

Cadastral Registration In Relation To Land Re-Planning

Ph.D, Bolormaa B.¹, MSc.Buyandelger M.²

NUM, School of Arts and Science, Department of Geography¹

MSUA, School of Agro ecology, PhD student²

e-mail: bolor_8315@yahoo.com

Abstract: Urbanization process happening in current Mongolian population settlement is creating more difference in rural and urban development, and leading to increased migration of population from rural to urban area. This in turn creates extensive centralization in Ulaanbaatar, which causes environmental deterioration, pollution, unorganized expansion of city borders, illegal land utilization, shortage of social services and other pressing problems. One of the common solutions to the above urbanization caused problems is land re-planning. In the current time of rapid population growth, there is no single perfect solution; however, testing this method has number of advantages. Land owners start participating in the land re-planning project by protesting /Sorenson 1999/. As a result of re-planning they give share from their land as well as many buildings, houses and businesses are required to move, thus land possessors want to estimate the benefits of re-planning project by the size of land contributed. To make it possible those impacted need to have their size of land determined correctly.

[Bolormaa B., MSc.Buyandelger M. **Cadastral Registration In Relation To Land Re-Planning.** *Nat Sci* 2016;14(2):14-21]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). <http://www.sciencepub.net/nature>. 3. doi:[10.7537/marsnj14021603](https://doi.org/10.7537/marsnj14021603).

Key words: Land cadaster, land registration, cadastral mapping, land re-planning

Justification

Rapid urbanization in developed countries and population growth have been for many years the pressing issue, thus urban expansion has become a problem that needed urgent addressing for the last twenty years. (Devas and Rakodi 1993) Considering the current urbanization process in Ulaanbaatar city, extensive centralization creates long term unresolved issues. Therefore, it is possible to apply re-planning of land to ensure more effective use of current resources for social needs derived from increasing centralization, to prevent Ulaanbaatar city development in coming 10-20 years from delaying future social and economic development and to resolve other problems caused by rapid development. Although this method has number of advantages, in current situation, the issue related with cadastral mapping and registration is causing some limitations. It shows location, zoning and changes of those impacted by the re-planning. The project will lead to changes in cadastral unit boundaries, thus those impacted would need official registration when moving to new location. (Yomralioglu 1992) Due to re-planning, new land parcels provide different benefits, which serves as risks to those impacted by the project. Therefore, keeping them satisfied is the priority. (Yomralioglu 1992) To ensure this, cadastral registration should be correct, meet international standards and should be able to provide land re-planning project with comprehensive information. An efficient use of current resources is becoming a pressing need now, thus resolving the above

mentioned limitations and implementing land re-planning will balance urban social needs and reduce poverty.

Research methods

Due to different situations in global cities, cultural differences of nations with regards to land relations, variations in political and institutional structure, there is no uniform type of land re-planning methodology that can be successfully applied globally. However, the main principles of land re-planning were used and adopted to local peculiarities to re-plan the selected land area. In order to identify main problems related with land re-planning, comparative analysis were made on collected national and international research materials, articles and presentations, Mongolian laws and legislations and other related documents. Land re-planning should be conducted in order to improve the living environment and conditions of local residents, thus to consider feedback from local residents the total of 640 people from 250 households, who represent the local population of 1400 people from 618 households were involved in a survey. Qualitative and quantitative analysis were made on result of questionnaire. This methodology was important as additional information like specific views, suggestions and recommendations with regards to land re-planning were collected. Moreover, during the survey, these recommendations were reasonably documented and verified.

Research methodology

Land re-planning can be defined briefly as the main tool for complex development of modern cities.

The main process of such tool is composed of taking local land which has been either unplanned or allocated in unorganized way and re-allocate it in accordance with requirements of urban land management planning to ensure balance between public and private needs. (Yomralioglu and Parker, 1992) In other words, all land parcels in the project area are merged into groups and impact percentage of each parcel to public purpose land is estimated. This percentage depends on the project area size and total area required for public purpose, while the remaining land is re-allocated in accordance with regional planning as development area (Muller, 1992).

International experience shows that urban re-planning is based on implementation of the following urban development and land management activities to ensure favorable living environment for residents. (JICA, 2008) Such as:

1. Renewed land management activity
2. Demolish old residential blocks that do not meet requirements and build new ones
3. Organize unsystematic settlements

Every country has its own land policy system, thus land re-planning documents are not globally standardized. Therefore, when applying one country's experience of land re-planning in other country, certain adaptations are made depending on local land related legal regulations. However, once the main principles are adapted to local traditions and peculiarities, the current land re-planning can be applied in every country. Sato(1986), Seele (1982), Chou and Shen (1982) Based on land re-planning process, its steps and main principles, the methodology is identified in the following way (Figure 1).

1. Selection of project area
2. Retrieve permission to implement the project from city authority
3. Inform the public about project
4. Study main issues related to land re-planning in the project area
5. Draft detailed plan of the master plan
6. Calculations
7. Land exchange, land amalgamation
8. Land distribution, its registry
9. Develop land re-planning
10. Ensure community participation
11. Introduce the report to government institution
12. Define new boundaries, make cadastral mapping
13. Conduct new registry of land title
14. Final report

Table 1. Urban land re-planning steps

As a result of land re-planning in urban development, small area or unequally divided land parcels and lands not suitable for utilization are amalgamated, subdivided or re-allocated in order to make that land more usable. This requires re-mapping according to urban development plan, and new boundaries are set. Therefore, land re-planning can be considered as a way for strengthening cadastre. Chou and Shen (1982) This requires calculations. In certain conditions, land re-planning calculation is based on the following three steps (Figure 1). Such as:

1. All land parcels are merged into one piece. This is calculated mathematically and not included in land registry.

2. Public use land such as road, square, green area, school and hospital area is excluded from this merged piece.

3. Project reserve area is divided again for development area and main land owners.

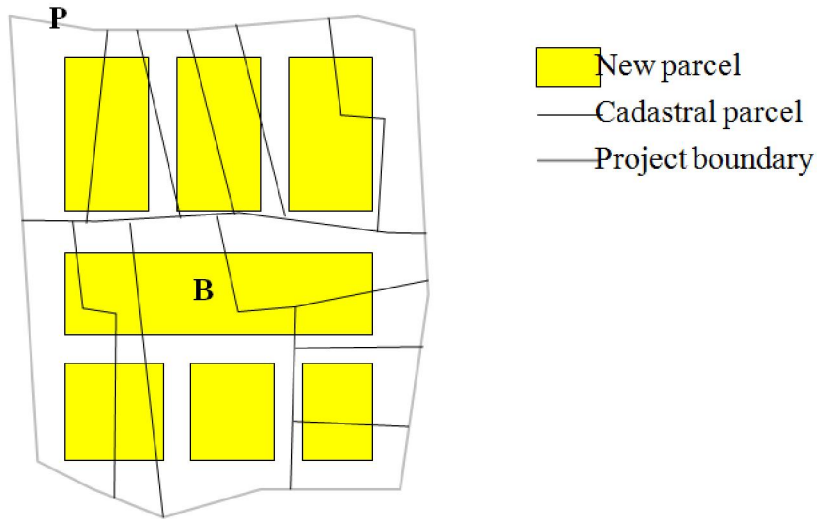
In order to apply these steps, the project area boundaries are identified using detailed base land map. According to the set boundaries, the size of all land parcels in project area is identified as defined in law. By this time, information such as immovable property parcel number, location, registration number, owner's name, address and other types of information required in the future should be collected.

Regarding project boundaries, if local land area is covered by the project in whole, the size is estimated as in the registry. Sometimes land parcels

are divided into two or more pieces depending on the project area boundary. In such cases, only the parts that are within the project boundary is included.

Land participation solution is made according to apartment estimations. Using this variable measurement, each land donation (Land area of

citizens and economic entity within land re-planning boundary) ratio is estimated according to Figure 2 formula (2.1). This ratio represents the percentage of land donation by each land owner. The donation percentage is used for each land parcel that defines independent donation area.



$$CP = 1 - ([B] / [P]) \quad [2.1]$$

$$RP = 1 - CP \quad [2.2]$$

$$CR_i = CP * P_i \quad [2.3]$$

$$NP_i = P_i - CR_i \quad [2.4]$$

CP	=	Donation percentage to the project
[P]	=	Total area of cadastral parcels
[B]	=	Total area of new parcels
RP	=	Percentage of land to be returned to land owners
P_i	=	Area of land parcels
CR_i	=	Parcel donation area
NP_i	=	Land area to be returned owners

$i=1,2,\dots,n$ (n = total number of land parcels included in the project)

Research results

The research covered the total area of 6.5 hectares located in Ulaanbaatar city Bayangol district’s 2nd khoroo territory, east of Railway college 16 story apartment block, with Piece avenue on the south and west mountain channel on the north. This area was selected for re-planning project because it has apartment blocks with 1-5 stories, which were mainly built in 1950 and 1960s. In the process of research, the total of 618 household apartments were counted in the area. Considering the average number of household members in Mongolia (4.28) it is considered that the total of approximately 2645 people live in project area. According to the plan, by the year of 2030 the total population is estimated to be 3140 or 872 households. 7 out of 12 residential blocks with 388 household

residents are estimated to be demolished to have apartment blocks for 640 households newly built. Within the re-planning project, it is considered that the total of 10 buildings including old apartments and buildings that do not meet re-planning spatial requirements, need to be demolished. This includes apartment blocks 7-1, 7-2, 7-3, 7-5, 7-6, 7-7, and 18a, kindergarten N66, Humun hospital and Mongol Business University. The total budget for demolishing these 10 buildings and implementing land acquisition works is estimated to be 14.2 billion MNT, including 7.1 billion for public building compensation, and 7.1 billion for building demolishing and temporary re-settlement expenses. This way the re-development area will be cleared to enable the construction of 4 block buildings in 3 sections. (Figure 3)



Figure 3. Land re-planning on selected project area

In relation to demolishing of 7 buildings to build new apartment blocks, the security of land titles of building users were studied to reveal that out of total 22 buildings, 10 or those except public apartments had secure land titles. /Table 1/

Table 1. Security status of land titles

State land title registry data								
N	Parcel number	Name citizen, legal entity	Registration number	Resolution number, date	Term /year/	Area size /m2/	Land use	Title type
	2	3	4	6	7	8	9	10
1	1619/0013	Sod-Onis Co., Ltd	2608502	2013.10.30 A/977	5	485,3	Residential, service	Possession
2	1619/0011	66th kindergarten	9089926	2003.07.08 283	15	3858,4	Kindergarten	Possession
3	1619/0025	Humun med Co., Ltd	2745593	2010.12.28 877	5	2151,2	Hospital	Possession
4	1619/0095	Gurvanmunkhkhagan Co., Ltd	2890801	2011.04.07 293	5	1260,8	Trade, service	Possession
5	1619/0028	TBD AnduudCo., Ltd	2041251	2014.08.14 A/703	10	1479,5	Trade, service	Possession
6	1617/0088	AnuunsuvdCo., Ltd	5160375	2008.06.13 295	5	135,5	Trade, service	Possession
7	1619/0128	P. Amartuvshin	NYU76013117	2013.04.16 A/397	5	126,3	Private housing	Possession
8	1619/0071	Mongol Business University	5200016	2013.09.05 A/828	5	3250,3	University	Possession
9	1617/0114	Nazu construction Co., Ltd	5090199	2011,09,19 A/828	5	359,5	Residential, service	Possession
10	1619/0003	Biggold Co., Ltd	5782295	2015,01,20 A/53	2	1829,9	Services	Use

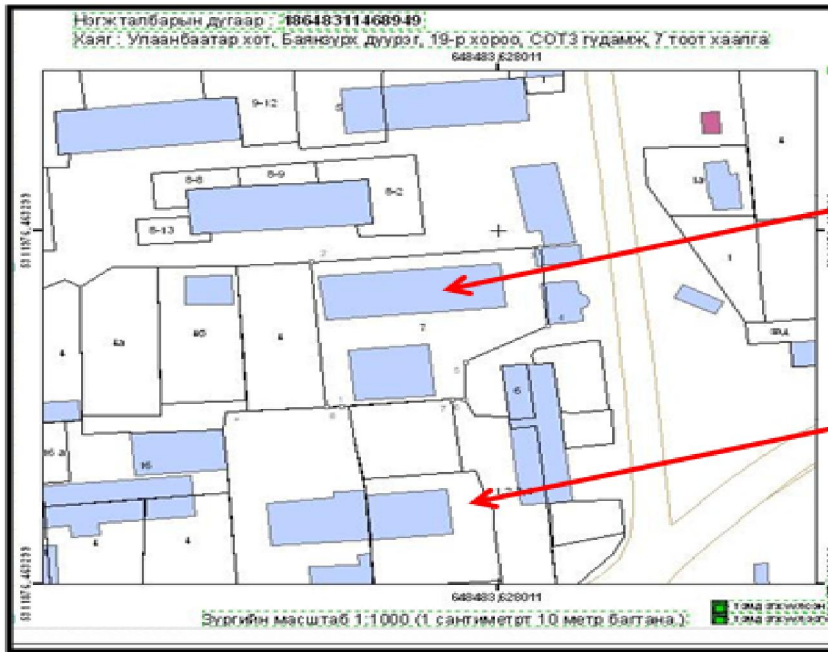
The table shows that residents of apartment blocks are to be affected the most, because all service building owners have their titles secured. According to the detailed master plan, apartment blocks from 1 to 7 are planned to be demolished for new development,

therefore, there's a need to estimate the protection of titles of 1400 people of over 400 households and related project dividends.

Cadastral registration is vital for calculating the amount of project dividends. Although the capital city cadastral database was established that enabled registry of parcel based, regularly updated land registry; the disadvantage of this system is that it only maintains the registration of land that is owned, possessed and used

by citizens, economic entities and organizations. In other words, the system does not include data about state owned or type of public possession land such as housing blocks, public possession land, roads and utilities. (Figure 4)

Parcel number:



Address: Ulaanbaatar, Bayanzurkh District, 19th khoroo, ... street, khashaa 7

Map scale: 1: 1000

Figure 4. Land cadastre map /current/

The current cadastral maps are not sufficient to make realistic calculation of project dividend, thus in order to make comparative analysis the following the project area of 6.5 hectares of land were classified by its current purpose types. (Table 2)

Table 2. Land use situation

№	Land utilization type	Area	
		m2	%
1	Housing block base area	27535.75	42.2
2	Kindergarten	3250.35	5.0
3	Service places	4764.28	7.3
4	Kiosks	37.07	0.1
5	Parking	1298.47	2.0
6	Green area	4034.88	6.2
7	Pedestrian area	6882.30	10.6
8	Auto parking	5418.30	8.3
9	Auto road	11967.62	18.4
	Total area	65189.02	100.0

The table shows that except 12,3% of the total area which compose kindergarten and service places, the majority or 87,7% of the total area is not registered in the cadastral registry. (Image5)

Land cadastral registration provides the initial phase of re-planning project with spatial data, while at the final phase of project implementation; it is responsible for coordination of keeping those impacted by the project satisfied. Moreover, it should be able to provide comprehensive, complete set of information in order to reduce the risks of project dividends, and the risks related with new location as well as to ensure satisfaction of those impacted by the project. If it fails to do so, the potential risk would be that uncertainty is created in re-planning benefits and assessment, and create unplanned expenses during the project implementation.

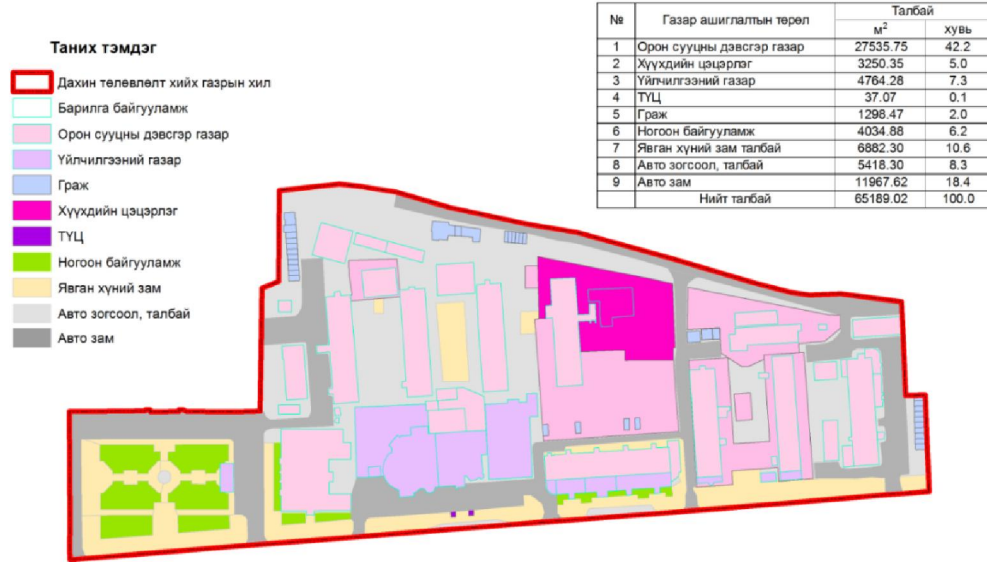


Image 5: Current situation of land use

According to international experience, the cadastral registration system must contain data of all parcels, meaning there shouldn't be any empty area or unregistered parcel. Therefore, there is a need to register all parcels by each type of land utilization for both state and individual legal subjects. (Figure 6) When this is approach is applied to re-planning project area, the land size of those impacted by the project will be changed in the following way. (Table 3)

Table 3. Land use situation (newly calculated)

№	Land utilization type	Area	
		м2	%
1	Housing block base area	41134.81	63.1
2	Service places	4801.36	7.4
3	Kindergarten	3250.35	5.0
4	Auto road	11967.62	18.4
5	Green area	4034.88	6.2
Total area		65189.02	100.0

The above is illustrated in the following way:

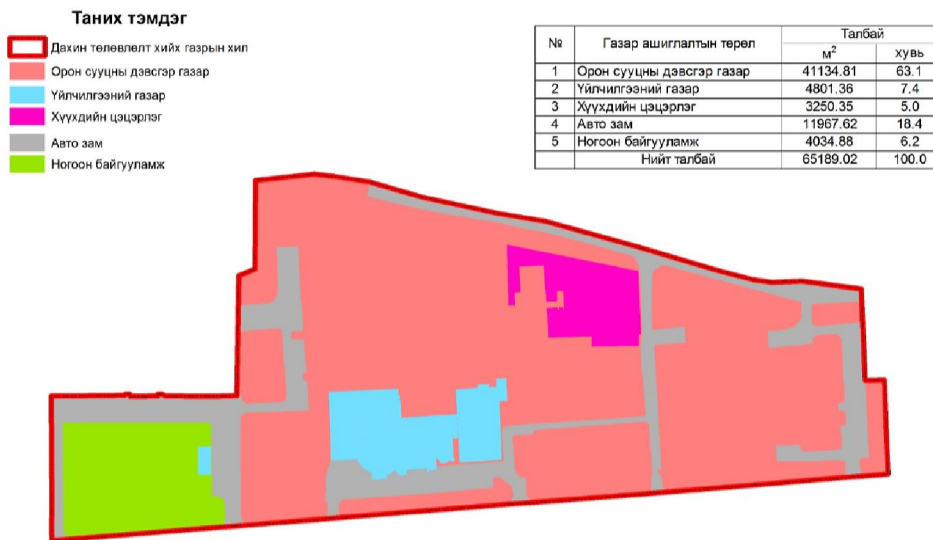


Image 6: Current situation of land use (newly calculated)

The above shows that as a result of renewing the cadastral registration, the area of housing block land, which correspond to the majority of project beneficiaries, is increased by 20.9%. This increases donation contribution of project beneficiaries by 20.9% and enables realistic calculation of project benefits. Moreover, it improves the initial evaluation score of project financing. (Table 4)

Table 4. Comparatives of land use changes

№	Land utilization type	Area	
		m2	%
1	Housing block base area /before/	27535.75	42.2
2	Housing block base area /after/	41134.81	63.1

Conclusion

Based on the results of land re-planning done on the total area of 6.5 hectares located in the Capital city Bayangol District 2nd khoroo territory, the following conclusions are made. Such as:

- Considering urban development history, land management planning, urban planning, population distribution and density, Ulaanbaatar city is estimated to the total population of 2 million in near 20 years. Therefore, based on the research results, the land re-planning is considered as the most effective method for managing urban development issues caused by the growth of population.

- Cadastral registration is not sufficient to realistically estimate the donation of project beneficiaries within the project boundary.

- Creating Capital city legal cadastral database and land registry that does not contain information on parcels without owners, or on empty areas, shall enable increase of housing block surrounding land area by 20.9%. This means that before the project implementation this area was 27535.75m² or composed 42.2% of total project area while after the project it will be 41134.81 hectares or compose 63.1% of total project area.

- Maintaining correct cadastral registration shall ensure the increase in donation percentage of project beneficiaries and eventually make the calculation of benefits to be received by project beneficiaries more realistic.

Literature and books used

1. Bolormaa B, Buyandelger M. "Methodology for developing land management plan of the year", UB, 2015.
2. Buyandelger M, Bolormaa B. "Distinctions and future trends of urban land use", UB, 2010.
3. Buyandelger M, Bolormaa B. "Theoretic and methodological aspects of urban land use and planning", UB, 2005.
4. Administration of Land Affairs, Geodesy and Cartography, "Good land administration, its role in economic development", UB, 2007.
5. Gantulga G, Myagmartseren P, Chinbat B. "Theoretic and methodological aspects of urban land use classification and development of strategic zoning system" Geography and natural resources Siberia, 2004.
6. Gankhuyag R. "Land reform of Mongolia" UB, 2005.
7. JICA (2008) Urban development study report, Ulaanbaatar.
8. Zanabaatar D. "Land management" UB, 2006.
9. Myagmartseren P. "Land cadastre", UB, 2004.
10. Good land administration - sustainable development (2011), Land Administration of UB city, Ulaanbaatar.
11. Sato Mystery of Capital 2004.
12. Courtney, J.M. (1983). Intervention through Land Use Regulation, In Dunkerley, H.B. (ed.), Urban Land Policy: Issues and Opportunities, A World Bank Publication, Oxford University Press.
13. Chou, T.C. and Shen, S.K. (1982). Urban Land Readjustment in Kaohsiung, pp.65-90. In Doebele, W.A., ed., Land Readjustment: A Different Approach to Financing Urbanization, Massachusetts: D.C. Heath and Company, Lexington Books, USA.
14. Dale, P.F. (1976). Cadastral Surveys within the Common wealth, HMSO, London.
15. Davis, K.P (1976). Land Use, McGraw-Hill series in forest resources. DOE, (1987). Handling Geographic Information. Report of the Committee of Enquiry chaired by Lord Chorley, HMSO publications.
16. Doebele, W.A. (1982). ed., Land Readjustment: A Different Approach to Financing Urbanization, Massachusetts: D.C. Heath and Company, Lexington Books, Boston, USA.
17. Doebele, W.A. (1986). Conceptual Models of Land Readjustment, In Minerbi, L. et al., (eds), Land Readjustment: The Japanese System, O'Gunn&Hain/A Lincoln Institute of Land Policy, Boston, USA.

18. Dunkerley, H.B. (1983). Urban Land Policy: Issues and Opportunities, A World Bank Publication, Oxford University Press.
19. Larsson, G. (1991). Land Registration and Cadastral Systems: Tools for land information and management, Longman Scientific & Technicals.
20. Muller, J.R. (1992). Detailed District Plan and Land Readjustment Project, In session 5: Land Policies and Management for Urban Development, International Conference on Urban Development Policies and Projects, Nagoya.
21. Satoh, T. (1986). Land Readjustment Problems in Implementation and Representation, In Minerbi, L. et.al., ed., Land Readjustment: The Japanese System, O'Gunn&Hain/ A Lincoln Institute of Land Policy, Boston.
22. Seele, W. (1982). Land Readjustment in the Federal Republic of Germany, pp.175-206, In Doebele, W. A. . ed., Land Readjustment: A Different Approach to Financing Urbanization, Massachusetts: D.C. Heath and Company, Lexington Books, USA.
23. Yomralioglu, T.(1992). Determination of Land Parcel Values in Land Reallocation using GIS, Proc. International Congress on Agrarian Reform and Rural Development, Ankara.
24. Yomralioglu, T. and Parker, D. (1992). A New Approach to Land Reallocation using GIS, Proc. EGIS'92 Conference, Vol.II, The Netherlands.

1/27/2016