

Land Institutions to Address New Challenges in Africa

Implications for the World Bank's Land Policy

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Abstract

Although land and associated property is a key part of national wealth and protecting rights to it is a key function of the state, Africa's formal land institutions often still operate on regulations that barely changed since colonial times, risking to undermine public trust and leading to high levels of informality that make it difficult to support vibrant urban land and financial markets, control corruption, improve rural factor market functioning to empower women, foster structural change, and ensure sustainable management of public land. If an appropriate regulatory framework is in place, digital technology provides opportunities for African countries to broaden the range of rights that can be legally recognized, expand the type of contracts involving such rights that private parties can enter,

reduce associated enforcement costs, and provide local and global public goods. Institutions such as the World Bank can create momentum for reform through globally comparable monitoring and help harness these opportunities by focusing interventions on providing analytical support to establish the policy and institutional environment to (i) document and enforce rights at scale; (ii) regulate land markets to ensure competition and deliver public goods including price information, land use planning to coordinate investment and avoid externalities, and tax land value gains to support local public services; and (iii) reduce the transaction cost for private parties to enter and enforce contracts involving immovable property and the uses to which it is put.

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**Land Institutions to Address New Challenges in Africa:
Implications for the World Bank's Land Policy**

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1. Motivation and background

How land rights are assigned, documented, and can be exchanged will affect individuals' wealth, gender equity, incentives for investment and resource conservation, and productivity of land use. By providing price signals and facilitating the operation of land markets for land, credit, and insurance, formal registries underpin key aspects of economic activity. The information maintained by them also provides a basis for levying recurrent land taxes based on market values or capital gains taxes to generate own source revenue and provide public goods especially in settings where other tax bases are narrow; by regulating land use to reduce the scope for negative externalities; and by managing public land in line with societal objectives.

Land rights are important for Africa's urbanization, structural transformation, and resilience to climate change. Historically, high cost of service delivery, reinforced by discriminatory legislation, often with colonial roots, limited access to documented land rights in many African countries. Equity was undermined as it was more difficult for women and other secondary right holders to enforce and exercise their rights. Agricultural productivity, adaptation capacity, and resilience suffered as output increased by expanding into marginal, risky, and often environmentally sensitive areas rather than via investment in capital and associated better factor market functioning, with shocks often triggering conflict. Urban job creation, mobility, and service access were reduced as informality limited investment in floorspace, collection of property tax revenue, and financial market development. State capacity, trust in the state, and the ability to access climate finance were often undermined by ambiguous definition and non-transparent ways of transferring rights to public land. Yet, while these challenges have been widely recognized, the cost of establishing and operating land institutions often made reform difficult.

This paper argues that digital technology can reduce the cost of and increase the benefit from documenting land rights in several ways. Shifting towards digital records, workflows, and interoperability makes it easier to document a range of rights, increase the quality of information contained in registries and the ability to access it, and allow routine dissemination of data (e.g., on prices) to provide a benchmark to help improve market outcomes. Free satellite imagery allows to consistently observe land use in near real time at a highly granular level, thus improving the ability to target and enforce land use restrictions, certify supply chains, and contract outcomes in terms of land use such as conservation. Connectivity can expand competitiveness of land markets, e.g., through electronic auctions, increase the scope for developing reputation or links to other markets (e.g., those for insurance) to improve land use, and makes protection and exercise of

secondary rights (or group rights management) easier as it allows electronic gathering of consent to and costless transfer of resources directly to right holders without intermediaries. Harnessing these opportunities requires adjustments in the regulatory framework that will have to be tailored to local contexts.

Opportunities for urban job creation, activation of land and financial markets, and generation of public revenue from taxing land appreciation are vast. Realizing them requires (i) improving coverage, quality, and interoperability of urban property registries as well as land service delivery by digitizing, simplifying, and re-engineering workflows; (ii) reducing cost of registration and passing on associated savings to customers; (iii) replacing often prohibitive transaction taxes (stamp duties) with a recurrent land tax; and (iv) increasing transparency and trust by making data on land valuation for tax purposes and transaction prices publicly available and reducing bureaucracy through interoperability with other registries such as those for mortgages or court cases.

To harness human capital externalities from higher density in urban areas, land institutions can help by ensuring that (i) land titles and affordable registration fees allow (women) entrepreneurs to use land as collateral to create jobs and developers to access long-term finance to build durable high structures to provide floor space; (ii) public land is managed transparently to provide infrastructure and public services and rights to such land are allocated through transparent auctions rather than through backroom deals by politically connected organizers; (iii) building standards and planning rules contribute to public safety and reduction of externalities and are enforced impartially.

To replace agricultural area expansion with intensification and climate-smart adaptation as the main source of increased output, better functioning of rural factor markets to foster structural transformation is essential. The contribution of land to structural transformation can be enhanced by (i) securing women's rights to land in case of inheritance or divorce via changes in (family) law and regulations to allow documentation at low cost; (ii) improving insurance, land, and labor markets by removing regulatory barriers to certain types of land transfers; (iii) operationalizing laws that allow low-cost documentation of communally and individually held rural land use rights by local authorities while ensuring data integrity and interoperability by linking up to a central database; (iv) encouraging long-term land transfers-including across generations-as a basis for investment and structural change; and (v) supporting decentralization by defining local bodies' role in managing land use and benefit from higher land productivity through increased tax revenue rather than wasteful forum shopping or land speculation.

The importance of documenting private rights must not detract from the fact that, in both urban and rural areas, large amounts of land remain in public ownership or even encourage non-transparent appropriation of public land by the powerful private interests to be legitimized with outside support, especially as the value of such lands increases with better access infrastructure and increased demand for environmental

services. Land institutions can contribute to resilience and sustainability by registering and publicizing boundaries of public land; vesting ownership of public land with local authorities that meet key criteria of internal accountability, transparency, and public oversight.

Improving governance of public and customary land is particularly important as Africa's economies are likely to be exposed to more frequent and severe climate shocks and secular declines of agricultural potential. Land institutions can help enhance resilience and reduce conflict by (i) ensuring that secondary land rights, particularly those held by pastoralists, migrants and women, are documented and can be enforced, transferred; and used as basis for insurance against extreme events or negotiation if adaptation investment is considered; (ii) registering and publicizing boundaries of public land and devolving ownership of public land to the local level, subject to accountability and oversight, and use resource management agreements, permits, and fiscal mechanisms to align incentives with access to local information for monitoring; (iii) ensuring competitive transfer of (use) rights to public land via (electronic) auction and providing the infrastructure to conduct these; (iv) publicizing any contracts involving use of public land to support independent third party monitoring; and (v) creating preconditions for supply chain certification and climate finance by establishing mechanisms for *bona fide* third parties access parcel boundaries for individuals or groups they are contracting with to independently verify land use.

Institutions such as the World Bank can support African countries' efforts to improve land institutions in two ways: First, land policies everywhere are intertwined with power and political economy issues that may lead interest groups benefiting from the status quo to oppose or try and undo reforms that improve overall welfare and transparency. Independent monitoring of the quality and cost of land service provision in a comparable way is important to motivate and create momentum for reform; document progress in its implementation; and alert outside investors of opportunities and institutional risks associated with land-related investments in specific jurisdictions.

The importance of the regulatory environment together with the location-specific nature of land institutions also implies that analytical support to help countries translate general principles into strategies to adapt laws and regulations to support institutional reform in measurable ways can provide clear value added. Three types of targets are particularly relevant. First, the share of (private and public) land and associated real estate to which rights are documented—making full use of the spectrum of options available to do so—and can be linked to land use patterns. Second, the cost for private parties to enter into agreements regarding such rights and enforce them. Finally, the extent to which land institutions serve the public good via regulation to ensure competitiveness of markets including measures to reduce information cost and entry barriers; transparent planning of land use to reduce externalities and harmonize private investment with

public infrastructure provision; and taxing land and gains in its value in a way that supports decentralization and local public service provision.

The rest of the paper is structured as follows: Section 2 discusses customary and modern land institutions in Africa, perceptions of their performance and examples of reforms that improved performance at scale. Sections 3 and 4 discuss how better documented land rights (for private or public land and at individual or group level) can help to address broader challenges in rural and urban areas. Recognizing that sequencing of reforms in ways that focus on specific areas where success can be demonstrated quickly and expanding from there may often help initiate and sustain policy change, section 5 discusses specific entry points for land reform and how these can be supported by institutions such as the World Bank.

2. Characteristics of African land institutions

A defining characteristic of African land institutions relates to the role of customary authorities in managing land. This section discusses origins, advantages and challenges faced by these institutions compared to formal ones, highlighting that lack of clarity on the interface between formal and traditional institutions can undermine trust as well as tenure security and lead to wealth bias. We then discuss how new technology can address these issues if corresponding regulatory and institutional adjustments are made and draw on evidence from documented reforms.

2.1 Traditional institutions

In rural Africa, especially at low levels of population density, customary institutions under traditional chiefs have long administered land rights locally in an equitable, accessible, and cost-effective way. In this context, chiefs allocate arable land to individuals or families under secure long-term rights and manage use of common land such as pasture and forest for joint benefit, following rules that evolved and were adapted to local conditions over long periods. Lineage members have an innate right to land to ensure equity and provide a social safety net (Baland & Francois 2005). The ability to adjust exploitation of common use areas to variation in resource availability is particularly important in high-risk settings where efforts to replace customary with individualized formal arrangements often proved unsustainable as they were more costly and less flexible (Nugent & Sanchez 1998).

Customary tenure also prevails in African settings where land is used individually and even in many urban settings. Local presence, access to private information (Basurto et al. 2020), and informal channels of accountability (Baldwin 2018) often allow chiefs to administer land in ways that are less costly (Boone 2017) and more flexible and responsive to local needs than formal institutions. Chiefs' ability to resolve local land disputes quickly, fairly, and without bribes (Winters & Conroy-Krutz 2021); to motivate

contributions to public goods (Tourek et al. 2020); and to assess individuals' land demand (Manara & Regan 2021) has been documented in the literature.

Individual rights under customary tenure are generally strong enough to incentivize agricultural investment (Besley 1995) including fallowing (Goldstein & Udry 2008), tree planting (Fenske 2011), and use of organic manure (Gavian & Fafchamps 1996) to improve soil fertility (Lawin & Tamini 2019). While some types of investment, especially by outsiders (Djezou 2016; Bros *et al.* 2019), may partly be motivated by a desire to stake visible land claims (Brasselle *et al.* 2002), many investments, e.g., organic manure, leave no visible traces, implying that concerns about reverse causality will not apply and trees or other forms of border demarcation often also enhance productivity (Deininger & Jin 2006).

The rights granted under customary tenure also allow owners to engage in local land rental transactions to allow some coping with idiosyncratic shocks (Beck *et al.* 2019), enabling efficient but land-poor farmers to expand (Deininger *et al.* 2017). Studies from Uganda (Baland *et al.* 2003), Kenya (Jin & Jayne 2013), Ethiopia (Teklu & Lemi 2004; Deininger & Jin 2006), Zambia and Malawi (Chamberlin & Ricker-Gilbert 2016) document the productivity benefits from land rental. Welfare effects are normally positive as rents received by owners exceed what they could earn from self-cultivation (Deininger *et al.* 2011) with women often benefiting disproportionately (Wineman & Liverpool-Tasie 2017).

A key characteristic of customary tenure is that permanent land transactions (i.e., long-term leases or sales) with outsiders are not allowed. This is unlikely to be a binding constraint if demand for land by outsiders is limited or contracts remain short term only. Historically, if long-term individual land transactions with outsiders offered advantages such as access to technology, markets, or other factors of production (Fenske 2014); land became more scarce; or external demand for land increased (Guirkinger & Platteau 2014), customary systems often individualized in a gradual manner. Such transitions were more rapid if other means to smooth consumption or manage externalities became available (Delpierre *et al.* 2019).

Recognition of the advantages of traditional authorities (Bruce & Migot-Adholla 1994) in terms of cost, local trust, and adaptive capacity to manage land rights and resolve associated disputes (Platteau 2000), triggered a wave of laws to formally recognize customary systems all over Africa in the early 2000s (Alden Wily 2018). The importance of customary institutions is also recognized by the “Framework and Guidelines for Land Policy” (F&G) adopted by African Heads of State in 2010 and national land policy documents elaborated building on this framework.¹ In many cases, however, legal provisions make little difference on the ground (Bubb 2013), due to lack of subsidiary legislation and enforcement. Without such legal clarity, even well-intended or technically justified interventions to strengthen customary land management may

¹ The F&G was spearheaded by the Africa Land Policy Initiative that brings together the African Union Commission, the United Nations Economic Commission for Africa (UN-ECA), and the African Development Bank (AfDB).

worsen landowners' position as they are reported to have done in Ghana (Adam et al. 2021) or Zambia (Green & Norberg 2018) where efforts to register customary rights without a legal basis, ways to hold customary authorities to account, or transfer rights, had no economic impact (Huntington & Shenoy 2021).

To make recognition of customary tenure relevant in practice, there is need for regulations on how such rights are to be documented and enforced (Firmin-Sellers 1995). This requires clarifying, among others, determining (i) the boundary and interaction between local authorities and central registries to ensure complementarity with each other rather than compete, including ways for chiefs to benefit from measures that increase land values and economic activity in their territory; (ii) how to commit to long-term contracts with outsiders that may transcend individual chiefs' tenure; (iii) what information to draw on and standards to follow when planning land use; (iv) what avenues of appeal subjects of traditional leaders have access to; and (v) how to establish fora and mechanisms to resolve inter-community disputes.

Strong complementarities between traditional authorities and the state in basic service delivery (Henn 2022) suggest that defining the role of customary authorities *vis a vis* formal ones especially at local level could harness significant synergies. Failure to clarify this relationship, on the other hand, may trigger competition between traditional and formal systems that increases uncertainty and encourages wasteful spending of resources on 'forum shopping', i.e. pursuit of claims to property in formal and customary systems in parallel (Eck 2014). Competition between formal and traditional systems may encourage chiefs to start charging for services they previously provided for free (Honig 2021) and, in extreme cases, leave resorting to physical violence as the only way to settle competing claims (Greiner 2017).

Efforts at regulating the role of traditional authorities in land administration and management need to be cognizant of three issues. First, as their main allegiance is to the lineage, chiefs may be challenged to resolve inter-community disputes or to commit to long-term contracts with outsiders. For example, in West Africa, chiefs invited outsiders when labor was sparse but started discriminating against them as land became more scarce (Bambio & Bouayad Agha 2018), lowering productivity (Fenske 2010) and increasing insecurity and conflict risk (Linkow 2016). Pastoralists' rights to seasonal migration routes, wetlands, or watering holes, though critical for herd survival (Moritz 2008), are vulnerable to unilateral alteration if representation in local decision-making or dispute resolution bodies is lacking (Bergius *et al.* 2020), secondary rights are not recorded (McPeak & Little 2018), or arbitration and negotiation venues absent (Eberle *et al.* 2020). Upfront mechanisms for decentralized decision-making and inter-community consultation are particularly important to avoid conflicts that, with overlaps between tribal, ethnic, and religious identity, can easily escalate and be hard to resolve (McGuirk & Nunn 2020).

Second, traditional tenure regimes often restricted women's inheritance rights (Casari & Lisciandra 2016).² In addition to contradicting basic tenets of equality, such discrimination undermines productivity of land use as documented by studies showing that insecure inheritance rights reduced women's input use (Dillon & Voena 2018) and investment in soil fertility (Deininger *et al.* 2021) even during spouses' lifetime. Unclear inheritance arrangements increased women's fear of land loss (Deininger *et al.* 2019b) and their likelihood of being involved in land disputes (Deininger & Castagnini 2006). In Ghana, stronger female inheritance rights encouraged women to invest on their plots and men, whose outside options were better, to take up non-agricultural employment, supporting structural transformation (Barker 2022).

Data from the Afrobarometer survey point to strong public support for gender equality with more than 70% of respondents in favor of equal land rights for women. Yet, women's land rights in case of divorce or inheritance often remain fragile as in Tanzania where progressive views regarding women's rights by members of local judicial bodies were not reflected in actual judgements (Genicot & Hernandez-de-Benito 2022). While changes in family law can be a first step towards shifting customary gender norms (Aldashev *et al.* 2012), training of officials, awareness raising, and access to mediation in specific cases is often needed (Cecchi & Melesse 2016).

Finally, co-optation of chiefs by colonial institutions to collect taxes (Frankema & van Waijenburg 2013) or help transfer land to outsiders via concessions (Lowe & Montero 2020) has in many settings undermined mechanisms that traditionally underpinned trust in and accountability by such leaders (Acemoglu *et al.* 2014).³ Chiefs whose downward accountability has been compromised may 'privatize' land for personal benefit even if this reduces social welfare (Leeson & Harris 2018), widens inequality (Obeng-Odoom 2014), or undermines sustainability (Mihaylova 2023). They may act as land brokers for outsiders (Lentz 2010); behaving like owners rather than custodians of land (Lanz *et al.* 2018) or let themselves be co-opted by politicians (Chimhowu 2019) to offer political support for personal benefit rather than that of the group they represent (de Kadt & Larreguy 2018).

2.2 Land registries and the benefits of documented land rights

Land registries comprise a spatial and a textual component. The former, normally referred to as cadaster, describes boundaries of the objects (land parcels) over which rights are defined, reducing the incidence of land disputes over long time horizons (Libecap & Lueck 2011) and making land use change (Dippel *et al.* 2020) or assembly (Leonard & Parker 2021) easier. The textual part, referred to as the register, provides

² A documented exception is Siam's traditional usufruct land rights system in the 19th century where women's land rights were very secure, protected in court against challenges by investors or local elites, and supported high living standards (Chankrajang & Vechbanyongratana 2021).

³ Systematic differences in the use of indirect rule between British and French colonial powers are still visible in higher levels of chiefs' perceived corruption and lower state capacity in former British vs. French territories (Ali *et al.* 2020c). This also holds for historical tribal homelands that were split between British and French colonies, and for counties colonized by either of the two powers within Cameroon (Ali *et al.* 2019c).

public evidence of registrable rights (ownership, leases, mortgages etc.) held by specific individuals and assigns priority among them as per law.⁴ This facilitates impersonal trade by protecting third parties' rights (Arrunada *et al.* 2019); expands the range of potential contractual partners and options by reducing the scope for moral hazard due to asymmetric information; and provides the basis for enforcement of rights via the courts as a last resort.

Although not costless, having rights documented and mechanisms for enforcing them clearly defined has several advantages. It provides private benefits by (i) increasing investment incentives and reducing the need to spend resources on non-productive activities to maintain land rights; (ii) expanding contractual options and the range of potential contracting partners for land transfers; (iii) improving credit access if there are liquid sales markets and collateral can be registered and enforced at low cost; and (iv) empowering individuals, especially women, who were traditionally often disadvantaged by making enforcement of rights easier and encouraging entrepreneurship. It also provides public benefits by (i) improving functioning of land and associated markets for mortgages and insurance via public price data; (ii) providing the basis for effective land use regulation and planning; and (iii) enhancing state capacity and the social contract by allowing fair taxation and incentivizing tax payment in return for public goods that can increase land prices.

Investment instead of 'guarding labor' and other defensive measures: Although undocumented rights are sufficient to incentivize short-to medium-term investment, greater scales and longer duration normally require documented rights. Rights that can be enforced via the courts have been instrumental in reducing deforestation in Brazil (Baragwanath & Bayi 2020) and Colombia (Peña *et al.* 2017; Vélez *et al.* 2020). In the US West, clarification of access rights to publicly owned grazing land increased productivity and use of fallowing as much as privatization (Bühler 2023). By contrast, uncertainty land allocation at the end of the 19th century, in turn, deterred irrigation investment and reduced output (Alston & Smith 2022). Having rights to land clearly documented reduces the need to spend resources on contesting them (Fetzer & Marden 2017) as discussed above, on or protecting rights (De Meza & Gould 1992), including via physical presence (Field 2007), allowing resource reallocation to investment or more beneficial activities.

Land markets: People may be concerned about losing their rights if they enter longer-term contracts. Systematic documentation of land rights at the community level in Mexico facilitated long-term land rentals, occupational shifts to non-agriculture, and migration (Valsecchi 2014; de Janvry *et al.* 2015). Complete registration of all land and measures to ease transferability and eliminate restrictions on urban residence rights in China almost doubled the likelihood of non-farm enterprise startups (Deininger *et al.*

⁴ Such protection is based on either a document lodged for registration and a way to prioritize among documents (often based on the time of registration) in a system of deeds or a search by the registrar at the point of registration (in a title registration system). See Arrunada and Garoupa (2005) for a conceptual comparison and economic evaluation of different registration systems and Arruñada (2012) for the importance of registries for impersonal exchange with third parties.

2019a) while increasing rental market transfers of land to more productive young producers, off-farm labor supply by older farmers, and profits through a shift from grains to vegetables and other higher value crops (Deininger *et al.* 2020b). Rural land record computerization that did not alter the nature of rights but the ease of accessing them increased the level of rental market activity and allocative efficiency in Pakistan by allowing land transfers to more productive farmers (Beg 2022). Documentation of use rights activated rental markets in Ethiopia, increasing women's participation (Bezabih *et al.* 2016) and reducing resource misallocation (Chen *et al.* 2022). Historically, reforms to replace oral short-term rental contracts with written ones for a longer term, together with a public body for enforcement, fostered tenants' investment in irrigation and drainage, leading to significant efficiency gains in Taiwan, China (Fan & Yeh 2019).

Credit access: Given its immobility and virtual indestructability, land is excellent collateral. If land markets are active, foreclosure in case of default is possible, and lack of title prevents credit-worthy borrowers from implementing profitable investment projects, registering land rights can quickly increase credit access and investment (de Soto 2000). While hopes of land titling in developing countries increasing credit access were often disappointed as one or more of these conditions were not in place, privatization of state housing in China alleviated credit constraints by allowing households to capitalize on the value of the real estate (Wang 2012). Data from the developed world also document the importance of this channel: Legal changes allowing land to be used as collateral resulted in higher property values (Zevelev 2021) while exogenous fluctuations in housing wealth improved financial well-being (Atalay & Edwards 2022) or increased property owners' propensity to take up entrepreneurship (Schmalz *et al.* 2017). In India, record digitization improved credit access in relatively less distorted urban markets (Deininger & Goyal 2012).

Individual empowerment and risk taking: By providing implicit insurance, documented land rights enable the individuals holding such rights to pursue more risky projects with higher average returns. Having individual land rights documented rather than just defined in abstract makes them easier to enforce and programs to issue documents in women's name have been shown to increase their soil fertility investment (Ali *et al.* 2014); participation in land (Holden *et al.* 2011), labor (Field 2007; Goldstein *et al.* 2018), and financial markets (Ali & Deininger 2021b); and their bargaining power (Menon *et al.* 2017) and influence over spending decisions (Wang 2014). Providing squatters with documented rights caused them to become more entrepreneurial and willing to take risks in Argentina (Di Tella *et al.* 2007), a result mirrored by effects of Peru's urban titling program (Aragón *et al.* 2020).

State capacity for service delivery: Property registries to facilitate taxation and market operation are a key component of states' ability to effectively deliver public goods and their legal and fiscal capacity (Besley & Persson 2009), the social contract, and citizens' trust. Panel regressions for 160 countries show a strong association between land registry development and economic growth in the 1960-2015 period (d'Arcy *et*

al. 2021) with effectiveness of public spending (e.g. the ability to implement large infrastructure projects) and the ability to implement policies and elicit voluntary compliance through a fair and transparent system rather than the value of taxes raised as the main mechanism. Property transactions yield more precise wealth measures than a capitalization approach (Fagereng *et al.* 2020). Registries are also key to monitor cross-border real estate investment (Alstadsæter *et al.* 2022) which substituted for cross-border financial flows (Johannesen *et al.* 2020) and, together with registries of beneficial ownership, curtailed use of real estate for money laundering (Neef *et al.* 2022).

Data and information: Publicity of price data from registries allows to improve market functioning, for the public or private sector to assess impacts of actions affecting land values *ex-ante* and put in place financing mechanisms. Making of price data public reduced price dispersion (Ben-Shahar & Golan 2019) and improved market functioning (Eerola & Lyytikainen 2015). It allows quantifying valuing the size and incidence of benefits from public goods such as road maintenance (Gertler *et al.* 2022), broadband access (Ahlfeldt *et al.* 2017), trees (Han *et al.* 2021), coastal preservation (Severen & Plantinga 2018) or losses from hazards such as contamination (Chang & Li 2021), radon exposure (Pinchbeck *et al.* 2020), proximity to nuclear plants (Coulomb & Zylberberg 2021), earthquake risk (Singh 2019), exposure to sea-level rise (Goldsmith-Pinkham *et al.* 2021), or species extinction (Frank & Sudarshan 2022) to inform public policy including interventions such as flood insurance (Garbarino *et al.* 2023). It allows to assess the differential impact of shocks such as COVID across locations (Rosenthal *et al.* 2022), effects of policies including restrictions on density (Hilber & Vermeulen 2016) or potential buyers (Lawley 2018; Hartley *et al.* 2023), or congestion pricing (Tang 2021).

2.3 The role of policy and examples of reform

The above suggests that a spectrum of rights can be documented and that the ability to obtain authoritative and current information on rights assignment and to enforce or exchange rights is important. Focusing only on one aspect such as credit to justify documenting land rights may be associated with disadvantages such as (i) a narrow emphasis on individual titling that is often neither cost-effective nor sustainable and that, by introducing wealth bias, may inadvertently increase inequality; (ii) neglect of the importance of registering public land or group rights to land that is used less intensively but still provides significant benefits at the local level and beyond; and (iii) failure to place land registries in their legal and institutional context and appreciate the need for interaction with other registries (courts, mortgage registries, personal ID, etc.) to ensure updating at low cost. We discuss each of these briefly below together with examples of how they have been overcome.

Cost-effective documentation of private land: Emphasis on issuing titles without checking if current procedural requirements and workflows are justified first can make titles unaffordable and introduce wealth

bias and reduce rather than increase tenure security. Titling costs of more than US\$1,000 per title in rural Madagascar (Jacoby & Minten 2007) or Ghana (Agyei-Holmes et al. 2020) and close to US\$500 in Benin (Mekking *et al.* 2021) or Zambia (Honig 2021) fall into this category. Often, large part of these costs can be attributed to the need for a detailed survey. Index maps that mark parcels' location relative to others and are fully sufficient to provide the spatial reference needed to unambiguously describe a land parcel and have in fact been used for generations in the UK. Such maps can be generated at very low cost from satellite imagery. Beyond introducing wealth bias, emphasis on high-cost mapping may cause disputes and detract from the thorough investigation of rights that is needed to ensure trust in the registry (Arruñada 2018).

The case of Ethiopia where land-use certificates to more than 6 million households (18 million parcels) were issued quickly in 2003–05 at low cost (< \$1 per parcel) via a decentralized process implemented by elected councils (Deininger *et al.* 2008) using a description of neighboring parcels only illustrates the scope for scaling up quickly in a decentralized manner that draws on elected local bodies. As digital tools were not yet available at the time, this effort established paper-based local registers, with significant impact.

The program reduced conflict (Di Falco *et al.* 2020), strengthened women's rights (Kumar & Quisumbing 2015) and bargaining power (Melesse *et al.* 2018) and spending on food and health care (Muchomba 2017). It increased tenure security and investment in land improvements (Holden *et al.* 2009), soil fertility (Melesse & Bulte 2015), and participation in informal rental markets (Holden *et al.* 2011) with benefits that exceeded cost (Deininger *et al.* 2011). As restrictions on land sales or rentals remained in place, certification only realized a fraction of the potential productivity gains from full land market opening (Chen *et al.* 2022).

Rwanda is the only African country with a nation-wide fully digital registry and cadaster. It titled all the country's 11.5 million parcels from 2011 to 2013 at a unit cost of less than US\$6 (Nkurunziza 2015), building on a completely revised legal and regulatory framework (including strong rights for women), a carefully evaluated pilot, and the ability to pass implementing regulations to quickly respond to problems as they emerged. Beyond showing that obstacles to systematically registering land at scale in Africa are often more of a political than a technical nature, it also demonstrates the benefits from such action: 86% of land parcels were individually or jointly owned by a woman (Ali *et al.* 2017); soil conservation investment (Ali *et al.* 2014) and activity in land and mortgage markets increased (Ali *et al.* 2015). A radical reduction of registration fees (including transfer taxes) helped the country move from rank 137 in the 'registering property' part of the World Bank's Doing Business ranking in 2005 to the top. The cost of the program could be recouped through incremental urban property tax revenues in less than a decade with current rates and in less than 3 years if rates were increased to 1% of property value. Fixed registration fees were very low as a share of property value in urban areas but rather high in rural ones, leading to relatively high levels of informality in the latter. Lowering fees for registering transactions in rural areas to be in line with stated

willingness to pay from household surveys and exempting poor land owners would allow to eliminate informality without jeopardizing the registry's ability to sustain itself from fee revenue (Ali *et al.* 2021).

These examples illustrate that fee reductions before launching titling initiatives are feasible and may be needed if overstaffing of land agencies or complex procedures make implementation of progressive laws unaffordable (Hunt 2004). However, a more frequent response was for donors to subsidize first registration, mostly in rural areas, a move justified with reference to the fixed cost of creating functioning registries. This approach faces two challenges: On the one hand, potential economic benefits from documenting land rights will be higher (due to higher land values) and cost of service delivery lower (due to parcel density) in urban than in rural areas. A focus on rural areas only thus requires an economic justification, especially as in many African settings, demand for documented land rights in urban areas is high: in Dar es Salaam, most slum dwellers paid into a savings scheme to finance title acquisition (Ali *et al.* 2016) with willingness to pay of US\$200 for title instead of much cheaper substitutes of low quality (Manara 2022),⁵ but supply constraints impeded an effective response (Manara & Regan 2021). Informal residents' willingness to pay for title was also high in urban Democratic Republic of Congo (Balan *et al.* 2020). High demand for documented land rights is reported from Zambia (Ali *et al.* 2020a), Ghana (Ehwi *et al.* 2021), and Nigeria (Goodfellow & Owen 2020). In fact, efficient urban titling programs could be self-financing if, instead of charging high upfront fees that credit constrained households may be unable to afford, a small fraction of the associated increases in land values is captured *ex post* via land taxes (Hawley *et al.* 2018).

A second challenge is that, even if a registry is successfully established, failure to reduce the cost of registering transactions will make subsequent registration unaffordable for most and may lead to a return to informality.⁶ High registration cost undermined sustainability in the past (Atwood 1990; Pinckney & Kimuyu 1994) and continues to do so even for interventions with otherwise positive effects (Agyei-Holmes *et al.* 2020; Fabbri & Dari-Mattiacci 2021). In Peru, a well-functioning low-cost registry was closed down in response to pressure by local notaries, triggering a marked increase in the cost of service delivery and, as a result, informality (Gutierrez & Molina 2020), suggesting that low-cost land service delivery is feasible but may run counter to powerful political economy forces.

This points to complexity paper-based registration procedures and standards for surveying, planning, and valuation as key issues that may increase the cost of registering rights and the associated corruption risk. Addressing these through a regulatory framework and performance standards that are monitored can go a

⁵ While policy makers placed enormous hopes in non-transferable documents to improve credit access in rural (Stein *et al.* 2016) or urban areas (Kironde 2006), these were bound to be disappointed and there were several cases where banks that had lent against such licenses were unable to liquidate, partly due to poor quality and maintenance (Kusiluka & Chiwambo 2019).

⁶ Evidence of high fees leading to 'deformalization' comes from Jamaica (Barnes & Griffith-Charles 2007), the Philippines (Maurer & Iyer 2008), and-for agricultural land-Rwanda (Ali *et al.* 2021). In urban Argentina, Galiani and Schargrodsky (2016) report that registering an inter-family transaction cost 27% of property values or more than 7 times average household income while registering a within-family transfer such as an inheritance or divorce cost about 20% of property value and 5 times average monthly household income.

long way towards improving and broadening access to documented rights. This is particularly important as the wealth bias introduced by high fees-that are affordably only for a few-may undermine public trust in the registry and, in many African settings, give rise to speculative acquisition of public or customary land with negative environmental and distributional impacts.

Public land management and operationalization of group rights: Unless rights to them are registered, large amounts of public land and the benefits they provide may be lost to the public. Moreover, documented rights need not be individual to encourage investment or sustainable resource management; demarcation of group or community boundaries together with regulations on how to internally manage rights or transfer them to outsiders can be effective in protecting against encroachment if groups are cohesive and able to rely on internal sanctions and means of conflict-resolution (Ferraro & Agrawal 2021). This was the rationale for legal reforms adopted by many African countries in the 2000s to recognize customary rights, possibly contingent on groups' meeting certain criteria, by demarcating and registering traditional authorities' outer boundaries and using low-cost internal registers.

In many settings, these efforts did not have the desired effect. One reason is that, instead of being recognized as having value on their own and providing sufficient security in more remote locations where land values are modest but environmental risk high, documented group rights were often viewed as a first stage towards title for individual fields. For example in Benin, low-cost village boundary clarification reduced tree cover loss and fires, land clearing, and inter-village border conflicts (Wren-Lewis *et al.* 2020). As subsequent systematic (individual) titling was never implemented, in part due to a high-cost approach, this was instead followed by titling in response to individual demand. Such on-demand titling provided no economic benefit (Fabbri & Dari-Mattiacci 2021) but increased conflict (Arruñada *et al.* 2022) and raised suspicions about elite capture in communities less well connected to markets (Fabbri 2021).

A second reason for initiatives to document community rights not having the desired impact was that regulations often increased the complexity of procedures to demarcate community land to the point of making them unaffordable and defeating their purpose. By mimicking procedures for issuance of titles that the legislation had set out to simplify, they thus often ended up replicating the wealth bias of on-demand titling and threatening to hollow out community rights from within. One example is Tanzania where nearly two decades after a law establishing 'certificates of village land' (CVLs) to document village boundaries at low cost was hailed as a major innovation (Alden-Wily 2003), less than 10% of villages had been able to comply with complex regulations to create a village land use plan (VLUP) as a first step towards CVL (Huggins 2018). Government is unwilling to enforce boundaries registered in CVLs if land is considered to be 'unused' and subject to investor interest (Bluwstein *et al.* 2018; Engström & Hajdu 2018), an issue of great relevance for potential outside investors that is now litigated in court. Unregistered VLUPs lack

publicity and were repeatedly changed in ways that reduced pastoralists' rights, something that is facilitated by the lack of pastoralist representation on deliberative and decision-making bodies at village level.

As efforts to secure community rights in Mozambique was similarly never implemented at scale (Quan *et al.* 2013) and reform to document customary rights in Malawi (Chikaya-Banda & Chilonga 2021) are too recent, requiring to go beyond Africa for good practice. Mexico combines a clear regulatory framework for documenting group rights with documented impact. Customary rights at the level of the group (*ejido*) were registered to more than 100 million hectares in the early 2000s.⁷ First, the *ejido* was registered as a legal entity to engage with outsiders as a group with organs of self-governance (the executive, the assembly, and an oversight committee) that follow clear procedural rules and its outer boundary defined. Second, internal boundaries of community land as well as individual agricultural and housing parcels were identified and registered centrally in the *Registro Agrario Nacional* (RAN) based on decisions by the assembly, supervised by a network of independent para-legal teams (via the *Procuraduría Agraria*) that was publicly supported and provided on-demand access to legal advice and a dedicated court system. Long-term transfers of land to outsiders by the community (but not individuals) are possible based on assembly decisions.

In addition to establishing clear procedures to register or transfer *ejido* land, there is no ambiguity or competition between tenure systems and a procedure for communities to exit the customary regime and move to the private system is available. This option to individualize rights includes strong safeguards against abuse, in particular the requirement for such decisions to be approved by 75% of members in a centrally supervised assembly vote.⁸ Studies show the program facilitated mechanization and higher productivity (de Janvry *et al.* 2015), fostering structural transformation via migration (Valsecchi 2014) and investment (Dower & Pfutze 2013) while increasing women's participation (García-Morán & Yates 2022).

Interoperability and policy alignment: While historically the technical complexity of documenting land rights, reinforced by established bureaucratic structures, caused a strong preference for stand-alone titling interventions, even successful interventions to document land rights at low or subsidized cost rates may not be sustainable objective if cost of subsequent registration is too high. Documenting land rights will be more effective in reducing transaction costs if linked to a clear (digital) way for individuals to authenticate their identity. Also, credit effects are contingent on viable procedures for mortgage registration or foreclosure.

The case of Lesotho illustrates how, following regulatory changes (including for mortgage registration), urban land titling can increase credit supply, especially for women. Regulatory reform in 2010 that, among

⁷ The voluntary *Programa de Certificación de Derechos Ejidales y Titulación de Solares* (PROCEDE) had by 2008 certified more than 98% of *ejidos* on an area of more than 100 million ha based on applications by communities (*ejidos*).

⁸ Only about 9% of *ejidos*, mostly located closer to cities with higher incomes, levels of literacy, and reliance on industry and services rather than agriculture for income exercised this right (Ramírez-Álvarez 2019). This contrasts to 'on-demand' opportunities for exit by individuals via private titling practiced in many African countries which hollow out the system from within and tend to give rise to rent seeding and may foster inequality.

others simplified bureaucratic procedures (including eliminating a need for Ministerial consent) to register mortgages was followed by systematic titling in 2011-13. Building on a 2006 law that, for the first time, allowed married women to independently own assets, procedural reform and titling increased women's level of registered rights in the short term.⁹ Regulatory reform and institutional restructuring improved market functioning, in particular mortgage markets, an effect that was quick for already registered parcels but took longer for land formalized via the systematic land registration program. In the longer term, the stock of systematically and sporadically registered parcels significantly increased mortgage market activity but, partly due to systematic differences in parcel characteristics that affected their marketability and suitability as collateral, the estimated impact of the stock of sporadically registered parcels remained larger than that of systematically registered ones 7 years after the end of the program (Ali & Deininger 2021b).

In the case of Ethiopia discussed above, lack of clear instructions on how to keep registries current led to great variation in updating procedures and quality as well as currency of registries across villages (Cochrane & Hadis 2019). It triggered a push for 'second round' certification, i.e. the creation of a computerized centralized registry for rural but not for urban areas that was implemented in 2014–20 at a cost of US\$6 per parcel (Zein 2021). Limited interest in (Bezu & Holden 2014) and benefits from this intervention (Ghebru & Girmachew 2020) are consistent with the notion that a central registry will have higher payoffs and thus be easier to establish and sustain in urban areas. Yet, successive efforts to digitize registries in the national and regional capitals were unsuccessful. With restrictions on land sales and rental impeding use of land as collateral, lack of demand may well undermine the sustainability of a fully digital rural registry.

2.4 Performance of African land institutions and opportunities for improvement

Table 1 combines data from a range of sources on the basis and perception of land institutions' performance in Africa by region. Panel A shows that formal land registries in Africa are characterized by high cost and often poor service: Formal fees to register a land transfer (without a survey) amount to more than 7% of parcel value on average. Limited digitization and coverage are one reason: of 53 Sub-Saharan African countries, only two (Rwanda and Kenya) report having a digital link between registry and cadaster; four claim to have most of the main city covered with a cadaster and a registry, and four that getting a first instance court ruling for a typical land dispute takes below a year. Inefficient and costly service provision reduces the scope for realizing the benefits from land rights by individuals and the state, including land value capture: On average, African countries collect less than 0.2% of GDP in property taxes vs. 2% in developed economies overall and much more in the UK, the Republic of Korea, Singapore, or the US.

⁹ Consistent with evidence on ambiguous effects of legal reforms not backed by regulation in patriarchal societies such as India (Anderson & Genicot 2015) or Pakistan (Beg *et al.* 2021), the 2006 law alone did not affect women's access to registered land rights.

Panel B suggests that, irrespectively of whether they are formal or customary, trust in land institutions in Africa is low: Almost two-thirds (61%) of respondents in the Afrobarometer survey think that rich people will be able to fraudulently register land they do not own. Such opportunities are perceived to be strongly biased in favor of the wealthy. The same is true for formally documented ownership rights: out of 11 African countries for which survey data are available, only two provide documented land rights to more than 2% of their population and in most cases, these are biased in favor of affluent males. Limited trust in and performance of formal institutions contrasts with appreciation for traditional leaders.

If accompanied by proper regulation, digital technology, while not a magic solution,¹⁰ offers opportunities to enhance the quality and interoperability of data managed by registries, reduce the cost of operating them, and enhance their potential contribution to improving land use to increase equity, transparency, accountability, and resilience. Three areas are particularly relevant:

First, use of digital records and procedures can reduce cost of service delivery, increase transparency and accountability of institutions and security of rights. It does so by adopting fully digital workflows that rely on routine use of unique land parcel identifiers; authentication of right holders via digital IDs and electronic signatures, digital payments, and allow establishing audit trails. This can reduce the potential for fraud or record tampering omnipresent in paper-based systems if linked to a discontinuation of paper records and increased quality and usefulness of land records via digital interoperability and mandatory cross-checks (e.g., with court records or tax clearance certificates) before transactions are registered and automatic updating of related records (e.g., on building permits). Moreover, automatic reporting of assessed land values and registered land prices and associated data (e.g., transaction volumes) at granular level will reduce transaction cost in land markets and facilitate credit supply by providing an objective basis for valuing banks' collateral in line with macro-prudential regulation standards, make acquiring land for large projects to improve mobility and resilience easier by providing an objective benchmark for land values. Linking property registries to registries of beneficial ownership also allows to address corruption, fraud, and money laundering through cross-border real estate investment (Alstadsæter *et al.* 2022).

Second, availability of digital imagery either from drones (Gevaert *et al.* 2020) or free satellite imagery and the capacity to easily process it (Gorelick *et al.* 2017) allows routine but granular analysis of land use at scale. This reduces the cost of documenting rights on index maps but also allows to link information on land use to information on rights, improving the scope for enforcement. Brazil's DETER system that monitors deforestation daily based on free imagery and processing on the Google Earth Engine cloud computing platform to trigger enforcement or further scrutiny in cases of high risk (Doblas *et al.* 2022)

¹⁰ Examples of blockchain technology being used to entrench corrupt practices (Deiningner *et al.* 2022) highlight that technology is not a magic solution but that the ability of achieving desired impacts is determined by the regulatory framework.

illustrates how this can be used to monitor compliance with environmental regulations. Making land use information public allows to use land use at parcel to determine eligibility for public credit programs (Assunção *et al.* 2020), certification of private sector supply chains (Carlson *et al.* 2018; zu Ermgassen *et al.* 2020), or reductions in the cost of measures to enhance resilience such as index based crop insurance (Masiza *et al.* 2022). Data on parcel boundaries together with satellite imagery on historical land use or yield proxies also offers opportunities to allow unbanked farmers to establish a history of creditworthiness.

Finally, connectivity can foster decentralization by combining central data maintenance with access to and use of authentic information by public and private bodies. By reducing cost of accessing information on registered primary or secondary rights (including encumbrances) and allowing its sharing (subject to right holders' consent where required by data privacy regulation) in real time with stakeholders in private or public sector. By indicating, for example, interest in certain transactions (e.g., leasing land or obtaining credit at some price), this can reduce transaction cost and increase competition in and thickness of land and financial markets, expanding the set of possible contracts and contracting partners.

Together with the ability to reference land use outcomes that are objectively verifiable via remote sensing at high levels of granularity, connectivity provides opportunities to expand the contracting space in ways that may allow to better insure against risk or reduce the potential for moral hazard. Reliable data on parcel boundaries and land rights could allow to bundle cash rent with crop insurance as alternative to sharecropping. The scope to easily register encumbrances or monitor cultivation activity at parcel level in real time can aid reputation development and potentially support an array of contract farming arrangements. Building on private operators' experience in documenting use rights for supply chain management or certification and adding interoperability with public records could allow to document rights in ways that can mature over time and reduce rural factor market imperfections in ways that could provide a basis for new business models by the private sector.

Connectivity, combined with the ability to use mobile money to transfer small amounts of resources at close to zero cost also makes it easier to better protect and more effectively exercise secondary rights by gathering consent to certain transactions electronically and automatically sharing current or future benefit streams. In settings such as Kenya where female co-ownership rights are enshrined in family law (Harari 2019), embedding a default requirement for spousal consent to any transfers or registered transactions could strengthen women's rights even in the absence of joint documents. Remote connectivity also reduces the cost of establishing and managing group rights as members can make decisions and receive payments in line with their share without the need for physical presence or intermediaries. This may make common pool resources and public land more valuable and contractible, including by reducing collective action issues as state-contingent 'Payment for Environmental Services' (PES) schemes could be tailored to individual group

members' behavior. It may also offer opportunities to improve enforcement of pastoralists' use rights and right holders' ability to enter contingent contracts building on such rights, something that can increase flexibility of and most likely also effectiveness of PES, e.g., by including upfront payments (Jack *et al.* 2022) or tailoring interactions to the specific circumstances of target groups.

The combination of increased benefits and reduced cost of documented land rights creates opportunities for African countries to reap benefits that can translate into greater transparency, effectiveness, coverage, and fiscal impact of their land institutions through appropriate regulatory change. Such change would include (i) adjusting their regulatory and institutional frameworks to deliver services at scale by allowing use of digital technology (e-signatures, mass valuation, digital lodging of surveys, etc.), interoperability, and public monitoring; (ii) replacing high and distortionary transaction taxes by a recurrent land tax based on mass valuation techniques and public access to assessed property values; (iii) using access to registry information to catalyze operation of financial and other factor markets; (iv) clarifying modalities for registering group and secondary rights, including ways to decide on management and conflict resolution consensually and transparently; (v) establishing standards for transfer of use rights to public land to which no formal rights exist or for public land acquisition, in a transparent and competitive way; and (vi) allowing land users to capitalize on new opportunities to provide local and global public goods through climate change mitigation and adaptation by providing national land use monitoring to allow documentation and quantification of such contributions.

3. Land rights to help address challenges of structural transformation

Institutions that clearly define rights to agricultural land and allow such land to be transferred easily can help reduce transaction cost in land markets and support functioning of other factor markets linked to land markets (e.g., those for insurance and credit). Africa is also richly endowed with land that, while traditionally often considered to be marginal, may become more valuable due to better infrastructure access or higher demand for services that can be derived from such land. Clarifying rights to such land, which may be public rather than private, and establishing competitive and transparent ways to assign them at the local level can open opportunities to bring in investment and access to global markets and know-how that bureaucratic processes were unable to tap into and that will be of increased importance to adapt to climate change and prevent temporary shocks from escalating into persistent conflict.

3.1 Rural factor market frictions, farm growth and structural transformation

Rural land institutions are important to provide landowners and users with investment incentives and to reduce frictions in land and other rural factor markets due to the cost of acquiring information on land ownership and enforcing contracts. Reducing such frictions can increase productivity and support structural

transformation by expanding the range of potential contractual partners and the time horizon of contracts, allowing tenants to make long-term investments and substitute know-how and technology for labor.

By reducing the scope for achieving an allocation of land that maximizes productivity and welfare, land market frictions contribute to resource misallocation (Restuccia & Rogerson 2017). Measured levels of misallocation are much larger in agriculture than in non-agriculture (Adamopoulos & Restuccia 2014). While part of this can be attributed to measurement error (Maue *et al.* 2020) that is particularly pervasive in agriculture and that can inflate the extent of measured misallocation (Gollin & Udry 2020), persistence of large wage gaps between agricultural and non-agriculture even after careful adjustments (Lagakos *et al.* 2020) suggests there is considerable scope for better rural factor market functioning by documenting rights, reducing the cost of enforcing contracts, and eliminating restrictions that might lead to adoption of sub-optimal contractual options.

For example, in Ethiopia where land cannot be sold and some regions restrict the share of land that can be leased out or the length of rental contracts, full marketability of agricultural land is estimated to have the potential to increase GDP by 9% and decrease agricultural employment by 20% (Gottlieb & Grobovsek 2019). *Ex ante* analysis shows that such reform would be pro-poor (Restuccia 2021) and significantly increase agricultural productivity (Chen *et al.* 2017).¹¹ The national certification program realized a fraction of these benefits (Chen *et al.* 2022). In Kenya, subsidies to short-term rental transferred land to younger, land-poor, and more entrepreneurial farmers, resulting in higher output and value added on rented plots via more intensive application of non-labor inputs (Acampora *et al.* 2022).

The relevance of land market frictions and the scope for policies to reduce them is illustrated by the case of China where reforms implemented in a stepwise fashion over the last decades cumulatively had enormous impact (Adamopoulos *et al.* 2022): reducing the scope for periodic land reallocation that had reduced migration incentives (Giles & Mu 2018) increased off-farm labor supply and rural incomes (Zhao 2020). Reforms to facilitate land rental fostered structural transformation (Deininger & Jin 2009), triggering estimated increases of output and productivity by 8% and 10%, respectively (Chari *et al.* 2021). Complete land registration on a pilot basis almost doubled the likelihood of non-farm enterprise startups (Deininger *et al.* 2019a). Better factor market functioning allowed adjustments to offset some of the negative impacts of climate change (Chen & Gong 2021) while cities with more elastic housing supply were able to attract more skilled migrants and industrialize (Niu *et al.* 2021).

By providing former tenants or sharecroppers with secure rights to land, land reforms undertaken in Asia in the post-WWII period improved credit market access (Iskan 2018) and fostered mechanization as well

¹¹ Globally, a hypothetical shift to unrestricted transferability of land (via ‘titling’) is estimated to potentially increase output by as much as 82.5% (Chen 2017).

as outmigration (Kitamura 2022) based on quick land distribution under secure and transferable rights (Jeon & Kim 2000). Most of the large number of land reforms implemented globally (Bhattacharya *et al.* 2019), however, moved more slowly and often involved politically motivated restrictions on transferability of land or access to public goods (Fergusson *et al.* 2022). Inability to fully extinguish landlords' claims created right overlaps that impeded investment and market operation in India (Deininger *et al.* 2013) and Uganda (Deininger & Ali 2008; Bird & Venables 2020). Retention of residual rights by the state also prevented investment in Zimbabwe (Deininger *et al.* 2004), Ethiopia (Deininger & Jin 2006), Colombia (Albertus 2019), Peru and Mexico (Albertus *et al.* 2016), or the Philippines (Adamopoulos & Restuccia 2020).

While land fragmentation increases the cost of moving between fields, it also provides benefits in terms of risk diversification (Ali *et al.* 2019b), food security (Knippenberg *et al.* 2020), reduced yield variability (Veljanoska 2018) and crop diversity (Noack & Quaas 2021) that may outweigh these costs. Fragmentation can, however, become an issue in settings such as India if parcels are too small to allow mechanization; eliminating all land market frictions is estimated to allow increasing income per agricultural worker by 68% and reducing the number of farms by 82% (Foster & Rosenzweig 2021). However, although evidence suggests it could raise productivity via machine use (Bryan *et al.* 2022), achieving land consolidation via private exchanges raises complex market mechanism design issues (Bryan *et al.* 2017) and public action, as implemented in Europe post WWII with positive economic though not always social impact (Loumeau 2022) may be considered.

Sharecropping is often adopted as a second-best contractual form to share risk, despite associated efficiency losses as documented in Malawi (Ricker-Gilbert *et al.* 2019) and other African countries (Kalkuhl *et al.* 2020). In Uganda, an RCT showed that higher output shares incentivize tenants to use more inputs and cultivate riskier crops, resulting in a 60% output gain (Burchardi *et al.* 2019). Rather than ban sharecropping which just tends to push such transactions into informality and may exacerbate the underlying problem, ways to reduce the risk that triggers use of such contracts in the first place, e.g., by bundling cash rent contracts with insurance similar to what was done for other inputs (Bulte *et al.* 2020), appear a promising topic for future research that can get a big boost from digital records.

Labor markets in rural areas also suffer from frictions. Imperfect observability of effort due to seasonality and spatial dispersion of agricultural activities implies that farms operated by owners who have a residual claim on profit avoid the cost of supervising hired labor, providing them with an efficiency advantage over wage-labor operated ones (Binswanger *et al.* 1995). At the same time, if farms are too small to offer full employment to owners and their family members, frictions associated with participation in off-farm labor markets may lead to seasonal under-employment (Dillon *et al.* 2019) and farmers working on their farm even at returns below the market wage, leading to an inverse relationship between farm size and

productivity as found in Rwanda (Ali & Deininger 2015), Malawi, Tanzania, and Uganda (Julien *et al.* 2019). Evidence from India over a wider farm size range shows that such non-separability affects only small but not large farms (Merfeld 2020) with estimated shadow wages for family labor 20% below non-agricultural wages (Caunedo & Kala 2021). Land market restrictions can significantly reduce employment in manufacturing and services, slowing structural change (Emran & Shilpi 2020).

As capital becomes cheaper relative to labor, the lumpy nature of capital inputs and the ability to substitute capital for supervision (Deininger & Byerlee 2012) may counter family farmers' labor cost advantages and lead to a positive relationship between farm size and productivity (Eswaran & Kotwal 1986). This is consistent with historical evidence from the US and cross-country patterns of the growing importance of capital in agriculture with economic development (Chen 2020). As functioning of labor and other factor markets improves, the inverse relationship between farm size and productivity indeed weakens as observed in China (Sheng *et al.* 2019), Bangladesh (Gautam & Ahmed 2019), India (Deininger *et al.* 2018), Vietnam (Liu *et al.* 2020), Brazil (Helfand & Taylor 2021) and also in Tanzania (Wineman & Jayne 2021), Kenya (Muyanga & Jayne 2019), and Nigeria (Omotilewa *et al.* 2021).

In many of today's developed countries, generational change was a key driver of structural transformation: cross-cohort accounted for between two-thirds and three-quarters of factor reallocation in the US between 1870 and 1910 (Porzio *et al.* 2022) and globally (Hobijn *et al.* 2018). In the second half of the 20th century in England and Wales, inter-generational mobility out of agriculture was aided by access to transport cost and had a significant impact on structural transformation (Costas-Fernandez *et al.* 2022). As transaction cost or other barriers (Kosec *et al.* 2018) to intergenerational land transfers *inter vivos* in Africa often remain high, promotion of long-term contracts and enabling young farmers to access land and establish viable farms early (Ricker-Gilbert & Chamberlin 2018) possibly give a boost to structural transformation.

3.2 Rights to public land and large-scale land-based investment

Increased demand for land and large scale land-based investment (LSLBI) in the wake of the 2007/08 spike in food and commodity prices was widely expected to provide relatively land abundant African countries with an opportunity to bring in and capitalize on know-how, market access, and increased competition associated with such investment (Collier & Venables 2012) in line with experience in other sectors (Monge-Naranjo 2019). Such hopes were based on the fact that, in comparable circumstances, establishment of oil palm after 2000, though at high environmental (Li & Semedi 2021) or social (Cisneros *et al.* 2022) cost, is estimated to have lifted more than a quarter of Indonesia's rural individuals out of poverty (Edwards 2019a); increased the productivity of manufacturing firms well beyond the oil palm value chain (Kraus *et al.* 2021); and improved access to employment, infrastructure (Edwards 2019b), nutrition, living standards and human capital formation (Chrisendo *et al.* 2022).

Although cultivated area in Africa increased by some 50 million ha between 2013 and 2019, well above the increase in Asia, studies point to limited direct or indirect benefits, in marked contrast to what is observed for other types of FDI in Africa (Abebe *et al.* 2022), including oil drilling (Cust & Harding 2020): Large farm establishment in Ethiopia did not create jobs and had little effect on smallholders' access to technology or input and insurance markets (Ali *et al.* 2019a). In Mozambique, use of improved practices and inputs by smallholders adjacent to large farms increased but yields or market participation did not (Deininger & Xia 2016) and large farms may put downward pressure on wages (Glover & Jones 2019). In Zambia, spillovers from large farm establishment were at best limited and increased competition for land (Lay *et al.* 2020).¹² Analysis for all of Africa suggests that land acquisition for mixed or food crop use increased malnutrition with limited positive impact on livelihoods (Kinda *et al.* 2022).

In addition to non-traditional investors focusing on countries with weak land governance (Arezki *et al.* 2015), limited positive or even negative impacts of LSLBI can be partly attributed to use of centralized and non-competitive mechanisms for investor identification and land transfer that often prioritized political (Bélair 2021) or territorial (Lavers 2016) over economic objectives.¹³ Land centrally assigned to investors was often found occupied ('encroached'), mired in conflict, or less suitable than expected. Respect for existing rights (Maganga *et al.* 2016), safeguards (Nolte & Voget-Kleschin 2014), or disclosure (Cotula 2014) and job creation or skill transfer (Nanhthavong *et al.* 2022) were often weak. While delays and bureaucratic bickering led some investors to withdraw (Engström & Hajdu 2018), those that proceeded were often unable to mitigate resulting environmental issues (Shete *et al.* 2016) or conflict (Sulle 2020).

Non-competitive ways of land allocation not only increase the likelihood of selecting investors with limited skills but also make it difficult for productive land users, including local farmers, to acquire land from unsuccessful investors through markets, especially if unused land is expected to revert to central agencies. In Zambia, titled large farms participated less in land markets than informal small ones and failed to access credit or achieve higher productivity, suggesting speculation as a potential reason for land acquisition (Ali & Deininger 2022). Encouraging competitive land markets, including by taxing land-thus also creating incentives for local authorities to plan and encourage investment or to properly extinguish dormant titles by absentee landlords based on non-payment of such taxes-seems important to ensure that expansion of medium-scale farms (Jayne *et al.* 2019) increases productivity and local welfare.¹⁴

Where such expansion happens on public land, experience suggests that land transfers via public (online) auctions are organized by local governments to capitalize on their incentives and information access;

¹² Beyond Africa, similar results are reported from Cambodia (Anti 2021) and the Lao People's Democratic Republic (Nanhthavong *et al.* 2020).

¹³ Case studies show that political objectives may change quickly (Widengard 2019) or not be shared by local officials (Dieterle 2021).

¹⁴ To the extent that it increases tenure security (as payment receipts can be used as proof of use) and give local authorities a stake in improved land use, a tax on land that is used commercially (beyond a certain size) could in fact be politically advantageous.

publicity of all contracts.¹⁵ Given smallholders' advantage in labor-intensive crops with high value-added (Rogers *et al.* 2021), emphasis on upstream investment that has shown to generate larger income or poverty gains than investment focused on land only (Van den Broeck *et al.* 2017) can offer more scope for market integration of smallholders (Dubbert 2019) and a more integrated investment approach (Schoneveld 2022).

3.3 Anticipating climate-related challenges

Climate change models predict that rising temperatures and greater frequency of adverse weather events will disproportionately reduce agricultural productivity in Africa (Conte *et al.* 2021). In the absence of adaptation investment, expected increases in temperature will shift the comparative advantage towards non-agriculture and depress local demand for non-tradables. Trade in non-agricultural goods is important to make up for such shortfalls: over the last five decades, cities with firms that sold their output in global markets were able to absorb drought shocks and even expand while those that depended on local markets only suffered significant declines as demand dried up (Henderson *et al.* 2017). Adoption of modern inputs, crop switching, trade, and urbanization can all reduce estimated impacts (Conte 2021), reinforcing the importance of secure transferable land rights to foster private investment in adaptation and diversification to prevent being caught in a subsistence trap (Nath 2020).¹⁶

Shocks to local food crop production in Africa have been shown to have persistent impact on the incidence of conflict that may spill over to neighboring areas (Harari & La Ferrara 2018). One explanation is that exogenous price changes will affect the value of food producers' resource endowments and the opportunity cost of engaging in fighting relative to production (Berman *et al.* 2021).¹⁷ Sedentary and pastoral groups have long engaged in a mutually beneficial symbiotic relationship whereby animals graze on floodplains or wetlands where they provide fertilizer in the dry season. Climate shocks such as droughts can, e.g., by changing the timing of transhumance, transform such complementary patterns of resource use into a confrontational relationship. Data on almost three decades of violent conflict in Africa show that droughts in pastoral areas tend to trigger agro-pastoral conflict in neighboring agricultural areas by exacerbating competition over scarce wetlands although political participation neutralizes this effect (McGuirk & Nunn 2020). Better definition of rights over pastoral resources and land dispute resolution mechanisms further reduced the extent and likelihood of violence (Eberle *et al.* 2020).

¹⁵ Mandatory allocation of public agricultural land via competitive auction on an electronic platform (Prozorro Sales) powered by open source software doubled public lease revenue in Ukraine and auctions organized by local rather than central government realized prices that were higher by about 40% (Deiningner *et al.* 2022).

¹⁶ Evidence from Brazil over more than two decades of increased frequency and severity of droughts shows that financial integration with other regions provides insurance against negative weather shocks in the short run. In the long run, regions where climatic conditions had deteriorated suffered from capital outflows and lower loan access, triggering net labor outflows even though local manufacturing absorbed some of the workers released from the agricultural and service sectors (Albert *et al.* 2021).

¹⁷ In food consuming areas, commodity price changes will also affect real income and thus the ease of recruiting potential fighters (McGuirk & Burke 2020).

Beyond agricultural production, demand is also expected to increase for land to provide green energy or environmental services such as carbon storage. An early program subsidizing afforestation in Chile in 1986-2011 seems to have realized neither economic nor environmental benefits-it triggered a decline in rural population and increased unemployment (Jordán & Heilmayr 2022), reducing biodiversity without higher carbon storage in above-ground biomass (Heilmayr *et al.* 2020), suggesting that careful design and possibly a combination of such programs with safeguards on converting natural ecosystems will have benefits.

Programs to provide environmental services can also increase land demand and, if rights are ill-defined, dispossess current users (Kansanga & Luginaah 2019). Evaluations of PES schemes (Börner *et al.* 2017) suggest their performance can be maximized via (i) additionality, i.e., PES target areas that, without support, are at high risk of irreversible land use change; (ii) leakage is avoided, i.e., better conservation outcomes in target areas are not offset by worse ones in non-target areas instead; and (iii) effects are sustained over time (Chabe-Ferret & Voia 2021). While internal enforcement is a necessary precondition for conservation (van der Zon *et al.* 2023), it can be reinforced by external monitoring using remote sensing data.

Allocating PES subsidies via competitive auction can help reveal private information including on strategic complementarities between neighboring parcels (Lewis & Polasky 2018). Auctions have been implemented successfully in settings such as Malawi (Ajayi *et al.* 2012) where they increased effectiveness and reduced cost by about 30% (Jack 2013). PES also achieved temporary reductions in deforestation in Uganda (Jayachandran *et al.* 2016) that were economically viable at a cost of carbon of \$39/t. If the size of incentives exceeds the opportunity cost of environmentally inferior uses and issues of collective action (Edwards *et al.* 2021) or political economy (Pailler 2018; Cisneros *et al.* 2021) can be resolved, competitively awarded PES based on clear rights could offer considerable potential.

Evidence from Brazil shows that even simplified ways of self-registration can be used to monitor land use but that associated incentive effects need to be considered carefully. Linking eligibility for subsidized credit to compliance with environmental regulation has been effective in reducing deforestation (Assunção *et al.* 2020). It also allowed to effectively monitor Command and control measures, by targeting a 'Priority List' of municipalities with more intense environmental monitoring and enforcement, were effective, reducing deforestation by 40% and cutting 39.5 million tons of carbon emissions, an amount that could be significantly increased by selection of ex post optimal municipalities (Assuncao *et al.* 2019).

To incentivize conservation of native vegetation on about 394 million ha of private land, the country established the rural environmental cadaster (CAR) as a tool for voluntary self-registration of rural properties whereby landowners geo-reference their property boundaries and remaining forests using satellite imagery at their own expense, possibly with NGOs support (Azevedo *et al.* 2017). Yet, to the extent that it allowed credit constrained small farms to access subsidized credit to establish pastures on previously

forested areas, CAR registration may actually aid deforestation (Jung *et al.* 2021). Intensification rather than deforestation can be encouraged by access to non-agricultural opportunities, as was the case with rural electrification in Brazil over the 1960-2000 period (Szerman *et al.* 2022).

4. Urban land policies

Africa now is one of the regions with the fastest rate of urbanization globally (Henderson & Turner 2020) and its urban population is expected to triple to more than 1 billion by 2040 (Collier 2017). Urbanization can bring benefits through skill-based human capital externalities that foster productive jobs based on input sharing, labor market pooling, and knowledge exchange (Rosenthal & Strange 2020), thus attracting skill and increasing land values. But urbanization also imposes costs from congestion, contagious diseases, and crime (Duranton & Puga 2020) that may outweigh benefits from proximity unless countered by public investment in services and mobility, ideally financed from land price appreciation due to urbanization that will boost global competitiveness (Venables 2017).

4.1 Land taxation and urban local service delivery

In developing countries with large informal sectors, a narrow tax base often limits the amount of taxes that can be collected centrally, implying that for many local governments, land taxes are a key source of revenue. Given the immobility of land, land taxation allows raising revenue to finance local public goods in a way that is progressive (Bonnet *et al.* 2021) and not distortive (Schwerhoff *et al.* 2020). Experts concluded that taxation of urban land and property is Africa's largest source of untapped revenue (Collier *et al.* 2017).

Property taxes increase owners' incentives to use land effectively (Oates & Schwab 1997), discourage land speculation (Norregaard 2013), and reduce vacancy rates (Segú 2020). They encourage compact urban development (Song & Zenou 2006; Ermini & Santolini 2017) and, in an open economy, can be output-enhancing (Kalkuhl & Edenhofer 2017). Local governments' ability to raise local revenue provides the basis for accessing the municipal bond market to, among others, generate resources for large infrastructure investment. As local public goods will increase land values (Gonzalez-Navarro & Quintana-Domeque 2016; Coury *et al.* 2021) and services financed using property tax proceeds benefit local residents, property taxes strengthen the social contract between state and taxpayers (Besley & Persson 2014). Collection of property tax increased participation and accountability even in fragile low-capacity African settings (Weigel 2020) with willingness to pay such taxes enhanced by better service delivery (Kresch *et al.* 2023).

Traditionally, transaction taxes ('stamp duties') were the preferred instrument to collect such revenue from urban properties as they do not require costly creation of comprehensive tax maps or property valuation. Although satellite imagery and mass valuation techniques make land value capture easier, the regulatory environment has been slow to adjust and in Africa transaction taxes account for the lion's share of transfer

fees of 7% on average. Evidence from developed countries shows that even modest transfer taxes are highly distortionary: A 1.1% land transfer tax in Toronto has been shown to lead to significant welfare losses (Dachis *et al.* 2012) and, if the decision of whether to own or rent is accounted for, was estimated to incur a deadweight loss of 79% of revenue (Han *et al.* 2022). In the UK, transaction taxes caused large distortions to volume, timing, and price of property transactions (Best & Kleven 2018) and negatively affected land markets and labor mobility (Hilber & Lyytikainen 2017; Eerola *et al.* 2021). While their net contribution to public revenue is thus often modest, transfer taxes push property transactions into informality and encourage corruption and under-reporting to a point where price data become meaningless, and registries deteriorate. Replacing them with equivalent recurrent land tax on a much larger base is easy technically and can increase revenue, welfare, efficiency, and transparency.

Satellite imagery allowed cost-effective generation of urban tax maps at scale in Italy (Casaburi & Troiano 2016) and, via national programs, in India (Awasthi *et al.* 2020), and Brazil (Christensen & Garfias 2020). Computer-assisted mass appraisal (CAMA) of residential property is now standard in most developed countries (Grover *et al.* 2017). In the Netherlands 2.8% of GDP is raised in property tax revenue by transparently valuing millions of properties annually in a way that is equitable, trusted and perceived as fair as assessed property values are available publicly (Kuiiper & Kaathman 2015).

While these techniques have been successfully applied to African cities (Ali *et al.* 2020b), African countries overwhelmingly use formulas (i.e., charges per property or area unit, possibly for different zones or bands) that are less tightly linked to market values and thus more regressive. They often also require valuation by a licensed valuer even for residential property (Franzsen & McCluskey 2017) despite this being slow, costly, often perceived to be fraud-prone and arbitrary. If land values increase quickly, the implied long re-valuation cycles can be associated with significant revenue loss. Focusing scarce capacity on valuation of commercial real estate and using CAMA for frequent revaluation of residential property instead could increase fairness and yield simultaneously.

Even with a complete tax map and market-based valuations, exempting owner-occupied housing from land tax as practiced by many African countries, will significantly reduce property tax yield and force renters to subsidize owners in a regressive way. Although politically expedient, such an exemption is justified neither from an economic (Englund 2003) nor a social perspective and may undermine tax morale, especially if taxes finance local services that are equally consumed by owner-occupiers. Levels of collection well below 10% in published studies from Africa- imply that, instead of increasing compliance (Slemrod *et al.* 2022) public disclosure of tax information and social recognition of top taxpayers in Africa significantly reduced compliance (Regan & Manwaring 2023), consistent with the notion that taxpayers overestimate compliance levels and, once learning the truth, stop complying to avoid being taken advantage of.

A much preferable option to lift compliance above the current low levels would be to require a tax clearance certificate before any transfer, mortgage, or other encumbrance on a property can be registered. Such a measure treats property tax arrears as a high priority lien on the property and can be designed to act as implicit deferral of property dues, thus addressing concerns about property taxes reducing owners' liquidity that have been raised in the literature (Brockmeyer *et al.* 2020). Another options to increase payment is to link tax payment explicitly to local service provision, including the possibility of withholding municipal services in case of non-payment. In systems that still rely on manual distribution of bills and a need to pay in person by queuing at government offices, allowing electronic billing and payment to reduce compliance cost (McCluskey *et al.* 2018).¹⁸

The example of Nigeria where, with World Bank support, more than 30 states enumerated the majority of their urban properties based on satellite imagery in slightly more than a year and used this as a launchpad to improve services and make acquisition of documented land rights easier (Deininger *et al.* 2020a), in line with evidence from Ghana (Dzansi *et al.* 2022), DRC (Balan *et al.* 2020), and Senegal (Knebelman 2021). It also shows that creating a property tax roll can be a low-cost way of documenting use rights that can be shared with other public agencies (including land registries) to support planning and local service delivery with the possibility of either using such data as the basis for low-cost issuance of land rights or allowing tax payment receipts to mature into more substantive rights over time. Linking efforts to increase property taxation to reductions in registration or transaction fees could remove a major obstacle to establishment and maintenance of urban land registries, improve welfare, and yield political benefits if tax payment opens a path to acquiring real rights while at the same time creating enforcement capacity the lack of which has thus far bedeviled most efforts to increase property taxation in Africa.

4.2 Supporting compact and dense urban development

Global data suggests that African cities are land-intensive, i.e. they consume lot of land and achieve density via crowding in slums rather than investment in height (Esch *et al.* 2023). This makes for sprawling cities with limited mobility (Peralta Quiros *et al.* 2019) where poor individuals can access only a limited number of jobs (Nakamura & Avner 2021). Land-intensive urban growth increases cities' net carbon footprint,¹⁹ pollution exposure (Yao *et al.* 2021), and the cost of providing public services (Ashraf *et al.* 2021) including transport (Gendron-Carrier *et al.* 2022). Intra-city mobility increased knowledge spillovers and innovation in the US (Roche 2020) and is linked to higher economic growth in African cities (Brandily & Rauch 2020), suggesting that sprawling expansion may negatively affect cities' growth potential.

¹⁸ In a randomized experiment in Zambia, SMS reminders increased payment significantly, especially for those on a network that allowed mobile payment. Effects were particularly large for payers outside the capital (Ali & Deininger 2021a).

¹⁹ Engineering studies that account for cities' total life-cycle GHG emissions suggest 7 to 27 floor buildings are optimal (Resch *et al.* 2016), though high density low rises may be preferable for stable populations (Pomponi *et al.* 2021). African cities have less than 2 floors on average.

To improve living conditions by regularizing slum residents' tenure, two challenges need to be addressed: Slum formalization may encourage land invasions farther from the city in the hope of future regularization (Smolka & Biderman 2012), resulting in a vicious cycle. Slum upgrading programs that fail to provide transferable property rights may also inadvertently block gradual redevelopment. For example, thirty years after a large scale slum upgrading program that involved more than 5 million slum dwellers in Indonesia over 1969-84, project areas were more informal and denser with 50% fewer high-rises; more fragmented land holdings; and land values lower by an average of 12% than in untreated neighboring areas, a finding that is attributed to the fact that land rights awarded to program beneficiaries were restrictive and not marketable (Harari & Wong 2019). Experiments in Latin America that provided randomly selected poor slumdwellers with better housing without stronger property rights had no direct effect on durable good ownership or labor market outcomes (Galiani *et al.* 2017) and only transitory indirect effects (Galiani *et al.* 2021), in contrast to 'site and services' projects.

The size of projected population inflows to African cities implies that providing the floorspace needed will require complementing vertical growth with area expansion. As 30%–50% of a city's surface is used for public spaces, public land use patterns and development of arterial infrastructure provide strong signals to investors in ways that are highly persistent over time (Baruah *et al.* 2021). In Tanzania, public provision of arterial infrastructure and basic services 'site and service' projects in the 1970s helped crowd in private investment by allowing owners to incrementally upgrade structures: 3-4 decades after the program, treated areas had larger buildings, better electricity access, and superior socio-economic outcomes than untreated ones as and slums that had been upgraded at much higher cost (Michaels *et al.* 2021). Deploying arterial infrastructure ahead of development also allows public services to be provided more cost-effectively, at about one-third of what it would cost to provide the same services *ex post* (Smolka & Biderman 2012).

While barriers to land and financial markets arising from high levels of informality and limited credit market access are one reason for limited investment in height, land use regulations exacerbate such effects. Many African cities impose minimum lot sizes or limit floor-area ratios (Lall 2017), directly constraining vertical development and making housing more expensive (Cavalcanti *et al.* 2019). As many existing structures fail to comply with such rules, enforcement is often discretionary (Tellman *et al.* 2021), giving rise to rent-seeking (Cai *et al.* 2017). By increasing formalization cost, such regulations impose a labor tax that further limits labor market participation, especially by women (Field 2007).

Unaffordability of floorspace tends to push poor people into informal settlements in hazardous locations that may be established on private (Brueckner & Selod 2009; Brueckner 2013) or public (Shah 2014) land at cities' fringe with poor access to services that favor diseases (Brotherhood *et al.* 2022). Slums are often organized by individuals with political (Obala & Mattingly 2014) or ethnic (Marx *et al.* 2019) connections.

In Kibera, Nairobi's main slum, benefits from redeveloping have been calculated to amount to more than 30 times the typical annual slum rent payments by all slum households even after fully compensating landlords (Henderson *et al.* 2021) but seems politically unfeasible, suggesting that in some cases households may indeed be trapped in slums (Marx *et al.* 2013).

Although it can improve welfare overall (Collins & Shester 2013; Hartley *et al.* 2021), large-scale redevelopment of informal areas may, through increases in land prices and gentrification, reduce the welfare of some former slum-dwellers unless countervailing measures are taken as was the case with large scale slum redevelopment in Mumbai (Gechter & Tsivanidis 2020) or Uruguay (González-Pampillón 2022). Options include transferable vouchers (Kumar 2021), rules requiring a certain amount of mixed income housing (Blanco & Neri 2022), or mixed-use zoning which has been shown to increase property values in Europe (Koster & Rouwendal 2012) and the US (Nakamura *et al.* 2018) more generally.

Beyond recurrent land taxation, capital gains taxes or other means for land value capture can be essential to finance urban infrastructure construction to improve inter-urban mobility and harness benefits from skill-based density (Sturm *et al.* 2022). Investments in bus transit (Balboni *et al.* 2021; Tsivanidis 2021) or metros (Du & Zheng 2020; Zárate 2022) to increase mobility can enhance access to productive jobs or formality and trigger land appreciation in excess of project cost (Gupta *et al.* 2022), warranting much greater use of instruments to capture land value to either recoup investment costs *ex post* or allow public bodies to issue bonds to finance such investment.

Acquiring land for infrastructure construction is easier and the scope for holdouts (Schafer & Singh 2018) reduced if rights are defined and land prices or valuations for tax purposes are public to provide a floor for monetary compensation that could be adjusted to specific contexts to ensure those affected by expropriation are not made worse off. Landowners with prior non-farm job experience were better able to adjust to expropriation shocks in Ethiopia (Mezgebo & Porter 2020) and China where expropriation generated less resentment towards government officials if projects yielded public benefits and local governance was transparent (Sha 2022). Instruments such as land pooling (Lozano-Gracia *et al.* 2013) or arrangements that allow in-kind compensation (Ghatak & Ghosh 2011), thus giving owners a stake in future development may thus be preferable to straight expropriation, especially in settings where land values appreciate.

In light of secular increases in urban land values (Knoll *et al.* 2017), decisions on acquisition or transfer of what land to acquire for public purpose or zoning regulations will have distributional consequences and can be a major source of corruption (Klopp 2000; Southall 2005). For more than a million transactions of urban public land in China, influential party members obtained price discounts of 55%–60% and officials providing such discounts were 23% more likely to be promoted to leadership positions (Chen & Kung 2019). Beyond causing immediate loss of public revenues, this may also have compromised longer term

performance: data from close to 1,500 industrial parks in China suggests that those that had their land allocated based on economic potential rather than political connections generated more manufacturing jobs and attracted higher levels of foreign direct investment than those that were not (Kahn *et al.* 2021).

5. Conclusion and policy implications

New digital technology provides an enormous opportunity for African countries to improve quality of land service delivery and in doing so help address informality and improve access to finance in urban areas, expand functioning of rural factor markets, strengthen resilience to climate risks, and empower women and other groups of land users whose rights have traditionally often been ignored in practice. To capitalize on these opportunities, legal, regulatory, and institutional change is needed in three dimensions. First, to eliminate supply-side constraints such as survey fees and procedures that impeded first-time registration of titles in urban areas and precluded registration of other use rights or rights to public land even in settings where such rights enjoy legal recognition. Second, there is need improve the quality and publicity of registry information and eliminate barriers to registering and enforcing contracts involving registered rights. Last but by no means least, it is important to ensure private benefits from more secure land rights are balanced by the public interest by (i) taking measures (including regulation and publication of prices) to ensure competitive land markets; (ii) planning land use in a way that is transparent and that provides a basis for public infrastructure provision to guide and leverage private investment; and (iii) taxing land and increases in its value in a manner that supports delivery of local public services and, by allowing local governments to benefit from actions that increase land values, contributes to effective decentralization.

While this provides an opportunity to go beyond a narrow project-centered focus on individual titling through policy-based lending and subsequent support to results-based approaches, it also requires adjusting general principles to local contexts including the political economy surrounding land institutions. Supporting legal and institutional change will require evidence-based analytical work and policy advice at country level to help prioritize and sequence actions. Objective data on the performance of land institutions- ideally sourced directly from digital registries via API-and quality of the regulatory framework in a way that is comparable globally and that can be linked to benchmarks in a way that overcomes the shortcomings of perception-based indicators is an opportunity for institutions such as the World Bank have a strong comparative advantage could exercise leadership to focus the debate and support reforms that could improve African countries' ability to address the challenges facing them in the years and decades to come.

Table 1: Objective and subjective indicators on land service delivery in African regions

Variable	Central Africa	East Africa	North Africa	South Africa	West Africa	Total
Panel A: Land registry information						
Registration cost (%)	9.3	5.3	4.7	6.9	7.2	7.02
# of ctries w. digital registry	1	1	0	1	0	3
# of ctries dig. Cadaster	1	1	1	0	1	4
Reg&Cad. digital & linked	1	1	0	0	0	2
Main city in register	1	0	0	4	1	6
Main city in cadaster	1	0	1	3	1	6
Court decision in < 1 year	1	1	0	1	1	4
No. of countries	12	7	6	12	16	53
Panel B: Survey information						
Can get land information	0.197	0.208	0.093	0.210	0.189	0.189
Rich people can defraud	0.754	0.656	0.538	0.603	0.598	0.613
Poor people can defraud	0.158	0.120	0.167	0.194	0.161	0.167
Support women's rights	0.778	0.731	0.470	0.795	0.714	0.723
No. of countries	3	3	3	10	15	34

Note: In panel A, row 1 reports cost of registering a property transaction (without a survey) as percentage of property value while rows 2-6 report the number of countries with a digital registry, a digital cadaster (not just scanned survey plans), or a digital registry and cadaster that are linked, most of the properties in the main city in the register or the cadaster, and the ability to obtain a first instance court decision for a typical land dispute in less than a year. Registration cost is as a share of property value. All information is based on 2020 World Bank 'Registering Property' Data.

For panel B, '*Can get land information*' is the share of those responding 'very likely' to the question 'If you went to the local lands office to find out who owns a piece of land in your community, how likely is it that you could get this information?' *Fraudulent registration (ordinary and rich)* tabulates the share of respondents who think it is very likely for an ordinary or a rich person, respectively, to '...pay a bribe or use personal connections to get away with registering land that does not belong to them' *Women's rights* is the share who 'agree or strongly agree' with the statement 'Women should have the same rights as men to own and inherit land'. All data are based on the Afrobarometer Survey Round 7.

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