title of possession annulled, it is replaced by the property title which is issued by the land registrar, who is responsible for registration and for ensuring that the land register is kept up to date.

4. Advantages

(a) From the legal point of view:

- Registration extending over the whole of the area surveyed;
- Registration and updating of property titles brought about by the implementation of the order of 21/2/64.

(b) From the topographical point of view:

- Definitive survey of the whole territory with connections to the general control network; resumption and continuation of all previous work.

No further topographical work other than division into lots or the re-drawing of boundaries, were necessary.

5. Experience gained from the first operations

The purpose of the order of 20/2/64 was the establishment of a legal cadastre to enable property owners to hold negotiable titles which could be used to obtain bank loans (Tunisia being essentially an agricultural country).

The first governorate to be subjected to this extended cadastral survey was Cap-Bon; operations began there in June 1964 and were completed in December 1968.

The following lessons can be drawn from these first operations:

- The cadastre should be given a new orientation:
 - (a) The present legal cadastre should be converted into a fiscal cadastre which entails establishing a plan showing parcels, and amalgamating small parcels in order to create larger properties; circuitous boundaries should be straightened and the legal cadastral survey should then be resumed on a new basis;
 - (b) Alternatively, the orientation could be towards a progressive multi-purpose cadastre for use in civil engineering, agriculture, land reform, and irrigation and could thus become an instrument for development rather than a fixed and strictly legal cadastre.
- In order to satisfy certain economic exigencies, the execution of the cadastral plan should be mechanized.

Various photogrammetric procedures have been used because of the relief, the density of the vegetation and the fragmentation of the parcels:

- (a) rectification;
- (b) plotting.

The aerial photographic surveys were carried out by IGN, France. Part of the Governorate of Cap-Bon was covered on the scale 1:7,500 using photographic plates and a 210mm focal length lens.

About 12,000 hectares were subjected to conventional rectification using the SRG V. The result was not satisfactory.

It was decided to use plotting methods for uneven areas which had been subjected to field completion. 10,000 hectares were subjected to plotting by the IGN. The Topographical Service carried out the pre-completion operations. Astralon 0.25mm bases were used. These bases were gridded by the Topographical service which also undertook the old parcels and the reference points.

The result was satisfactory but not very advantageous from the point of view of speed of execution. It proved necessary to choose another method.

6. Overflight

An area of 20,000 hectares was used as a test site. This area was covered twice.

The first coverage on the scale of 1:16,000 was prepared on the ground. Once the models had been set up on the Presa-type analog apparatus, the mechanically calculated co-ordinates of all the secondary points, which had been chosen beforehand were observed. With the aid of a Programme 101 calculating machine and using the berlmét method, it was possible to convert and adjust the machine co-ordinates into ground co-ordinates. It is then possible to prepare the lower altitude flight.

Using the second coverage on the scale of 1:7,000, the pairs are fed into mechanical plotters and the boundaries are traced on an Astralon 0.25 mm base according to the indications made on enlarged photos by the magistrate.

The results obtained by this procedure were not uniformly conclusive for a number of reasons:

- (1) The beaconing of the boundaries prior to the photographing was poorly done: 60 per cent of the beacons, which were in the form of circular lime marks disappeared and between 20 and 25 per cent were invisible. The visual outline, which was done on old enlarged photos dating from 1962, gives a topography different from that shown on the new coverage, thus creating considerable identification problems and loss of time on the plotter, which in turn affected output.
- (2) The procedure proved too lengthy since it entails:
 - (a) carrying out two aerial coverages;
 - (b) ground preparation for the higher altitude flight;
 - (c) locating the negatives of the lower altitude flight;

- (d) converting and adjusting
- (e) locating the negatives of the lower altitude flight;
- (f) plotting;
- (g) returning to the area for verification and completion of the boundaries which do not show up on the photographs.

On the other hand, this procedure does have its advantages, namely:

- (a) Cost : about 1 dinar (2 dollars) cheaper than the topographical survey;
- (b) Accuracy : equivalent to that obtained by direct survey.

In order to improve the results, a number of tests were conducted with a view to calculating the identification error and the accuracy of the machines and the operators.

- (1) An area of 400 hectares was beacons with symmetrical lime shapes effected with templates.

About 80 per cent of the beacons were visible on the negatives. A sample of 300 points was subjected to two surveys:

- (a) one using topographical procedures;
- (b) the other using photogrammetric procedures.

The root mean square position error as determined by this test was calculated as 0.34 m.

- (2) Two plots each including a sample of about 500 points were carried out by two different teams using different machines and with the outline in the survey photo as the common datum.

By comparing these two plots it was possible to calculate the standard identification error as 0.88 metres which is very high and greatly detracts from the result, i.e. from the current cadastral plan.

Conclusion

The low level of accuracy obtained hitherto differs from the degree of accuracy required and does not conform to the legal character of the cadastre.

This again raises the problem of the cadastre. The very purpose of the cadastre must be reconsidered so that its degree of accuracy may be defined.

The use of photogrammetric analysis and differential rectification for cadastral surveys are two innovations now being tested at the Department of Topography and Cartography.

N.B.: The graphs annexed to the report will be published as Add. 1 of this document.