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Community-based feedback to improve land pooling for planned urbanization: a case study of Thimphu, Bhutan

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Abstract

Land pooling can be an effective strategy for public infrastructure projects, especially in small but growing cities where rural-to-urban transition gives rise to greenfield development. This paper outlines a model comparing outcomes of land acquisition and land pooling; reviews the literature on the negative effects of land acquisition on displaced households; and evaluates land pooling using original data from 1200 households in four Local Area Plans (LAPs) in southern Thimphu, Bhutan. Land prices in the LAPs increased, due in part to additional public services but in large part to a rise in urbanization over time. Land pooling participants benefited from increased land prices but not all were satisfied with the quality of works, particularly in terms of a lack of maintenance, nor with the consultation, planning and building phases. The case study has implications for government and multilateral development bank policy for land pooling and similar mechanisms for planned urbanization.

Key Words: urbanization, land pooling, land acquisition, hedonic pricing



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Community-based feedback to improve land pooling for planned urbanization:

A case study of Thimphu, Bhutan

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Abstract: Land pooling can potentially be an effective strategy for public infrastructure projects, especially in small but growing cities where rural-to-urban transition gives rise to the prospect of well-planned greenfield development. Seen as a more inclusive and less costly alternative to land acquisition, land pooling has been used for urbanization projects in Japan, Germany, Korea, United States, Australia, India and Thailand. However, little empirical evidence exists on the experience of communities who participate in land pooling – particularly in developing Asia. This paper outlines a model that compares outcomes of land acquisition and land pooling; reviews the literature on the negative effects of land acquisition on displaced households; and, to evaluate land pooling in practice, uses an original primary data set from 1200 households in four Local Area Plans (LAPs) in southern Thimphu, Bhutan, to assess land price growth as well as project beneficiary satisfaction with the consultation, planning, and construction phases of a land pooling project. Results indicate that land prices in the LAPs increased, due in part to additional public services but in large part to a rise in urbanization over time. Among original land owners, results from a community feedback survey show that not all these households have access to the services that were to be provided when land pooling was implemented. Thus, land pooling participants benefited from the increased land prices but not all were satisfied with the quality of works, particularly in terms of a lack of maintenance and recreational areas. The case study has implications for government and multilateral development bank policy for land pooling and similar mechanisms for planned urbanization.

1. Introduction

For the poor, land ownership is worth more than the market price of the land. Particularly in rural areas, land serves many purposes for the poor: as a productive livelihood and hedge against food security; a foundation for the formation of social networks; collateral for borrowing; insurance against unemployment; an access point for public services; a facilitator for political and civic engagement; and a basis for shelter (Cotula et al. 2006). The rise of urbanization has put mounting pressure on agricultural lands, and displacement of rural land owners in the name of city expansion and urban development often means that original owners of the land cannot share in the gains of urbanization; in fact, they most likely suffer large welfare losses.

An alternative to land acquisition, land pooling is a land consolidation and redistribution technique used to redefine ownership of land in a way that creates a new configuration of plots that is more appropriate for urban structures and uses. Each land owner in a defined area makes a proportionate contribution of land for urban development; these contributions produce enough land for the provision of public roads, infrastructure, social facilities, and open space, after which the remaining pooled land is reshaped to fit an urban plan and returned to the original landowners. Land pooling may be an effective strategy for public finance of infrastructure projects, particularly in small but growing cities, where rural-to-urban transition gives rise to the potential for well-planned greenfield development.

In Bhutan, planned infrastructure spending by the public and private sectors combined is more than 6 percent of the country's GDP; the majority (more than 5 percent of GDP) of infrastructure investment



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comes from the government budget (ADB 2017a). Thimphu, Bhutan's capital, saw rapid population growth from rural-to-urban migration in the late 1990s and early 2000s, prompting the government to institute a comprehensive plan for urbanization (the Thimphu Structure Plan, or TSP, which was approved in 2003); part of the TSP required preparation of Local Area Plans (LAPs) to detail infrastructure networks and other amenities in what would be small, planned cities (Norbu 2015).

Urban infrastructure – including roads, water and sewerage, and power and telecommunications systems – was constructed in the LAPs of Thimphu, where residents ceded some of their agricultural land in exchange for the provision of public amenities. In four LAPs in southern Thimphu – Babesa, Changbangdu, Lungtenphu and Simtokha (“southern LAPs”) – where urban infrastructure was funded by the Asian Development Bank (ADB 2017b), land pooling contributions were close to (but not exceeding) 30 percent. LAPs were also planned with designated space for community amenities like recreational areas, police stations, healthcare facilities and schools.

With the project completed, land owning households in the land pooling area generally (i) have higher total incomes than renters, with a large proportion of income earned through property rental; (ii) have shifted out of agriculture to other employment sectors; and (iii) have greater access to public services. Land values in the southern LAPs have increased significantly, which implies that newly urbanized municipalities can increase land-based tax revenue from residents. However, welfare outcomes are more varied when households describe their experience with timeliness, quality, and completion of works they expected under the LAP.

The study contributes to the knowledge base on land pooling for urbanization by:

- 1) Documenting outcomes (both at the municipal and household level) of southern LAP land pooling projects;
- 2) Conducting selected analytical exercises to quantify the expected benefits that can be generated through land pooling;
- 3) Discussing the potential for expanding the use of land pooling as a public finance mechanism for infrastructure projects – not only in Bhutan, but more generally in urbanization projects in developing Asia; and
- 4) Offering policy implications and consider changes that may be necessary to successfully implement land pooling-based infrastructure financing projects.

The rest of the paper is organized as follows. Section 2 reviews the literature on land acquisition and, to a limited extent, land pooling; Section 3 presents a simple theoretical model of land acquisition versus land pooling; Section 4 details the project area and land pooling timeline in the Southern LAPs of Thimphu; Section 5 summarizes the data and data collection process for a household survey of original and new land owners, as well as renters in the area; Section 6 estimates a hedonic pricing model to show how public works have affected housing prices in the urbanizing area; Section 7 outlines results from the qualitative portion of the household survey, where respondents rate the various stages of land pooling implementation; and Section 8 concludes with policy recommendations for land pooling.



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2. Literature Review

Land acquisition programs involve the transfer of use, rights, ownership, and control through sale, lease, or concession to commercial farming (Davis et al. 2014), or the compulsory acquisition of land by the government (Kusiluka et al. 2011). Land acquisition programs have the objective to develop infrastructure towards industrialization or agricultural productivity through acquiring land from local and indigenous communities; however, impacts of these projects tend to be one-sided due to fiscal management issues and poverty implications.

Many indigenous landowners tend to sell their land in full or in small pieces to be set loose from urbanization and poverty pressure (Kusiluka et al. 2011; Kironde 2004). Moreover, some policies allow governments to arbitrarily change land categories in an area, for instance, by declaring village lands as reserved lands (Kusiluka et al. 2011). Acquiring land to build up infrastructure, industries and various services displaces rural and indigenous communities from their traditional employment and livelihood (Sarkar 2007).

Since sparse quantitative literature on the human impacts of these projects exists, studies often report the negative effects that arise in land acquisition projects due to lack of transparency in the transactions and poor law or policy implementation. According to a country-level study by Davis et al. (2014), the impact of lost livelihood varies widely by country; however, these projects affect rural communities in countries where income inequality is pervasive. The most heavily impacted areas in terms of lost agricultural income are sub-Saharan Africa and Southeast Asia. In addition, the loss of income often leads to migration as an option to secure a household's income. Similarly, a study by Kusiluka et al. (2011) examines the negative impact of land acquisitions on the livelihood and environment of indigenous communities in Tanzania. Issues noted are loss of income, loss of means of livelihood, disruption of economic activities, persistent land-related conflicts, relocations to poorly developed areas, inadequate and late compensation, and environmental degradation (Kusiluka et al. 2011).

These negative effects on livelihood and environment often have implications on food security and poverty. Both Kusiluka et al. (2011) and Sarkar (2007) confirm that displacement of communities is a common result of land acquisition where relocation areas have poor services. Delayed payment of compensation persists with no guarantee of development in the land allocated within the period prescribed in the law or policy (Kusiluka et al. 2011). In an analysis of ongoing land reforms in South Africa, Valente (2009) finds those targeted for a land grant program – who had long before been displaced from their ancestral lands – are significantly more food insecure than those not targeted by the program. Moreover, in the case of West Bengal, land acquisitions even lead to evictions, riots, and loss of human life (Sarkar 2007). Sarkar (2007) recommends that jobs be created outside agriculture to resolve increasing population pressure on lands. Kusiluka et al. (2011) present recommendations for safeguarding the welfare of indigenous communities, particularly with respect to adequate consultation prior to land acquisition exercises; fair and prompt compensation; and strengthened programs that increase awareness of land laws and policies, as well as access to formal institutions responsible for the provision of justice.



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3. A Simple Model Comparing Land Acquisition and Land Pooling

Governments have traditionally used eminent domain as a tool to acquire lands for the provision of public infrastructure. Not only does land acquisition for urbanization come at a significant cost to governments (large, upfront land acquisition costs can make up a large portion of project costs, not to mention additional costs and time delays that can occur when land owners mount legal challenges against land acquisition), it can potentially have negative impacts on the livelihoods of displaced households.

Consider a rural, land-owning household in an area subject to land acquisition for urbanization. Assume the household falls under one of the following possibilities:

- (i) Cash or in-kind land replacement is enough to resettle the household on a plot of land of equivalent size and quality near the original land holding;
- (ii) Cash or in-kind land replacement is enough to resettle the household on a plot of land of equivalent size and quality, but far from the original land holding in an area that is not urbanizing;
- (iii) Cash or in-kind land replacement is insufficient for the replacement of land of the size and quality near the original land holding, so the household becomes landless and rents in the same area in which it used to own land;
- (iv) Cash or in-kind land replacement is insufficient for the replacement of land of the size and quality even outside the land acquisition and urbanizing area, so the household becomes landless and rents farther away in an area that is not urbanizing.

Because the exercise of eminent domain is a relatively non-consultative process, households take their land acquisition compensation as given. Further assume, whether payments are made in cash or in kind under scenarios (i) and (ii), household will always purchase or keep replacement land in the area near or far, respectively, from the acquired land it previously owned. Under scenarios (iii) and (iv), any land given in kind as a replacement is sold at market value and the household becomes landless in the area near or far from the acquired land; the household will use the payment or land proceeds, in combination with wage income, to finance its rental payments. Finally, assume a household that cannot afford to buy land in a far, non-urbanizing area (scenario (iv)) cannot afford to rent in the closer, urbanizing area. In practice, land acquisition where compensation in land or cash is significantly delayed could effectively put households in a lower-opportunity scenario – even if promised compensation, timely delivered, would have been enough for the household to maintain ownership of land near its original location.

There are several important parameters when assessing outcomes of households under the four scenarios described above. The initial endowment of land for a representative farmer is L . Let p_R , p_N , and p_A be land prices for rural, near-acquisition, and acquisition areas, respectively, with associated growth rates Δp_R , Δp_N , and Δp_A . Intuitively, land price growth rates will be lower in rural and urban periphery areas as opposed to the land acquisition area, where urbanization is in full swing and where public infrastructure will be built that will push up the value of nearby land ($\Delta p_R < \Delta p_N < \Delta p_A$). Land rental costs are a fixed proportion, θ , of land prices for all areas (this assumes rental price growth moves with land price growth). The displaced farmers who have become landless are assumed to be compensated a fixed proportion of the value of land, π_R or π_N , in the area in which they have resettled. Considering non-land income



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opportunities, let w_R , w_N , and w_A be wage rates in the three areas, with associated wage growth rates Δw_R , Δw_N , and Δw_A . Rural wages for displaced households may or may not be higher than near-urban and urban wages despite higher land prices in urban areas, as (i) labor moving into the city might depress the urban wage; and (ii) skills of displaced households might be better suited to agriculture, resulting in a lower wage for urban jobs for which the displaced households are relatively less experienced. Finally, households who own land can rent all or part of the land (designate this choice proportion as γ) and can sell all or part of the land (designate this choice proportion by λ) in any given year (sales are assumed to occur at the end of the year, so rental income can accrue for all of the rented land before the sale). Landless households face a rental cost that is covered by wages and choice proportion, μ , of compensation money.

Alternatively, land pooling could be used for public infrastructure provision in an urbanizing area. Under land pooling, land owning households give up an agreed-upon portion of their land, α , without monetary compensation by the government but in exchange for access to public services, so that they keep the remaining $(1 - \alpha)$ portion of their original land. Prices for this land – because it will be near the new public services in the urban area – will follow the same growth as acquired land under the acquisition scenario (Δp_A).

After displacement through land acquisition or urbanization and no resettlement through land pooling, we can characterize farmers by their land or compensation assets and income opportunities in their resulting area of residence (Table 1):

Scenario	Starting Value of Assets	Income opportunities
(i) Nearby land replacement	$p_N L$	$w_N + \gamma \theta p_N L + \lambda p_N L$
(ii) Rural land replacement	$p_R L$	$w_R + \gamma \theta p_R L + \lambda p_R L$
(iii) Compensation for nearby rental	$\pi_N p_N L$	$w_N + (\mu \pi_N - \theta) p_N L$
(iv) Compensation for rural rental	$\pi_R p_R L$	$w_R + (\mu \pi_R - \theta) p_R L$
(v) Land Pooling	$(1 - \alpha) p_A L$	$w_A + \gamma \theta p_A L + \lambda p_A L$

Table 1 – Assets and returns, land acquisition and pooling scenarios

Rather than being displaced, farmers in the acquisition area would prefer land pooling if wages and land income opportunities (sales and rental value from the original land holding) in the acquisition area result in a greater stream of benefits over time relative to in near-acquisition and rural areas. Land replacement is always preferred to compensation within the same area.

4. The Study Area

Thimphu's urban area was expanded from 8 to 26 square kilometers in 1999, in response to growing urbanization. A comprehensive master plan – the 2002-2027 Thimphu Structure Plan (TSP) – was approved by the Cabinet in 2003, after a series of public consultations with various stakeholders including land and property owners. The implementation of the TSP required the preparation of detailed Local Area Plans (LAPs) for the planning of infrastructure networks and other amenities, facilitated through a land pooling process. LAPs cover small areas (about one square kilometer) and are expected to accommodate



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access (direct or within walking distance) to public services to a population of around 12,000 (Norbu 2015).

Initially, land for urban development and public services was to be acquired by the government, but it was later decided that land pooling would instead facilitate the process. Land owners preferred pooling to acquisition due to a variety of issues with land acquisition, including:

- Compensation offered by the government was below market value;
- Land acquired from farmers at below-market rates was then allotted as serviced plots to businesses;
- Information asymmetry on market prices and opportunities favored more educated, rich, and powerful community members;
- The planning process was rushed, top down, not transparent and with little public consultation or time for meaningful review;
- Land and housing markets had been distorted by speculation among few large land owners who kept their land idle (Norbu 2015).

An Asian Development Bank (ADB) loan (\$24 million) funded the construction of public works in the Southern LAPs (Figure 1). The project resulted in the construction of (i) 33.7 km of secondary and tertiary roads with associated drainage to connect the four local areas to major service roads and the Babesa expressway; (ii) a 31.9 km network of secondary and tertiary water distribution pipes; (iii) a 28.5 km sewerage collection network; and (iv) 25.7 km ducting for power and telecommunication networks with 265 access shafts for cable and associated structures (ADB 2017b). While the layout of the LAPs was planned to include other community service areas (e.g., parks, police stations, schools, hospitals), these were not funded under the ADB infrastructure project.

The land pooling experience in Thimphu shed light on legal and regulatory constraints to implementing an alternative to land acquisition for urbanization. The absence of legal grounds for land pooling eventually led to the passing of the Local Government Act (2009, 69) (*Land Pooling Rules and Regulations*), which defines land pooling and outlines provisions on land pooling and guided land development to carry out planned development in line with its goal of ensuring the timely and sustainable provision of urban services while minimizing displacement and acquisition. Land registration, prohibited land transactions, and land use conversions are defined in the Act. Per the legislation, two thirds of the landowners are required to support the land pooling approach for development plans to proceed (World Bank and MWHS Bhutan 2014). Prior to the Local Government Act of 2009, the Land Act of Bhutan 2007 superseded the Land Act of Bhutan 1979 as the governing law behind land acquisition. The 2007 Act served to improve the management, regulation, and administration of ownership and use of land for socio-economic development and environmental well-being. It established an autonomous National Land Commission, reduced the number of land categories from 20 to 7; and made provisions for compensation in substitute land or cash payment or both by the government upon acquisition. With respect to compensation for land acquisition, the 2007 Act gives landowners in rural areas have the option to choose what kind of compensation they would like and calls for the revision of the compensation rate every three years by the Property Assessment and Valuation Agency (Royal Government of Bhutan 2007).



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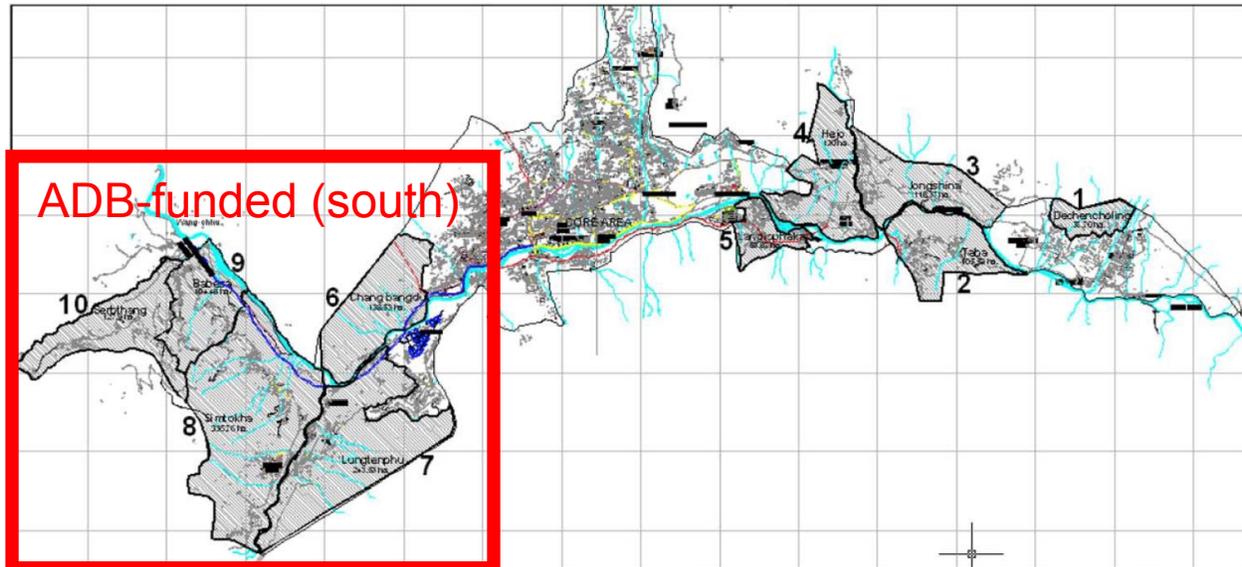


Figure 1 – The study area

5. The Data

Sample Selection

In the empirical analysis, primary data are collected through a household survey covering the southern LAPs. A sampling frame of households who owned land prior to the formation of the LAPs (“original land owners”) was initially constructed using land and mortgage records for Chang Gewog¹ provided by Thimphu Thromde.² A field team in Thimphu was tasked with locating mobile numbers for these households (mobile numbers are not included in land and mortgage records obtained), as well as for households who currently own land in the LAP but did not own land in the LAP to the infrastructure project (“new land owners”). Sampling was to be stratified at the LAP level, with original land owners from each LAP selected through purposive sampling to obtain a near-census of these households, followed by purposive sampling of new land owners to also obtain a near-census. The remainder of the sample consists of renters who do not own any land in the LAP. Both original and new land owners identify their rental properties in the interview process; renters are sampled through selecting a household at random in an apartment building (apartment building floors are randomized, and on selected floors enumerators alternate between knocking on doors on the left- or right-hand side, moving to the next door on the selected floor if the initial respondent refuses the interview or is unavailable).

Due to a lack of complete digital records, in combination with the available data from the 2017 Bhutan Census of Population and Housing being disaggregated only to the municipality level, a full listing of the population of owners or renters in the LAPs was unattainable. A subset of land records was collected,

¹ Gewogs are administrative units in Bhutan representing a bloc of villages; gewogs are one level of administration below districts. Chang Gewog is comprised of areas in southern Thimphu, including the southern LAPs.

² Thimphu Thromde is the local administrative government, or municipality, of Thimphu.



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and this was used to roughly estimate the population of owners in each LAP (Table 2). The population of renters remains unknown but is estimated to be much higher than the population of owners given the nature of the LAPs (apartment buildings are primarily filled with renters, and fewer land owners – if any – occupy units in the buildings they own).

LAP	Total unique landowners	Proportion of unique landowners
Babesa	353	28.2%
Changbangdu	235	18.8%
Lungtenphu	411	32.9%
Simtokha	252	20.1%
Total	1251	100%

Table 2 – Initial estimated population of landowners in each LAP

Based on previous studies conducted in the northern land pooling areas of Thimphu, the response rate was expected to be approximately 70-80 percent. Available (but incomplete) mortgage records allowed a rough matching to the land records to tentatively identify the number of original land owners and new land owners. From these combined data, an overall target of 900 owners and 300 renters, with a priority on old landowners was set as the initial target sample (Table 3).

Category	Original Sample	Reserve Sample	Targets complete (70% response)
Original Land Owners	586	0	410
New Land Owners	314	351	490
Renters	300	~	300
Total	1200	351	1200

Table 3 - Initial Target Sample

Citizen representatives for each LAP are to maintain contact information for land owners; however, these representatives were not willing to assist the survey team by providing these numbers due to incomplete contact information records, time constraints, and political sensitivities surrounding the upcoming national election in Bhutan. Without a reliable list of owners and contact details from which to draw a sample, convenience sampling was the chosen alternative. Field teams spent one day manually gathering contact details of building owners by asking LAP residents and populating lists. Using the contact information from the manual listing, enumerators scheduled appointments to interview owners in the following days. This process was repeated until manual listing activities in all four LAPs had covered all land owners present in the area. Despite considerable efforts in the manual listing, it was not possible to conduct interviews with all land owners. Constraints to obtaining a near-census of landowners include:

- Mobile numbers of landowners did not register calls (this happened occasionally when tenants provided mobile numbers for landlords, but mobile numbers for the landlords had been changed or were otherwise out of service);



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- Landowners had recently sold off their land or buildings and the new tenants or neighbors could not definitively identify landowners (online rental payments are fairly common in the southern LAPs, and many tenants making electronic transfers to their landlords' accounts had never even seen their landlords);
- Absentee landowners owning land or buildings in the LAPs refused to come to Thimphu for interviews, or were out of the country and could not be contacted to schedule an interview;
- Landowners agreed to interviews but did not conform to the appointments made, even after several attempts to reschedule;
- Owners of vacant plots could not be identified in several LAPs (even neighbors had no knowledge of who owned adjacent plots);
- Owners outrightly refused to be interviewed or suggested their caretakers be interviewed instead (caretakers are not expected to know the level of detail required in the survey).

Overall, and estimated 20-25 percent of landowners refused to be interviewed or could not be contacted. Initially, it was expected that there would be enough owners to reach two thirds of the sample (n=900) so a sampling interval of three was deployed for renters, i.e. one renter selected for every third apartment building. However, as fieldwork progressed it was clear that the total number of owners that could be surveyed would be closer to 600, so the target and sample interval of renters was adjusted to reflect this (Table 4). Random selection of and adjustment of building-level sampling intervals for renters results in a sample where renters are proportional to owners in each LAP.

LAP	Renters	Original land owners	New land owners	Total	%
Babesa	175	111	69	355	29.5
Chang Bangdu	116	46	42	204	17.0
Lungtenphu	169	102	73	344	28.6
Simtokha	148	107	44	299	24.9
Total	608	366	228	1,202	100

Table 4 – Final achieved sample by LAP and respondent type

Survey Instrument

The survey instrument covers demographics, expenditures, and income-generating activities of households and includes a series of modules on land transactions and experience with the land pooling process and outcomes. Original landowners answer additional survey modules designed to generate objective and subjective welfare comparisons of pre- and post-land pooling time periods. Borrowing from methods used in participatory impact assessment, households interviewed are instructed to create their own timeline of land ownership or rental events; knowing when and where households bought, sold, and/or rented property informs the research of differential effects of the land pooling project. Depending on the length of ownership or tenancy, survey respondents are also asked to evaluate the land pooling process in three distinct periods: (1) consultation to formation of a LAP; (2) formation of a LAP to the start of urban infrastructure works; and (3) construction to completion of urban infrastructure. All respondents are asked about current conditions, including completeness and maintenance of existing infrastructure and amenities.



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Summary Statistics

Focusing on the sample of original land owners, who were asked to recall the situation before land pooling and compare it to the present, current access to services within the LAPs is not universal. While most original landowners had access to paved roads and water after land pooling, but fewer had access to sewerage and drainage in LAP areas. Lack of access meant that the household had never had access to a service directly on an owned plot, or that the plot previously had the service (before or after land pooling) but the plot no longer could access the service due to some level of disrepair.

Distribution of plot service by LAP and Overall, Original Landowners (%)					
Service Type	LAP				Overall
	Babesa n=112	Changbangdu n=37	Lungtenphu n=101	Simtokha n=114	
Paved road	77.7	78.4	83.2	82.5	80.8
Water	74.1	75.7	73.3	72.8	73.6
Sewerage	45.5	48.7	42.6	55.3	48.1
Drainage	59.8	43.2	47.5	74.6	59.3

Table 5 – Distribution of plot service, Southern LAPs

Examining the full sample, wages in the area are relatively high but vary by land ownership status and across LAPs. On average, renters report lower monthly wage incomes than original and new land owners, while there is no significant difference between wages across original and new land owners. Reported monthly wages are the highest in Simtokha, followed by Babesa, with lower monthly wage incomes in Changbangdu and Lungtenphu.

Average Monthly Wages by Tenancy and LAP	
	Monthly Wage (Nu.)
Tenancy Type	
Renter	26,217
Original Land Owner	48,458
New Land Owner	49,081
LAP	
Babesa	41,241
Changbangdu	26,157
Lungtenphu	26,037
Simtokha	45,905

Table 6– Average monthly wages

While land owners earn significantly more in wage income relative to renters, rental income for owned property is an even larger chunk of total household income for land owners. Renters on average spend almost half of their wage income (47%) on housing expenses (Table 7).



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Average Rental Income and Payment (Nu.)	
	Monthly Rental Income (Residential)
Tenancy Type	
Original Land Owner	88,208
New Land Owner	81,377
Monthly Rental Payment	
Renter	12,452

Table 7 – Average rental income and payment, owners and renters

Land Prices

We base our land price analysis on the transaction roster of the household survey, in which households are asked to itemize land transactions made since 2005 (some households had earlier records and provided these as well when available). The transaction roster includes questions on year of sale or purchase, price, land area, structures on the transacted plot, services available on the transacted plot, and reason for buying or selling. In total, 365 sales and purchases were recorded. However, transactions are dropped if they display inconsistencies with the current plot roster, where more detailed information is recorded for plots still owned by the household. The final sample for land transactions is reduced to 260 once inconsistent transaction observations are dropped.

A Hedonic Pricing Model for the Southern LAPs of Thimphu

Based on a theory of consumer demand, hedonic pricing models assume that items can be valued by their individual characteristics (Rosen 1974). Empirically, this means an item's price can be regressed on the characteristics to determine the way in which each characteristic uniquely contributes to the overall composite unit price. Thus, hedonic pricing models are often used in real estate analysis.

Using the land transaction data from the household survey, we estimate the following loglinear model:

$$\ln p_n^t = \beta_0^t + \sum_{k=1}^K \beta_k^t z_{nk}^t + \varepsilon_n^t$$

Where $\ln p_n^t$ is the log form of the price per square meter for each transaction n in year t . z_{nk}^t are plot-specific characteristics that are hypothesized to affect land prices through quality differentiation. Determinants of price in the hedonic model are as follows:

- *With Structure*: dummy variable equal to 1 if the land has a building on it at the time of transaction, and 0 otherwise;
- *Total Services*: variable ranging between 0-4, equal to the number of major services to which the plot has access to road(s), water, drainage and sewerage at the time of transaction;
- *LAP*: dummy variables equal to 1 if the transacted land is in the LAP, and 0 otherwise (Changbangdu is the omitted LAP).



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Because building a structure comes at an additional cost, we expect the coefficient on *With Structure* to be positive to indicate the additional value of land when it includes a building – most often in Thimphu this is a family home, multi-family residential apartment building, or mixed-use building. Unfortunately, transaction data does not differentiate across structure type, as this information is not included in land titles, and, during survey piloting, land-owning households were not often able to recall what kind of structure was on the property at the time of purchase if they had since rebuilt on the plot. Intuitively, multi-family buildings would be expected to add more value to a plot, as generated income potential from these types of buildings is higher than for single-family homes.

Total Services captures access to public services as a result of urbanization and the land pooling process. Because some households had access to some public services before land pooling, one service on its own may not have a significant effect on price – particularly when the quality of that service is not known prior to land pooling. However, infrastructure provision in the land pooling process was done as an entire package, with all four services coming online during the construction period. As the land pooling construction phase progresses, we expect to see a higher count of total services and a corresponding positive relationship between number of services and land price. Additionally, because all four services were offered at relatively the same time, including a categorical variable for each service on its own in the model is likely to introduce multicollinearity; the more highly correlated the individual service variables, the more difficult it is to attribute differences in price to a change in a single variable under the assumption of *ceteris paribus*.

Adding a set of indicators for *LAP* captures location-specific characteristics that can determine price. Changbangdu, the omitted LAP, is the closest to central Thimphu; thus, we expect coefficients on Lungtemphu, Simtokha, and Babesa variables to be negative to capture the price premium of being closer to the city center.

Results

Results of the hedonic pricing model are presented in Table 8. Estimated coefficients on all LAP location variables are negative, although Lungtemphu is not significant (Lungtanphu is the closest LAP to Changbangdu, followed by Simtokha and Babesa). As expected, price per square meter declines the farther away a plot is from the city center. The presence of a structure on the plot at the time of sale is positive, large in magnitude, and highly significant. The *Total Services* variable also takes on the expected sign and is significant, with each additional service available at time of transaction increasing price per square meter by 13%.



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Table 8. Determinants of Land Prices, Southern LAPs

Dependent Variable: log price per sq. m. (Nu.), detrended

Babesa	-0.818*** (0.315)
Lungtenphu	-0.0904 (0.317)
Simtokha	-0.683** (0.318)
With Structure	1.112*** (0.195)
Total Services	0.130** (0.0614)
Constant	-0.144 (0.309)
Observations	242
R-squared	0.234

Robust standard errors in parentheses

**** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Land Owners' Assessment of the Land Pooling Process

Because land pooling is designed to be an inclusive process that benefits original land owners, it is important to understand these owners' perceptions about their participation in and the final result of the land pooling process. A qualitative line of questioning in the survey allowed for the collection of household-level data that include (i) preference rankings for community amenities that were to be provided to residents under the LAP; (ii) quality perceptions for individual amenities provided to LAP residents; (iii) Likert-scale questions that elicit satisfaction of original land owners with the consultation, planning and construction phases of the LAP.

Households' welfare will improve the most where services they most value are available. However, across the sample, only 48% of households had access to the service they ranked as most important. Taking it one step further, households not only want a public service to be available, but they want available public services to be high quality. In this respect, only 33% said the most important service was accessible and high quality. This shortcoming of public service provision indicates a need for increased community engagement in project planning stage, financing for maintenance and expansion of services as LAPs grow.



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Responses to questions about satisfaction with land pooling project phases indicate that original land owners are the most dissatisfied when they did not approve of the original land pooling process (Table 9).

Satisfaction with Land Pooling Phase	Approved of original LAP plan (%)	
	No	Yes
Consultation		
Very dissatisfied	3.7	0
Dissatisfied	14.81	2.84
Neutral	44.44	14.18
Satisfied	33.33	69.5
Very satisfied	3.7	8.51
Don't know	0	4.96
Planning		
Very dissatisfied	3.7	0
Dissatisfied	25.93	2.84
Neutral	51.85	19.15
Satisfied	14.81	68.09
Very satisfied	3.7	9.22
Don't know	0	0.71
Building		
Very dissatisfied	3.7	0
Dissatisfied	11.11	9.22
Neutral	48.15	24.82
Satisfied	33.33	56.74
Very satisfied	0	8.51
Don't know	3.7	0.71

Table 9– Satisfaction with land pooling phases and approval of initial LAP plan

Conclusions and Policy Implications

Land pooling and similar mechanisms such as trusts and readjustment are likely to be increasingly used in urbanization projects where land acquisition would otherwise create budget constraints for infrastructure building and planned urban expansion. Without timely implementation of urban planning, unplanned urbanization can lead to increased environmental deterioration, settlement on marginal lands and degradation of basic services such as drinking water, sanitation and waste disposal and treatment. Urban sprawl can also occur, increasing energy inefficiency and the cost of community infrastructure and public services (Bhatta 2010). Land pooling also avoids issues common to land acquisition in developing



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countries: insufficient (i) laws and regulations; (ii) procedure for land acquisition and compensation; and (iii) land valuation approaches for compensation (Ghimire et al. 2017).

While the benefits of land pooling can create a win-win situation for governments (improved public finance for urbanization) and citizens (increased participation in the urbanization process), land pooling projects are relatively new to developing Asia and there is room to improve by learning from early adopters. Social safeguards and resettlement policy should adapt with the evolving nature of urban development projects. While land pooling has the potential to be a more inclusive urban development plan for original owners or inhabitants of a project area, how the land pooling and land readjustment process is conducted affects both objective and subjective outcomes for land pooling participants.

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