

Sustainable Mass Plot Valuation

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Key words: Sustainability, land management, administration, mass valuation, appraisal.

SUMMARY

Sustainable land management is administered by protecting the natural resource in order to convey the next generations the land on the earth. There are a lot of studies exercised for sustainability of the scarce land. These have been conducted in the context of land management and taken into consideration in different directions such as technical, law, economic and social. Real estate valuation is a significant part of land management in the economic sense. Sustainability of real estate valuation should also be provided for mass appraisal by determining optimum criteria in accordance with the type of real estate. Thus, social justice will be achieved in processes of real estate valuation and by removing unearned income in all valuation studies. Sustainable mass plot valuation can be used in procedures of taxation and will constitute the basis for a lot of processes such as expropriation, privatization, nationalization, ensuring. The purpose of this study is to establish a system that is clear and understandable, by including long-term according to the economic conditions and criteria of the plot in urban areas. To provide the sustainability of the system, characteristic features of the plot should have a database consisted of data that are accurate, recent, reliable and accessible. It has been discussed that the necessity of the existing local, spatial, physical and legal features and economic features that affect plot value should be included in the system. It is given place to whether to change an extraordinary for these features or any other feature that may be added.

Sürdürülebilir Toplu Arsa Değerlemesi

Anahtar kelimeler: Sürdürülebilirlik, arazi yönetimi, idare, toplu değerlendirme, değerlendirme.

ÖZET

Sürdürülebilir arazi yönetimi, yeryüzü üzerindeki taşınmazların gelecek nesillere iletilmesi için arazilerin korunarak yönetilmesidir. Teknik, hukuksal, ekonomik ve sosyal yönlerden arazi yönetimi konusu ele alınarak kısıt olan arazinin sürdürülebilirliği için çalışmalar yürütülmektedir. Arazi yönetiminin önemli bir ayağını taşınmaz değerlendirme oluşturmaktadır. Taşınmaz türüne göre optimum kriterler belirlenerek toplu değerlendirme için taşınmaz değerlemenin sürdürülebilirliği de sağlanmalıdır. Böylelikle rant ortadan kalkarak, bütün değerlendirme çalışmalarında sosyal adalet sağlanmış olacaktır. Sürdürülebilir toplu değerlendirme değerlendirme işleminde kullanılabilecek ve kamulaştırma, özelleştirme, devletleştirme,

sigortalama gibi diđer birok iřlemeler iin altlık oluřturacaktır. alıřmanın amacı; ekonomik kořullara ve kentsel alanlardaki arsa kriterlerine gre uzun dnemleri kapsayarak aık ve anlaşılabilir olan bir sistem kurmaktır. Sistemin srdrlebilirliđini sađlamak iin arsanın karakteristik zellikleri; ulařılabilir, gncel, dođru ve gvenilir verilerden oluřan bir veri tabanında bulunmalıdır. Sistemde arsanın deđerini etkileyen mevcut mahalli, konumsal, fiziksel ve yasal zellikleri ile ekonomik zelliklerinin yer alması gerekliliđi tartiřılmıřtır. Bu zellikler veya eklenebilecek bařka bir zellik iin olađanst bir deđiřimin sz konusu olup olmadığına da yer verilmiřtir.

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1. INTRODUCTION

The land is regarded as one of the basic elements from which a nation can derive wealth. The land is a natural thing that exists and is not created by humankind even though its use can be changed by human beings (LAG 1996). Natural resources on the earth, such as land and water are decreasing rapidly due to rapid population growth, climate change and desertification. It is necessary to take urgent measures for the protection of these resources in the individual, society, state chain and should be in planned and correct way usage of them (Malczewski 2004, Cangir and Boyraz 2008, Akbulak 2010). For the sustainable use of land, a qualified land knowledge and an effective land management and administration system are needed (FIG 1999, Erkan et al. 2011, Yomralıoğlu 2011).

All countries have to deal with administering of their land. A global perspective for land management and administration is shown in Figure 1. The operational component of the land management concept is the range of land administration functions that include the areas of: *land tenure* (securing and transferring rights in land and natural resources); *land value* (valuation and taxation of land and real estate); *land use* (planning and control of the use of land and natural resources); and *land development* (implementing utilities, infrastructure, and construction planning). These four functions interact to deliver overall policy objectives, and they are facilitated by appropriate land information infrastructures that include cadastral and topographic datasets linking the built and natural environment (Enemark 2004, Williamson et al. 2010, FIG 2014a).

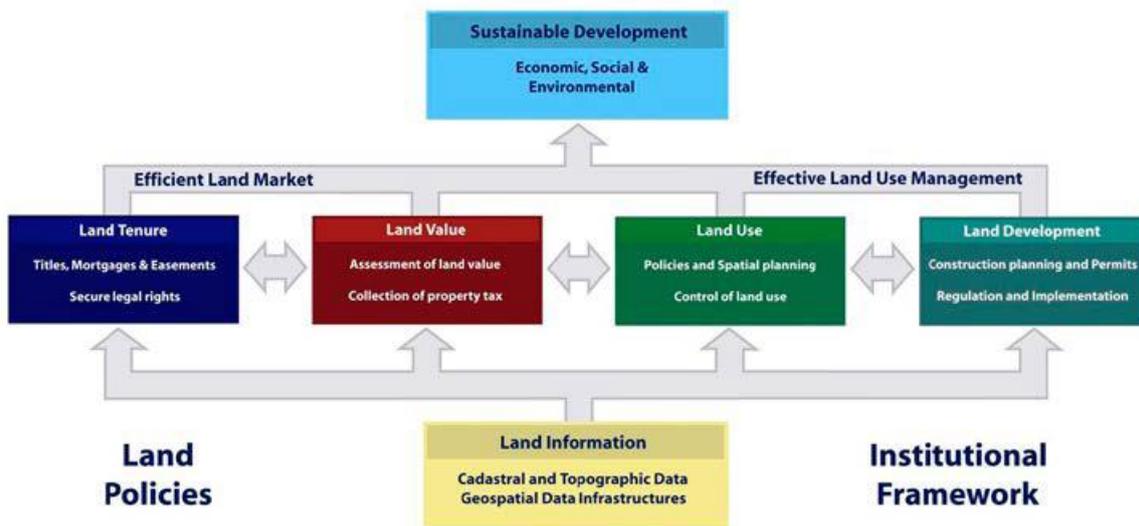


Figure 1. A global land administration perspective (Enemark 2004, Williamson et al. 2010, FIG 2014a).

Land administration systems provide a country with an infrastructure for implementing of land policies and land management strategies in support of sustainable development (FIG 2014a). Land administration systems – whether highly advanced or very basic – require a large scale spatial framework to operate. This framework, or large-scale mapping, should identify the spatial units such as land parcels as a basis for dealing with the land administration functions and protection of natural resources (FIG 2014b). Real estate taxation is part of the wider land administration in the framework (FIG 2016). For the taxation, real estate valuation should be executed by using advanced methods and current database.

It was researched topics of real estate valuation and there are three major trends in this topic: (1) the expansion of spatial econometrics; (2) the recognition of the differences between land values and improvement values; and (3) acknowledgment of value premiums stemming from more sustainable forms of development (Krause and Bitter 2012). It was researched new ways in order to assess and enhance land registry sustainability in Rwanda (Ali et al. 2017). It was analysed the dynamics of land policy that ensued from the introduction of the land value tax on urban development in the Estonian capital Tallinn (Wenner 2016). As the social status, it is examined A human well-being approach for assessing the value of natural land areas in order to decide on the policy measures to be implemented (Kopmann and Rehdanz 2013). Financial and environmental risk analysis identified the key factors influencing the sustainability of real estate industry and proposes environmentally friendly solutions for robust economic growth within the industry (Vanags and Butane 2013).

Social capital and willingness-to-pay for coastal defences (Jones et al. 2015), land use, such as coastal use (Alpaslan and Ortaçesme 2009), agriculture, forests, etc. has been intensively emphasized and land management have been observed in the form of ecological balance and protection of land and water which are natural resources (Foley et al. 2005, Kopmann and Rehdanz 2013, Galdeano-Gómez et al. 2017). In addition, there are sustainability studies in various fields such as sustainable urbanization (Tosun 2009), sustainable architecture (Özmehmet 2007) and the sustainability management in the civil aviation (Torum and Yilmaz 2009).

The real estate valuation issue is within the land administration and management. One tip of the sustainability of land management is the sustainability of real estate valuation. In this case, with a sustainable mass plot valuation system for a city can be used to determine the value close to reality and to determine taxation, insurance, fees, etc. Moreover, it will be easier and faster to make the decisions that will be taken in the management of the real estates. The goal of this work is to create a sustainable mass plot valuation system. The operation of the system; identification of the plot from real estate types, determination of optimum criteria, the creation of the database, application of valuation method and the temporal cycle of economic and extraordinary criteria for sustainability.

2. MATERIAL AND METHOD

The basic materials for sustainable mass plot valuation are the plot, criteria and database. The method of real estate valuation to be used in this system should be the applicable mass appraisal. So as to be able sustain of the system should be renewed according to economic criteria in short-term, in long-term extraordinary criteria.

2.1. Criteria of the Plot

In the general sense, real estates vary according to their type, usage purposes and service forms. In the literature, real estates, have been determined that different types of classification are made and different definitions and concepts are used according to the purpose of use, especially based on land and structure basis. According to the 1st and 12th Articles of the Real Estate Tax Law (1970), the tax status is separated as the buildings are subject to the Building Tax and the land and the plots are subject to the Land Tax. It is seen that they also distinguished the real estate types. With regards to the literature result (Figure 4); agricultural, improved and unimproved land, building; according to the service forms, residential (buildings in the region of residence), commercial (shopping mall, accommodation, gas station, etc.), industrial (factory, thermal power plant, gas filling plant, etc.) and the public (schools, hospitals, public institutions, etc.) are grouped likewise (Yomralıođlu 1997, Üreten 2007, Yalprı 2007, Tatođlu 2008, Temel 2009, Őahin 2010, IVS 2011, KarakuŐ 2011, Erdođdu 2012, Ergin 2013, IAAO 2013, USPAP 2013). In terms of usage and economic value, there is a big difference between the land and the building, as well as, between the residential and the commercial building for the buildings, between the agricultural land and the plot for the lands (zoning plot). In particular, different usage of their purposes lead to different values as well, while all the plots are a part of the land, all the lands are definitely not a plot. (Yalprı and Ünel 2016, Ünel 2017). In this study, it includes the plots where is improved land in urban areas in the Central Anatolian Region. There are many criteria affecting the values of the plots (Figure 2).

CRITERIA	A. Legal Features	Property Conditions <ul style="list-style-type: none"> • Full ownership • Shared ownership 	Zoning Status <ul style="list-style-type: none"> • The gross floor area • Total construction area • The number of floors ≥10 • The number of floors <10 • Detached building • Attached building 	Legal Restraints <ul style="list-style-type: none"> • Right of mortgage • Easement • Annotation of lease
				Plot Area
	B. Physical Features	The Location of the Plot <ul style="list-style-type: none"> • Corner parcel • Intermediate parcel 	Technical Infrastructure <ul style="list-style-type: none"> • Water supply • Electricity, sewer, natural gas and telephone • Solid waste collection service • Storm drainage • Unpaved road • Asphalt road 	The Road Condition <ul style="list-style-type: none"> • The periphery road • Road width ≥10 meter • Road width <10 meter
		Geometric Structure <ul style="list-style-type: none"> • Length of the frontage • The number of frontage • Geometric shape 		The Slope of the Plot
C. Locational Features	Health-care Organizations <ul style="list-style-type: none"> • Community clinic, health center, etc. • Public/private hospitals 	Cultural Centers <ul style="list-style-type: none"> • Cinema/theatre • Historical/touristic places 	Insanitary Areas <ul style="list-style-type: none"> • Waste disposal areas • Treatment facilities • Natural gas and tube filling facilities • Petrol stations • Wireless towers • Energy transmission lines • Underdeveloped areas • Marsh areas • Natural disaster areas • Untreated stream sides 	
	Educational Institutions <ul style="list-style-type: none"> • Primary schools • Higher education ins. • High schools • Courses 	Entertainment Centers <ul style="list-style-type: none"> • Fair, concert area, etc. • Sport facilities • Stadium/hippodrome • Entertainment v. 		
	Public Agencies <ul style="list-style-type: none"> • Governorships • Court houses • Municipalities • Jailhouse 	Green Areas <ul style="list-style-type: none"> • Forest/copses • Recreation areas • Parks • Playgrounds 	Industrial Areas	
	Security Units <ul style="list-style-type: none"> • Police stations • Fire department/ 112 emergency • Military zones 	Transportation Networks <ul style="list-style-type: none"> • Airport • Railway station • Coach station • Metro stations • Bus stations • Minibus lines • Underpass/overpass 	Cemeteries	
	Attraction Centers		Worship Places	
	Shopping Centers <ul style="list-style-type: none"> • Hypermarkets • Mini-markets • Open/closed bazaars • Commercial ent. 		Business Centers	
			Parking Areas	
			View <ul style="list-style-type: none"> • Mountain, hill, etc. view • Lake, river, etc. view • City view 	
D. Neighbourhood Features	Population <ul style="list-style-type: none"> • Education level • Income level • Migration rate • Crime level • Neighbourliness relations • House owner/rent situation 	Environmental Perspective <ul style="list-style-type: none"> • Prestigious neighbourhoods • Structuring density • Development potential • Purchase-sale rate 	Underground, Ground, Over-Ground Features <ul style="list-style-type: none"> • Slope • Geological situation • Climate condition • Air pollution • Noise pollution 	

Figure 2. Criteria affecting value of plot (Yalpir and Ünel 2016)

The studies related to the valuation made by the Council of Higher Education have been examined in Ünel's (2017) thesis. It is seen that the criteria used in science and social sciences have common existing criteria, but there are differences in their use or approaches to the study issue. These complexities and differences need to be resolved in order to use these criteria in the mass appraisal. Although the necessity of the criteria of both sciences is indisputable, the challenges of using all of them together will arise. It is necessary for the experts to meet on the same platform and distribute the task to a common intelligence union, because of the valuation is a multidisciplinary issue.

The issue of how to carry out sustainable mass appraisal should be to bring long-term solutions by discussed on this platform to the problems rather than instantaneous ones. Assuming that the valuation criteria are standardized, in order to ensure sustainability, it is necessary to primarily determine and classify all the criteria related to the temporal developments affecting sustainability, and then determine how the system works with these criteria (Figure 3).

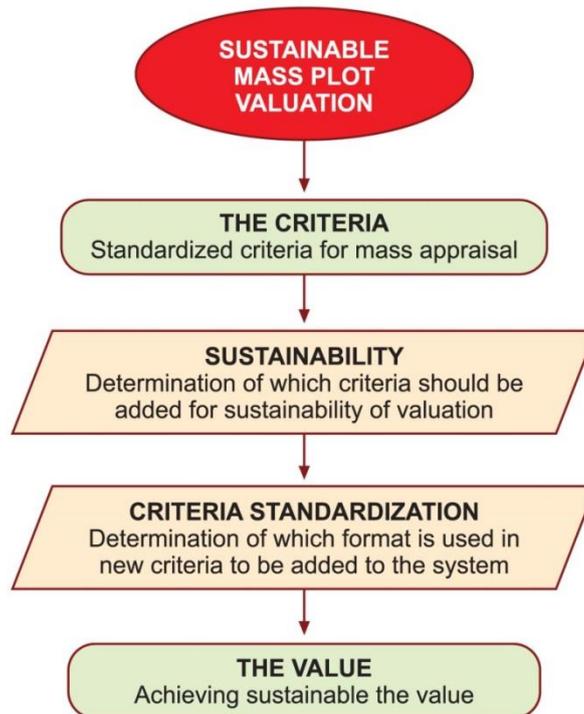


Figure 3. The general structure of sustainable mass plot valuation

Optimal criteria and standards will be detected through sustainable valuation activities. With the time-independent valuation will determine to what extent the correct and efficient use of the system by testing its performance at the beginning.

2.2. Real Estate Valuation and Mass Appraisal

Real estate valuation, the features considering, such as status, location, rights and responsibilities of real estate at a particular time, is to determine the unit price according to market conditions in an impartial manner. The processes of real estate valuation consist of determining the type of real estate and criteria of real estate, applying valuation method and estimating the value of real estate. Herein, the key point is to detect criteria affecting value for each type of real estate. For the sustainable mass plot valuation, geographic and descriptive data of the plot criteria should be collected, regulated and converted to (standardization) the

standard format. The other words, the database should accurately be constituted for mathematic model (Figure 4).

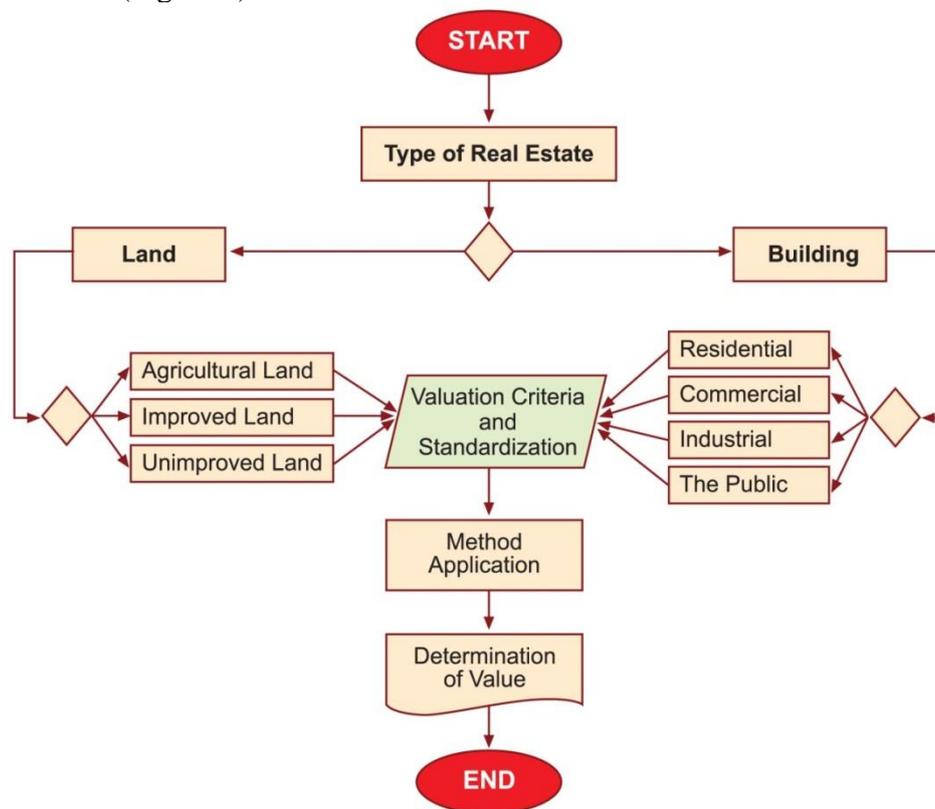


Figure 4. Diagram of real estate valuation

The real estate valuation methods are discussed as of traditional, statistical, spatial analysis and advanced valuation techniques in four different ways. Traditional valuation methods are cost, comparison and the income approach. The statistical valuation methods are depended on the data set such as regression, nominal, hedonic methods. Spatial analysis valuation method is a method that is applied by combing geographical data and attribute of real estate in the computer. Advanced valuation methods, which are artificial intelligence techniques and hybrid techniques, are grouped in two main categories (Unel and Yalpir 2013).

Traditional methods of real estate valuation are still used in order to determine the value of a real estate. But these methods are inadequate when the values of many real estates are estimated as the mass appraisal. It is explained that valuation of a real estate is more expensive than valuation of many real estates. Computer-supported statistical analyses are used for their valuation in Automated Valuation Model (AVM)/Computer-assisted Mass Appraisal (CAMA) by many countries such as USA, Denmark, Netherlands, Sweden, Northern Ireland, Lithuania. Within methods of statistical analyses, it is usually mentioned the regression method (IAAO 2013, Yıldız 2014).

Mass appraisal is the process of valuing a group of real estates as of a given date, using standard methods, employing common data, and allowing for statistical testing. In order to determine a real estate's value, it is valuers rely upon valuation equations, tables, and schedules developed through mathematical analysis of market data. When market value is the goal, values for individual parcels should not be based solely on the sale price of a real estate; instead, valuation schedules and models should be consistently applied to real estate data that is correct, complete, and current. The development, construction, and proper administered of a computer-assisted mass appraisal (CAMA) system result in a valuation system that is kept current and is characterized by accuracy, uniformity, equity, reliability, transparency, and low per-real estate costs (IAAO 2014).

3. SUSTAINABLE MASS PLOT VALUATION

Sustainable mass plot valuation can be executed with the inclusion of all the features needed in real estate valuation for urban areas. Mass plot valuation in the first step, in the second step sustainability, is considered. However, valuation and sustainability should be addressed as a whole and this shouldn't be neglected definitely. Otherwise, it may require the return to the beginning of the processes.

The current situation should detect for mass plot valuation and the above criteria by reducing to the optimum level and the plot data should be obtained and the model should be produced with one of the evaluation methods. The bases of the system should be solidly established and the paths for sustainability should be kept clear and ensured integrity. Sustainability of mass appraisal is possible by including steps that showing temporal changes in the system. For sustainability, "economic criteria" should be dealt with, which varies according to time concept, in the ordinary cases. These are GNP (Gross National Product), CPI (Consumer Price Index), PPI (Producer Price Index), interest rates, inflation, etc., which change with annual, monthly and even daily periods are the criteria. Afterwards, "extraordinary criteria" can be included in the system step. These; global and local economic crises and risks, zoning status of the real estate subject to valuation, legal amendments and other extraordinary developments specific to the real estate.

Suggestions on the operation sequence in the sustainable mass appraisal are as follows:

- By examining all technical units, definitions and concepts related to appraisal and ensuring their common usage,
- The definition and limits of real estate types are clearly identified,
- Consideration of all the criteria related to the evaluation and classification of the optimum criteria according to the type of the real estate underlying the main headings and classification in order of priorities,
- Detecting the criteria that may change temporally for sustainable mass appraisal,
- Standardization studies related to data productions to be used in appraisal and linked to general government institutions and presenting reports to the relevant governmental institutions for the elimination of the identified deficiencies,

- Registration of the market values according to the real estate type by taking into consideration the purchasing and selling dates and the purchasing conditions,
- Establishment of databases containing real estate types according to optimum criteria,
- By examining the methods used by developing and developing countries in the literature, determination of the evaluation method which constitutes the model most suitable for our country and closest to the market value,
- Execution of valuation,
- Production of value maps,
- Implementation to percentage increment/decrement every 6 months according to economic criteria,
- It is to investigate and update whether there are additions/subtractions in the criteria affecting real estate value once every 4 years.

In this context, processes should be carried out step by step for "sustainable mass plot valuation" in the plots that the basis of urban areas. The definition of the plot, its contents, boundaries and purpose of use (residential, commercial, etc.) should be clearly shown. Standards of optimum criteria affecting the plot value should be determined. With the plot values which the unearned come and interest rates are stabilized and the plot data belonging to optimum criteria should be established in standard formats. Value maps should be produced by estimating the value with the determined modern valuation methods. Time-related changes should be followed up with economic criteria and value maps should be updated. The mass appraisal study should be renewed by returning to the beginning in extraordinary situations (Figure 5).

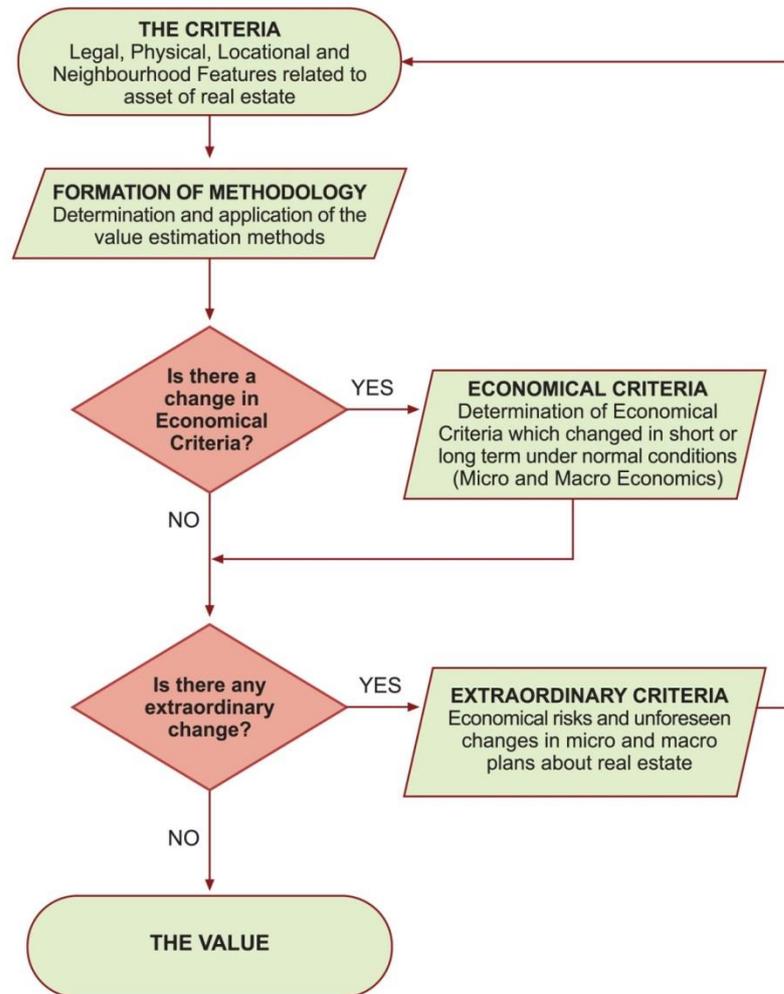


Figure 5. Sustainable mass plot valuation

There is no need to establish any real estate valuation institution for the installation of the system. Because the data required for valuation is generated by existing institutions and organizations. The biggest problem in here is to reach reasonable market values and other data on the market. The municipality and the General Directorate of Land Registry and Cadastre can jointly conduct and evaluate the evaluation system by storing the data produced by the existing institutions and especially the municipality with the help of GIS in a correct, current and reliable manner. Criteria to be used in mass appraisal are related to zoning plans, in municipalities, real estate maps and all rights and obligations on real estate documents are included in General Directorate of Land Registry and Cadastre, so there is no need for another institution. In addition, municipalities receive the real estate tax and based on this, General Directorate of Land Registry and Cadastre receive title deed fees.

4. CONCLUSION

One of the important feet of land management is real estate value. Taxation, which is a major contributor to the economies of the countries, is calculated from this value. It is pretty important to preserve sustainability and to continuity the system for a mass plot valuation that will be needed in urban management as well. The basic requirement for sustainable mass plot appraisal is optimum criteria and standardized data on them.

In order to establish a sustainable mass plot appraisal system, it is necessary to regulate the legislation infrastructure after research and examinations. In terms of mass appraisal, a regulation has been gone in effect in 2015, in order to standardize data initially and to establish National GIS. However, the data in the valuation is not a complete solution against an important problem. For the valuation system, long-term solutions should be produced from the beginning to the end. The process of the system should be as simple, flexible and easy as possible and should be carried into effect on as soon as possible. Technological developments should be followed and do not to make the system complex, bulky and functionless. In addition, the result data should be shared transparently with all users, taking by safety precautions.

Generally, all relevant disciplines for "real estate valuation", as well as "sustainable mass appraisal", can meet with certain periods on a platform to improve the system. The system can be mentioned, starting from the identification of the real estate types by taking into on a country basis "From Sustainable Mass Appraisal" and "National Value Map". This value map; should be produced to economic criteria, the application of real estate projects, and according to the construction of roads and bridges can be made to updated by processing changes. Thus, the value information is offered to the public in a transparent manner visually and, it will be ensured that objections are avoided in many land applications.

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