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Applying International Land Readjustment Practices into Ger Area Redevelopment: A Case Study of the 35th Khoroo, Bayanzurkh District, Ulaanbaatar

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Abstract

Ger areas in Ulaanbaatar face significant challenges in infrastructure, land use, and tenure security. Land readjustment (LR) is a collaborative land development tool that could facilitate ger area redevelopment by pooling fragmented plots, providing infrastructure, and equitably reallocating land to owners. This study examines international LR models and experiences – including cases from Japan, Germany, Turkey, Serbia, and Taiwan – to derive insights for the Mongolian context. Key features such as legal frameworks, land contribution ratios, stakeholder participation, and value capture mechanisms are compared. The methodology combines a literature-based comparative analysis with an empirical case study of Bayanzurkh District's 35th khoroo (BZD 35) in Ulaanbaatar. In BZD 35, a pilot project applies LR principles to reorganize ~66.7 hectares of ger area land, addressing fragmented ownership deficits. Results include an integrated plan for new roads, service networks, and re-parceled residential plots, achieved through land pooling contributions from existing landholders. International best practices – from Japan's consensus-driven approach to Turkey's legislated land contribution and Taiwan's cost-equivalent land method – inform a proposed hybrid LR model for Mongolia. The discussion highlights how a tailored LR approach could improve ger area redevelopment outcomes, given Mongolia's legal and social context. The study concludes that land readjustment, if adapted appropriately, offers a viable, inclusive, and self-financing mechanism for sustainable ger area upgrading in Ulaanbaatar.

Keywords: *Land readjustment; Ger area; Ulaanbaatar; Urban redevelopment; International comparison; Land pooling*

Гэр хорооллын газрыг дахин зохион байгуулах олон улсын туршлагыг дахин төлөвлөлтөд ашиглах нь: (Улаанбаатар хотын Баянзүрх дүүргийн 35-р хорооны жишээн дээр)

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Хураангуй

Улаанбаатар хотын алслагдсан гэр хорооллын бүсүүдэд дэд бүтэц, газар ашиглалт, газрын эрхийн бүртгэлийн олон бэрхшээлүүд байсаар байна. Үүнийг цогц байдлаар шийдэх боломж, арга замыг судлаачид мэргэжилтнүүд өнөөг хүртэл эрэлхийлсээр байгаа билээ. Газар дахин зохион байгуулалт (ГДЗБ) нь гэр хорооллын хөгжлийг хамтын ажиллагаанд суурилан дэмжих үйл ажиллагаа бөгөөд салангид, жижиг талбар газруудыг нэгтгэж, дэд бүтцийн сүлжээ бий болгох замаар үнэ цэнийг нэмэгдүүлж, газрыг шударга зарчмаар дахин хуваарилахад чиглэсэн мэргэжлийн үйл ажиллагаа юм. Энэ судалгаанд Япон, Герман, Турк, Серби, Тайван зэрэг улс орнуудын газар дахин зохион байгуулалтын загвар, туршлагыг судлан Монголд тохирох боломжийг тодорхойлохыг зорьсон. Судалгааны аргазүй нь олон улсын туршлагын харьцуулсан шинжилгээний аргыг Улаанбаатар хотын Баянзүрх дүүргийн 35-р хороонд явуулсан судалгаатай харьцуулан авч үзэв. Үүний тулд эрх зүйн зохицуулалт, газар хуваарилах хувь хэмжээ, талуудын оролцоо, газрын үнэлгээнд суурилсан хөрөнгө оруулалтын механизм зэрэг гол үзүүлэлтүүдийг харьцуулсан болно. Түүнчлэн Баянзүрх дүүргийн 35-р хорооны Сайрын амны 66.7 га газарт хийгдэж буй ГДЗБ-ын төслийн хүрээнд оршин суугчдын оролцоог хангах замаар газрыг дахин хуваарилалтад оруулж, шинэ автозам, дэд бүтцийн сүлжээ бүхий цогц төлөвлөлтийн ажлыг судалгааны багийн зүгээс гүйцэтгэсэн болно. Үр дүндээ тулгуурлан Японы зөвшилцөлд тулгуурласан арга барил, Туркийн газрыг эргүүлэн авах тогтолцоо, Тайваний өртөг тэнцвэржүүлэх загвар зэрэг олон улсын шилдэг туршлагуудыг онцолж Монгол Улсад тохирсон холимог загварыг боловсруулахад ашигласан. Монголын хууль эрх зүйн болон нийгмийн орчинд нийцүүлэн боловсруулсан газар дахин зохион байгуулалтын арга зүй нь гэр хорооллыг дахин төлөвлөх ажлыг үр дүнтэй, оролцоотой, санхүүгийн хувьд өөрөө бүрэн шийдвэрлэх боломжтой шийдэл байж болохыг илэрхийллээ. Судалгааны ажлыг нийтэд нь дүгнэхэд газар дахин зохион байгуулалтыг оновчтой арга зүй, загварт тулгуурлан зохион байгуулж, хэрэгжүүлбэл Улаанбаатарын гэр хорооллын нөхцөлийг сайжруулах олон боломж бүхий бодит үр дүн өгөхөөр шийдэл болох боломжтой.

***Түлхүүр үгс**: Газар дахин зохион байгуулалт, гэр хороолол, Улаанбаатар, хотын дахин хөгжүүлэлт, олон улсын харьцуулалт, газар нэгтгэх*

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Introduction

Ger areas are low-density, informal settlements typically located in the peri-urban zones of Ulaanbaatar, where residents live in traditional Mongolian dwellings (gers) or detached houses. These areas generally lack access to essential urban services such as piped water, sewage systems, and district heating. The rapid expansion of ger areas since the 1990s has been driven by rural-to-urban migration, limited housing options, and gaps in land management policies (Kamata et al., 2010; Asian Development Bank, 2014; World Bank, 2019).

Ger areas in Ulaanbaatar, characterized by informal settlements of yurts and self-built houses, have expanded rapidly over recent decades. These areas face serious challenges, including inadequate infrastructure, fragmented land ownership, and limited access to basic urban services. Addressing these issues without displacing current residents remains a central challenge for Mongolian urban policy.

Land Readjustment (LR), also known as land pooling or replotting, offers a potential solution. LR involves landowners pooling their parcels, allowing for comprehensive infrastructure planning, after which they receive proportionally smaller but better-serviced plots. This mechanism has been used effectively in both developed and developing countries to promote equitable urban redevelopment while minimizing displacement and public acquisition costs (UN-Habitat, 2016; Sorensen, 2000).

Historically, LR originated in early 20th-century Germany through the Lex Adickes law and was instrumental in Japan's post-war urban reconstruction. Japan's model, emphasizing voluntary participation and local consensus, later influenced the development of LR systems in South Korea and Taiwan (Djokic et al., 2021). Turkey also adopted a variant of LR to support new urban expansions, integrating public land reservation into planning without requiring full compensation (Šoškić et al., 2022).

More recently, transition economies like Serbia have piloted LR projects to address informal settlements and fragmented land tenure systems. These international cases highlight the importance of robust legal frameworks, community participation, and transparent value-sharing mechanisms for LR to succeed (Arendt, 2003; Yun, Lee, 2015).

In Mongolia, LR is not yet institutionally established, but the characteristics of ger areas—such as mixed formal-informal tenure and infrastructure deficits—suggest a high relevance. A pilot LR project in the 35th khoroo of Bayanzurkh District (BZD 35) provides a timely opportunity to test the applicability of international models under local conditions.

This study aims to bridge global LR experiences and Mongolian realities. It addresses three main questions: (1) What international LR lessons are relevant for Mongolia (2) How can these inform the planning and implementation of LR in BZD 35? (3) What adjustments are needed for Mongolia's legal and institutional framework to adopt LR at scale.

The remainder of the paper presents a comparative literature review, outlines a methodology adapted from international LR frameworks (Šoškić et al., 2022), details the BZD 35 case study, and critically evaluates the findings in the context of Mongolia's urban planning landscape. The primary aim of this study is to examine the applicability of international land readjustment (LR) practices to the redevelopment of ger areas in Ulaanbaatar, Mongolia. The research ultimately aims to contribute to the development of a context-appropriate LR model that addresses the unique land tenure and infrastructure challenges of Mongolia's ger area.

Study Area

Ulaanbaatar, the capital and largest city of Mongolia, is located in a high-altitude basin within the Khentii mountain range, approximately 1,350 meters above sea level. Positioned along the Tuul River in the north-central part of the country, the city functions as Mongolia's primary cultural, industrial, and financial center, and serves as the core of the national road network. It experiences a cold semi-arid climate with long, dry winters and short, warm summers (Batjargal, 1997; Boldbaatar et al., 2024)

Bayanzurkh District's 35th Khoroo (BZD 35), also known as Sairyn Am, is located on the northeastern fringe of Ulaanbaatar, Mongolia's capital city. This area epitomizes the spatial and socio-economic complexities of Ulaanbaatar's ger area. Informally settled beginning in the early 1990s during the post-socialist transition, BZD 35 has grown into a low- to medium-density residential enclave characterized by self-built ger compounds, fragmented land tenure, minimal infrastructure, and limited access to public services.

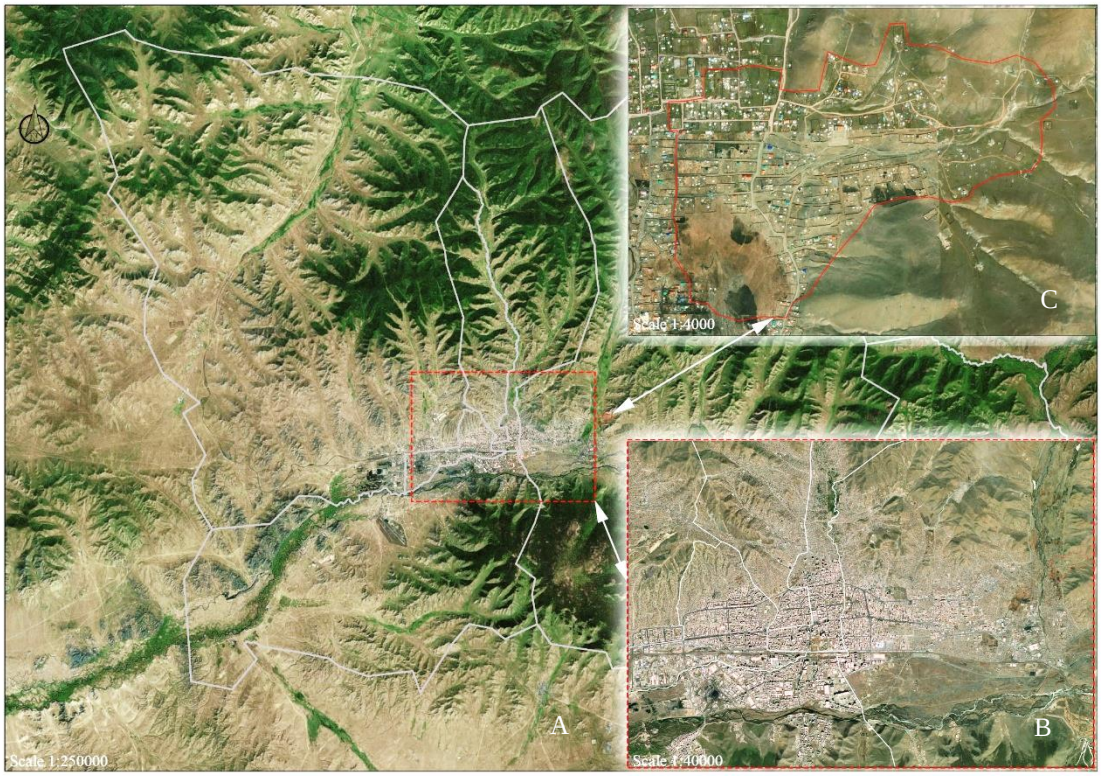

Figure 1. Location map of study area A. Ulaanbaatar city B. Built up area C. Bayanzurkh District's 35th Khoroo

Covering approximately 66.7 hectares, the project area includes an estimated 695 land plots, inhabited by around 3,000–4,000 people across nearly 700 households. Land tenure data reveals a highly irregular pattern: only 11% of plots are formally titled, 36% held through possession licenses, and 53% occupied informally with no legal documentation. This prevalence of informal and semi-formal land occupation presents a central challenge for urban upgrading but also offers an opportunity for tenure regularization through land readjustment (LR).

The site's topography varies from relatively flat terrain in the valley bottom to steep slopes on its northern and southern edges, affecting development patterns and complicating infrastructure provision. Environmental assessments indicate vulnerability to seasonal flooding and seismic activity, requiring careful planning to mitigate hazards.

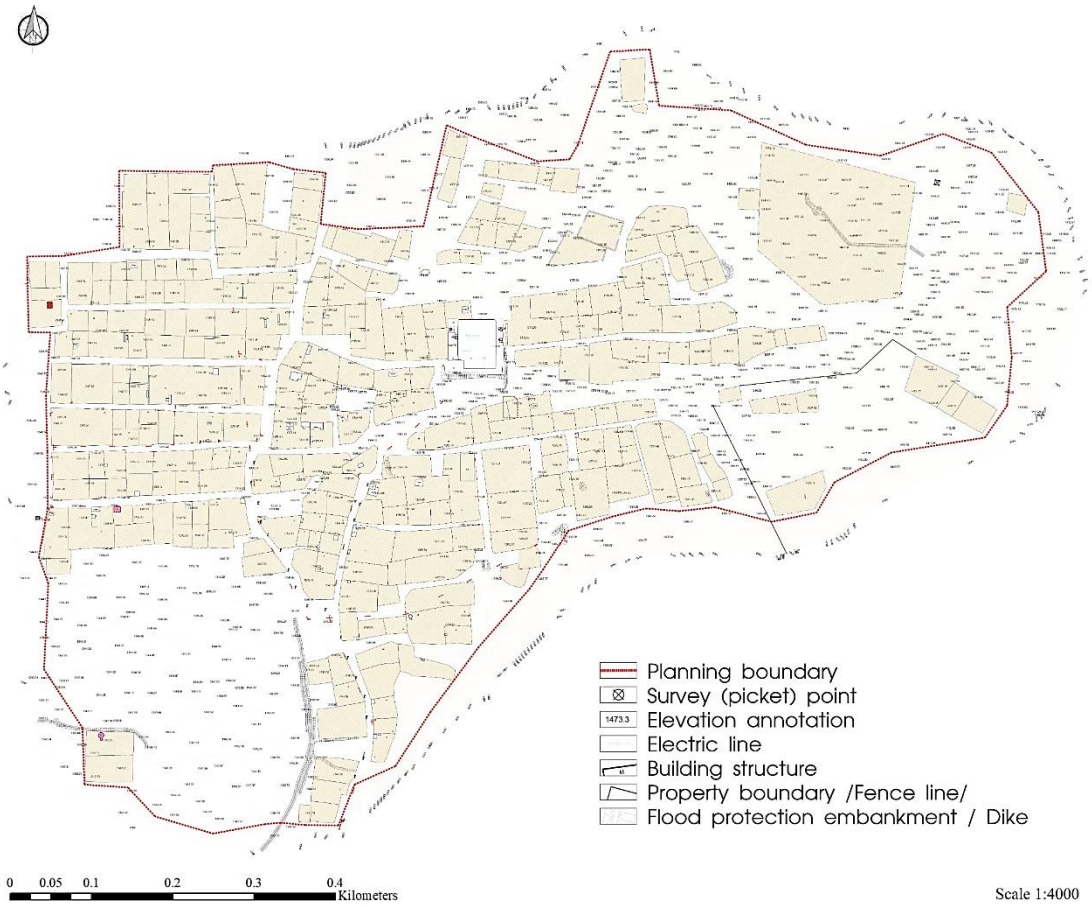

Figure 2. Pre-Planning Topographic Survey Map of BZD 35

Existing infrastructure is sparse. The internal circulation system comprises unpaved, unplanned tracks, most of which are impassable during inclement weather. Households lack piped water and sewer connections, relying instead on water kiosks and pit latrines. The electricity grid reaches only parts of the neighborhood, with frequent issues related to overload and safety due to informal splicing. Central heating is absent, and most households depend on coal-fired stoves, contributing to Ulaanbaatar's severe winter air pollution.

Public facilities within BZD 35 are scarce. While a single local school and administrative center serve the population, most residents travel outside the khoroo for health services, markets, or childcare. The area's land use profile is overwhelmingly residential (51.1%), with negligible institutional and commercial presence. Notably, 48.5% of plots are either vacant or undefined, often due to unsuitable terrain or unregistered occupation.

Given these characteristics, BZD 35 was selected by the Ulaanbaatar City Municipality for a pilot LR project aimed at reconfiguring plots, installing basic infrastructure, and regularizing tenure. The location's combination of informality, underutilized land, and municipal interest rendered it an ideal candidate for applying and evaluating an adapted LR model. The aim is to transform a fragmented, underserved area into a legal, serviced, and more inclusive neighborhood, while minimizing resident displacement and leveraging land value for self-financing redevelopment.

Methodology

This study applies a comprehensive mixed-methods approach to explore the feasibility and application of land readjustment (LR) for informal settlement redevelopment in Mongolia. Specifically, the research combines international comparative analysis with empirical site investigation and participatory planning to design a contextual LR model for Bayanzurkh District's 35th Khoroo (BZD 35). The methodological structure consists of three interlinked components: (1) Comparative literature review; (2) In-depth site-level data collection and analysis; and (3) Planning scenario development grounded in the land readjustment framework.

Comparative Literature Review: A structured review of international land readjustment literature was undertaken to identify transferable principles applicable to the Mongolian context. Key cases included Germany (formalized, compulsory LR), Japan (voluntary, consensus-driven LR), Turkey (top-down LR through municipal authority), Serbia (transitional, hybrid LR models), and Taiwan (dual public-private LR implementation). Central variables analyzed included: legal mandates, institutional setup, landowner participation thresholds, land contribution percentages, value capture mechanisms, project duration, and stakeholder engagement strategies (Djokic et al., 2021; Sorensen, 2000; Šoškić et al., 2022).

The following table presents a synthesized comparison of international land readjustment (LR) models based on key criteria: legal basis, initiation mechanism, landowner participation, typical land contribution, infrastructure financing, and project outcomes. This comparative framework informs the contextual adaptation of LR principles to the Mongolian urban setting.

Table 1. Comparison of international Land Readjustment Models

Country	Legal Basis	Initiation Mechanism	Owner Participation	Typical Land Contribution	Infrastructure Financing	Key Outcomes
Germany	Codified in municipal law (Lex Adickes)	Municipal authority	Mandatory (once declared)	20–40%	Municipality; reserve land sales	Orderly suburban growth, strong legal appeal rights
Japan	Land Readjustment Act	Local gov't or landowner associations	Voluntary (~2/3 consent)	30–40%	Reserve land sales	Post-war reconstruction, participatory planning
Turkey	Development Law (Article 18)	Municipality (top-down)	Compulsory	30–45%	Public land deduction	Rapid urban expansion, low community input
Serbia	Emerging legal framework	Pilot projects by planners	Mixed (consultation-based)	Flexible (based on model)	Municipal land allocation	Regularization of informal areas
Taiwan	Urban Planning Law & LR Law	Public or landowner-led	Voluntary (registered association)	30–40%	Reserve land; tax incentives	Urban edge development, legal tenure

Analytical Framework and Case Study Assessment: To quantitatively assess the feasibility and projected impacts of land readjustment (LR) in BZD 35, the study applies a set of analytical formulae based on international LR methodologies. These formulae are adapted from existing literature to reflect best practices in measuring land contribution, value uplift, equity, and stakeholder participation (Djokic et al., 2021; Lin & Lai, 2007; Sorensen, 2000; UN-Habitat, 2016).

The proportion of land contributed by property owners to support public infrastructure development is assessed using the Land Contribution Ratio (LCR), calculated by dividing the contributed land area by the original land area and multiplying the result by 100. This ratio offers a clear metric to evaluate the land pooling burden shared among stakeholders and reflects the physical feasibility of implementing LR (Sorensen, 2000).

$$LCR = \frac{A_c}{A_o} \times 100 \quad (1)$$

Where A_c = Area of land contributed (m²), A_o = Original land area (m²).

To estimate the financial benefit to landowners following LR implementation, the Land Value Uplift (LVU) is calculated. It measures the percentage increase in land value due to infrastructure upgrades by comparing pre- and post-project land values. This indicator helps determine the effectiveness of LR as a value-capturing mechanism and supports future cost-benefit analyses (Lin & Lai, 2007).

$$LVU = \left(\frac{V_a - V_b}{V_b}\right) \times 100 \quad (2)$$

Where V_a = Land value after LR (MNT/m²), V_b = Land value before LR (MNT/m²).

The Value Equivalence Index (VEI) evaluates whether landowners receive equivalent or improved land value after plot reallocation. It is calculated by comparing the product of the new plot's area and value to that of the original plot. A VEI of one or more indicates that reallocation outcomes meet or exceed pre-existing land value, reinforcing fairness and equity principles in LR (Djokic et al., 2021).

$$VEI = \frac{A_n \cdot V_n}{A_o \cdot V_o} \quad (3)$$

Where A_n, V_n= Area and value of new plot, A_o, V_o = Area and value of original plot.

To assess the financial sustainability of LR projects, the Cost Recovery Ratio (CRR) compares the total value of reserved (municipal) land, which may be sold or developed, to the infrastructure investment costs. A CRR equal to or greater than one suggests that LR can be self-financing and less reliant on external funding (UN-Habitat, 2016). This measures the extent to which infrastructure costs are recoverable through the value of reserve land:

$$CRR = \frac{R_l}{C_i} \quad (4)$$

Where R_l = Total value of reserved (municipal) land, C_i = Total infrastructure cost.

Finally, the Stakeholder Consensus Ratio (SCR) is used to measure voluntary participation. It is calculated by dividing the number of stakeholders who consented to the LR process by the total number of affected stakeholders and multiplying by 100. This ratio gauges public support and legitimacy, which are crucial in voluntary or semi-voluntary LR models, such as those seen in Japan and Mongolia (Sorensen, 2000).

$$SCR = \frac{N_s}{N_t} \times 100 \quad (5)$$

Where, N_s = Number of stakeholders who provided formal consent, N_t = Total number of affected stakeholders. These indicators support an evidence-based approach to evaluating LR implementation and provide a foundation for comparative analysis with international cases.

The selected site for the case study is the 35th khoroo of Bayanzurkh District (BZD 35), a ger area comprising 66.7 hectares on the northeastern fringe of Ulaanbaatar. Data collection included topographic mapping, land ownership analysis, socio-economic profiling, and review of urban development plans. A detailed cadastral survey showed that only 11% of plots had formal titles, 36% held temporary possession certificates, and 53% were informally occupied. The dominant land use was residential, while 48% of plots were vacant or environmentally constrained (Final LR Report, 2024).

Table 2. Land use composition in BZD 35

Land Use Type	No. of Plots	Share (%)
Unregistered/Unclear	367	52.8%
Residential Ger Compounds	325	46.7%
Educational	2	0.3%
Enterprise	1	0.15%
Total	695	100%

Land Readjustment Scenario Development: The planning framework was guided by Šoškić et al.'s (2022) four-model LR typology. BZD 35 matched Model 2: modifying an existing partial plan while initiating LR. The planning process involved: (1) community consultation; (2) calculation of required land for infrastructure (~33% of total area); (3) uniform land contribution model; (4) reallocation

algorithm based on land valuation; and (5) regulatory approval with owner consent agreements. Figure 1 illustrates the LR process schema applied.

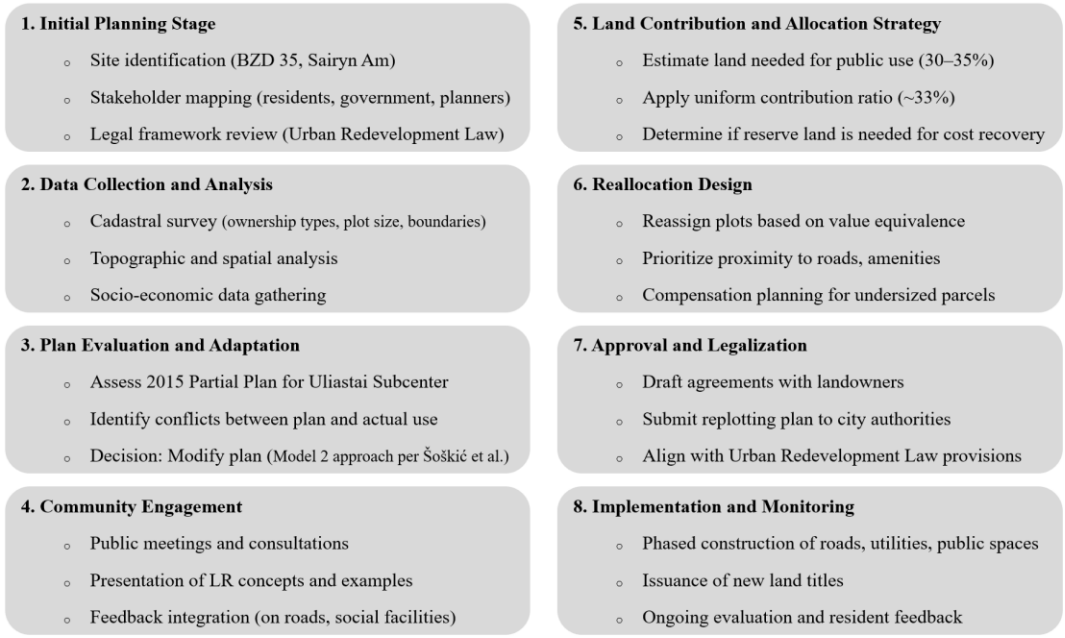

Figure 3. Conceptual schema of LR process for BZD 35

To ensure equity, the reallocation algorithm emphasized value equivalence: owners received reconfigured plots of equal or higher market value, accounting for location, access, and utility connections. For owners whose remaining area fell below the minimum plot size, compensation was arranged either through additional land, social housing units, or monetary payment.

Figure 4. Implementation Progress According to the Conceptual Schema of the Land Readjustment (LR) Process

Results

This section outlines the comprehensive outcomes of implementing a land readjustment (LR) scheme in the ger area of Bayanzurkh District's 35th khoroo (BZD 35). The findings are organized into four thematic areas: (a) modifications to the original land use plan and the updated spatial layout; (b) the distributional effects of land contributions and the reallocation process; (c) planned infrastructure improvements and service provision; and (d) projected social, economic, and urban impacts. These

outcomes are substantiated by spatial analysis, stakeholder feedback, field data, and references to international benchmarks and best practices.

Modified Plan and Land Use Layout: The 2015 partial urban development plan for the Uliastai subcenter served as the foundational document for the redevelopment of BZD 35. However, field surveys and stakeholder consultations revealed that the original plan required significant adaptation to address ground-level realities and community needs. Consequently, a revised land use layout was developed, balancing regulatory standards with on-site constraints.

The revised plan organizes the formerly fragmented and irregular plots into a coherent grid-based structure, integrating a three-tiered road hierarchy: (1) a 12-meter-wide primary loop road providing external linkage; (2) 8-meter-wide secondary access roads; and (3) 6-meter-wide tertiary internal pathways. Approximately 30% of the total 66.7-hectare area (about 20.1 hectares) is designated for roadways and rights-of-way, improving circulation and emergency service access, which were previously limited due to narrow footpaths and informal passages.

Private residential land comprises 43.5 hectares post-readjustment. Each of the 695 initial households, including 367 informal settlers, receives a reconfigured and titled plot, averaging 300–500 m², in lieu of their original land. Though smaller than the pre-readjustment average (~700–800 m²), these plots are legal, regularly shaped, and directly accessible by road. Approximately 3% of the site (around 2 hectares) is reserved for public amenities, including a centrally located 0.5-hectare parcel for a kindergarten or community center and distributed green spaces totaling 1 hectare. Additionally, 0.5 hectares of northern hillside are designated as undeveloped green slope for environmental protection and recreational use.

Crucially, the plan earmarks 4.5 hectares (6.7%) for municipal reserve plots. These high-value parcels—located along primary roads—are intended for mixed-use development and future monetization. Revenue generated through the sale or lease of these plots is expected to contribute significantly to covering infrastructure investment costs, a model consistent with the "cost-equivalent land" approach used in Japan and Taiwan (Sorensen, 2000; UN-Habitat, 2016).

Land Contribution and Reallocation Outcomes: The project applies a uniform land contribution rate of 33% from each parcel, following international norms (e.g., 30–40% in Japan and Taiwan). The reallocation principle emphasizes value equivalence rather than area equality, ensuring that the returned plot's market value is at least equal to that of the original holding (Djokic et al., 2021). Table 3 provides a hypothetical scenario:

Table 3. Illustration of land readjustment for a sample plot (hypothetical)

Original Area	Contribution (33%)	New Area	Estimated Value Increase
600 m²	198 m²	402 m²	+120%

Though average plot areas declined to 60–70% of their original size, the inclusion of infrastructure and legal tenure more than offsets this loss in terms of value. Ger-area land in Bayanzurkh was valued at approximately 38,000 MNT/m² before the project. Post-redevelopment, prices for serviced land with road access and formal titles are expected to exceed 100,000 MNT/m², implying a potential increase of 100–150% in asset value for residents (Final Report on Land Readjustment in BZD 35, 2024).

Plot reallocation aimed to preserve proximity to original locations where feasible, maintaining social cohesion. Educational and small commercial plots were also retained and repositioned to optimize accessibility and functional integration with new infrastructure.

Infrastructure and Service Provision: One of the core benefits of LR is the facilitation of public infrastructure provision in previously underserved informal areas. In BZD 35, the following upgrades are planned:

- Roads: A 7.8-kilometer network of paved and gravel roads with sidewalks and drainage infrastructure will replace unplanned paths. This network enhances mobility, safety, and service access.
- Utilities: Primary utility corridors are now defined. The first phase includes electrical upgrades via new substations and cabling aligned along road easements. Water kiosks and sanitation facilities are to be established on reserved plots, with a long-term plan to extend centralized sewerage and district heating from the Amgalan hub.
- Public Amenities: Land has been secured for a kindergarten, market stalls, and small parks, reflecting UN-Habitat's recommendation to enhance social infrastructure in low-income neighborhoods (UN-Habitat, 2016).
- Drainage and flood mitigation: A designated 10-meter-wide channel along the existing stream will serve as a drainage corridor. Additional culverts and erosion controls are planned to address historic flooding risks in the lower elevations of BZD 35.

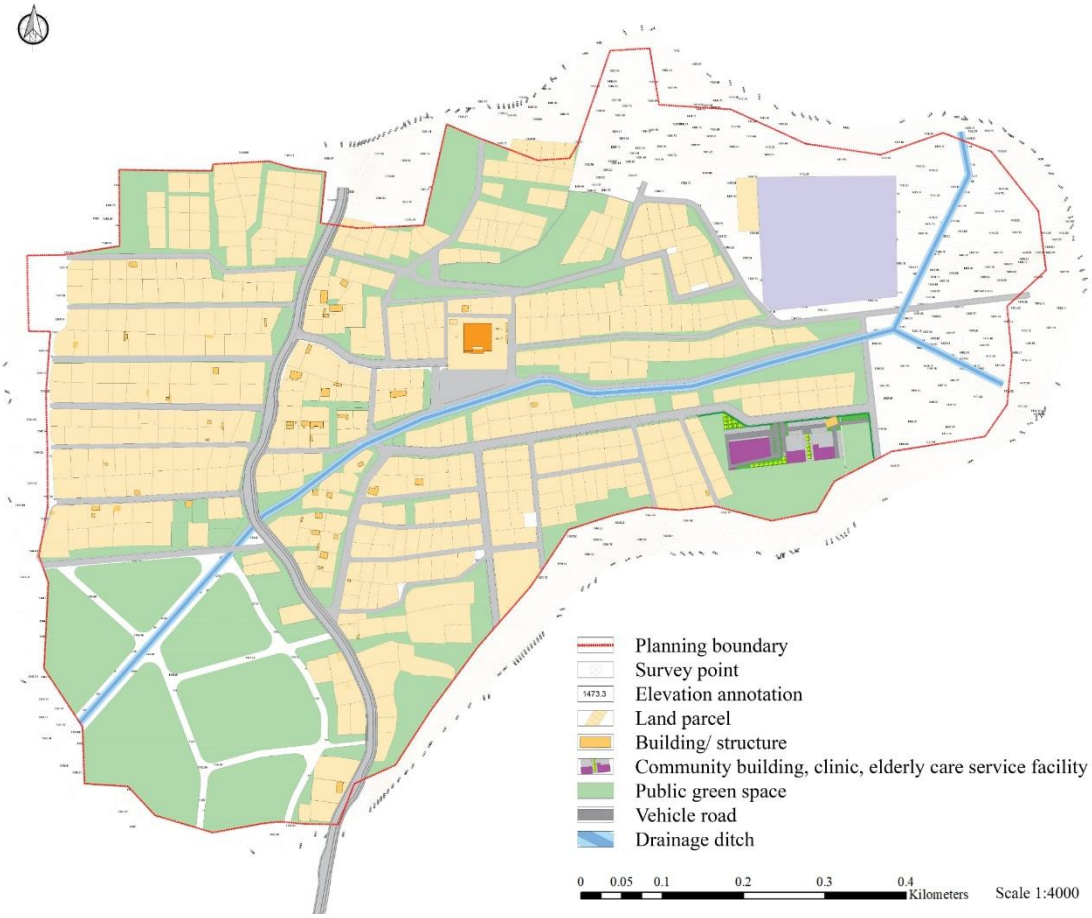

Figure 5. Final Land Readjustment plan developed from study results

Anticipated Impacts: The multi-dimensional benefits of LR in BZD 35 align closely with international precedents. Key anticipated outcomes include:

- Tenure Regularization: All 695 households, including previously unregistered residents, receive legally recognized plots. This legal security can significantly improve household economic resilience and creditworthiness (UN-Habitat, 2016).

- Incremental Housing Development: By securing tenure and enabling access to utilities, the project sets the stage for gradual housing upgrades—from traditional gers to masonry houses or low-rise apartments—mirroring the transition observed in post-LR Japanese cities (Sorensen, 2000).
- Market Dynamics: Land value appreciation is expected to generate significant gains for residents and municipal authorities. To prevent gentrification or speculative resale, policy tools such as resale restrictions or housing subsidies may be required.
- Municipal Finance: Sale of reserve plots could yield ₮5–6 billion MNT (~USD $1.7–2.0 million), partially covering estimated infrastructure costs of ₮8 billion MNT (~USD $2.7 million). With proper valuation, the LR model could approach financial self-sufficiency
- Community Empowerment: The participatory process has strengthened resident trust and institutional collaboration. The establishment of a community land readjustment committee enabled bottom-up feedback, promoting equity and legitimacy in the planning process (Šoškić et al., 2022).

In sum, the BZD 35 project illustrates the successful application of an adapted LR model in a Mongolian context. It achieves spatial, legal, and economic integration for informal settlements, while laying the groundwork for future replication and policy reform. These results emphasize the potential of LR to contribute meaningfully to inclusive urban transformation in Ulaanbaatar.

Discussion

The pilot land readjustment (LR) project implemented in Bayanzurkh District's 35th khoroo (BZD 35) provides critical insights into the adaptation of international LR models within the unique socio-legal, spatial, and institutional context of Mongolia. Drawing on global experiences from Germany, Japan, Turkey, Serbia, and Taiwan, the BZD 35 project explored the feasibility and effectiveness of a hybrid LR strategy suited to the characteristics of Ulaanbaatar's ger areas.

International literature on LR highlights several foundational elements that have enabled successful urban redevelopment across diverse legal and institutional settings. In Germany, LR (Umlegung) is a legally codified and mandatory tool rooted in detailed urban plans, involving land pooling with a 20–40% contribution rate (Djokic et al., 2021). Japan emphasizes voluntary landowner associations, where consensus replaces formal planning, and land contributions (30–40%) fund infrastructure, often resulting in enhanced land value and satisfaction (Sorensen, 2000). Turkey's top-down approach, mandated under Article 18 of its development law, deducts up to 45% of land parcels to deliver rapid urban infrastructure but faces criticism for limited stakeholder engagement (Çete, 2010). Serbia and Taiwan demonstrate recent, adaptive models where legal recognition of informal landholders and financial sustainability mechanisms, like value capture and resale of reserve land, are central (Šoškić et al., 2022; UN-Habitat, 2016).

Applying these international insights, the BZD 35 pilot adopted a hybrid LR model aligned with Models 2 and 4 of the Serbian frameworks, integrating planning with land reallocation in an urban environment characterized by outdated formal plans and complex land tenure issues. This approach contrasts with the rigid planning-implementation sequences seen in many post-socialist settings, offering a more flexible and pragmatic alternative for Mongolia.

A notable innovation in BZD 35 was its emphasis on stakeholder engagement. While Mongolia lacks statutory requirements for landowner consensus in LR, the project drew inspiration from Japan's voluntary model, conducting multiple rounds of consultations. This participatory approach-built trust, reduced resistance to re-parceling, and increased community ownership of the process (Sorensen, 2000). The contrast with Turkey's mandated process further underscores the benefits of inclusive planning (Çete, 2010).

The integration of informal landholders also marked a significant shift in LR practice. Unlike earlier projects in Latin America where such residents were excluded (UN-Habitat, 2016), BZD 35 formalized tenure for over 360 informal households, offering titled plots. This inclusive approach resonates with Serbian pilot projects and aligns with recommendations from recent international literature advocating legal recognition and social integration (Djokic et al., 2021; Šoškić et al., 2022). However, the project also exposed systemic deficiencies in Mongolia's land administration, particularly overlapping claims and unregistered boundaries. Future LR efforts must incorporate a pre-implementation phase focused on cadastral clarification, potentially through legal amnesties or mediation mechanisms.

From a financial perspective, the pilot tested LR's self-financing potential through value capture. Although less extensive than Taiwan's Songshan project, BZD 35 demonstrated that even low-income ger areas can experience significant land value uplift following infrastructure investment (UN-Habitat, 2016; Lin & Lai, 2007). Nonetheless, the risk of fluctuating land prices and rising construction costs necessitates robust financial modeling and flexible funding options, including public-private partnerships and temporary subsidies.

Spatially and socially, LR presents a sensitive alternative to displacement-centric redevelopment. Previous approaches in Ulaanbaatar involved razing entire ger areas to make way for high-rises, often undermining community cohesion. In contrast, BZD 35 preserved neighborhood structures while enabling incremental densification through a newly established grid layout, echoing phased redevelopment strategies seen in Nepal and South Korea (Shrestha, 2020). This layout supports future vertical expansion and long-term housing upgrades, making LR a tool for resilience and social continuity.

Institutionally, the pilot revealed the absence of dedicated LR entities in Mongolia. Countries like Germany and Japan have formalized LR through specialized municipal bodies or national agencies (Sorensen, 2000; Šoškić et al., 2022). Establishing a multidisciplinary LR unit in Mongolia—comprising planners, surveyors, legal experts, and community facilitators—could improve project design, implementation, and replication at scale.

In conclusion, the BZD 35 pilot demonstrates that with appropriate legal, financial, and institutional adaptations, land readjustment can become a viable, inclusive, and sustainable instrument for ger area redevelopment in Ulaanbaatar. The project successfully aligned with key international best practices: participatory planning, legal tenure recognition, infrastructure provision, and cost-sharing mechanisms. While challenges remain—such as public unfamiliarity with LR, legal gaps, and scalability—the pilot offers a promising foundation for shaping a Mongolian-specific LR model that can be expanded citywide.

Conclusion

The redevelopment of BZD 35 through land readjustment illustrates that this approach is not only feasible in Mongolia's urban context but may be among the most equitable and sustainable tools for transforming ger areas. Key outcomes of the pilot—such as secured land tenure, inclusion of informal occupants, participatory design processes, and value capture financing—represent a meaningful shift from conventional, top-down urban renewal models.

This study has shown that:

- Land readjustment is technically and socially viable in Mongolia. Residents retained ownership of buildable, legally registered plots, while also gaining access to essential services and infrastructure.
- A hybrid international model can be locally tailored. Drawing on elements from Japan, Germany, Turkey, Serbia, and Taiwan, the BZD 35 case suggests that Mongolia can synthesize global best practices into a contextually appropriate framework.

- LR supports national urban development goals. By integrating ger areas into the formal city fabric with minimal public expenditure and high community satisfaction, LR contributes to the goals outlined in Mongolia's Urban Development Plans.
- Legal and institutional infrastructure must evolve. For LR to become a replicable strategy, Mongolia must adopt a dedicated legal instrument (e.g., a Land Readjustment Act), establish technical units for implementation, and provide upfront financing mechanisms for early-stage infrastructure works.
- LR can prevent displacement and promote long-term urban equity. By securing tenure and offering an in-situ path to urban improvement, LR counters many of the social injustices seen in relocation-driven redevelopment.
- As Mongolia continues to urbanize, land readjustment offers a rare opportunity to build a city that is more inclusive, resilient, and locally driven. The BZD 35 case provides a foundation—not a blueprint—for future experiments. It must now be supported by legislative clarity, institutional investment, and sustained monitoring to realize its full potential.

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