



Institut Agronomique et Vétérinaire Hassan II
FORMATION EN SCIENCES GÉOMATIQUES ET INGÉNIERIE TOPOGRAPHIQUE



State of the Art of 2D Cadastre and Reflection on a Future 3D cadastre Case of Morocco

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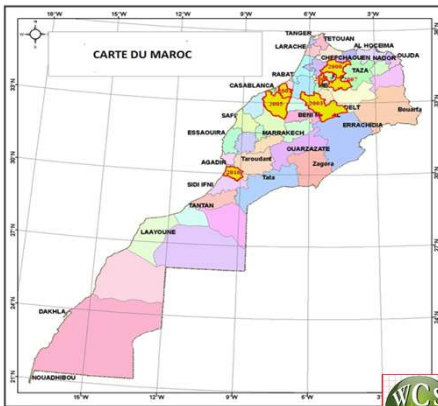


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INTRODUCTION


- Geographic position: 21° to 36°N, 17° to 1°W°
- Population: 33,8 Mi (60,4% urban, 39,6%rural)
- Casablanca: 3 359 818
- Marrakech: 980548
- Tangier: 1 005 041
- Fès: 1 129 768
- Agadir: 600 599
- Rabat: 577 827


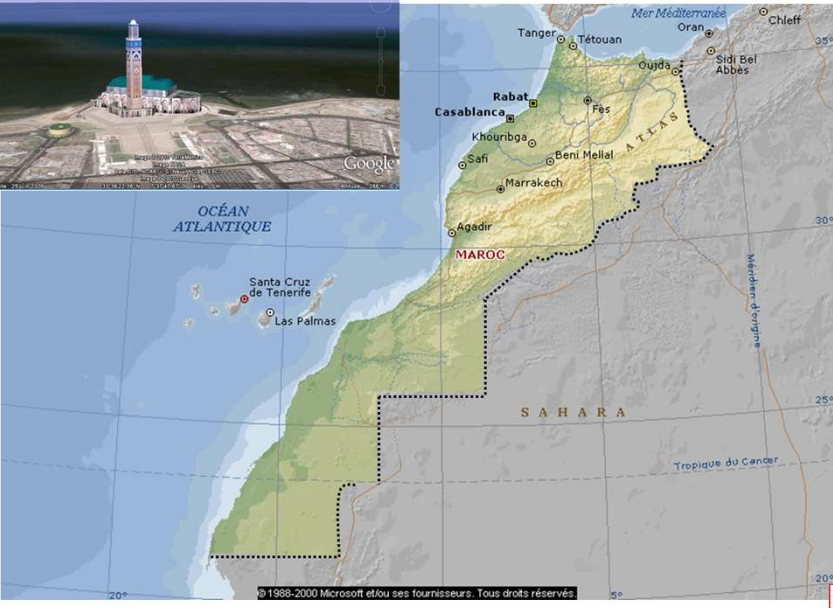


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INTRODUCTION

3D information has become important because:

- the evolution of data acquisition, software products supporting the third dimension.
- 3D great success and rapid development; (GIS)
- GIS can integrate three-dimensional data in the fields of urban planning, simulation of future projects and integration into the landscape, etc.
- Consequently, the 3D data has become an interactive data of great importance.
urban planning, cadastre.....



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INTRODUCTION

In 2D cadastre, information is represented using only 2D topographic plans.



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BUT These plans do not allow a faithful presentation of reality, (the case of buildings with complex geometry containing apartments belonging to several owners)



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INTRODUCTION

The objective



- Present the state of the art of the 2D cadastre
- Present a reflection on a 3D cadastre based on previous international experiences, while maintaining the positive aspects of 2D cadastre.
- Simple application to exploit 2D plan to move to 3D

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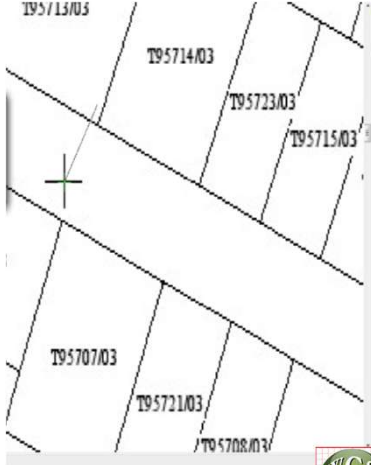
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THE 2D CADASTRE IN MOROCCO

- It Is a legal cadastre
- THE ADMINISTRATION RESPONSIBLE FOR THE CADASTRE
- The cadastre provides the following data:
 - ▣ information on owners and their land properties,
 - ▣ information about the rights and charges
 - ▣ any technical data on the parcels and their geographical repartition.




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THE 2D CADASTRE IN MOROCCO

- Land titling and land registration.
- Geometric description of land parcels and land register so as to provide security of tenure.
- The basic elements of 2D Moroccan cadastre are **cadastral maps, cadastral plans, Titles, and requisitions.**
- Concerning buildings, the dimensional information is provided by the co-ownership (co-properties).

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THE 2D CADASTRE IN MOROCCO

- Law - co-ownership
- building parts: private and common.
 - owner
 - apartments,
 - exclusive rights of ownership
 - certain restrictions
 - respect the framework collective life
 - requirements for the management and maintenance of collective parts.

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THE 2D CADASTRE IN MOROCCO

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cadastral map

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THE 2D CADASTRE IN MOROCCO

Niveau	Superficie Construite (en m ²)	Désignation et Superficie des autres équipements	Observations
Sous-sol	128		
RDC	128		
1 ^{er} étage	139		Cour = 12m ²
2 ^{ème} étage	142		
Terrasse (CE+Dcse+WC)	55		Dans dépendances =44m ² et dort WC=9m ²
Total	592		

Cadastral Plan
Describes the limits of property
And coordinates of the boundaries

Propriété dite : Smara 35
Etat : Municipalité de Smara, Lotissement Smara, 355
Titre : 21103/38

Contenance: 01^h 28^{ca}; 26.16m

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the plan of co-ownership for a floor

DIVISION PAR APPARTEMENTS
Plan du 5^{ème} Etage
de la zone 0100 à la zone 0105

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Description of a memorandum of co-ownership

- Name, title, situation : city, district
- Name of the engineer
- Name of requérants ,,,,

Description of Subdivisions:


- Basement description:
- Ground floor descrsption:
- First floor
- Second floor
- Third floor.....
- Terrace description



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THE INSUFFICIENCIES OF THE CO-OWNERSHIP


- information about co-ownership is described by 2D topographical plans,
- 2D plans do not allow a global view of the entire property (make search manually).
- difficult to know the vertical extent of servitudes.



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THE INSUFFICIENCIES OF THE CO-OWNERSHIP


- we cannot consult several apartments at a time,
- manually search the title in the archive
- difficult to represent all the parts constituting a co-ownership using only a 2D cadastral plan.
- solution to enable the representation of the physical 3D reality.


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USEFULNESS OF 3D CADASTRE

- The case of a road, a bridge and a building one over the other, all with different owners,
- Street under building, the 2D cadastre is no longer able to give a complete and sufficient description of the rights. Consequently, a 3D cadastre becomes indispensable





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REFLECTION ON A FUTURE 3D CADASTRE IN MOROCCO

- Establish 3D cadastre only in the situation where 2D is not able to respond to some queries (preserve the existing data, and exploit the benefits of 2D cadastre) some cases :
- building containing several apartments belonging to several owners that share common parts within the building.
- A home is built upon a public road.
- Some companies need to know their rights on the use of tunnels.




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REFLECTION ON A FUTURE 3D CADASTRE IN MOROCCO

Concepts About Future 3D Cadastre Components

- In order to conserve the functioning of the existing Moroccan legislation, land registration and cadastre,
- it is recommended that the 2D plans kept the basis
- The public domain rights can be represented in 3D, like the rights of the public domain on private property such as runways, trails, drainage and irrigation canals.
- Servitudes can be represented by 3D.




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REFLECTION ON A FUTURE 3D CADASTRE IN MOROCCO

In the case of urban areas:

- use the 3D representation in the urban areas where the geographical space is not spacious,
- There are complex buildings with several floors: there is a large number of properties.



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REFLECTION ON A FUTURE 3D CADASTRE IN MOROCCO



Concepts About Future 3D Cadastre Components

In the case of urban areas:

- Apartments are characterized by small areas and are grouped together on condensed areas with high population density.
- In some cases we can also find overlays between public properties such as roads, bridges, buildings, and private properties.




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REFLECTION ON A FUTURE 3D CADASTRE IN MOROCCO
Concepts About Future 3D Cadastre Components

for rural areas:


- Rural areas are characterized by scattered parcels and habitats.
- Overlays don't exist and private ownership is dominant.
- In this case, a 2D representation is satisfactory because of additional financial resources

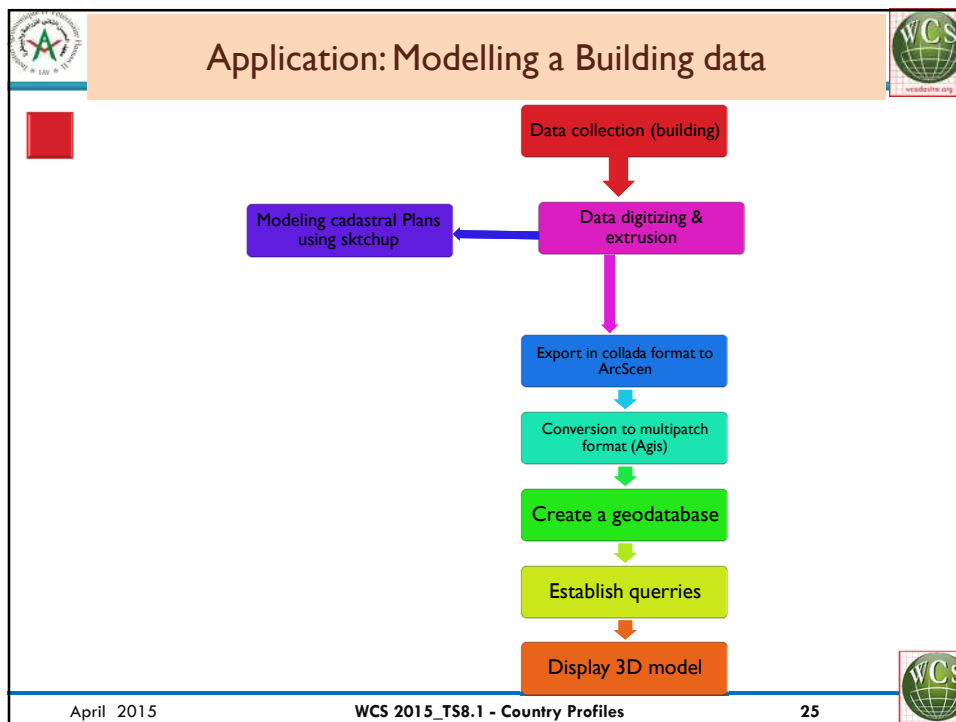
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REFLECTION ON A FUTURE 3D CADASTRE IN MOROCCO
Basic Strategies To Move To 3D Cadastre

- The first step is to make a 3D support for areas with high buildings.
- the case for big towns such as the city of Rabat (districts of Agdal and Ryad),
- the city of Casablanca metropolis, the cities of Tangier, Marrakech, Fès and Agadir.
- In these towns, the existing 2D database can be used and completed by 3D data.
- it is very useful to provide users with the information on the extent of land ownership and the rights attached to it.

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Data collection (ex. building)

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ID_Divise	Consistance	Surface_dans_titre	Surface_avec_hors_titre	quote_part_ter
27-27a	appartement à usage d'habitation (Me à F.27a-	96	4	4
28-28a	appartement à usage d'habitation (Me à)	53	12	12
29-29a	appartement à usage d'habitation	80	10	10
30-30a	appartement à usage d'habitation	80	5	5
31-31a	appartement à usage d'habitation (Me à)	90	10	10
32-32a	appt à usage d'habitation à 32A-32Aa (su Étage)	86	3	3
33-33a	appartement à usage d'habitation	134	10	10
34-34a	appartement à usage d'habitation	60	16	16
35-35a	appartement à usage d'habitation	104	6	6


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CONCLUSION

Database of 3D cadastre can be a useful tool for a large number of users:


- urban planning
- telecommunications field for example to determine the good sites for telecommunication networks.
- terrain analysis, mission planning
- infrastructure management as well as in the field of real estate.

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CONCLUSION

- Unfortunately, the implementation of a 3D cadastre in Morocco is subject to **several constraints**
- technical, legislative, scientific, and human and material resources constraints.

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CONCLUSION

- pursue developments in 3D acquisition techniques
- data processing,
- establish an adequate 3D platform for 3D objects
- database which supports the 3D

Technical

- problems concerning the registration of 3D property
- The legal concepts should be developed
- Develop New law texts concerning 3D data

legislative

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CONCLUSION

- professionals should provide adequate scientific equipment (hardware, processors, 3D cards, software)
- follow the evolution of software products supporting the 3D.
- limited budgets

Material R

- trainings for HR to understand 3D technology
- Application of 3D concepts to the technical staff

Human R

- clarify to professionals and managers the advantages and qualities of 3D representation.
- Introduce 3D concepts to decision makers

scientific

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Thank you for your Attention



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