

IMPLEMENTING NATURAL RESOURCES CADASTRAL PLAN IN PASARGADAE DISTRICT OF IRAN BY USING QUICK BIRD IMAGES

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KEY WORDS: Cadastre, Natural Resources, Plan, GIS, RS, Sustainable management

ABSTRACT:

Natural Resources are essential for security and sustainable development of each country. Therefore, in order to reach sustainable development, conservation as well as optimum utilization of natural resources, executing of natural resources cadastral plan is necessary and essential. Governments conduct lands management in Iran, so there is a need for comprehensive plan with arranged program for best evaluation. In this research as a pilot, Pasargadae city is opted. Pasargadae region is located in north-east of Shiraz in Fars province with Latitude and longitude of 30° 15' 53"N and 53° 13' 29"E respectively. In order to generate the cadastral maps, Firstly, images from QuickBird satellite with 50-60 centimeters resolution were georeferenced by utilizing ground control points with accurate GPS coordinates. In addition to satellite images, old paper maps with 1:10000 scale in local coordinate system from agriculture ministry in 1963 were digitized according to 1:25000 scale map from army geographical organization with AutoCad software. Beside, paper maps with 1:50000 scale and Google Earth were used to find the changes during time. All the above maps were added to QuickBird images as new layers by using ArcMap software. These maps also were utilized to determine the different land-uses. Thus, by employing ArcMap software lands divide into 2 groups: firstly, lands with official document, which is owned by either natural or legal persons, and secondly national lands under different uses such as forestry, range management and desertification plans. Consequently, the generation of cadastral maps leads to better difference between private and national lands. In addition, producing cadastral maps prevent the destruction and illegal possession of natural lands by individuals.

1. Introduction

Cadastral surveys deal with one of the oldest and most fundamental facets of human society-ownership of land. A parcel-based and up-to-date land information system containing a record of interests in land. Cadastre usually includes a geometric description of parcels linked to other records which describe the nature of interests, ownership or control over these, and often the value of the parcel and its improvements (International Federation of Surveyors, FIG 2005).

It is generally accepted that a National Digital Cadastral Map serving not only as a platform for land use management; physical planning and land valuation but as a land titling tool is essential to any successful land titling effort.

Land information is crucial for planning and development in all countries. Iran is one of the countries that national lands, manage by governments, so there is a need for accurate land information. Consequently, executing of cadastral plan is an essential tool for authorities to deal with social, economic, technological and environmental problems.

In underdeveloped countries, cadastral surveying and cadastral mapping are time-consuming and expensive procedure. Also, it is mentioned as one of the major restrictions on economic development. Recently, employing remote sensing/ satellite and aerial images make new ways to resolve the problems of traditional approaches.

Thus, in this paper, the stages of preparing national cadaster maps in Iran by using QuickBird images are deliberated. In addition, the advantages and disadvantages of this technique are discussed.

2. MATERIAL AND METHODS

The case study is Pasargadae region which is located in north-east of Shiraz in Fars province with Latitude and longitude of 30° 15' 53"N and 53° 13' 29"E respectively (Fig 1). This region is a historical place that belongs to Cyrus the great age so it has several aspects for study such as solving the problem of national and other lands. In order to generate the base maps of the project images from QuickBird satellite with 50-60 centimeters resolution were georeferenced by utilizing ground control points with accurate GPS coordinates.

Later, old paper maps with 1:10000 scale in local coordinate system from agriculture ministry in 1963 were digitized according to 1:25000 scale map from army geographical organization with AutoCad software. Beside all the above maps, paper maps with 1:50000 scale were used to find the changes during time. All the above maps

were added to QuickBird images as new layers by using ArcMap software and required adjustments and corrections were applied to them.

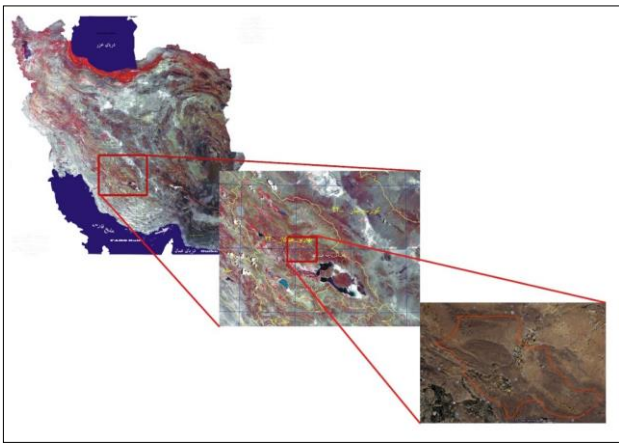


Fig 1- The location of Case study

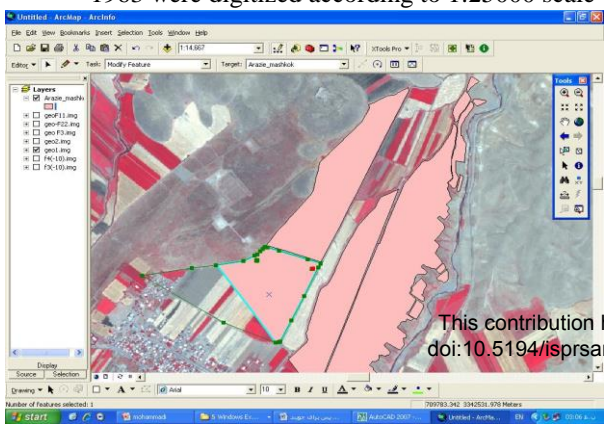
In addition to above maps and information Google Earth Image also, were used to determine the changes. By employing ArcMap software lands divide into 2 parts: firstly, lands with official document, and secondly national lands under different uses such as forestry, range management and desertification plans. In addition, some corrections were carried out to place the accurate locations of natural and man-made features such as roads, rivers, channels, water features and so on for reaching to international standard cadastre maps.

3. RESULTS

Final cadastral maps includes boundaries of each parcel, parcel identify, parcel dimension and area, various geographic features locations and names, forest, rangeland and pastureland borders etc. Cadastre information belongs to base map of land, so much so that in this study the first step is georeferencing the Quick bird satellite images by accurate GPS spots that was according to triangular way of geodetic network related to agriculture organization of Fars province and it was connected to National Cartographic Center (Fig 2).

As mentioned in material and method several stages had done. Here the results of study are in order with the sample of final map.

- Old paper maps with 1:10000 scale in local coordinate system from agriculture ministry in 1963 were digitized according to 1:25000 scale



This contribution has been peer-reviewed.
doi:10.5194/isprsarchives-XL-1-W5-73-2015

they have small negligible errors. Besides, Also, other need documents prepared: such as some property deed for national lands and other lands without legal document. Besides, a complete bank of information designed and prepared in Access (Fig 3). Also, paper maps with 1:50000 scale and Google Earth were used to find the land-changes during time. In order to georeferencing the maps UTM coordinate system (Universal Transfer Mercator) and WGS 1984 datum were used. Then, maps get mosaic, determine overlays and gaps.

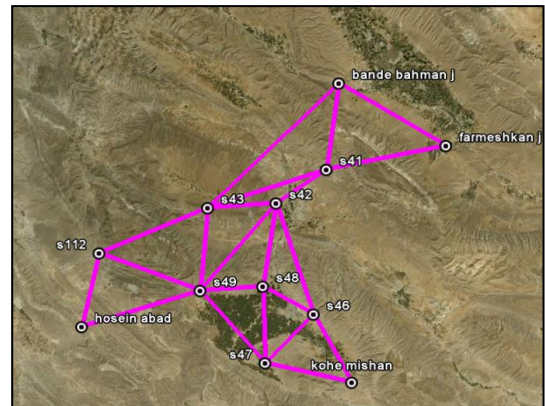


Fig 2- Triangular and Static method for georeferencing the satellite images

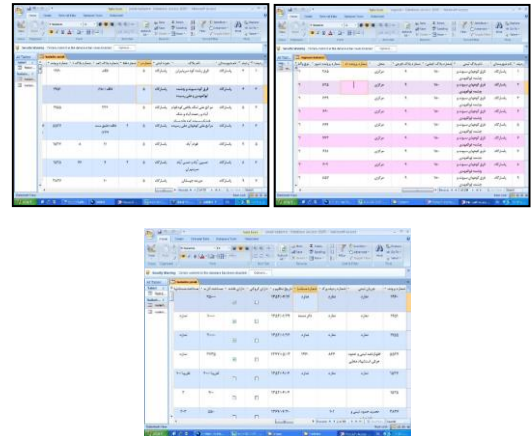


Fig 3- The sample of prepared bank for land information

- The second stage is digitizing the lands with Arc Map that are not use as an agriculture or farming, city or village boundaries, and recognize the lands that are rangelands and forest and desert. By doing this national lands will be determined for conservation (Fig 4).
- Then required corrections were implemented in maps with the base of Quick Bird images and some changes that are man mistake or errors in georeferencing (Fig 5) and some adjustments are doing by Quick Bird images (Fig 6).

Fig 4- digit and determination of different lands and separating the national lands

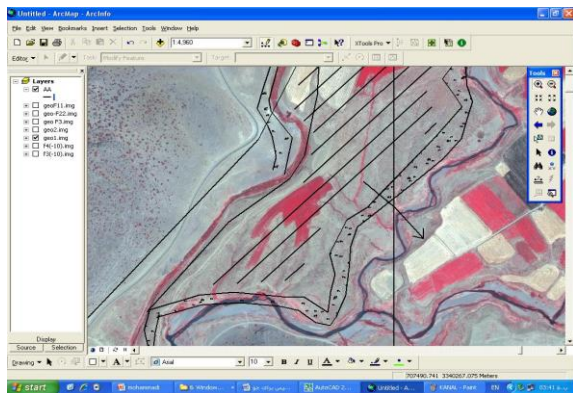


Fig 5- Accurate the map (In this figure the river should replace in its correct place)

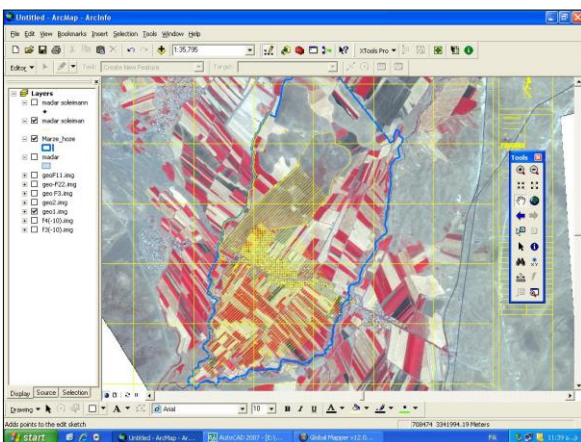


Fig 6- Adjustment of old maps with Quick Bird images

The final Cadastre maps convert to dwg format for using by some experts in Natural Resources office because they are using Auto Cad software for land survey (Fig 7).

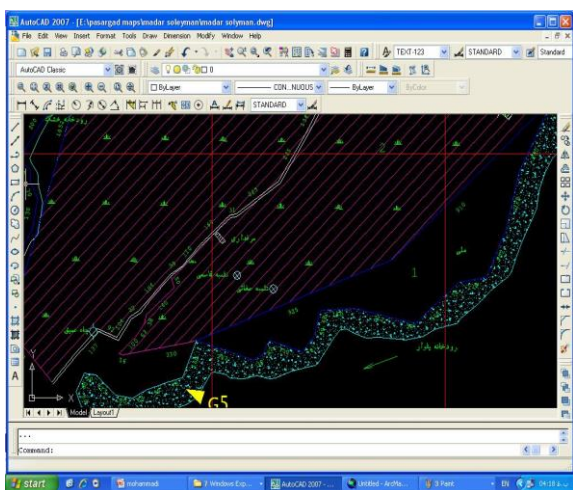


Fig 7- Final cadastre map with dwg format in AutoCad software

4. CONCLUSION

In the past Cadastre was for collecting land taxes and historically develop for fiscal purpose, and now widely adopted to support land registration (legal purpose) and is becoming a tool to improve land development (physical purpose). The generation of natural resources cadastral plan leads to reliable maps which increase the ability of authorities to monitor land-use and land-changes frequently. Also, the current data base is updatable to the changes which occur during time as well as preventing of overlaying of information. In addition, producing cadastral maps prevent the destruction and illegal possession of natural lands by individuals. This means that Most of natural resources like forests, range lands, agricultural, and other features environments are facing with many risks annually. There are no urgent facilities and proper tools in developing countries in order to calculate and get accurate data for abandoned, destroyed and aggregated lands, when a natural or physical events occurs, it is just estimation, of course that is beyond of human losses.

Legal benefits of Cadastre execution in national and other lands are: resource exploitation, collective land rights, water protection, indigenous land rights, and environment protection, land use planning, land property, shelter and housing, natural resources, natural land objects that are useful for society, tribes, private land owners and house owners. Thus, digital cadastral mapping can be provided to make the Land Records easy to use.

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