

Applicability of Land Readjustment Replotting System to the Rehabilitation of the Informal Settlements in Jalalabad City, Afghanistan

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Abstract

With a population growth rate of 4% Jalalabad is one of the currently rapidly growing cities in Afghanistan. Many spontaneously and informally developed settlements areas are there with densification, scattered land and buildings, inefficient land use and poor subdivision layouts with no effective spatial plans and urban developments. This research effort evaluates the applicability of the land readjustment replotting sub-system (LRRS) to the rehabilitation of informal settlements in Afghanistan, especially focusing on the existence of land governance laws and regulations for the application of a land readjustment system (LRS) and the residents' participation in replotting their land plots for the rehabilitation of their informal settlements. For these analyses, surveys were distributed to 24 urban planning experts and 99 residents in informal settlements, were used as well as technical reports and government published. The research reveals that 1) existing laws and acts concerned with land governance in Afghanistan can be applied to conduct LRS on the rehabilitation of informal settlements; 2) approximately 70% of resident respondents have the awareness to apply the LRRS, and over 40% are ready to contribute less than 20% of their land plots to the rehabilitation of their settlements by an application of LRRS, and 3) many respondents are willing to participate in LRRS and undertake their roles as stakeholders.

Keywords: *informal settlement, land readjustment system, upgrading informal settlement, urban development, public participation, basic public facilities*

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1. Introduction

Afghanistan had a population of 28.6 millions as of 2015 and **Figure 1** shows the proportion of population in urban and rural areas over time. UNDESA 2014¹⁾ estimated that the percentage of population in urban areas should increase by 40% by 2050. Many cities have been spontaneously and informally urbanized but without using any effective spatial plans. The UN-Habitat states that over 86% of urban stock can be classified as informal when lacking one or more of the following basic elements for adequate housing; 1) access to safe water sources, 2) improved

sanitation, 3) durable, structurally sound housing materials, 4) adequate living space, and 5) security of tenure. People living in informal settlements are deprived of any security of land tenure, land development rights and land use rights (Enemark, S. et al, 2009²⁾). National and local governments in Afghanistan are unable to provide an adequate infrastructure and public utilities to match the rapid urban expansion, due to financial problems. The land subdivision by private developers and land expropriation by the government have been traditionally conducted to upgrade the informal settlements. However these traditional mainstream approaches to the development of informal settlements appear to have been inadequate in solving or mitigating the identified social, urban space and infrastructure problems (Ghada Faruk Hassan, 2012³⁾).

Jalalabad, as one of the most densely populated cities in Afghanistan with many informally developed settlement areas (here in after “informal settlement”) in its inner city, was selected as case study area for the current research. **Figure 2** shows the location of Jalalabad. More than 1 million people are thus living on just 19.13 square kilometers, producing a density of 522 persons per hectare on average and experiencing an annual growth rate of 4%.

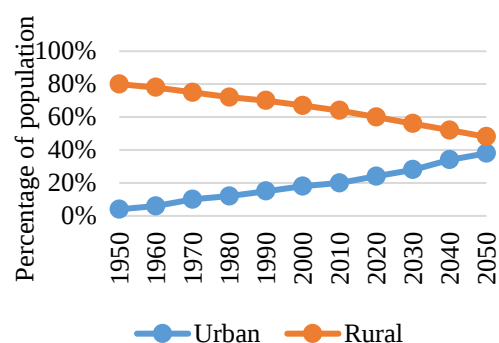


Figure 1. Population proportion Afghanistan, Source: UNDESA, 2014¹⁾

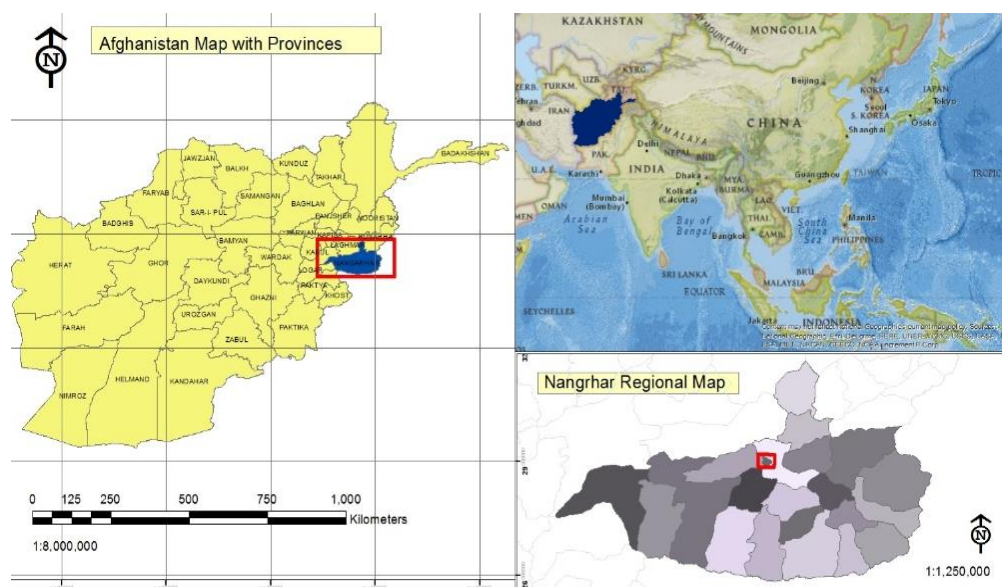


Figure 2. Detailed map of research study area in Afghanistan, Source: IMS GIS Database

Figure 3 illustrates the proportions of land use of the built-up areas in Jalalabad. As shown in the figure, unplanned developed residential land occupies 29.9%, and thus, Jalalabad is facing the problem of relocating urban people into well planned and environmentally safe areas. To improve the current disordered urbanization, Jalalabad needs to establish efficient land use planning to develop the infrastructure effectively.

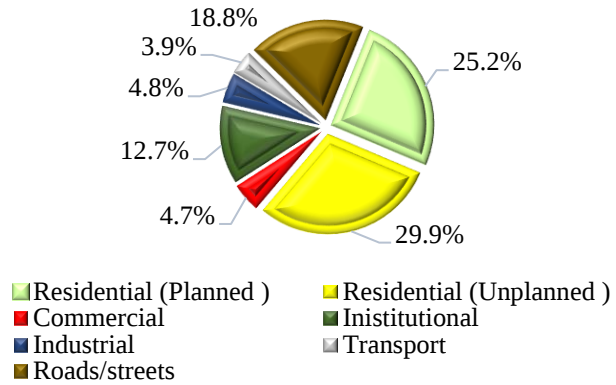


Figure 3. Land use in built-up areas
Source: State of Afghan Cities, 2015

2. Methodology

2.1. Analysis

The Land Readjustment System (LRS) is one of the comprehensive methods utilized for urban land development. It consists of two main procedures: (1), a Land Readjusting Replotting sub-System (LRRS) used to readjust the irregular boundaries of the land plots, and (2) the development of public infrastructure, such as roads, parks, and urban utilities. LRS has two fundamental goals, namely 1) increasing land value through development and 2) profit sharing of any development with land rights holders and stakeholders (Matsui & Deguchi, 2014⁴). As LRS fully depends on the consent of the landowners to use parts of their land for infrastructure development like road and park, it is very important to investigate and confirm the contribution and willingness of landowners to accept the LRS. This research also aims to evaluate the applicability of LRS/LRRS for upgrading informal settlements instead of using the more traditional approaches and consists of following steps:

- 1) Spatial analysis: The condition of informal settlement areas in Jalalabad are spatially analyzed using satellite images and GIS based on digitizing land use, including the urban roads, public facilities, and a measurement of densities of population and dwelling units.
- 2) Assessment of land governance: The applicability of LRS can be done based on existing laws and acts related to urban land governance are assessed using questionnaire surveys given to 24 urban and regional planners.
- 3) Public participation in replotting informal settlements: Residents' willingness to participate in or contribute to infrastructure development projects undertaken by LRRS/LRS is evaluated using the questionnaire survey and interviews with 99 resident respondents.

2.2. Data used for the spatial analyses

The data used for the planned spatial analyses were obtained from several related institutions and government agencies, such as the Ministry of Urban Development, Independent local governance authorities, UN-Habitat, local municipality governance in Jalalabad City and by reviewing and discussing the methods of land readjustment already used in Japan. The analysis began by investigating existing land uses and community facilities in the study area, such as the parcel-level assessment of land utilization and its activity, existing land use mapping and patterning, its development status, and how these lands interact overall. For this analysis, land use data were obtained from the Land Reform in Afghanistan (US-AID) Geographic Information Systems (GIS)



Figure 4. Identifying the informal settlements in Jalalabad



Figure 5. Diagnostics of land use in the informal settlements

database for land use and informal settlement maps produced in 2012. This information was verified and then supplemented using a field survey of the study area conducted in 2014. Further, to analyze the situation regarding informal settlements, land use type, densities and dwelling units in the case study area, satellite imagery, aerial photographs, detailed plans and the master plan of the city were collected from the Ministry of Urbanization Affairs. The location map of the informal settlements was gathered from a Land Reform workshop conducted by local municipality district officials and district engineers. That data, such as the measurement of densities on population and dwelling units, land use, and urban development regulations were collected from the Land Reform Handbook⁵⁾. Documents related to land rights and social housing were collected from UN-Habitat NGOs. **Figure 4** and **Figure 5** shows the workshop that identified informal settlements sites and the diagnostics of land use in those informal settlements, respectively.

2.3. Assessment of land governance laws and acts

Questionnaires surveys were prepared to evaluate the applicability of LRS to the rehabilitation of informal settlements, community participation for land contribution and rights conversion for the LRS in case study areas for 24 experts in urban and regional planning. The main question was “Are there any acts or laws that can be a basis for the replotting sub-system of LRS in the informal settlement areas in Afghanistan”. A supplemental survey was undertaking using email. These 24 experts had either the needed knowledge of LRS from training by the Japanese International Cooperation Agency (JICA) or held a Doctor of Philosophy from universities in Japan. **Table 1** shows the professions of the respondents. These respondents are categorized into three groups; 1) government employees who are working in governmental agencies and have experience in their related fields; 2) academicians who are working at an academic institution; and 3) experts who are working for private and international aid agencies or NGOs.

Table 1. Professions of respondents to the questionnaire that assessed the land governance

Profession of respondents		Number of respondents
Technical advisors of the Ministry or Urban Development and DCDA (New Kabul City)	Urban planning	2
	Civil engineering	2
	Urban design	1
	Land reform specialist	1
Architects and planners		9
Civil and environmental management		6
Urban landscape engineering		1
Ph.D. researchers		2
Total		24

2.4. The public participation in LRRS

To investigate the awareness and willingness of the residents in these informal settlements to join land development projects and apply LRRS, a questionnaire survey was conducted with the residents. The main survey questions addressed; 1) general information about existing public facilities, 2) contribution for the improvement of basic infrastructure, 3) awareness of land value, and 4) willingness to accept the application of LRRS. **Table 2** shows the questionnaire coding instructions. Sample size is listed as $n = 99$ from the Slovin Formula.

Table 2. Contents and coding instruction for the questionnaire on LRRS

Question		Coding Instruction for answers
Attributes of resident	1) Land ownership	Self-owned:1, Family owned:1, Rent:3
	2) Employment	Employed:1, Unemployed:2, Retired:3
	3) Land plot size (square meters)	<100:1, < 200:2, <300:3, <400:4, <500:5
Existing condition	4) Existing conditions of infrastructure on your land	No access road:1, Lacks public utilities:2, Poor access road:3, Multiple poor conditions:4
	5) Type of building material	1-2 story bricks house:1, 1-2 story concrete house :2, Other :3
	6) Existence of green area in the community	Exist:1, Not existing:2
Resident's awareness of LRS	7) Knowledge of LRS	Very good:1, Good:2, Roughly:3, Not at all:4
	8) Agreement on infrastructure development by LRRS	Very good:1, Good:2, Roughly:3, Not at all:4
	9) What role will you play in LRRS?	Active role:1, Just support:2, Not support:3, Protesting:4
	10) Do you know your land value will increase by applying LRS?	Yes:1, No:2
Land contribution for LR	11) Has anyone approached you to purchase your land?	Yes:1, No:2, Unknown:3
	12) How much percentage of land are you ready to contribute to LR?	50%:1, 30%:2, Less than 20%:3, No idea:4
	13) What type of right do you want to convert using LRRS?	Land to land:1, Land to apartment:2, Land to money:3, Not participating:4

3. Results and Discussion

3.1. Spatial growth and population density of informal settlements in Jalalabad City

Figure 6 shows the General Plan of Jalalabad City in 1974. The area surrounded red line is the central city. It can be seen that some roads and residential areas were planned around the city center. The built-up areas increased from 450 hectares in 2004 to 1930 hectares in 2012. **Figure 7** shows the built up areas of Jalalabad in 2012. In **Figure 7**, the areas in yellow are informal settlements. There were 17 informal settlements. The informal settlements expanded to the fringe areas of the city. By year 2013, the ensuring spatial structure of the city where informal settlements had formed was a ‘circle-type’ with the land development pattern concentrated along the old city area. The population of Jalalabad City is estimated at 1,000,000 located within 1930 hectares, therefore, the gross density was approximately 522 people per hectare. **Figure 8** shows the population and density of 17 informal settlements. *Anoor Bagh* has the highest density of 1382 and the smallest settlement 32.9 people per hectare in *Kambo River*. Site-A (*Arabaan*) and Site-B (*Majbor Abad*) in red color were selected as the case study areas to evaluate the applicability of LRS/LRRS. Site-A is located in the city center, and it has 66.54 hectares, 950 plots of residential houses, and a population density of 208.9 persons per hectare. Site-B was selected from the fringe of city and had 33.49 hectares, 566 plots of residential houses, and a population density of about 268.7 persons per hectare.

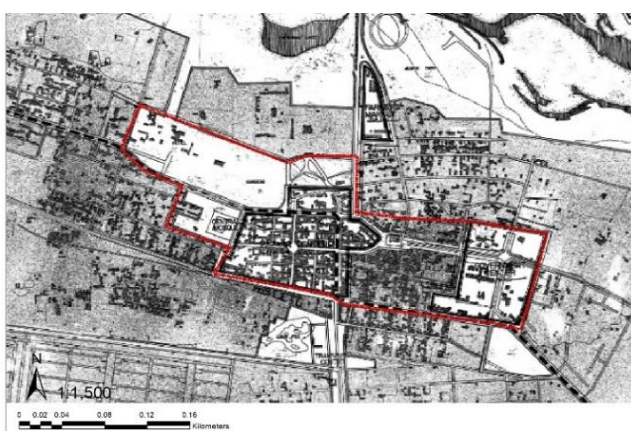


Figure 6. Earlier General Plan of Jalalabad City
Source: Ministry of Urban Development, in 1974

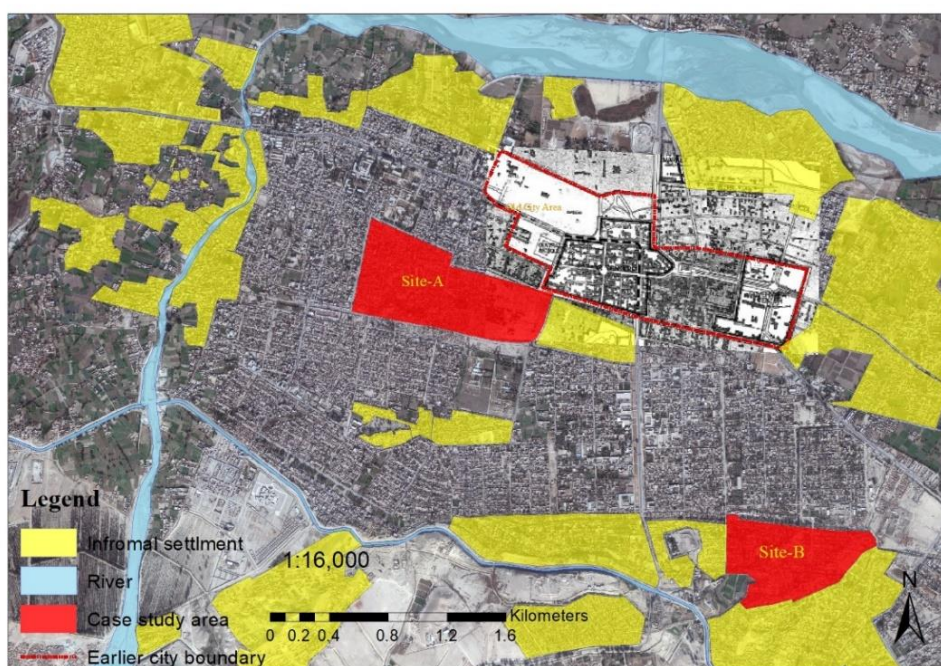


Figure 7. Built-up area and location 17 informal settlements, Source: LARA Project

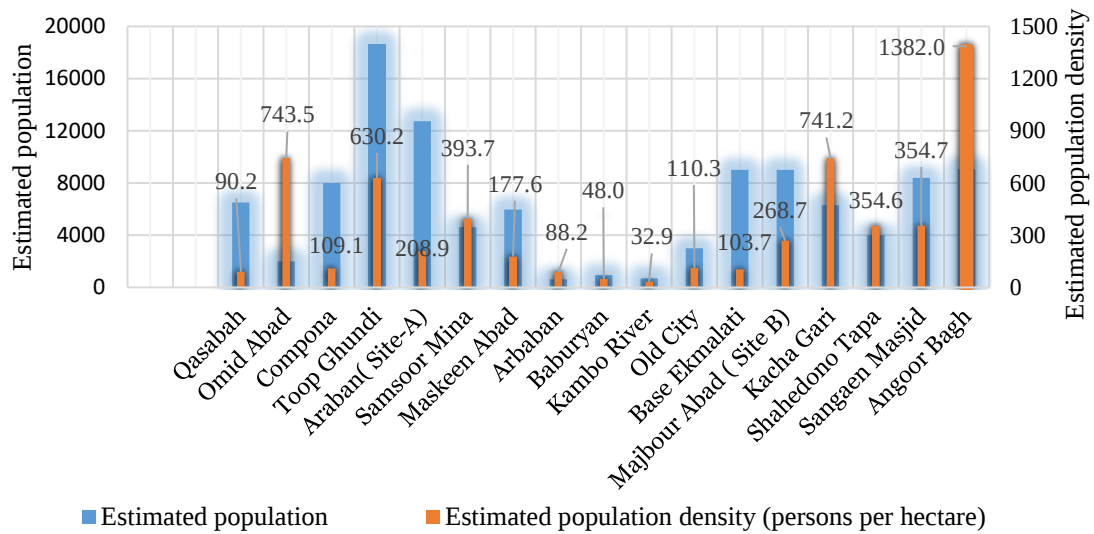


Figure 8. Population and density of 17 informal settlement areas

3.2. Characteristics of the case study areas

3.2.1 Their land use

Figure 9 illustrates the land use in Site-A (*Araban*) which has an area of approximately 665,400 square meters (sqm). This site has four community development councils, so-called *Guzar*, and each council has its own discretion for community development. Figure 10 shows proportions of land use. As shown in this table, the residential area occupies 60 % (373,000 sqm) and the commercial area total 15 % (101,350 sqm). The area of agriculture and vacant land is 1.5 % (10,200 sqm) and administration facilities and governmental facilities total 0.8 % (5,450 sqm) and 1,400 sqm (0.30%), respectively. However, religious facilities cover 1.8 % (14,000 sqm) of land use. The site has approximately 950 and 20 parcels, respectively, for residential and commercial use. This site is located in the center of the city and, therefore, most of the parcels are

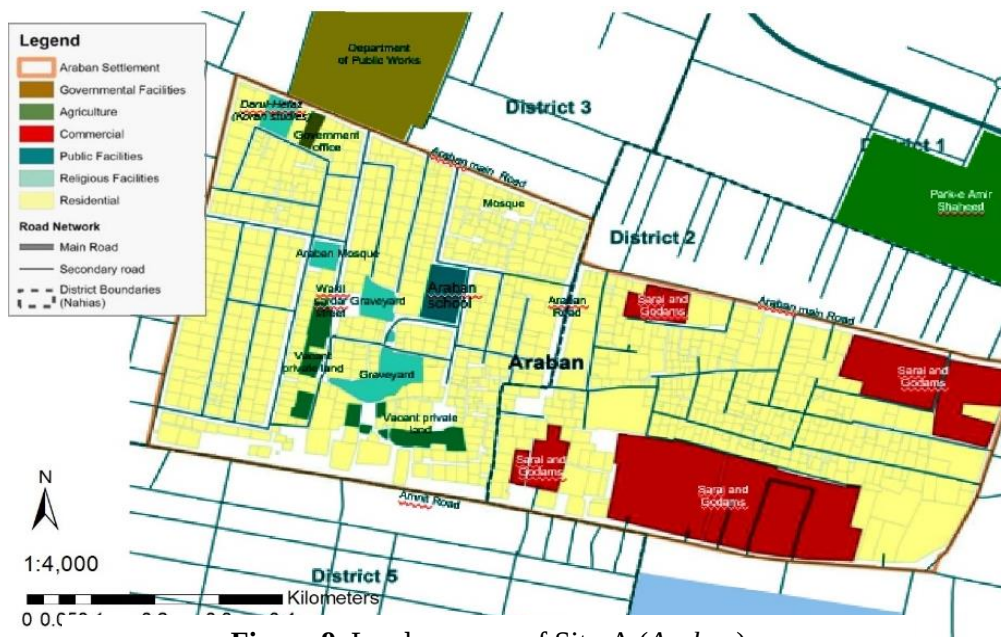


Figure 9. Land use map of Site-A (*Araban*)

generally accessible. Many drainages channels have been built either by the residents or by the UN-Habitat, but they are in poor conditions due to aging, solid blockages and disrepair. About 30% of the residents have direct or close access to main asphalted roads.

About 20% of the secondary road conditions are good. The conditions of 80% of the roads within the informal settlements, however, need alignment and pavement.

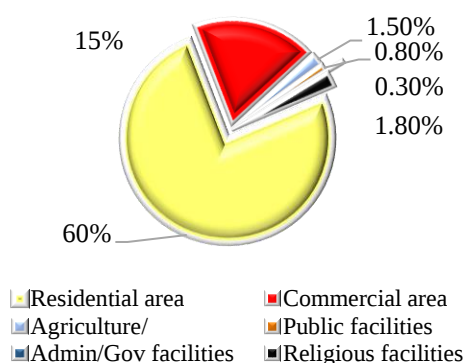


Figure 10. Land use proportion in Site-A (Araban)

3.2.2. Condition of the roads

Figure 11 shows the road conditions in Site-A

(Araban). Most of the informal settlements in Afghanistan have a similar road network pattern and four types of road characteristics. The road types and conditions in Site- A are as follows;

- 1- Main asphalted roads (Black color); these roads form the framework of the settlement and only 30% of this settlement in Site-A has direct access to these roads.
- 2- Non-asphalted streets (Brown color); Vehicles and medium-size trucks can pass over these secondary roads to access the main asphalted roads.
- 3- Non-asphalted streets (Yellow color); only car and small trucks can pass through these streets.
- 4- Narrow footpath (Red color); these paths are 80 to 120 centimeters in widths and a length of 100 to 130 meters. Around 30% of the informal settlements cannot be accessed by vehicles.

As shown above, there are streets with poor conditions, and many houses are not accessible by vehicles. In the areas away from the streets, residents just walk footpaths to reach their individual dwellings. These footpaths are usually narrow and irregular in size. In some places, the land owners have developed boundary walls for their plots and the footpaths thus blocked.

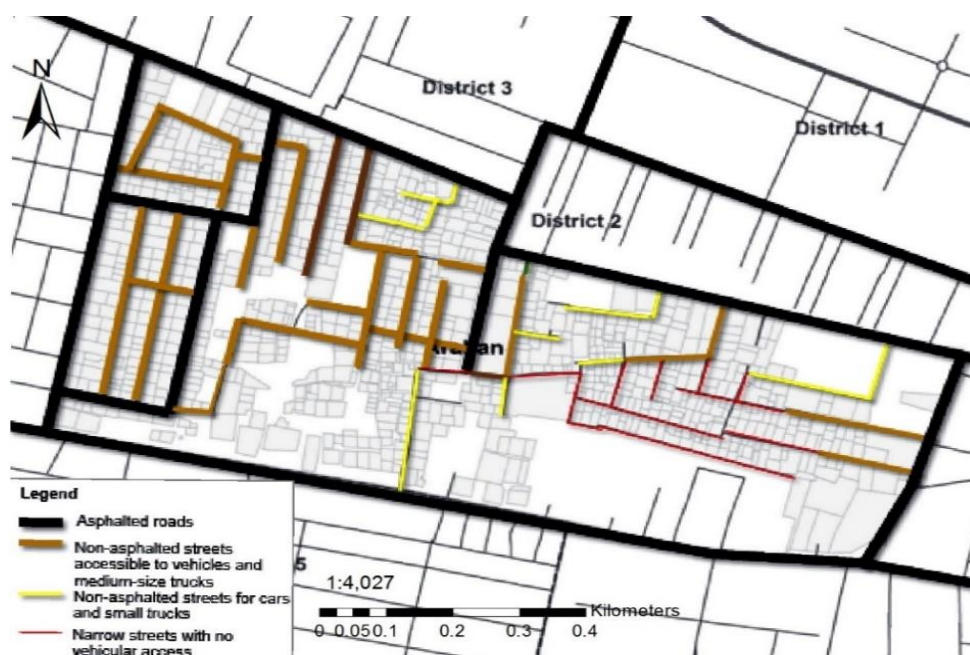


Figure 11. Road conditions in Site-A (Araban)

3.3. Assessment of land governance for the application of LRS

[Policies, laws and acts for application of LRS]

There is no explicitly defined LRS law in Afghanistan. In this Chapter, the existence of policies, laws and acts regarding land governance in Afghanistan for adopting LRS to upgrade informal settlement areas, was investigated using a questionnaire delivered to the 24 urban and regional planners listed in **Table 1** in Chapter 2.3.

Figure 12 shows the answers to the question; “Are there any policies for land improvement or governance in Afghanistan?” In the figure, 16.7 % of the expert respondents answered ‘Exist’, but 75% and 8.3% answered ‘Not existing’ and ‘Unknown’. These answers show that the Afghan governments have not explicitly defined land readjustment as a policy.

Figure 13 shows the answers to the question “Are there any laws or acts as a basis for adopting LRS?” Although 16.4% and 5.3% of the respondents answered ‘Not existing’ and ‘Unknown’, 78.3% did answered ‘Exist’. These questionnaire results reveal that LRS could be initiated and the government could prepare a LR plan and approve and implement LR projects as long as the government establishes a policy for application of LRS.

Eminent domain has been used for expropriation or compulsory purchase for some infrastructure development projects in Afghanistan. According to the current legislation in the Ministry of Justice, municipalities have the power of eminent domain and can expropriate private land for infrastructure development such as road widening and public services (AKTC, 2011⁶). Further, based on the obligation and power of the municipal law created in 2000 by the Ministry of Justice, the land readjustment by-law with 6 chapters and a total of 82 articles was proposed by JICA in 2014. The purpose of the bylaw is to lay down procedures for making and executing of land readjustment schemes in Kabul Municipality (Land Readjustment Bylaw, 2014⁷). However, after approval, the bylaw can also be implemented in other municipalities.

[Regulations for urban land management]

It is important when evaluating the applicability of LRS into urban areas to investigate the existence of regulations regarding both urban land management and land acquisition. **Figure 14** shows the answers on the existence of regulations regarding urban land management. For the question ‘Are there any regulations for urban land management?’ 83.3% of the respondents answered ‘Exist’ and 16.7% answered ‘Not existing’. For the question on an “institution for land acquisition”, the respondents answered in the same percentages, 83.3% indicated ‘Exist’ and

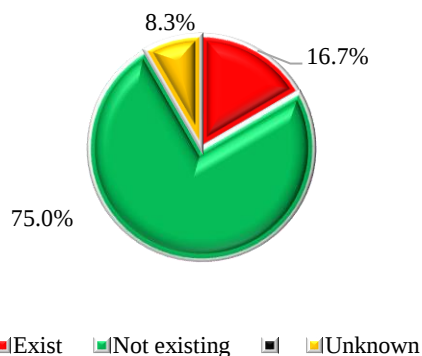


Figure 12. Existence of policies the for the LRS

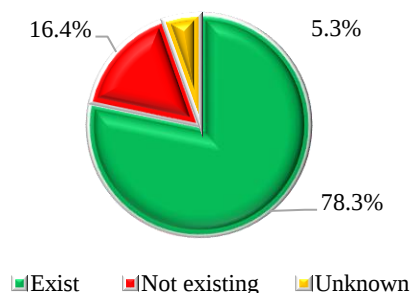


Figure 13. Exiting of Laws and Acts for application of LRS

16.7% of ‘Not existing’. However, as for the questions regarding “policies, land law related to land compensation for landowners and other parties”, the answer ‘Exist’ is relatively low at 66.6% rather than the prior answers of 83.3%.

Data, technology, people, management and funding are the five essential components for urban development and land

management systems. Land compensation is one of the key processes in LRS. These results indicate the importance of land management regulation, land acquisition, and land compensation should be comprehensively integrated like the law and regulation in Japan. (GLTN, UN-habitat 2012⁸⁾).

[Possibility for implementation of LR by municipalities]

In Afghanistan, urban sectors are governed by a range of institutions at both the national and sub-national level, most notably the Ministry of Urban Development Affairs (MUDA), the Independent Directorate of Local Governance (IDLG), and Kabul Municipality. These circumstances can cause institutional bottlenecks to effective management of the urban sectors, for example, overlapping and poorly delineated mandates (e.g., for undertaking spatial planning); a disconnect between national and municipal governance (e.g., development and implementation of an urban master plan); and formal/ informal governance (e.g., Provincial Governors have considerable informal control over municipalities even though the two are administratively separate), (State of Afghan Cities 2015 Volume 1). Applying the above viewpoint, this research focused on the implementation of urban land readjustment by the municipalities. **Figure 15** shows the answers to the question “Can municipalities implement LR projects?” where 16.7% of 24 experts answered they can do “very well”, and 25% answered “Well”. These responses indicate that it is possible implement a LR project for the upgrading of informal settlement by some municipalities. However, 50% also said ‘Maybe possible’ and 8.3% answered: “Not at all”. Some respondent replied in the description column that municipalities may conduct

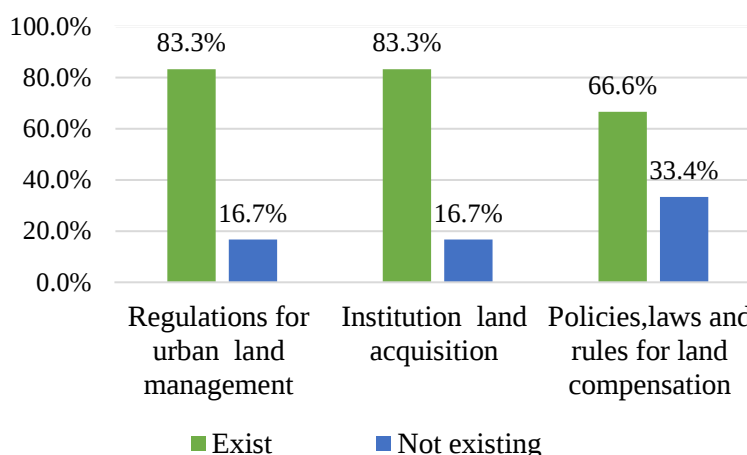


Figure 14. Existence of regulation, institution, and policy for land governance

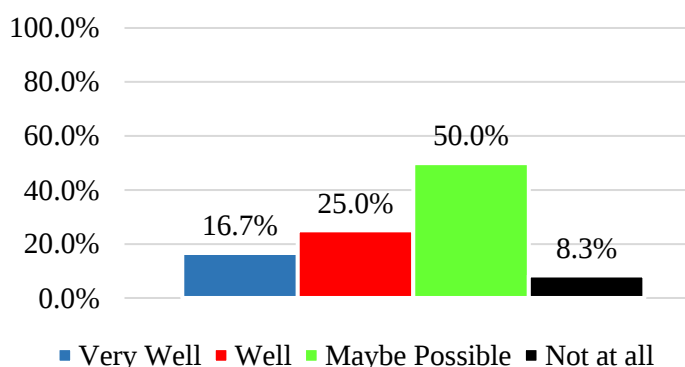


Figure 15. Possibility of municipalities implementing LR

LR projects if they get technical assistance, subsidies and authority from the national government. In Japan, local government (municipalities), central government agencies, public corporations (such as the Japan Housing and Urban Development Corporation), and private organizations can become executors of a LR project (Andre Sorensen, 2000⁹). “Projects sponsored by associations and public corporations, rely mostly on land sales, and those sponsored by local government rely mostly on national subsidies” (Schnidman, 1988¹⁰). A privately sponsored project, is designed to be self-financed since the private sectors do not obtain subsidies from the public authorities. If LRS is adopted in Afghanistan, LR projects will have to rely on selling some parts of land plots and obtain subsidies from the government as the one respondents indicated in **Figure 15**.

3.4. Questionnaire results for respondents about land plot conditions and LRS and LRRS

3.4.1. Characteristics of the respondents and land plot conditions

This section analyzed the residents’ awareness of public participation in replotting by using LRS based on the questionnaire results for the residents in Site-A (*Araban*) and Site-B (*Majbor Abad*). As shown in **Table 2** in Chapter 2, these 99 respondents were selected (59 from Site-A, 40 from Site-B). Questionnaire answers were lumped together and analyzed. **Table 3** shows these questionnaire results.

[1) Land ownership] ‘Self-own’ was 32.3% and ‘Family own’ was 59.7%, and only 8.0% answered ‘Rent’. It is better that 92% own their houses for consensus formation.

[2) Employment] 57.4% were ‘Employed’ and their major employer were the government. 32.3% were ‘Unemployed’ and 11.2% were ‘retired’.

[3) Land plot size] Most of the land plots were ‘<200’ square meter at 38.7%, 31.3% were ‘<300’ the standard in Afghanistan. 23% had ‘<400’ square meters and 3.0% had ‘<500’ square meters. However, 4.0% had ‘<100’ square meters and these small land lots may be a problem from the viewpoint of land contribution to LRRS.

[4) Infrastructure condition] 43.4% and 35.4% answered ‘Poor access road’ and ‘Multiple poor conditions’, respectively while 16.3% were facing ‘Lacking public utilities’ and 5.0% had ‘No access road’. These answers reveal that these informal settlements need to develop public facilities.

[5) Building material] 67.4% are ‘1-2 Story brick houses’ and 27.6% have ‘1-2 Story concrete houses’. As redevelopment of concrete houses is relatively expensive, it would be effective to applying LRS before concrete houses increase.

[6) Green area] 13.2% answered ‘Yes’, that they have recreational areas in their neighborhoods. However, 86.6% answered ‘Does not’ green areas in their informal settlements.

3.4.2. Awareness of LRS

This section analyzes the respondents’ understanding of LRS, their willingness to develop an informal settlement by the application of LRS and their roles in LRRS, based on the results of the questionnaire shown in **Table 3**.

[7) Knowledge of LRS] 15.2% of the respondents answered that they understand LRS “Very good” as a tool for providing urban facilities. Further, 21.2% and 34.4% answered “Good” and “Roughly” respectively. A total of 71.1% of 99 respondents have understandings about LRS. UN-Land reform project (US-AID) did an assessment of land reform and explanatory meetings of

LRS in Site-A and government surveyed and prepared an upgrading plan for Site-B. These activities may cause a relative high understanding.

Table 3. Questionnaire results of 99 respondents on land plot condition and their awareness about LRS and LRRS

1) Land Ownership				
Self-owned		Family owned		Rent
32 (32.3%)		59 (59.7%)		8 (8.0%)
2) Employment				
Employed		Unemployed		Retired
57 (57.4%)		31 (31.4%)		11 (11.2%)
3) Size of land plot				
<100 m ²	<200 m ²	<300 m ²	<400 m ²	<500 m ²
4 (4.0%)	38 (38.7%)	31 (31.3%)	23 (23.0%)	3 (3.0%)
4) Existing conditions of infrastructure on your land.				
No access road	Lack public utilities	Poor access road	Multiple poor conditions	
5 (5.0%)	16 (16.3%)	43 (43.4%)	35 (35.4%)	
5) Type of building material				
1-2 story bricks house		1-2 story concrete house	Other	
67 (67.4%)		27 (27.6%)	5 (5.0%)	
6) Existence of green area in the community.				
Exist		Not existing		
13 (13.2%)		86 (86.8%)		
7) Knowledge of LRS				
Very good		Good	Roughly	Not at all
16 (16.2%)		21 (21.2%)	34 (34.4%)	29 (29.2%)
8) Agreement on upgrading the informal settlements by LRRS.				
Very good		Good	Roughly	Not at all
56 (56.6%)		8 (8.1%)	31 (31.3%)	4 (4.0%)
9) Role of respondents in LRRS.				
Active role cooperation		Just support	Not Supporting	Protesting
51 (51.6%)		36 (36.3%)	12 (12.1%)	0 (0.0%)
10) Do you know your land value will increase by applying LRS?				
Yes		No		
68 (68.8%)		31(31.2%)		
11) Has somebody approached you to purchase of your land?				
Yes		No	Unknown	
46 (46.5%)		45 (45.5%)	8 (8.0%)	
12) How much percentage of land are you ready to contribute to an LR project?				
50 %		30-25%	< 20%	No idea
4 (4.0%)		17 (17.7%)	40 (40.2%)	38 (38.1%)
13) What type of rights do you want to convert using LRRS?				
Land to land	Land to apartment	Land to money		Not participating
34 (34.4%)	46 (46.5%)	5 (5.0%)		14 (14.1%)

[8) Agreement of LRS and 9) Role in LRS] For the question “How much do you agree with infrastructure development to upgrade the informal settlement by applying LRS?” 56.6% of the respondents answered ‘Very good’. And 8.1% and 31.3% answered ‘good’ and ‘Roughly’, respectively. Consequently 95.3% were willing to adopt LRS for upgrading the informal settlement to provide public facilities. This high percentage reveals that there is a potential for a successful LR project in these two study areas. As for the question “What will be your role in the application of LR project?” 51.6% answered a ‘Positive role’ and 36.6% answered ‘Just support’, while ‘Not supporting’ was only 12.1%. As a whole, the respondents had a positive mind toward LRS.

[10) For land value and 11) land deal] 68.8% answered ‘Yes’ to the question “Do you know your land value will increase by applying LRS?”, and only 31.2% answered ‘No’. To the question “Has anyone approached you to purchase your land?” 46.5% answered ‘Yes’. These results are interest in light of the 90% land ownership, from the viewpoint of using LRS to upgrade the informal settlements.

3.4.3. Awareness of contributions to LRS application

This section analyzed the respondents’ awareness of contributions to the application of LRS and the conversion of rights in LRRS. The answers are shown in the low areas of the above Table 3.

[12) Contribution for the application of LRS] For the question “What percent of land are you ready to contribute for LR?” 38.1% answered ‘No idea’. Some indicated that ‘They cannot decide because they don’t have a clear understanding of LRS as a tool for urban land development. However, 40.2% would contribute ‘less than 20%’ of their land, and 17.7% were ready to contribute ‘30-25%’ of their land. LRS is based on land owner participation and the consensus of all stakeholders. It will be positive situation if more than 60% of the respondents are ready to contribute their land to adopting LRS.

[13) Land right conversion] For land right conversion in LRS, the question asked was “What type of rights do you want to convert in LRRS?” ‘Land to land’ was 34.4% and ‘Land to apartment’ was 46.5%, 6.6% answered ‘Land to money’, namely that they wanted to sell their lands. The advantage of LRS is that residents can remain in their communities after the LR projects are completed. Therefore, their requirement of ‘Land to land’ can be satisfied. Since these informal settlements have a high population density, 46.5% of ‘Land to apartment’ is useful information to have for developing higher housing in any LR projects.

3.5. Relation to awareness of LRS

This section analyzed the relationship of the respondents’ answers and their awareness of LRS. Table 4 is a cross table for the number of answers the questions 7), 8), 9), 10), 12) and 13) in Table 2 above, which was concerned with the procedures for applying LRS in informal settlements. As for question “7) knowledge about LRS” and other answers, we focus on the 15 respondents who answered ‘Very good’. All of the 15 persons answered ‘Very good’ in “8) Agreement of LRS”, 11 persons answered ‘Active role’ in “9) Role in LRRS”. 13 of 15 persons answered ‘Yes’ to the question “10) Awareness on land value increasing”. These results indicate the importance that governments need to address to publicize the characteristics and advantages of LRS for proceeding with LR projects. As for the question “8) Agreement of LRS”, 56 persons answered ‘Very good’, 38 of them answered ‘Active role’ for “9) Role in LRRS”, and answered ‘Yes’ to the question “10) Awareness on land value increasing”. Namely, these three factors had a relationships with each other. As for “9) Role in LRRS”, 51 persons answered ‘Active’ and 36

Table 4. Cross table for the number of answers for Questions 7), 8), 9), 10), 12) and 13)

Cross tabulation		7)Knowledge of LRS			8)Agreement on upgrading by LRRS.			9)Role in LRRS			10)Awareness on increasing		11) Has somebody approached you to purchase your land			12)Land contribute to an LR project			13) Rights convert using LRRS							
		Very good	Good	Roughly	Not at all	Very good	Good	Roughly	Not at all	Active role	Just support	Not supporting	Prot. estimating	Yes	No	Yes	No	Unkown	50%	30-25%	< 25 %	No idea	Land to land	Land to apartment	Land to money	Not participating
7) Knowledge about LRS	Very good	16				15	0	1	0	11	3	2		13	3	5	10	1	2	2	5	7	5	10	2	1
	Good		20			11	3	6	0	11	6	3		15	5	12	7	1		6	9	5	6	10	2	2
	Roughly			32		16	4	10	2	14	15	3		21	11	13	17	2	1	7	12	12	11	15	1	5
	Not at all				31	14	1	14	2	16	12	3		18	13	16	14	1	1	14	2	14	12	11	2	6
8) Agreement on upgrading the informal settlements by LRRS	Very good					56				38	13	5		37	19	35	18	3	4	13	29	10	22	29	1	4
	Good						8			4	3	1		5	3	3	5			1	3	4	4	3	1	
	Roughly							31		8	18	5		23	8	6	23	2		3	8	20	8	13	2	8
	Not at all								4	2	2			2	2	2	2					4		1	1	2
9) Role in LRRS	Active role cooperation									51				31	21	32	16	4	3	14	22	13	21	21	2	8
	Just support										36			27	9	12	23	1	1	3	11	21	12	16	2	6
	Not Supporting											12		9	2	2	9				7	4	1	9	1	
	Protesting											0														
10)Awareness on increasing the land value by LRS	Yes												68			27	37	3	4	15	22	26	24	31	2	10
	No														31	19	11	2		2	18	12	10	15	3	4
11) Has somebody approached you to purchase your land	Yes															46			1	12	26	7	20	20	1	5
	No																45		2	5	11	30	13	25	4	6
	Unkown																	8	1		3	1	1	1	3	
																			4				2	2		
12) Land contribute to an LR project	50%																			17			9	8		
	30-25%																				40		12	23		5
	< 20 %																							11	13	5
	No idea																							34		
13) Rights convert using LRRS	Land to land																									
	Land to apartment																							46		
	Land to money																								5	
	Not participating																									14

persons answered 'Just support'. Although 31 of the 51 persons and 27 of the 36 persons answered 'Yes' to question "10) Awareness on land value increasing", a relationship could not be seen between these two factors. In the answers to "12) Land contribution", 40 persons who answered '20% of land' were the largest number. If the average area of a land plot can be assumed to be 250 square meter (JICA, 2006¹¹), 20% was about 50 square meters. This area of 50 square meters is valuable for developing the infrastructure in informal settlements. Further, 12 and 23 persons of the 40 answered 'Land to land' and 'Land to apartment' to question "13) What type of right do you want to convert in the LRRS?", respectively. These answer' proportion of 12:23 is similar to the proportion 5:10 of the 15 persons who answered 'Very good' and 6:10 of 21 persons who answered 'Good' in the question "7) knowledge about LRS". These results reveal that governments need to keep land parcels for individual families and land parcels for apartment buildings in any land re-plotting during LR projects.

4. Conclusion and Discussion

This research evaluates the applicability of the land readjustment re-plotting sub-system (LRRS) to the rehabilitation of informal settlements in Afghanistan and especially focused on the existence of land governance laws and acts for the application of the land readjustment system (LRS), utilizing on the questionnaire given to 24 experts. Two case study areas, Site-A (*Arabaan*) and Site-B (*Majbor Abad*), were selected from 17 informal settlements in Jalalabad City and a questionnaire survey was conducted to analyze the residents' participation, awareness of re-plotting their land plots and land contributions to rehabilitate of the informal settlements by applying LRS. Thus, the results of this research can be summarized as follows:

1) Analyses of land and road conditions in Site-A (*Arabaan*) revealed that many drainages channel have been built either by the residents or by the UN-Habitat, but they are in poor conditions due to aging, solid blockages, and disrepair. About 30% of the residents have direct or close access to main asphalted roads and about 20% of secondary road conditions are good. However, 80% of the roads need alignment and pavement. Footpaths are 80 to 120 centimeters in width and a length of 100 to 130 meters, and around 30% of these informal settlements cannot be accessed by vehicle. The data indicate that informal settlements have poor infrastructure that needs to be improved.

Questionnaire results for the 99 residents in Site-A (*Arabaan*) and Site-B (*Majbor Abad*) revealed that 92% of respondents have their own land. This high ownership ratio is an important point when introducing LRS.

2) A questionnaire survey given to the 24 experts revealed that there is no policy explicitly defined for LRS in Afghanistan. However LRS could be adopted and conducted for informal settlement development based on the existing laws and acts regarding urban land management. If the governments establish that policy concern, local governments may have the possibility of conducting LR projects even if the national government has comprehensive policies for LRS, authorities, subsidies, and technical assistance.

3) The questionnaire results for the 99 residents revealed that about 70% including the 'Roughly' answers have knowledge of LRS, and most agree with adopting LRRS and are willing to play an active role and support it as stakeholders. These results indicate that governments firstly need to publicize the characteristics and advantages of LRS before proceeding with LR projects.

As for the land contribution rate, the greatest number of 40 respondents answered that they are ready to contribute '20% of a land plot'. This 20% is almost the same as the finding in Japan

and represents a feasible value for a LR project. Yet 43% and 57% of 79 respondents owning land plots answered that they want to exchange their land right to 'Land to land' and 'Land to apartment', respectively. These results reveal that governments need to keep land parcels for individual families and the land parcels for apartment buildings in any land replotting done for LR projects. From these results, it is clear that LRRS has the capability and applicability for undertaking the rehabilitation of informal settlements in Afghanistan.

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