Leveraging Land to Enable Urban Transformation

Lessons from Global Experience

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January 2013

Abstract

Around the world, in both developed and developing countries, policy makers use a variety of tools to manage and accommodate urban growth and redevelopment. Government officials have three main concerns in terms of land policy: (i) accommodating urban expansion, (ii) providing infrastructure, and (iii) managing density. Together, the planning for infrastructure and urban expansion, land use, and density policies combine to shape the spatial structure of cities. This

paper reviews global experience on using land based instruments to accommodate urban development and financing infrastructure. The review suggests that urban transformation is most efficient when land markets are fluid, particularly when they are grounded in strong institutions that (i) assign and protect property rights, (ii) enable independent valuation and public dissemination of land values across uses, and (iii) enable the judicial system to handle disputes that may arise in the process.

This paper is a product of the Urban and Disaster Risk Management Department, Sustainable Development Network. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at nlozano@worldbank.org.

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**Leveraging land to enable urban transformation:
Lessons from Global Experience¹**

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Key words: Urbanization, land transaction, land valuation;
JEL classification: R14, R52;
World Bank Sector: URBAN

This paper was originally written as a background paper for the India Urbanization Review, which provides a policy framework to help Mayors and other policymakers anticipate and implement strategies for sustainable development. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

¹ The authors are grateful to Gregory K. Ingram and Yu-Hung Hong for fruitful discussions. Yu-Hung Hong provided very useful comments to early versions of this document.

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1. A Framework for Land Policy

Around the world, in both developed and developing countries, policy makers use a variety of tools to manage and accommodate urban growth and redevelopment. Government officials have three main concerns in terms of land policy (i) accommodating urban expansion, (ii) providing infrastructure, and (iii) managing density. Together, the planning of infrastructure and urban expansion, land use and density policies combine to shape the spatial structure of cities. When effective, urban planning aligns land use, population and employment density and infrastructure to optimize urban form and economic productivity (Joshi and Kono, 2009). Density is in fact a key driver of the demand for urban infrastructure and largely determines the functional efficiency of cities. Land instruments for accommodating growth and financing infrastructure are therefore most useful when placed in the context of an overarching policy framework that helps in sequencing among policies.

At early stages of urbanization, policies that facilitate rural-urban land use conversion will be critical to support urban expansion. Creating strong institutions that facilitate this transformation and help minimize transaction costs and reduce information asymmetries will contribute to enhancing the fluidity of incipient land markets. Clear definition of property rights and valuation will set the basis for well functioning markets (see Table 1).

As urbanization advances and reaches intermediate levels, population pressures in cities will increase and policies that promote the coordination of land use management and infrastructure development, and manage densification gain importance. Well designed policies may allow cities to grow vertically with the same parcel of land accommodating higher value economic use, and supporting more people and infrastructure. The challenge here is to allow for rapid substitution between land and capital, where land shortages will be managed through higher levels of capital investment. While the core land institutions mentioned above remain important, city and neighborhood level zoning, building codes, and FSIs gain importance.

Finally, as demand for urban built space increases with incomes, cities spread out (sprawl), and individual cities become part of a larger metropolitan area. Policies that promote coordinated and consolidated management of metropolitan areas will gain importance in the land policy portfolio for countries at middle incomes and cities at mature stages of urbanization.⁶

However, no matter the stage of urbanization or the levels of incomes, urban transformation is buttressed by strong institutional foundations that govern the functioning of land markets. These include (i) clear definition and protection of property rights, (ii) institutions that enable independent valuation and public dissemination of land values across uses, and (iii) a judicial system that can handle disputes that may arise in the process.

⁶ World Bank (2008), Dowall (1992), and Bertaud (2004, 2010)

Table 1. The Complexity of Land Policy Challenges Changes by Stage of Urbanization

	Rural-Urban Land Use Conversion (Property Rights and Strong Institutions)	Land Use and Infrastructure Coordination (Rights of way and Planning Infrastructure)	Densification (Zoning, high FSI, TDRs)	Metropolitan Land Use Planning (Coordination and consolidated management)
Early ⁷	✓			
Intermediate	✓	✓	✓	
Advanced	✓	✓	✓	✓

In this paper, we review how countries have built the institutions for property rights and valuation to support urban development. In the next section, we present a summary of the underlying institutions and valuation methods that provide a basis for most of the instruments discussed later in the paper. In section 3 we provide a review of international experience on land assembly focusing on the two most widely used alternatives: eminent domain/ land acquisition and land readjustment (LR). Land assembly through compulsory acquisition is typically conflict ridden.⁸ LR is presented as an alternative to eminent domain, because it requires the voluntary participation of landowners. In section 4, we highlight international examples of land-based instruments that can be used as part of an overall portfolio of investments needed to finance urban infrastructure and redevelopment. These include user charges, local government debt, as well as land based financing instruments – such as property taxes, exaction and development impact fees, and land sales or leases. Land-based instruments provide cities with an opportunity to enhance urban efficiency by intensifying the use of land and managing densities while sharing the cost of infrastructure provision with private landowners and developers.

2. Land Valuation Methods

The success of tools used for urban expansion and land based financing is based on robust systems for determining land values. Developed countries rely on a number of forms of available data and supporting institutions to assess land values. Among these are market data

⁷ The 2009 World Development Report (World Bank 2008) provides a definition of the stages of urbanization as follows: Early 0-25% urban, Intermediate 25-75% urban; Advanced 75% urban and more.

⁸ Consider China, where government acquisition of rural land for urban expansion has generated much public discontent and protests. In the United States, urban revitalization projects are blocked by lawsuits undertaken by dissatisfied property owners who are unwilling to sell their landholdings to make way for new development. The conventional way of dealing with property owners' resistance is either to buy them out or to force them out using the government's compulsory purchase power (Hong, 2011).

on transactions, attributes of the property, as well as ancillary data concerning potential income from land and the cost of inputs into land development. These data are managed to provide up-to-date and reliable information for professional appraisers as well as the general public.

Institutions that improve the information foundations of the valuation process, including training a cadre of appraisers in property valuation contribute to ensuring transparency in the valuation process, and making information of land values widely accessible. In Korea for example, until the mid-1970s, local government officials assessed the market value and replacement costs of assets for land acquisition purposes. In 1972, the government introduced the Basic Land Prices system, to improve the process of assessments. In this new system, land and buildings had to be assessed by certified private sector appraisers instead of government officials. Two private appraisers had to provide estimated values for the property and the final value was obtained as the mean of the two appraisal values. If the two appraisals differed by more than 10 percent, a third appraiser was selected and the mean recalculated. Since 2003, a third appraiser may be recommended by affected individuals as well (ADB, 2010).

Developing countries often lack the systems to record and manage this information. Transaction data, for instance, may not reflect the true price of land because of black market transactions to save on duties or heavy public subsidies on housing and land use. Land registries are often archaic and lack the dynamic functionality which allows them to be searched or updated quickly. These deficient features in transaction record management translate to a dearth of data on real estate prices, preventing analysis that is critical for land value appraisal. The implications of this bear heavily on local financing mechanisms involving real estate.

Land valuation is integral to local revenue generation since land values form the basis for activities such as property tax collection and land sales or leases. A credible system that helps “discover” and “disseminate” the value of land makes it difficult for buyers to defraud existing landowners. In the absence of such information, there is considerable scope for undervaluation of land during the acquisition process.

In countries where land valuation is successful, techniques are standardized to enable appraisers to arrive at uniform and transparent valuations. In the United States, most states require that assessors and appraisers be certified. Appraisers generally work for private clients to determine the market value of property in the event of real estate transactions, while assessors generally work for the government to determine values of properties for tax purposes.⁹ Both agents must abide to the same regulations in valuating real property. However, for practical purposes and to avoid overestimation of prices, property prices for tax purposes are usually set at a fraction of actual market values. For example, it is generally recognized in the United States that tax assessors’ calculation of property value is about 33 percent lower than market value. In Bogotá, Colombia, property values have usually been set at between 70 and 80 percent of estimated market values.

Public land valuation in developing countries is especially fraught with challenges. These include the cost of hiring private assessors since these countries lack standardized public methods, the need to maintain and constantly update land price data and the fact that inter-governmental transfers of public land are often recorded as a zero value transaction. However, there are a

⁹ United States Department of Labor, Bureau of Labor Statistics. Occupational Outlook Handbook, 2010-11. http://www.bls.gov/oco/ocos300.htm#oes_links

couple of cases that point to innovations in public land valuation. Kuwait now requires two separate private appraisals when undertaking public-private partnerships (Peterson and Kaganova 2010: 6). Meanwhile, South Africa mandates that public land be taxed the same way as private land which means that public land undergoes the same valuation processes (Peterson and Kaganova 2010: Box 2). Yet many other developing countries are still struggling to value public land; in these places land auctions are often used as tool to reveal land value through bid pricing. Meanwhile, in Germany, land valuation is dictated by federal regulation.¹⁰ Germany has local land valuation boards that are charged with collecting and maintaining land price data as well as disseminating land price information (Kertscher 2004 and Seidel 2006). The United States and Germany are two examples where land valuation techniques have been refined.

As an example, in the United States the legal system allows each state to define its own method for property valuation. In most cases, states delegate this power to local governments leading to a vast variety of systems used. While the most commonly used is the market value approach, in many cases all three methods are combined to estimate property values; New York City is an example. In New York, these methods are used selectively for different property categories. The sales comparison approach is used to value small residential properties and vacant land, using sales data of comparable properties for the previous three years. The income approach is used to value offices and businesses, taking an estimated income and dividing the net income by a capitalization rate. Finally, the cost approach is used for new construction and renovations, but also for special properties such as stadiums, museums, churches, etc. (Lafuente 2009). The following describe common land valuation techniques given access to relevant data on transactions and land attributes.

2.1 SALES COMPARISON APPROACH

The sales comparison approach relies on market data to analyze information on comparable properties to arrive at an estimated value. This approach is based on the assumption that consumers are willing to pay no more than they would for another property with similar characteristics (Gwartney and Arizona 2001). The reliability of the approach requires considerable amounts of data, particularly transaction information on similar properties to the one being assessed. This method is widely used where large pools of data are available, and is relatively straightforward to analyze, particularly with statistical software. However, there are a number of weaknesses to this approach, including:

- Sales data may not accurately reflect the transaction's market value, thus appraisers must understand the underlying factors of each comparable sale and adjust accordingly, and
- Not all properties have enough market comparables (Arizona 2001: 3.3).

1.1. Valuing undeveloped land reveals another drawback of this method. In urban areas, where there is a scarcity of undeveloped land, land sales are rare resulting in little data on these transactions. While transaction data on built-up parcels may be available, decoupling land and built-up portions of a site are difficult. This form of analysis must often be paired with another to arrive at a more accurate valuation (German et al.). As with any of these land valuation

¹⁰ For full text of WertV, see: <http://www.werttax.de/downloads/wertv.pdf>

methods, the comparable sales approach must be used with a clear understanding of the limitations of underlying data.

2.2 COST APPROACH

This method calculates land value by determining its residual cost once the land has been developed. The total development cost of the site is determined, including labor, construction materials and infrastructure provision. In addition, these estimates require understanding development restrictions based on area regulations as well as development potential given the market environment that affects the location and characteristics of the site. This method is complex since it develops values based on assumptions that require accurate knowledge of:

- Land use restrictions;
- Costs of inputs—labor, capital and materials;
- Fees and tax rates;
- Sales price once developed;
- Characteristics of underlying land; and
- Value of depreciation.

Because this method is so speculative, it is often only paired with the sales comparison approach to justify that value. Mixing approaches, in particular, allows for greater degrees of variation since they bring together a number of aspects of the market, many of which intersect. Additionally, the extent to which assessors analyze these markets may result in values that are difficult to determine objectively. As demonstrated, these traditional methods of land valuation require extensive knowledge and data concerning real estate markets.

2.3 INCOME APPROACH

The income approach is applied to income producing sites, where income is divided by a market capitalization rate to arrive at a present value. This method is easily applied to rental property, where the net operating income is used to calculate annual income streams. In the case of land, farmland¹¹ is best suited to this valuation method but land use for parking or ground leases may also use this valuation method. The following is an example of how this is applied in practice.

Assume that there is a piece of land generating US\$50,000 per year, and the determined market capitalization rate is 10 percent. Then the value of this piece of land is $\text{US\$}50,000/0.1 = \text{US\$}500,000$. While this seems extremely straightforward, there are difficulties in arriving at a true value from the income approach, including determining a reasonable capitalization rate¹² or determining land rents absent of built up property.

¹¹ In Arizona, this method is used exclusively for farmland.

¹² The capitalization rate can be understood as the rate of return an investor would like to realize on an investment. In areas where land speculation is high or where there is a scarcity of information on land value returns, the capitalization rate could fluctuate wildly, and thus so would the value of land.

3 Assembling Land for Urban Expansion

3.1 EMINENT DOMAIN/ LAND ACQUISITION

Expropriation, eminent domain, or compulsory purchase as it is called in some countries, is the primary method municipalities use to acquire land to accommodate urban expansion. This legal institution allowing governments to take land to achieve some objective of public interest has increasingly been criticized, as questions about corruption and private negotiations surrounding takings. The main issue becomes one of balancing the need for urban expansion with the costs associated with welfare of displaced individuals. In this context the definition of public interest may appear as a central element to land acquisition. However, as the definition of “public use” or “public purpose” constantly evolves, courts play a critical role in providing guidance on the legal scope of eminent domain while still allowing for a flexible definition of public use/purpose that adjusts as cities and countries grow.¹³

In recent work, Azuela and Herrera-Martin (2009) provide a historic perspective of eminent domain. In their view, in the last two decades discontent with the use of this instrument has increased. While 30 years ago it was considered a crucial component of any development strategy, today, the social costs of eminent domain are widely recognized. According to Michael Cernea (2000) between 90 and 100 million people were displaced in the last decade of the 20th century. Finding the balance between efficiency for urban expansion and equity is not an easy task. There are high social costs associated with expropriation when it implies the displacement of individuals with little or no compensation.

However, society may also be forced to bear very high costs if governments are forced to pay exorbitant sums to landowners. In China for example, compensation for the acquisition of farmland includes land compensation (6–10 times its average production value in the past three years prior to acquisition), settlement subsidy payment (4–6 times the average production value of the land taken in the past three years prior to acquisition –payable to each person, and improvements and crop compensation (determined by sub national governments).¹⁴ A study of select Chinese cities (Beijing, Chengdu, Fuzhou, Guangzhou, Hangzhou and Tianjin) in the late 1980s highlighted that the break-even price for reviewed 10 projects is 84 per cent greater than the average cost of construction and profit -- implying that the final consumers pay an average of 84 per cent over the average cost (including profit) of redevelopment projects. And in Indonesia – private sector developers of toll roads are pressing the government to fully assume the costs of land for infrastructure projects. They claim that if the cost of land acquisition is charged to the investors, these projects become unattractive.

The issues inherent to eminent domain may be exacerbated when the appropriate institutions are not in place. Lack of definition or weak enforcement of property rights increases the vulnerability of tenants and landowners. Cases in which land is taken from individuals without providing appropriate compensation is not necessarily suggesting a problem with the expropriation system but rather it points at deficiencies in the institutions that support the

¹³ Dowall (2011) and Azuela and Herrera-Martin (2009)

¹⁴ Chan (2003)

process. First, it suggests flaws in defining property rights and a weak judicial system to guarantee that individuals have recourse. Second, it suggests deficiencies in determining compensation to be provided to displaced individuals. In Mexico, some of the most serious political conflicts in recent years had their origin in inappropriate assessments and low credibility of the institutions in charge of difficult expropriation cases (Azuela and Herrera-Martin, 2009). The problem becomes more complicated when the people occupying the land do not have title to the property, e.g squatters and land renters. While the real problem is one of property rights definition some countries have articulated procedures for a variety of land occupiers. In Singapore for example, sitting tenants are served notice of the intention to redevelop their area and they are offered the choice of moving to another rental flat, or the purchase of a new unit. In Hong Kong SAR, China, displaced tenants were provided with modest relocation assistance and were expected to pay market rates for their new units – but did not receive in-kind compensation. In South Korea, each tenant household member is to receive three months' housing rental compensation along with compensation for moving expenses.

Social resistance, legal constraints, and rising costs associated with eminent domain have led to an international tendency to move away from this instrument and look for alternative ways to assemble land for urban expansion. Land readjustment has emerged in this context as an alternative that addresses a number of challenges that municipalities face when undertaking land development. As an example, in the United States, the Metropolitan Area Planning Council in Boston is experimenting with the adoption of selected elements of land readjustment (LR) in urban renewal projects.

However, even as countries reconsider the use of eminent domain this does not mean that they will stop using it altogether. In this context, countries will have to redefine the meaning of what a successful expropriation is, in terms of three parameters: efficiency, equity, and social acceptance (Azuela and Herrera-Martin, 2009). A parallel effort will be required to build the institutions to support a process that satisfies those three objectives.

3.2 LAND READJUSTMENT: AN ALTERNATIVE TO LAND ACQUISITIONS FOR LAND ASSEMBLY

Land readjustment (LR) is an alternative land assembly tool for urban expansion. Land readjustment is most commonly used to expand urban boundaries on the periphery of cities. However, it may also be used in urban areas for redevelopment purposes. LR is gaining acceptance as an alternative to land acquisition as it has many advantages for land assembly. Being in essence a participatory tool, LR avoids to a great extent the public discontent and protests that land acquisition may generate. LR is thus more politically feasible than eminent domain in some situations, and is arguably more efficient and equitable than the use of eminent domain given the role of landowners in the process (Hong 2007). However, LR involves efforts from public authorities such as the redrawing of boundaries and the associated adjustment of property rights. In some cases, LR also requires local officials to initiate the project, as in the Japanese case, and negotiate with affected landowners for a set of general agreements for the undertaking.

A number of countries practice LR, however, its application is context-specific. Before implementing LR countries must first assess whether enabling institutions exist to facilitate the adoption of selected ideas of LR. If the answer is no, a detailed plan to create such institutions is required before LR can take off. Second, countries must ascertain what other institutions are required to implement a modified LR system that fits the specific context of the country.

The premise of LR is to provide public infrastructure at a shared cost to landowners and the municipality. This is achieved by assembling a readjustment area, providing infrastructure and basic services, and then reallocating land back to participating private landowners. The reallocation represents a distribution based either on pre-adjustment land holdings or land values, but the land amount decreases under the assumption that the value of land has increased through the provision of infrastructure.

At a basic level, municipal governments seek to achieve urban development goals through planned growth. LR aids urban development objectives by providing public infrastructure and standardizing the layout of land—no matter how fragmented existing plots are. LR also enables municipalities to develop new urban areas with finite resources by financing infrastructure provision through the increase in land values and sharing with the landowners the increment accrued to the area by the capital investment. Once infrastructure is in place, land values will rise as these previously undeveloped areas become ripe for development and offer connectivity to transportation networks in a vibrant property market. With landowners and local governments as primary stakeholders in LR, the scope for citizen participation is greater than land management policies that rely on unilateral decision-making.

The LR process allows the development of land without complex transactions that are characteristic of eminent domain. Rather than buying out all existing properties or using eminent domain, the governmental agency invites owners to participate in the project as capital investors. In return, owners are assured to receive a property of at least equal value, near their original property, after the development of the area has taken place. Landowners are more amenable to adjustment processes because they are able to remain where they are, preventing significant social and emotional ruptures that often accompany relocation.

In developing countries, incentives for participation are often not present, and transaction costs are non-negligible. In this context, the government can consider the creation of institutions that may provide the right incentives and help minimize transaction costs. Hong (2007) suggests that when incentives for participation are not present, land readjustment may take the form of what he calls “instigated property exchange.” In general, the process is the same as that of land readjustment, but instead of fully voluntary participation, this method involves an institutional arrangement for persuading owners to negotiate with developers under the shadow of the land expropriation law.

The advantages of LR include, among other things, that it does not require substantial upfront capital for buying out existing land owners, thus lowering the redevelopment costs for public and private developers. LR is also more equitable than other land assembly methods, because the benefits and costs of land redevelopment are borne by the affected property owners and it minimizes displacement of large populations. Finally, LR acts as an institutional arrangement through which wider community participation in land development and public-private-community partnerships can be fostered.

However, LR is not free of limitations. In many cases, potential development options may not match the preferences of existing residential property owners making it hard to achieve consensus. Another limitation is that LR requires a strong legislative framework to support its implementation and this may require a lengthy political process. LR takes time, both in terms of implementation (e.g. title swapping is time consuming) as well as in terms of investment recovering (land owners will only recover their investments after several years). Finally, the process of determining land values and land contributions is controversial; however this is not unique to LR but is a problem common to all land-based instruments. Most importantly, the weaknesses of LR can be reduced if the right institutions are in place.

The following outlines the case of Germany as the most prominent example of contemporary LR and examines comparative cases in Asia that developed from the German model. The cases of Japan, South Korea and Taiwan, China are also described. They are considered as a single case as these three Asian countries implemented the German model with little variation among them. Then, we describe the case of Australia as an example of implementation of LR in a large federal country. Finally, we include the China case, to highlight its particularity. Additional cases are summarized in Table A1 in the Annex. The objective of these cases is to illustrate the relative successes and challenges of LR within different country contexts and point at key considerations and institutional requirements as LR implementation is underway.

GERMANY

Germany provides one of the oldest and most oft-cited examples of land readjustment (LR)—known as *Umlegung*—in the international literature on land management. The influence of Germany's LR model is so pervasive that Japan adopted it in the early 1900s and Japan now serves as Asia's leading example of urban development using LR. The success and acceptability of Germany's model for LR is a result of a number of factors, including: 1) its long-standing history of well established property rights; 2) its streamlined and transparent evaluation and implementation process; and 3) the strong judicial system in place to address public claims.

Germany's model provides considerable insight into establishing institutions and processes to carry out land redevelopment, recognizing their own legal framework. While many countries may not have the institutional structures to carry out LR, lessons from Germany on land valuation techniques and the evolution of price data management instruct others on how to construct a sound foundation on which to develop a comprehensive land management strategy. Adopting Germany's model requires a cognizance of the country specific challenges related to the extent of democracy in public process, legal framework and institutional strength and technical know-how of local bodies.

One particular process that should be highlighted in the German LR process is the method of land valuation. Land valuation processes in Germany are relatively well managed and transparent (Kertscher 2004 and Seidel 2006). In Germany, land valuation processes are defined by the law. The law mandates the setting up of valuation committees, the definition of standardized market values, and the method for collecting purchase price data.

For purposes of LR, Germany relies on public valuation boards, or land valuation boards. These valuation boards cover specific areas (e.g. Berlin, Hamburg, Munich, Dresden, etc.), comprised 10 to 20 members and number around 1500 across Germany (Kertscher 2004). These members represent expertise from public survey departments and private sector knowledge on real estate and land valuation (Seidel 2006). Land valuation boards are entrusted to collect and maintain purchase price data; publish periodic valuation trend reports; write and provide valuation reports when requested by the public or private sector, or courts; and, generally assess property values and levels of compensation. These boards manage the process of valuation and provide oversight and accountability to the valuation process. This stresses the point made before that LR also requires efforts in terms of building institutions. In this case, institutions that govern land valuation for LR.

The existence of strong institutions allows Germany to use redistribution of land by relative value. Land valuation methods are outlined in the federal law, and include the sales comparison approach, the income, and the cost approach. For LR purposes, and to generally value land, the comparison approach is the most commonly used.

Purchase price data is critical to carrying out market comparison valuation. Germany's database on purchase prices is a record of the ground value of all land transfers. Details on land plots included in the database are size of lot, type of use, location, date, etc. This information is available to the public for a fee (Seidel 2006). The database has been digitally stored since the 1980s, which allows for more complex computational valuation methods on large quantities of data, such as multiple regression analysis. By the 1990s, valuation committees began to geo-referenced these data and linked it to geographical information systems (GIS) (Kertscher 2004). The evolution of the management of price data enables Germany to explore methods to increase transparency and ensure that data can be analyzed in the most accurate way.

Germany's LR process may also use redistribution by relative size.¹⁵ Redistribution by relative sizes provides a useful instrument when the value of land is hard to determine. By defining the assignment of land after development based on initial size rather than value, the public agency avoids the need for a valuation exercise. This may prove to be of great use in countries where land markets are weak or information on property prices is not available. The challenge in this case may prove to be convincing landowners to accept redistribution by relative size as a reallocation criterion. This may be more useful for projects where plots have very similar characteristics and no dramatic differences in prices are expected across different plots.

While Germany's LR process serves as a model for successful implementation of urban development processes, some argue that the German case presents challenges in its adoption. Since LR is local authority-led and considered mandatory, it is not seen as truly participatory. Landowners have a right to appeal compensation amounts as well as express their views, but do not play a role in the LR process itself. Larsson also argues that all landowners that fall within the project area must participate in readjustment since there is no way to exempt oneself from the process (Larsson 1997). Further, while it is true that consensus of the majority of landowners is not required in Germany for commencing a LR project, it may be an important

¹⁵ In this case, the area of each landowner's property deducted by the municipality shall not exceed 30 percent, or 10 percent in the case of already developed land, and should the municipality need less the full 30 percent, the landowner must pay the municipality the difference in the post-development market value.

step in other countries where trust in government to undertake such a land development project is absent.

Origins and Legal Basis

Enacted into law by Lord Mayor Franz Adickes of Frankfurt am Main in 1902, land readjustment in Germany was adapted from rural land consolidation methods to serve municipalities in carrying out comprehensive plans. Lex Adickes (Adicke's Law) is codified in Germany's Federal Building Code (BauGB), §45 through §84.¹⁶ The premise of LR in Germany, as explained by the BauGB, is that it "empowers municipal governments to enforce their land use plans through land consolidation"(Davy 2007: 39). Municipalities may exercise mandatory LR if the land use plan requires land consolidation and replotting. Davy observes that after nearly a century of practice in Germany "mandatory land consolidation has been refined to an art form"(Davy 2007: 42). The legacy of LR in Germany as well as clear interpretations of property law contribute to German LR's wide acceptance as an urban development tool both domestically and abroad.

Germany's LR process ability to strike a balance between governmental authority and individual property rights provides a compelling alternative to expropriation or eminent domain. Private property is protected under Article 14 of the German constitution, but paragraph 3 stipulates that it may be expropriated for public purpose given just compensation (Davy 2007). German local authorities are viewed as "comprehensive planning authorities"(Müller-Jökel 2004), thus enabling them to use LR as the primary tool to carry out long-range development plans as public projects. Very few court cases have challenged German LR as an unconstitutional taking of property, unlike similar claims in countries where eminent domain is practiced exclusively by local authorities as a public land management process.¹⁷

In 2001, the German Federal Constitution Court ruled against petitioners who argued that LR was an unconstitutional taking. The Court claimed that a taking would require failing a public purpose use test as well as a physical taking of property, neither of which LR does (Davy 2007). LR is viewed as a regulation rather than a taking because the government's power is clearly circumscribed in the LR process.

Process and Methodology

After over a century of practicing LR for land redevelopment, Germany has streamlined its process. While some countries such as Japan, Korea and Taiwan, China may take up to 10 years to complete the LR process, including redevelopment, Germany takes between two and five years (Schnidman 1988). The process of LR is initiated by the municipality's Land Readjustment Authority, which centralizes control by overseeing the LR process and arbitrates claims. The following table outlines the various elements of the LR process led by the Land Readjustment Authority.

¹⁶ *Baugesetzbuch* translated into English: <http://www.iuscomp.org/gla/statutes/BauGB.htm#45>

¹⁷ See United States Supreme Court cases: *Kelo v. New London* (2005); *Dolan v. City of Tigard* (1994); *Lucas v. South Carolina Coastal Council* (1992); *Nollan v. California Coastal Commission* (1987); *Penn Central Transport Co. v. City of New York* (1978); etc.

Box 1: ILLUSTRATION OF REDISTRIBUTION METHODS

To further illustrate the two methods for redistribution (relative size vs. relative value), the following examples offer a sense of how these two redistribution techniques are carried out.

In the case of redistribution by *relative size*, take the example of a landowner who owns 1,000m² of undeveloped land. The municipality is entitled to 30 percent of the landowner's holdings to use for public infrastructure. In this case, the landowner should receive 700m² of her property back, which is now fully serviced. If the municipality takes more than 30 percent and say, returns only 600m² then the municipality must compensate the landowner with a payment equal to the new market value (valuation methods in Germany are discussed just after these examples) of the additional 100m². Similarly, if the municipality does not need the full 30 percent for readjustment, and say, for example, the landowner receives 800m² back, then the landowner now owes the municipality the new market value of the additional 100m² (examples adapted from Müller-Jökel 2004).

In the case of redistribution by *relative value*, we return to the example of a landowner who owns 1,000m² of undeveloped land. In this case, we are concerned with two values: 1) the input value of the land before readjustment; and 2) the post-development value of land once readjustment has taken place. If the input value is 100USD/m² then the input value is 100,000USD. Let us assume that the value post-development is calculated to be 200USD/m². If municipality returns 600m² of land to the landowner, then the value of that land after redevelopment is 600m²*200USD = 120,000USD. Thus, the landowner has received a benefit of the value of the post-development land she receives minus her original input value of her land, so 120,000USD - 100,000USD = 20,000USD. The following table illustrates this example.

Table. An Example of Redistribution by Relative Value

Land Status	Land Value/m ²	Land Size (m ²)	Total Land Value (land value*land size)
Input land	100USD	1000	100,000USD
Post-development land	200USD	600	120,000USD
Compensation (post-development value – input value): <ul style="list-style-type: none">• Payment from landowner to the municipality if positive value• Payment from municipality to landowner if negative value			20,000USD

Table 2. Land Readjustment Process in Germany

Step 1	Commencement of Land Readjustment	<ul style="list-style-type: none"> • Define area selected for LR based on land use plan • Map all properties and list all landowners • Record commencement of land readjustment in land registrar
Step 2	Preparation for Land Readjustment	<ul style="list-style-type: none"> • Mass all properties in site and designate for LR • Establish market value of land • Subtract land designated for public use from mass (e.g. roads, parks, etc.) and allocate to municipality or development company • Designate either <i>relative size</i> or <i>relative value</i> as method of redistribution • Determine share of each individual owner
Step 3	Value Capture and Reallocation	<ul style="list-style-type: none"> • Determine readjustment gain difference to be paid to municipality (relative value method) or retained in land (relative size method) • Consider present and proposed uses of land as well as needs and suggestions of landowners • Allocate the right to readjusted plots back to each owner • Determine the right to compensation of landowners who have not received their full share
Step 4	Readjustment Plan	<ul style="list-style-type: none"> • Issue formal decision on LR • Determine rights and obligations of each party, including municipality • Include a map of new property boundaries • Arbitrate legal issues among parties • Issue a public notice that LR is legally binding once legal issues are resolved or arbitration is exhausted
Step 5	Implementation of Readjustment Plan	<ul style="list-style-type: none"> • File readjustment plan with land registrar • Monitor implementation of readjustment plan

Source: Table adapted from Davy 2007, page 41.

GERMANY'S MODEL IN ASIA: JAPAN, SOUTH KOREA, AND TAIWAN, CHINA

Germany's model of LR was first adopted by Japan (locally known as Kukaku Seiri), appearing in Japan's City Planning Law of 1919. Japan further disseminated the German model of LR during its occupation of South Korea and Taiwan, China. The examples of Japan, South Korea, and Taiwan, China illustrate how LR developed under local contexts despite sharing similar origins.

A number of country-specific features enable the success of LR. In Japan, for example, a strong culture of ownership rights favors LR over expropriation in the Japanese context (Sorenson 2007). In addition, fragmented land holdings, and scarcity of public land holdings in rural areas make LR necessary for development. Japanese farmers are also highly organized and politically influential. While in Korea, rapid urbanization in the 1950s and 1980s coupled with the limited supply of arable land (Archer 1984: 14) led the way to LR for urban growth and land use conversion. The use of LR as a cross-subsidy tool for low-income housing provides a revenue generation tool that assures equity in the Korean LR process. Large readjustment areas in Taiwan, China such as Kaohsiung offered early success and opportunities to refine the LR process. High urbanization pressures in these cities have led also to rapid increases in land values, rendering the financing of local infrastructure through the sale of reserve land viable. While in Japan and Korea, landowners contributed predetermined percentages of their initial land area to the project, in Taiwan, China the contribution to the project was determined based on the expected change in land values after the implementation of the project.

Origins and Legal Bases

Although LR was practiced in these three countries before officially being codified into law, the widespread use of LR was precipitated by specific events in each country's urban history. The Great Kanto Earthquake of 1923, which devastated Tokyo and surrounding cities, as well as the destruction of Japan's urban areas during World War II were defining moments for LR in Japan. The need to rebuild both public infrastructure and private property after these events made LR the prime redevelopment tool. In Korea, the aftermath of the Korean War and political instability of the 1940s resulted in housing and urban facility shortages. Again, the urban renewal tool of choice was LR. The subsequent rise in urbanization of South Korea after the war is attributed to a great extent to LR policies (Archer 1984). Today, the use of LR in South Korea has decreased considerably due to the rapid increases in land value and infrastructure development costs. Both changes have made LR financially less feasible without a large amount of land contribution from participating owners or substantial government subsidies. Taiwan, China's use of LR was not used for redevelopment, but to carry out a concerted urbanization process using undeveloped land. The conversion of agricultural land was first used in the development of Kaoshiung in 1958. Today, LR in Taiwan, China is largely used to convert rural land into urban uses. The following laws trace the origins and development of LR in each country's history.

Table 3. Laws for Land Readjustment through time

Japan	South Korea	Taiwan, China
<ul style="list-style-type: none"> • 1919 City Planning Law • 1946 Special City Planning Act (post-disaster rehabilitation) • 1954 Land Readjustment Act 	<ul style="list-style-type: none"> • 1936 Urban Land Planning Ordinance • 1962 City Planning Law • 1966 Land Readjustment Project Act 	<ul style="list-style-type: none"> • 1930-55 Land Law • 1954-64 Equalization of Urban Land Rights Law
<i>Administering Government Agency</i>		
Ministry of Construction	Ministry of Construction	Department of Land Administration/Provincial Land Bureau

Source: Archer 1984.

Process and Methodology

Japan and South Korea share a nearly identical methodology for LR, which comes as no surprise given the events that catalyzed urban development in those two countries. However, Taiwan China's methodology diverges slightly, which is explained by the fact that LR began as a method of the government to drive a state-driven urbanization strategy.

Projects in Japan and South Korea can be either privately or publically initiated, and executors include 1) individuals, 2) land owner associations, 3) local governments, 4) government agencies and 5) housing and town corporations. Because of the range of executors, Japan is lauded as having one of the most participatory LR processes in the world. From 1954 to 1979, the majority of projects in Japan (by area) were initiated by local governments (42.3%) and landowner associations (29.5%) (Archer 1984: 10). Depending on which group initiates the project, development can appear substantially different. Local governments, for example, use LR to provide infrastructure, whereas landowner associations are typically in it for the profit.

For privately-initiated projects, all landowners/leaseholders must be in agreement, so there are fewer conflicts and less of a need for legal processes. An association is formed once 2/3 of the affected parties are in agreement. The association attempts to build consensus as the project moves forward. The prefectural governor approves the association.

For publicly-initiated projects, the project area must fall under an LR site in the city plan. There is no requirement for agreement from affected landowners/leaseholder, although the project program is open to public review (Sorenson 2000 and Archer 1984). The following are steps common for all projects:

- Project area and boundaries are defined;
- Legal body established to become the primary agent of project;
- Draft plan created, delineating public areas to be developed;
- Consent of landowners requested;
- Project implementation plan established, including financial plan and replotting design;
- Construction of new infrastructure; and
- Project completion, financial reconciliation, and return of readjusted parcels to participating landowners.

In addition to the shared methodology between Japan and Korea, Korea has a provision to set aside proceeds from LR for low-income housing. In 1980, the government mandated that 30 percent of the funding for low-income housing would come from LR (Schnidman 1988: 5).

The Korean model is different in that it received little financial support and therefore it had to be mostly self-financing projects. LR was used mostly for financing installation of infrastructure and more importantly for housing land supply. In Japan on the other hand, most of the financing came from government subsidies and the public works fund and therefore LR was mostly used for provision of public facilities rather than residential land (Lee 2002). Landowners contributed 30 percent of their land for public facilities and 20 percent to cover project start-up costs¹⁸; in Japan these percentages were 20 and 10. The land that was used to cover start-up costs, also called cost-equivalent land, was then sold by the implementing agency at market rates (Schnidman, 1988). Both in the Korean and Japan case, the remaining land is returned to landowners, if possible at a similar location and similar characteristics but according to the new master plan.

Taiwan, China's methodology is similar to Japan and Korea's, but because LR came later and was a result of government efforts at urbanization it is seen as less participatory than are similar LR projects in Japan and Korea. As with Japan and Korea, both local governments and landowners can initiate the LR process. However, only 50 percent of landowners (by number and area) must agree to participate, compared to two-thirds in Japan and Korea. In Taiwan, China, the first step of a land readjustment project was the appraisal of the property by the Urban Land Value Appraisal Committee, according to a large number of factors spelled out in the law. This appraisal was used as the basis for determining landowners' contribution to the project (i.e. land value redistribution).¹⁹

Table 4 below highlights some of the challenges that the governments of Japan, Korea, and Taiwan, China faced as they implemented LR for land assembly and infrastructure expansion. Highlighting these challenges will inform governments thinking about implementation of LR in their local context and alert them about possible issues that may arise throughout the process. Many of these implementation problems are not insurmountable, but rather challenges that can be addressed on the way. Most importantly, they are in most cases not exclusive to LR

¹⁸ ADB (2010)

¹⁹ Schnidman (1988)

projects but rather common to all development and redevelopment projects. The LR experience in Japan, South Korea and Taiwan, China demonstrates that countries may adapt and refine LR policies according to local contexts as well as over time.

Table 4. The Challenges of Land Readjustment

Japan	<ul style="list-style-type: none"> Local governments almost always initiate LR (Larsson 1997) A relatively small portion of public infrastructure in LR projects is funded by the land increment, instead Japan's LR projects are heavily subsidized (Lee 2002)
Korea	<ul style="list-style-type: none"> Program does not reach low-income, instead produces middle income residential districts [low-income housing provision sought to address this] Land speculation around project areas increases land prices, this is not however a limitation specific to LR projects Land reduction rates can be severe, indicating impact on landowners (Lee 2002) Highly fragmented landholdings on the urban fringe drove landowners to sell land to speculators during LR process Highly fragmented landholdings meant re-plotting was extremely complex (Archer 1984: 14)
Taiwan, China	<ul style="list-style-type: none"> Valuations for compensation were not market-based, instead they rely on a formula which assign weights to different land features (Archer 1984)

AUSTRALIA

Land readjustment in Australia, referred to as land pooling, is practiced exclusively in the western part of the country. LR in Western Australia has been mainly undertaken in the city of Perth, Australia's fourth largest city.

An important difference in the Australian model is that the land that enters the project becomes a government holding until it is redistributed; in land readjustment the land remains property of the landowner until it is readjusted. A key element in the success of LR in Australia is the acceptance of the official valuations due in part to the professional competence of the valuers and awareness of the landowners of the land value system for property taxation in Western Australia" (Archer 1984: 22). Land value assessment is the basis of determining property taxes in Australia, thus, local councils provide professional appraisers to determine the market value of land. This process is widely accepted in Australia as standard practice.

Origins and Legal Basis

LR is allowed under the Town Planning and Development Act of 1928. Although legally authorized since 1928, Western Australia did not undertake its first land pooling project until 1951. This inaugural project was undertaken in response to a lack of funds to redevelop a previously subdivided plot that had not been provided adequate infrastructure (Archer 1984). Since then, most land pooling projects have been used to subdivide smaller plots of agricultural land on the urban fringe. As of 1998, only twelve out of 26 local government councils in Perth used land pooling as a land development and management tool. LR is perceived as "mainly a means of overcoming land development problems rather than to ensure orderly development and adequate land supply" (Archer 1998: 211). Thus, local government councils view land pooling as a reactive tool, instead of one that promotes longer term development.

As was the case with examples from Germany and in East Asia, LR authorizes local councils to implement municipal plans. However, in Perth LR is generally not used for urban expansion, but instead for subdivision and housing-specific projects (Archer 1998: 211). Most project improvements finance specific infrastructure requirements, rather than general public infrastructure needs that accompany urban growth (Archer 1984). Western Australia remains the only Australian state that is authorized to use land pooling.

Process and Methodology

LR follows a similar methodology to Japan, South Korea and Taiwan, China, which begins with the creation of a town planning scheme that details the project to be covered by land pooling. However, in Australia, LR can only be initiated by local councils, not by private land owners. Archer (1984) notes that landowners could form a cooperative to initiate the process, but as of 1984 no such cooperative had undertaken it. Local councils formulate the plans in consultation with landowners and open the process to public review. As with Japan and Korea, two-thirds of affected land owners must agree to the plan (Turk 2008).

As land enters the readjustment project, it becomes a governments holding. Once the land is pooled and infrastructure provided, the land is redistributed to land owners based on the value method. The government does not share any of the increment, but rather distributes all of the value gained to landowners and retains only the value used to cover the cost of improvements (Archer 1998: 218).

Western Australia has successfully implemented land readjustment for smaller projects and with strong public acceptance. However, there is great potential to incorporate LR schemes into a broader land management framework. Another challenge faced by Australia is the streamline management of LR process to avoid delays that have previously engendered dissatisfaction among landowners (Archer 1984).

LAND READJUSTMENT WITH A SINGLE LANDOWNER: THE CASE OF CHINA

China's Constitution names the state as landowner under the socialist system. Very few examples of LR exist since land acquisition by the government is largely done through expropriation with minimal public participation. The few examples that exist have been performed ad hoc. Three national laws have changed how land is viewed and pave the way for efforts to establish:

1. Land Administration Law (LAL): farmers retain 30-year use rights over land allocated by the collective;
2. Rural Contracting Law (2002): allows marketable use by landowners for up to 70 years, although farmers have faced difficulty in challenging rights violations due to a lack of an effective process; and
3. Law on Property (2007): the same level of rights is extended to all types of property (i.e. state, collective and private) (Guo et al. 2008).

Rural and urban land is strictly separated by different rules and institutions. In addition to the aforementioned national laws, recent legislation aimed at better protecting landowners in the face of weak or nonexistent property rights include: State Measures of Compensation for Housing Relocation and Resettlement in the Urban Areas in 2001 and suspension of compulsory relocation and settlement in urban areas in 2003 (Li and Li 2007a).

While there are only a few examples of LR in China because the practice is not institutionalized, recent cases suggest that LR-like arrangements may be applied in a “vertical” manner to redevelop inner-city areas, such as in Hong Kong SAR, China (Li and Li 2007a, 2007b). Essentially, an inner-city property may be redeveloped to modernize the building as well as capture any air-rights not in use. The current tenants are relocated during redevelopment and allocated a comparable unit upon their return. By relocating individuals in the same location their initial flat was, the amount of time for negotiation with owners was minimized and there was no need for a valuation process. In the case of development on the urban fringe, the example of Pujiang provides a successful case of LR.

This project was initiated by a group of landowners to demonstrate the potential for LR as a tool for urban renewal (Li and Li 2007a). Areas of Pujiang were slated for redevelopment, but because affected residents were unable to remain in situ the project was unpopular and failed to receive sufficient stakeholder support. The deputy director and staff of the Urban Renewal Program in Pujiang initiated a pilot project, which required voluntary participation by landowners. The joint effort, coupled with cash incentives for swiftly vacating the site, proved to be successful. Li and Li (2007b) attribute the success of this pilot to a number of factors, including: the urgency of renewal because of the dilapidated state of the area; strong political and administrative will from the local development agency; compensation awards amenable to affected landowners; and citizen participation in the process—nine volunteer citizen organizers helped usher the project through. While this case is only a pilot, it offers an instructional precedent for China’s use of LR for urban redevelopment.

In general, the land management arrangement in China has pitfalls related to state power versus individual rights. Among others, these include the fact that farmers’ rights are limited; the state has almost unlimited taking power; and land transfer value is a large source of revenue for local governments—misaligned incentives. While LR in China is nascent and sporadically practiced, China’s rapid urbanization ensures that land policies will undergo significant changes in the coming years.

Box 2: MAIN LESSONS FROM INTERNATIONAL EXPERIENCE WITH LAND ASSEMBLY

-Land acquisition and Land Readjustments (LR) provide alternatives for land assembly. , Given its participatory nature, there has been a recent move towards LR. Advantages of LR over land acquisition include that it promotes community participation, it does not require substantial upfront capital for buying out existing land owners, it avoids holdouts, it is more equitable, and it minimizes displacement of large populations.

-Supporting institutions are essential for the success of LR and land acquisition. These institutions include: institutions that assign and protect property rights; institutions that enable independent valuation and public dissemination of land values across uses; and institutions that enable a judicial system to handle disputes that may arise in the process.

4. Looking Ahead: Land-Based Financing Tools

Land sales can be used as mechanisms for generating initial capital to defray the first-time infrastructure investment costs. However, in the long run, it is still important to use other instruments such as a property tax or other similar levies that allow for maintaining and expanding public facilities in the future. In the US, property tax revenue provides the greatest source of funding for local authorities at the municipality and school district level. In developing countries however, property taxes are still only a small percentage of local revenues, except for largest cities where property taxes are gaining importance. However, ad valorem taxes are often hard to collect in developing countries where property values are difficult to determine and tax collection rates remain low. Betterment levies, special assessment taxes, and exactions provide a response to these challenges by linking fee payments to increases in value based on infrastructure improvements. The funds generated are specifically used to finance these infrastructure projects. While these efforts may not result in infrastructure projects “paying their own way,” they are consistent with local revenue generation and accounting efforts. In the United States, tax increment financing (TIF) illustrates a more advanced form of land-based financing, which relies on property tax increases from improvements to finance infrastructure investments. All of these examples uncover the range of tools used by governments. In this section, an overview of these land-based tools is presented with an emphasis on international best practices and persisting challenges.

4.1 LAND LEASING AND LAND SALES

Land leases and land sales, particularly through auctions, demonstrate efforts to monetize public land assets. They enable municipalities to generate direct revenue through the lease or sale of their landholdings. This option of using land as a method for revenue generation often forms the base of a municipality’s toolkit for land management. Publically held land is often the most valuable asset that a municipality owns, thus a well-developed land leasing and sales strategy can maximize revenue from this resource. The sale of public land is often the simplest strategy a municipality can employ, because of the relative ease of conducting land sales. These transactions require less institutional structures than other tools described in this note. For example, TIF requires a well-established, functioning property tax regime. Land sales and auctions can be employed by any municipality with land holdings and suggest a number of ways in which this initial effort of using land as a method of revenue generation can instill an institutional foundation for more advanced tools for long-run land management strategies.

In practice of course, just as with any other instrument, complications may arise. Options for leasing public land can be organized in terms of public auction, opened or closed tender and negotiated contracts. Some of the possible structures for auctions will be discussed in what follows. Further, while in theory public auctions should be the most transparent method, in many countries other less transparent contracts that leave space for corruption have wider acceptance.

Land Leaseholds: the Case of China

Land leaseholds are used extensively in China since all land is ostensibly owned by the government. Leaseholds are used to enable municipalities to generate income for local

governments. Until 1994, the central government was allowed to collect up to 60 percent of all land leasing revenue. After financial reforms, that percentage went down to 5, enabling local governments to capture a local revenue source (Peterson 2007). China acquires leasable land through a number of sources. Often they move administrative buildings or state-owned enterprises to new sites to free up well-located plots or acquired rural land from collectives located at the urban fringe (Peterson 2007: 290). While the case of China is unique because of their land ownership status, it demonstrates the financial benefit municipalities gain when they are able to control the income potential of their land assets. Moreover, municipalities gain valuable asset management experience as they manage leasehold agreements and maintain strict accounts of their landholdings. These technical land management skills equip China to explore innovative and institutionally complex tools in the future.

Land Auctions

In the absence land valuation for direct sales or valuation for capital value based property tax collection, municipalities still rely on leveraging land as a source of revenue. Municipal land holdings comprise significant shares of total land in cities. Peterson and Kaganova (2010: Box 1) explain that 48 percent of cities in the World Bank's Urban Growth Management Initiative publically own one-quarter to more than half of the city's land. While a portion of these holdings may be earmarked for urban development plans, some of it has the potential to generate direct revenue for municipalities. Land auctions provide a tool for such income, and are particularly appealing to municipalities that are unable to value land for direct sale. Auctions provide an alternative to the "search and match" method of price discovery of land and create a structured market through which local authorities optimize land sale revenue.

The allure of land auctions in countries that lack price data on real estate points to the basis of auction theory. Auction theory explains agent behavior through a game where there is asymmetric information. The winning bid results from agents observing signals and understanding their own private value of the good on auction. Quan (1994) explains that "real estate auctions provide us with a less obstructed view of how agents behave under a set of explicit trading rules". The analysis of real estate auctions diverge from general auction theory in that the model assumes that the underlying good shares a common, or the same, objective value to bidders. While this value is not known *ex ante*, its price would be agreed upon by bidders with full information (Quan 1994: 32). Real estate auctions differ from general auctions because there is a common value component to the good in question. The underlying theory behind auctions allows for scope in continued research into price formation through auctions.

On a more practical level, local governments rely on land auctions for the sale of property largely because they are a speedy and efficient way of land sale. Moreover, auctions provide greater transparency than negotiated sales. In countries plagued by corruption, the auction method lends credibility to public land sales. Corruption in land sales has two deleterious effects for policy. The first is that corruption generally means that less is paid to the seller, thus siphoning off potential public funds as savings to a private buyer. The second is in the form of misallocation of development potential, where "honest developers with higher valuations are deprived of the chances to develop the land" (Hongbin et al. 2009: 36). The other form of foul play that may occur in auctions and tenders is collusion between bidders. One way to avoid collusion is to increase the number of qualified bidders at public auction, especially in developing countries where only

large developers have the upfront capital to lease public land. Encouraging smaller land developers to participate in the bidding by promoting credit markets where that they can borrow funds to finance the acquisition of leasehold rights may be an alternative.

Table 5. Auction Types: Advantages and Potential for Foul Play

Auction Type	Description	Advantages	Potential for Foul Play
English Auction	<ul style="list-style-type: none"> Most common form of auction Ascending price auctions Held “live” The auction ends when no one is willing to pay more than the last bid Highest bidder wins 	<ul style="list-style-type: none"> Allows the public to observe auctions, can easily be televised 	<ul style="list-style-type: none"> Possible collusion since bidders can adjust throughout process Potential for corruption if auctions are not advertised
First-Price Sealed Bid	<ul style="list-style-type: none"> Each bidder allowed to submit only one sealed bid At the end of submission period, the highest bid wins auction 	<ul style="list-style-type: none"> Collusion less likely since bidders cannot adjust their bids (see Ooi et al. 2005 for example from Singapore) Often used for government tenders, where the selection of the winner can partially attributed to something other than price, such as quality of project 	<ul style="list-style-type: none"> Potential for corruption if auctions are not advertised
Vickery (Second-Price, Sealed Bid)	<ul style="list-style-type: none"> Identical to the first price sealed bid, except the winning bidder pays the second highest price Important in auction theory, but rarely used in practice²⁰ 	N/A	N/A
Two-Stage	<ul style="list-style-type: none"> The first stage remains open for approximately 10 days, where bidders can submit bids online or in person, and the bid amounts are publicly displayed At the end of the first stage, if there is only one bidder they win the auction at the price they bid If there is more than one bidder, it converts to a less public English auction (see Cai et al. 2009 for examples from China) 		<ul style="list-style-type: none"> Cai et al. (2009) find that two-stage auctions allow for rampant corruption, particularly when the first-stage concludes with one bidder

One of the first steps to ensuring that auctions maximize the potential benefit to local authorities is selecting an auction type. There are several types of auctions that may be used for real estate transactions. Table 5 illustrates primary auctions formats used or discussed in developing countries.

²⁰ Given the structure of the auction, a cheating bidder could change the outcome of auctions or reveal bidders’ private information (Rothkopf et al. 1990).

Another key aspect of the auction methodology is setting the reserve price. McAfee et al. (2002) generate a bidding model to illustrate how to optimize auction yields based on a reserve price. They find that, based on the model, the reserve price should be “at least as large as, and generally strictly larger than, the average value (to the seller) of good that fail to meet the reserve”. While this empirical study corroborates intuitive notions of what the reserve should be, it does not offer practical advice to local finance managers. A review of the literature suggests that reserve prices are typically set slightly below the true market value. In Singapore’s sealed-bid auctions, the reserve is set at 85 percent of the Chief Valuer’s assessed market value (Ooi et al. 2005: 13). Kaganova (2010) offers a “rule of thumb” of a starting or reserve price set to 80 percent of market value. While there are theoretical and practical examples of informed reserve price setting, countries who have turned to auctions in order to better grasp prices will struggle with setting a reserve price that relies on market value. Frequent auctions, however, provide dynamic data on revealed prices which allows for developing land pricing models based on historical prices.

When it comes to the acquisition of private land, the use of eminent domain sparks questions around what can be determined to be just compensation. “Just compensation,” a term used in the United States Constitution, holds no explicit meaning, but suggests that it reflects commonly understood values. Shapiro and Pincus (2008) propose a “Strong Pareto” auction for land assembly under eminent domain. In this model, each landowner sets her own reserve, and the total reserve amount aggregated into this assemblage and divided by the number of shares each landowner holds. Shapiro and Pincus’ model offers a view of the interaction between reserve setting and bidding on assembled plots. The resulting efficiency and fairness benefits demonstrate welfare maximization and provide a case for public assemblage of land as a form of public goods creation.

Actual land auction data is not widely available, but a number of countries use land parcels sales through auction as a standard component of their land management practice. However, recent large transactions provide examples of the revenue potential of land auctions. However, it is important to keep in mind as one looks at these numbers, that the land sales revenue is a one-time collection. Even if the numbers at first seem high, they do not provide a continue revenue stream as property tax receipts would. Three notable land auctions are documented by Peterson (2009) and Peterson and Kaganova (2010).

- 1) Cairo, Egypt (May 2007): auction of 3,100 hectares of desert land for a new town, generating US\$3.12 billion.
 - Land auctions are a key tool of Egypt’s Public Asset Management Initiative and New Town development; they reflect part of a long-term policy agenda
 - Land auctions seen as a way to enlarge private sector involvement in financing infrastructure and new development
 - Private buyers of land are also responsible for installing necessary infrastructure on those sites (Peterson 2009)
- 2) Mumbai, India (January 2006 and November 2007): auction of 13 hectares of land in the centrally located, new financial center—Bandra-Kurla Complex, generating US\$1.2

billion, more than 10 times Mumbai Metropolitan Regional Development Authority's (MMRDA) total fiscal spending in 2005²¹

- Bandra-Kurla Complex is MMRDA's largest land holding and land sales from this site are its main revenue source
 - MMRDA has not publically disclosed the use of these funds, although it has indicated they be used for capital infrastructure financing (Peterson 2009: 92)
 - Reliance on land sales for operating budgets is risky, particularly because land markets suffer during economic downturns²²
- 3) Istanbul, Turkey (March-April 2007): auction of old municipal bus station and government building which generated US\$1.5 billion amounting to more than Istanbul's total fiscal spending and infrastructure investment in 2005.²³
- Land owned by municipal government, so proceeds went directly to fund local infrastructure
 - These were one-off large sales of land as part of a program to aggressively catalyze investment and provide revenue for roads (Peterson 2009)

The precedent of these large land auctions serve as examples of how municipalities can leverage land and obtain significant revenue from municipal landholdings. However, these cases point to land sales as short-term measures for land management strategies. Mumbai perceived land sales as risky since land prices correspond to the macro-economy, while in Istanbul, the land sales were seen as a one-time event. These experiences should be a lesson to municipalities on how to manage large land sale transactions rather than perceiving such land sales as a free-standing land management solution.

4.2 BETTERMENT LEVIES AND SPECIAL ASSESSMENT TAX

Betterment levies and special assessment taxes provide revenue to municipalities based on the increase in land value from public improvements. This revenue is collected from property owners who directly benefit from the improvements. Betterment levies are payments made by *affected* property owners who help fund infrastructure improvements based on the increased value of their property. Special assessment taxes similarly collect payments from property owners within a designated area of improvement. In the United States this zone is called the Special Assessment District, and levies collected generally fund special assessment bonds which finance specific infrastructure improvements.²⁴ Betterment levies and special assessment taxes share the following characteristics:

²¹ Actual comparison of a one-time revenue related to land sales and fiscal spending would in fact require additional time-series data to determine if this revenue source is fiscally sustainable in the long run.

²² In March 2008, two plots for auction in Bandra-Kurla Complex had no bidders. The cooling of the real estate market was blamed.

²³ This property in Turkey was purchased by Sama Dubai with grand plans to build the Dubai Towers, Istanbul. These were to be the tallest skyscrapers in Turkey. However, the municipality and developer could not come to terms on the impact of the buildings to the surrounding area so the project has been halted indefinitely. Meanwhile, the land remains undeveloped.

²⁴ For purposes of this brief special assessment taxes are not discussed in detail, however, it is worth pointing out that one of the key elements to their performance is the state of the debt markets, since special assessments rely on bond financing.

- Financing: betterment levies and special assessments play an important role in financing specific infrastructure provision or improvements
- Benefit: property owners are charged levies based on the benefit they receive from the improvement, determined by increases in monetary value or factors such as convenience
- Proportionality: property owners pay levies based both on their capacity to pay and the benefits received

The most well-known system of betterment levy collection is practiced in Colombia where the country has been using this municipal financing tool since 1921. Betterment levies, or *contribución de valorización*, in Colombia were established by Act 25 in 1921 and are now under regulatory decree passed in 1970. Betterment levy collection has been a significant source of financing local projects, thus earning its reputation as a successful tool. Betterment levies comprised 16 percent of the Bogotá's total income and 45 of Medellín's in the 1960s. In Bogotá this jumped to 24 percent in 1993 (Uribe 2009 and Borrero et al. 2011).²⁵ To illustrate the extent of this investment in Bogotá, up to 50 percent of the city's arterial road network has been funded by these levies (Uribe 2009: 2).

Methodology

Colombia's betterment levies follow two methodologies, one based on Bogotá's model and one on Medellín's. The Bogotá model relies on calculating the benefit and charging commensurate levies. The Medellín model, which has also been used in cities like Manizales and Bucaramanga, uses a dual appraisal approach, which relies on pre-assessment and post-assessment values to determine the value capture increment (Borrero et al. 2011). In this model, first the betterment plan is enacted. This involves defining the financial and construction plan, identifying the properties that will benefit from the betterment and will be subject to levy, and finally, assessing these properties. To identify the properties that benefit from the infrastructure project, authorities look at proximity and accessibility to the project. Properties in a comparable area are also assessed, to provide the hypothetical increase in values. These estimated changes in value are then used to create a map of changes in prices in the area of influence that is then used to distribute the betterment levy. To estimate the benefits of the project, a multidisciplinary team works together. Economic studies, road network studies, urban studies and real estate studies are developed jointly to determine the benefits in specific areas. Finally, the method of dividing the amount of levy to be paid by each party is determined. Different jurisdictions have used alternative methods.

The most commonly used are the frontage method, the simple area method, and the dual appraisal. In the first method, levies are calculated based on the amount a property abuts a street where improvements such as sidewalks or street lights have been installed (measured in linear meters). In the simple area method levies are calculated based on improvements that uniformly benefit the entire property such as water or sewerage lines (square meters). Finally, when the dual appraisal method is used, levies are calculated based on assessed values before and after the improvement is completed (Borrero et al. 2011). Affordability considerations are also taken into account, and therefore the levy may be allocated differently depending on income levels.

²⁵ Medellín discontinued the use of betterment levies in 2001 because of administrative challenges.

While Colombia's betterment levies have been lauded as a successful example of this method of land financing, the process does face a number of challenges. Betterment levies were less successful in the 1980s and 1990s because of rising land costs, making it difficult to determine compensation values (Peterson 2008 and Uribe 2009). Among the weaknesses of this method are the fact that there is no quantitative standardized method to measure the benefits from infrastructure improvements; and the lack of a uniform method for assigning the benefits and therefore the levy paid by each unit. After this decline, the process was simplified and instead of making parcel-by-parcel estimates of land-value gains due to individual investment projects, the city created a bundle of public works projects linking it to a citywide valorización fee that is broadly differentiated by benefit zone as well as other factors. The approach has allowed Bogotá to revive valorización as an effective device for financing infrastructure.

Citizen participation in the betterment levy process has also contributed to its more recent success. The primary mode of public engagement is through citizen overseers. Enabled through the Citizen Overseers Act of 2003, citizens are empowered to monitor, research, and participate in public administration activities (Borrero et al. 2011). Citizens may also initiate a betterment project if 55 percent or more of the citizens in the coverage area consent. This effort is appropriate for smaller projects, and was employed for the *Obra por Tu Lugar* program. Borrero et al. (2011) find that although *Obra por Tu Lugar* is positively received, communities face difficulties financing projects. The various avenues for community participation promote greater acceptability of betterment levies in Colombia.

Uribe (2009) points to three internal challenge areas for betterment levies in Bogotá. First are institutional limitations. At present, betterment levies are managed by *Instituto de Desarrollo Urbano* (IDU), and their unilateral management is perceived as "non transparent". Further, until recently the property tax valuation performed by the Cadastre was not consistent with IDU determined benefit from a betterment project. With recent updates to the cadastral database, it is possible now for IDU to use the same property values that are recorded in the Cadastre. Efforts are currently being done in this line, so that all data collection efforts are centralized in the Cadastre, and other institutions can benefit from these efforts. Second, betterment levies have the potential for producing regressive effects. In general, the majority of betterment projects end up occurring in more affluent areas of the city because of their high capacity to pay; some projects (e.g. highway overpasses) may decrease property values. Finally, inter-administrative coordination is deficient in many cases. Even though IDU works with the Planning Department on betterment project planning, the projects are not always internally consistent with the city's Master Plan.

Betterment Levies in Peru

The experience in Peru provides a counterpoint to Colombia's betterment levy process. Betterment projects in Peru are concentrated in metropolitan Lima and are empowered by Legislative Decree No. 184 of 1981. While betterment levies have become a widely used form of revenue collection in Colombia, they have yet to gain traction in Peru, which illustrates unique implementation challenges to metropolitan Lima. From 1990-3, more than 500 public works projects were undertaken in Lima, but only 31 projects used betterment levy financing (Huayapa 2001: 4). To determine the benefit of projects, local authorities choose among two methods, or a combination of them.

The first method is based on analogy and estimates benefits based on changes in property prices in comparable areas where similar projects were implemented. As an alternative, they can also use the double appraisal method where as discussed in the case of Colombia, before and after prices of the properties in the area of influence are compared. Lima has faced several challenges in implementing betterment levies. First, the municipality lost key professionals, including engineers, architects, economists, etc., and the remaining staff was not compelled to participate in training courses on implementing betterment levies. Second, the political will from municipal authorities is non-existent while middle and upper class residents are dissatisfied with levies. These classes feel they are overburdened with taxes; meanwhile projects are not well marketed so citizens do not understand their full benefits. The outdated land registry has also posed challenges as it makes the administration of the levy particularly difficult (Huayapa 2001: 5).

While the methodology for Lima's betterment levies is nearly identical to Colombia's, the lack of training and technical knowledge on implementation translates to potential missteps at every turn. Like Colombia, public participation is a part of the betterment levy process in Lima. A citizen representative is selected by democratic process to act as a liaison between the community and the municipality (Huayapa 2001).

Successful implementation of betterment levies requires several prerequisites to be in place. First, strong institutions must be in place to support the process and build capacity in terms of implementation and collection of taxes. A clear understanding of the methods to calculate benefits and define the distribution of the levy among tax payers is essential. Just as important is the attitude of tax payers. Encouraging citizen participation and working towards a strong tax payment culture will also support the success of betterment levies.

4.3 DEVELOPMENT/IMPACT FEES AND EXACTIONS

Development/impact fees and exactions are one-time fees collected by a municipality from a developer, to dedicate land or build or pay for costs of capital improvements that are required for public facilities. These fees are usually set as a condition for the approval of development. Fees paid by developers may be in-kind (e.g. provision of public services or land) or monetary, and are used to fund specific activities that serve the public benefit. Exaction-revenue relies on current charges rather than accrued property taxes, which may provide an alternative in places that do not have strong property tax regimes.

Since exactions are predicated on an active new development environment, they are typically used in areas facing rapid growth. The primary model of exactions originates from the United States, where private development impact fees have long helped finance public works. The legal argument behind exactions is that public need for increased or improved infrastructure is "attributable" to new development (Altshuler and Gómez-Ibáñez 1993). The popular use of exactions in the United States emerged from the struggles of betterment levies and special assessment taxes during the Great Depression. The collapse of the financial system triggered defaults on financing for public works. Their purpose is best summarized by Altshuler and

Gómez-Ibáñez (1993): “Functionally, exactions are at once instruments for shaping the physical environment, for generating public revenue, and for resolving political conflict”.

Methodology

Exactions are backed by a regulatory authority, and some suggest that they border on a taking since owners are not provided just compensation. In the United States, exactions must be able to uphold their force in court since takings are unconstitutional. States are required to authorize local authorities to exact development fees. The following are three characteristics that govern the use of exactions in the United States:

- 1) “Rational nexus:” the justification for exactions must be determined by an impact from the development that warrants infrastructure investment; the project must comply with the Master Plan, and the exactions must be applied equitably (Altshuler and Gómez-Ibáñez 1993)
- 2) Proportionality: the cost of the infrastructure provided, and thus the amount of exaction, should be proportional to the impact of the project
- 3) Restricted funds: exactions collected can only be used to fund the cost of the infrastructure required by that project (Peterson 2009).

The amount of fees paid varies significantly, not just by state to state, but by jurisdiction. Impact fees are not assumed to fully fund the total cost of infrastructure, so fees may be either set or negotiated. Altschuler and Gómez-Ibáñez (1993) cite a 1991 survey in California which found that municipalities were unable to determine exact fees amounts charged because of such variation.

A major criticism of impact fees is that by acting as a development tax they reduce home construction, especially within the small home market. However, recent empirical work suggests that impact fees may in fact expand housing construction within suburban areas by reducing exclusionary regulations and increasing the percentage of proposed projects receiving local government approval (Burge and Ihlanfeldt, 2006). Burge and Ihlanfeldt (2006) find that in Florida counties, impact fees earmarked for public services other than water and sewer system improvements have increased construction of small homes within inner suburban areas and of medium and large homes within all suburban areas.

Impact Fees in Developing Countries

Impact fees have been almost exclusively used in developed countries; however, Chile has employed impact fees in the 1990s to finance roads. Two municipalities in the Santiago metropolitan area successfully raised significant funding to build the Northeast Radial roadway, amounting to 62 kilometers of roads (this case is documented in Zegras 2003). Chile’s exercise in impact fees was *ad hoc*, so no standardized method exists for determining fees. Further, no legislation dictates the legality of the practice. Zegras (2003) explains that Santiago is an anomaly among developing countries. The status of Chile as a higher income country and an emerging economy positions its capital city as an example of a city that can begin to test such a practice. He also warns that cities that house a large slum population will face unique challenges due to the absence of clear land titling. Prerequisites for successful implementation of development/impact fees and exactions include the definition of reasonable methods to determine exaction or fee amounts, a strong regulatory authority to justify use of

exactions/impact fees, a strong municipal accounting standard to ensure that exactions are used for specific purposes, and the ability to curb corruption during the collection of these fees from developers.

Just as it was describe in the case of betterment levies, strong institutions are important for the implementation of impact fees. In this particular case, strong municipal accounting standards are important to ensure that exactions are used for specific purposes.

4.4 TAX INCREMENT FINANCING (TIF)

Tax increment financing allows municipalities to fund current development projects with anticipated increases in revenue from property tax generated through development. This tool is designed to capture expected (new) tax revenues generated as a result of higher property values that will materialize after the development project takes place. Municipalities create TIF districts to spur development that would not occur “but-for” TIF. The increment is used to fund borrowing for specific projects or purposes, e.g. roads, affordable housing, etc.

Originating in California in the 1950s, TIF is mainly used in the United States to ensure financing where federal funds have begun to dry up. Dye and Merriman (2006) explain that the rules differ across states, but all tax increment districts must have at least one of the following characteristics: i) be blighted or underdeveloped; ii) need rehabilitation or to be converted to a new use; or iii) adhere to the “but-for” clause mentioned above. The popularity of TIFs in the US stems from it being not only an efficient financing tool but also a useful instrument for land development.

TIFs provide a cheaper alternative to finance development projects as the cost of government selling securities is in general considerably lower than what a developer would pay if he had to access the capital markets for financing; interest costs are considerably lower and the terms of repayment are more generous than what the private market would provide.

While TIF rules vary, the municipalities follow the following general methodology for TIF projects:

- Draw up a development plan, forecasting the development in the tax increment district and project costs
- Perform financial feasibility study
- Designate area as one that requires TIF based on essential characteristics
- Freeze local tax revenue at predevelopment value which still goes to the local government, any increment above that goes into TIF collection to finance general obligation municipal bond payments
- The coordinating authority is the local development authority (adapted from Wisconsin methodology, Kashian et al. 2007)

The United States uses TIF extensively, but this financing method has yet to be used in developing countries. The system itself is predicated on precise methods of measuring tax increment through appraisal methods as well as effective property tax collection hence the difficulty of applying it in developing countries where appraisal capacity is limited and data on

property prices is in many cases non-existent. Further, TIF collection is based on an existing property tax system. If a country does not have a working tax system in place, the advantages of TIFs in terms of enforcement may not materialize

For a TIF program to be successful it is important to have a well-developed property tax regime and have the ability to assess the property tax base and calculate the increment resulting from the project. Complications in calculating the increment will arise if the appropriate institutions are not in place. Further, there must be a structured set of public financing tools that allow the use of TIFs (e.g. bonds, intergovernmental loans, etc.) and strong municipal accounting capabilities to support this. Finally, as it has been stressed throughout the document, just as is the case for other financing instruments, institutions are a prerequisite for success. In this case, institutions that guarantee the objective valuation of property are of especial importance. Maintaining up to date records of property values becomes increasingly important with instruments such as TIF, where values are required to extract the price increases related to specific improvements.

Box 3: MAIN LESSONS FROM INTERNATIONAL EXPERIENCE ON LEVERAGING LAND TO FINANCE INFRASTRUCTURE

-Strong institutions are a pre-requisite for implementing land-based financing instruments. Institutions are essential to clearly define property rights, guarantee standardized and objective methods of land valuation, support and oversee the process of land management, land sales, and tax collection.

-Land sales can be used as an initial revenue source for infrastructure investments. However, since they are not a long term financing source as a tax revenue system will be, they are most successful when coupled with other financing sources such as a system of property taxes.

-Betterment levies and special assessment taxes provide revenue to municipalities based on the increase in land value from public improvements. The main challenge countries have faced in implementing these is the calculation of the increased value due to an infrastructure project. For their implementation to be viable these instruments require institutions for valuation and price data collection and public dissemination. A simplified version of these has successfully been implemented in Bogotá, Colombia, where levies are not estimated parcel by parcel but rather linked to a citywide fee. Its success can be partly attributed to large efforts to update and maintain a comprehensive cadastral database and increased participation of the citizens as overseers of the process.

-Development and impact fees and TIFs have been mostly used in developed countries. Their successful implementation requires strong institutions that are non-existent in many developing countries. These instruments need a strong regulatory authority to enforce the collection of the fees and guarantee that they are used only for the purpose for which they are defined. Clear definition of property rights is essential. Further, up to date information on property values and a clearly defined methodology for the estimation of the impact of projects on land and property values is also a pre-requisite for their successful implementation. TIFs also require a well-developed property tax regime. If a strong property tax system is not in place, their implementation may prove to be difficult.

5 CONCLUDING NOTES

Most local governments engage in land management processes as an integral part of their municipal functions. Whether these instruments are land acquisition and land readjustment for accommodating urban expansion, or land exactions for financing infrastructure strong institutions appear as a pre-condition for successful implementation of all instruments described in this note. In developing countries where information asymmetries are widely spread and transaction costs are high, institutions become essential to correct these market failures. All the instruments described here require at least three types of institutions to support their successful implementation: first, institutions that assign and protect property rights; second, institutions that enable independent valuation and public dissemination of land values across uses; and third, a strong legal framework supported by a healthy judicial system to handle disputes and oversee the process.

For land acquisition purposes, courts to provide guidance in terms of the legal scope of eminent domain appear as key institutions. Given that the definition of public purpose constantly evolves, having a rigid and exclusive list of public purposes will pose stringent barriers to urban expansion. As an alternative, a flexible definition of public purpose can be combined with a strong judicial system to guide and evaluate acquisition decisions on a case by case basis. If a flexible definition is used, it becomes increasingly important to provide a clear definition of the process to adjudicate conflicts in cases where the "public purpose" of a particular acquisition is questioned, as well as to establish the institutions that guarantee that affected parties can voice their concerns.

This paper also highlights the international tendency to move away from compulsory acquisition towards more participatory approaches such as Land Readjustment (LR). The advantages of LR compared to other land assembly methods include among others, that it promotes community participation, it does not require substantial upfront capital for buying out existing land owners, it avoids holdouts, is more equitable, and it minimizes displacement of large populations.

However, strong institutions are required for LR to succeed as a method of land assembly. If developing countries are to consider the broad implementation of LR methods for land assembly and as an initial instrument to defray the cost of infrastructure, they will first have to focus on evaluating whether its institutions are ready to initiate the process, and identify particularities of the local context that would require adjustments to the international models of LR.

This paper has also presented international examples on how countries have used different land-based instruments to finance infrastructure. The discussion of these cases highlights that while land sales are a useful instrument to provide upfront financing for infrastructure, they are not a long term financing tool as a property tax system is. While land sales appear to be the easiest instrument to implement, they also require strong institutions to become a successful

source of (immediate) revenue generation. Institutions to manage land assets (e.g. transparent and robust municipal accounting methods) and institutions that define objective valuation techniques to determine leasing and sales price (or floor price in the case of land sale auctions) are essential.

Finally, as land-based instruments are considered for financing infrastructure, it is important to recognize the risks associated with them (Peterson, 2009). Real estate markets are highly cyclical and if land financing is used to finance infrastructure broadly (as opposed to focus only on new development) this cycles will bring instability to local authorities. Further, the large revenues associated with land transactions and urban infrastructure investment creates incentives for corruption. Finally, there is the risk that high potential profits from land transactions will transform local authorities into real estate developers with profit rather than welfare maximization as their main objective.

ANNEX 1. LAND READJUSTMENT AT A GLANCE

Table A1.1. Land Readjustment Features by Country

<i>Key Features</i>	Germany	Japan	South Korea	Taiwan, China	Australia	India	
<i>Legal Basis</i>	<i>Baugesetzbuch</i> (1987)	Land Readjustment Act of 1954	Land Readjustment Project Act of 1966	Articles 56,76 and 161 of bylaws of Equalization and Urban Land Rights Law of 1957	Sections 6,7 and 13 of the Town Planning Development Act 1928-1996	<ul style="list-style-type: none"> · Maharashtra Regional and Town Planning Act of 1966 · Gujarat Town Planning and Urban Development Act of 1976 	
<i>Initiating entity</i>	<ul style="list-style-type: none"> · Local government · Landowners · Developers 	<ul style="list-style-type: none"> · Individuals · Associations · Local government · Administrative agencies · Public corporations 	<ul style="list-style-type: none"> · Private landowners · Associations of landowners · Municipal/ provincial governments · Ministry of Construction 	<ul style="list-style-type: none"> · Local governments · Landowners 	<ul style="list-style-type: none"> · Local governments · Associations 	Local governments	
<i>Participation of landowners</i>	Compulsory when publicly initiated	<ul style="list-style-type: none"> · Compulsory when publicly initiated · At least two-thirds of landowners and lessees (by area and number) must consent when privately initiated 	<ul style="list-style-type: none"> · Compulsory when publicly initiated · At least two-thirds of landowners and lessees (by area and number) must consent when privately initiated 	At least half of landowners (by area and number) must consent to an application	<ul style="list-style-type: none"> · Compulsory when publicly initiated · At least two-thirds of landowners and lessees must consent when privately initiated 	Voluntary	
<i>Cost recovery</i>	<ul style="list-style-type: none"> · Land contribution for public space · Cost-equivalent land for cost of project 	<ul style="list-style-type: none"> · Land contribution for public space · Cost-equivalent land for cost of project 	<ul style="list-style-type: none"> · Land contribution for public space · Cost-equivalent land for cost of project · Land contribution can be used for affordable housing 	<ul style="list-style-type: none"> · Land contribution for public space · Cost-equivalent land for cost of project 	<ul style="list-style-type: none"> · Land contribution for public space · Cost-equivalent land for cost of project 	Land contribution for public space	for public
<i>Amount of land contribution</i>	<ul style="list-style-type: none"> · Value basis: no more than 30% of market value of land · Area basis: no more than 30% of area 	Land deduction rate not determined (usually 20% for communal land and 10% cost-equivalent land)	Land deduction rate not determined (usually 24-28% percent deduction for communal land and 8-10% cost-equivalent land)	Not more than 40% for public purposes and cost-equivalent land	Land deduction rate undetermined	Up to half of value increment	
<i>Public sector support</i>	All procedural costs	<ul style="list-style-type: none"> · National and prefectural subsidy · Low or zero-interest loan 	Deficits covered from general municipal budget	Unknown	Initial costs provided by government, but must later be recovered through the project	Costs above those collected from half the increment value covered by local authority	

<i>Distribution method</i>	<ul style="list-style-type: none"> Value basis Area basis 	<ul style="list-style-type: none"> Value basis Area basis 	<ul style="list-style-type: none"> Value basis Area basis 	<ul style="list-style-type: none"> Value basis Area basis 	Value basis	Value basis	
<i>Valuation method</i>	Market value (using pre and post-adjustment values)	Pre-adjustment value based on a formula including plot characteristics	Pre-adjustment value based on a formula including plot characteristics	Pre-adjustment value based on a formula including plot characteristics	Market value of land	Arbitrary	
<i>Minimum size of LR plot</i>	None	At least five hectares	None	None	None	100 hectares under Gujarat Town Planning and Urban Development Act	

Adapted from Turk (2008)

Table A1.2. Land Readjustment Features by Country						
<i>Key Features</i>	France	Sweden	Turkey	Indonesia	Nepal	
<i>Legal Basis</i>	Article L 322-1-10 in the Code de l'Urbanisme (1985)	A Joint Development Act (1987)	18 th article of Development Act (1985)	No law authorizes and regulates LR	<ul style="list-style-type: none"> Development Committee Act 2013 (1954) The Town Development Act 2045 Para. 12, Land Reform Act 2021 and Bylaw 2060 	
<i>Initiating entity</i>	<ul style="list-style-type: none"> Individual landowners A group of landowners 	<ul style="list-style-type: none"> Landowners Associations 	<ul style="list-style-type: none"> Municipality Special Provincial Administration 	Municipalities	<ul style="list-style-type: none"> Committee of landowners Municipalities 	
<i>Participation of landowners</i>	Voluntary participation (support of at least two-thirds of landowners or, in some conditions, at least half of landowners)	Voluntary participation	Compulsory	Landowner consent (100% landowner agreement)	Majority of land owners consent	
<i>Cost recovery</i>	<ul style="list-style-type: none"> Land contribution for public use Cost-equivalent land for cost of the project 	<ul style="list-style-type: none"> Land contribution for public use Cost contribution within area 	Land contribution for public space	Land contribution for public use	<ul style="list-style-type: none"> Land contribution for public space Cost-equivalent land for cost of the project 	
<i>Amount of land contribution</i>	Land deduction rate not determined	Land deduction rate not determined	<ul style="list-style-type: none"> Maximum contribution in LR projects is 40% If the contribution percentage within the project area is more than 40 percent, the difference must be expropriated by the municipality 	20 percent of previous land holdings of landowners	<ul style="list-style-type: none"> Land deduction rate not determined Contribution share depends on the total cost to be shared by all the landowners 	
<i>Public sector support</i>	State awards grants at the initial stage	Preparatory investigation loans at the initial stage	All procedural costs	All procedural costs (outside of land contribution) are borne by local authority	None	
<i>Distribution method</i>	Value basis	Value basis	Area basis	Area basis	Value basis	
<i>Valuation method</i>	A value fixed by assembly of landowners before LR (value after LR represents initial plus increment)	The probable market value of land before and after LR	Amount of area for area basis	Amount of area for area basis	Valuation value by street value	
<i>Minimum size of</i>	None	None	LR projects are	None	None	

<i>LR plot</i>			designed for areas with sizes equal to or larger than the size of a single residential block			
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Source: Taken from Turk (2008)

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