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Challenges posed by the new wave of farmland investment

Klaus Deininger

Despite recent headlines about the ‘land rush’, scant empirical evidence implies that the debate is often theoretical and dominated by preconceived notions. To provide evidence that could better inform the debate, this paper focuses on three areas. First, we find that new land demand, which skyrocketed after the 2007/08 commodity price spike, remained at high levels, with a strong focus on Africa, and often countries with weak land rights protection. Some countries transferred large areas to investors, frequently locals, with limited benefits and in many cases negative impact due to weak processes and limited capacity. Second, complementing the focus on demand with an assessment of agro-climatic potential point towards major scope for productivity increase on currently cultivated areas and allows identification of countries where demand for land expansion may concentrate. Finally, comparative analysis of country policies highlights the need for recognition of existing rights, an emphasis on voluntary transfers, transparency, and thorough review of economic, social, and environmental viability as necessary—though by no means sufficient—conditions to reduce the likelihood of negative impacts.

Keywords: Land tenure; farm size; agribusiness; farmland investment

1. Introduction

The 2007–2008 boom in food and commodity prices and the subsequent period of relatively high and volatile prices reminded many import-dependent countries of their vulnerability to food insecurity, and prompted them to seek opportunities to secure food supplies overseas. This led to a ‘rediscovery’ of the agricultural sector by different types of investors and, together with the expectation of demand for land from environmental services under REDD, a wave of interest in land acquisitions in developing countries. The dearth of empirical data about the magnitude of this phenomenon has given rise to widespread speculation with assessments of the phenomenon, often determined by preconceived notions rather than information on what is happening on the ground. This paper, which draws heavily on Deininger *et al.* (2011) has three objectives, namely to (i) provide evidence on overall magnitude and determinants as well as some local impacts of the phenomenon; (ii) lay out an analytical framework for the debate by highlighting trade-offs between productivity increases by existing (smallholder) producers and area expansion; and (iii) based on case studies of the policy, legal, and institutional framework governing land acquisition in 14 countries, identify key elements of policy that are critical in this context.

This work draws heavily on Deininger *et al.* (2011). The views expressed are those of the author and do not necessarily reflect those of the World Bank, its Board of Executive Directors, or the countries they represent.

Although data are spotty, evidence on the aggregate magnitude of the phenomenon points to some key differences to past processes. Land demand, which was propelled to extraordinarily high levels in the wake of the 2007/08 commodity price spike, remained at extraordinarily high levels, contrary to commodity prices. Expressed demand also focused disproportionately on Africa, where two-thirds of such demand is concentrated and where demand in 2009 alone was equivalent to more than 20 years of previous land expansion. Moreover, regression analysis suggests that weak recognition of land rights at the country level was associated with higher levels of demand, even once other factors had been controlled for, a fact that raises significant concern. Comparing this to actual land transfers, data on which are available from a more limited number of countries, illustrates not only that in some countries the areas transferred were indeed large but also that in most cases domestic investors were more important than foreign ones. Finally, aggregate data at the country level and case studies point towards a number of policy challenges, in particular limited recognition of land rights and weak frameworks for consultation, unclear or duplicative institutional responsibilities, neglect of environmental and social issues in project preparation, failure to monitor and enforce agreements, and insufficient attention to checking economic viability often lead to very negative impacts on the ground.

To provide an analytical framework for dealing with this phenomenon, we use information on the natural endowments (soil, climate, slope, elevation, rainfall) to determine, for each plot, the potential production of five major rainfed crops that can be achieved. Overlaying this with information on population density, current land use (e.g. agricultural cultivation, forest, pasture) and protection status, and access to infrastructure, among others, provides a number of interesting conclusions. First, it suggests that in virtually all African countries where demand for land acquisition has recently increased, the level of productivity achieved by existing (smallholder) cultivators is less than 25 percent of potential. Irrespective of whether or not there is scope for land expansion, there is thus immense scope to increase productivity on land that is currently cultivated. Ways to do so would include public or private investment in technology, infrastructure, and access to finance. Second, in many countries, availability of land that could potentially be of interest to investors is much lower than is claimed. It is also highly concentrated in a limited number of countries, suggesting that efforts to deal with this phenomenon would be well-advised to focus on these countries.

Finally, noting that investor interest in land acquisition is unlikely to decrease soon, we draw on case studies to point out five policy areas where attention needs to be focused. A first one is recognition of existing rights. For local people to benefit from investments, but also for investors to enjoy a level of tenure security that encourages them to make the needed long-term investments, rights to land and associated natural resources need to be recognized, clearly defined on the ground, and enforceable at low cost. This includes both ownership and user rights to lands that are managed in common areas, state lands, and protected areas. A second issue is that any land transfers need to be voluntary. They will need to be based on users' free, prior, and informed consent, provide them with a fair level of proceeds, and not involve expropriation for private purposes. A third area relates to technical and economic viability. For investments to provide local benefits, ways to ensure technical and economic viability need to be in place, consistency with local land use plans and taxation regimes be ensured, and effective ways to transfer

assets of nonperforming projects be available. Also, the processes adopted need to be open, impartial, and fully transparent. This implies that information on prices, contracts, rights, and ideally land use plans should be publicly available, with parties fully aware of and able to enforce any agreements they entered and with public agencies performing their functions effectively. Finally, environmental and social sustainability need to be accorded their proper weight. To prevent investments from generating negative externalities, areas not suitable for agricultural expansion need to be protected from encroachment, environmental policies clearly defined and adhered to, and social safeguards (including provisions on gender and worker welfare) defined and implemented. Publicizing projects in which these principles have been translated into practice (or cases where they have been neglected) and drawing lessons from these is likely to provide a constructive way of helping those faced with demand for land acquisition to take charge of the situation.

2. Putting recent land acquisitions in perspective

2.1. Global and regional experience

Historically, the key problem with establishing large farms has been securing access to labor. The coercive practices that were adopted by large land owners virtually everywhere, and their negative impact on welfare of local populations, social peace, and long-term development, have been well documented (Binswanger *et al.* 1995a) and need not be repeated here. Still, to identify key features of recent processes of land acquisition, it is of interest to put these into context and provide some of the justification.

FAO estimates suggest that, of the world's total land surface of some 13 billion ha, about three billion ha is suitable for crop production (Bruinsma 2009). Roughly half of this is currently cultivated, while most of the remaining 1.5 billion ha of potentially suitable land is covered by either forest or grassland. Large-scale land expansion is not a new phenomenon. During 1990–2007, arable land expanded by 1.8 million ha per year, with declines in industrial and transition countries (–2.0 and –1.2 million ha, respectively) more than outweighed by large increases of 5.0 million hectares per year in developing countries (Table 1). Geographically, cropland expansion, which would have been much larger without productivity increases, was concentrated in Sub-Saharan Africa, East Asia, Latin America, and Southeast Asia.

Predictions suggest that expansion of cultivated area is unlikely to slow. Population growth, rising incomes, and urbanization will continue to drive demand for food products, especially oils and livestock, derived demands for feed and industrial products, and biofuel mandates (Hertel *et al.* 2010). While estimates of future land expansion range between some two million (Bruinsma 2009) and 10–12 million (Eickhout *et al.* 2009) per year, a conservative estimate is that, in developing countries, six million ha of additional land will be brought into production each year to 2030. If not guided by policies, this can cause significant social and environmental problems (Fargione *et al.* 2008).

Increases in harvested area during the 1990 to 2007 period were concentrated in a few commodities. With an increase in area of more than 50 million ha, soybean, rapeseed, sunflower, and oil palm accounted for over half of the total change in harvested area during the period. Demand for oil crops grew as a result of higher consumption of cooking oil in developing country markets of Asia, greater use of

Table 1. Historical land expansion and recent land demand.

Region	Cultivated land area (millions of ha)			Annual change (%)		Land demand 2009	
	1961	1997	2007	1961–1997	1997–2007	Mn ha	year eq.
Sub-Saharan Africa	134.6	192.2	218.5	1.60	2.63	39.7	21.8
Latin America	102.6	160.9	168.0	1.62	0.71	3.2	2.2
East Asia & Pacific	183.9	235.7	262.8	1.44	2.72	8.0	4.6
South Asia	197.9	212.9	213.5	0.41	0.06	0.7	2.1
Oceania	34.0	42.8	46.7	0.25	0.38	0.0	0.2
Middle-East & North Africa	77.9	91.3	89.0	0.37	−0.23	1.4	5.9
Eastern Europe & C. Asia	291.5	263.6	241.7	−0.77	−2.19	4.6	
Western Europe	99.4	86.8	83.5	−0.35	−0.32	–	
North America	235.3	232.5	225.3	−0.08	−0.72	0.2	
World total	1357.1	1518.6	1549.0	4.49	3.04	57.8	13.9

Source: Own computation based on FAOSTAT and GRAIN.

Note: Cultivated area is land under arable or permanent crops. Land demand 2009 refers to intended or actual land acquisitions based on media reports. The last column ('year eq.') identifies this demand in terms of the number of years using average annual expansion in the 1961–2007 period.

soybeans as feed, and use of vegetable oil to produce biodiesel in the EU. More than two-thirds of the increase in soybean area was in Argentina and Brazil, while oil palm expansion was concentrated in Southeast Asia. In addition to population and income growth and biofuel mandates, greater trade and productivity improvements caused shifts in production of some crops to developing countries with high productive potential. For example, since 1990, soybean yields in Latin America increased at twice the US rate thereby increasing per ha returns further fueling land expansion.

In Latin America, different processes of land expansion can be distinguished. The best known is forest clearing for extensive livestock ranching and establishing land rights in the Amazon basin. Expansion has been rapid in the Amazon where the cattle population more than doubled from 1990 to 2006 and pasture area expanded by 24 million ha (Pacheco and Pocard Chapuis 2009). Net impacts were often negative as most of the land deforested was not put to productive use. A second process was the expansion of soybeans and other crops in the *cerrado* (savannah) region of Brazil, based on public investment in research and development (R&D) that allowed cultivation of acid soils previously unsuitable for agriculture, use of appropriate varieties, and adoption of conservation tillage. Although a major technological success, direct impacts on rural poverty were less than possible because capital subsidies encouraged highly mechanized cultivation (Rezende 2005, World Bank 2009a). Public and private sector players in Brazil and neighboring countries now recognize that agricultural investment and expansion pose social and environmental challenges, and that action will be needed to reduce detrimental impacts. These include rehabilitation of degraded lands, stricter enforcement and monitoring of 'legal reserves' (mandates for keeping forested areas on agricultural properties), better delineation of protected areas, and environmental zoning. In Peru's Pacific Coast, auctions of some 235,500 ha of public land brought in almost \$50 million in investment over the past 15 years, generating large numbers of jobs,

underpinning the country's emergence as a major high-value agro-exporter (Hernandez 2010).¹

In Southeast Asia, area expansion has been pronounced for oil palm, generally under large estates, often with smallholders attached to them in Indonesia and Malaysia. In Indonesia, planted area more than doubled from about 2.9 million ha in 1997 to 6.3 million ha in 2007, with significant smallholder participation and creation of an estimated 1.7 to three million jobs. However, more than half of the expansion was at the expense of natural forests (Koh and Wilcove 2008). Policies aiming to foster development of the industry by giving away land and trees on it for free led to deforestation of large areas with high biodiversity value, without necessarily undertaking the necessary investment to enable future oil palm production. Concerns abound about oil palm expansion as a major contributor to loss of biodiversity, greenhouse gas emissions, and social conflict, due to a failure to recognize local land rights and enforce concession obligations (World Bank 2009b). With expected further increases in palm oil demand, directing plantation expansion from standing forest towards degraded grassland areas will be important. Estimates suggest that the area under these degraded areas equals at least double the need to satisfy increased demand over the next decade. Economically viable options to use these can be made more attractive by using payments under REDD, the UN Program on Reducing Emissions from Deforestation and Forest Degradation (Fairhurst and McLaughlin 2009). Applying these mechanisms successfully, however, requires that the rights of existing occupants on degraded lands be identified and compensated.

Since 1990, rice has made up the largest expansion of cultivated area in Southeast Asia with an additional 10 million ha. Small farmers have been almost entirely responsible for this increase and this has had the additional benefit of reducing poverty. Thailand and Vietnam have clarified property rights and used public investment to provide smallholders with access to technology. The small and medium farmer-driven expansion of rice exports—and subsequently exports of other commodities with higher value added—in these countries indicates that these policies had a major impact on poverty reduction and gradual increases of farm size as non-agricultural growth accelerated as well (Do and Iyer 2008, Ekasingh *et al.* 2007). It also illustrates that increases in production are by no means contingent on large-scale land acquisition. In fact, in the rubber sector, production has shifted largely from large plantations to smallholders (Hayami 2010).

In most of Africa, area expansion has been based on smallholder agriculture in the context of population growth. While African countries vary from very land scarce (e.g. Rwanda and Malawi) to relatively land abundant (e.g. Tanzania, Zambia, and Democratic Republic of Congo), large-scale investment has been limited throughout. Policy distortions against agriculture, especially exports and low public investment in rural areas, reduced investment incentives, and the realization of Africa's agricultural potential, has contributed to disappointing performance of many ventures.² Elimination of many of these interventions over the past two

¹Peru uses very transparent and competitive processes for divestiture of state lands for agricultural use along the Pacific Coast. In the Amazon, processes for land transfer are less open and have many loopholes.

²The example of semi-mechanized sorghum and sesame production in Sudan illustrates the risks of investing in large-scale farming in Africa and holds lessons for more recent investments in the region, e.g. in Ethiopia. The scheme, which dates from colonial times,

decades has allowed agricultural growth to accelerate, and paved the way for renewed investor interest in the continent. Still, attempts to jumpstart agricultural growth via large-scale farming faces many challenges, and awareness of the lessons from past investment booms will be important.

Structural issues arising from long-standing neglect of technology, infrastructure, and institutions were a key contributor to disappointing performance of commercial cultivation of bulk commodities, where Africa can have a comparative advantage. In some cases neglect of existing land rights prompted conflict and further undermined investment incentives. Past success with export agriculture was thus limited to higher-value crops such as cotton, cocoa, coffee, and more recently horticulture (World Bank 2009a). These gaps also affect smallholder performance. In fact, none of the Sub-Saharan African countries that attracted investor interest recently achieved more than 25 percent of potential yields, and area cultivated per rural inhabitant remains below one ha. If technology, infrastructure, and institutions can be improved, higher global demand for agricultural commodities can bring large benefits to existing producers and countries. The challenge for the public and private sectors is to identify ways to address these challenges effectively in a way that provides local benefits.

Eastern Europe and Central Asia represents a unique situation, where investments in very large farms contrast with an overall contraction of agricultural land use. In Russia, Ukraine, and Kazakhstan, area sown to grains has declined by 30 million ha since the end of the Soviet era. These croplands were mostly returned to pastures or fallow, due to lack of suitable technology and market access. Large farms were better able to deal with financing, infrastructure, and technology constraints, leading to the emergence of huge farms as illustrated by the fact that the 70 largest producers in Russia and Ukraine control more than 10 million ha. They increased grain production in Russia, Ukraine, and Kazakhstan, the region's three most land-abundant countries, but large scope to improve technology remains (Lissitsa 2010).

In view of large differences of labor intensity across crops, the social and equity implications of cropland expansion will depend on the crop grown and the way production is organized. Except for plantation crops, agricultural production across the globe has historically been managed by owner-operated farms, with increases in farm sizes largely driven by rising nonagricultural wages (Eastwood *et al.* 2010, Gardner 2002). Recent technology developments such as zero tillage, pest resistant varieties, and information technology that make it easier to manage large farms, have been widely adopted in Latin America (Regunaga 2010). But very large operations emerged only where vertical integration of operations well beyond the production stage allowed to better deal with obstacles created by other factor markets imperfections, especially marketing and access to finance. Thus, while increases in farm size can have advantages (Collier and Dercon 2009), especially in

expanded rapidly in the 1970s, when financing from the Gulf States aimed to transform Sudan into a regional breadbasket through favorable access to land and subsidized credit for machinery. The scheme attracted civil servants and businessmen, who mostly hired managers on farms of 1,000 ha or larger. Official statistics indicate that some 5.5 million ha were converted to arable land under the scheme, with up to 11 million ha occupied informally (Government of Sudan 2009). Land rights of traditional small-scale farmers and pastoralists were neglected, and encroachment by mechanized farms is identified as a serious contributor to conflict (Johnson 2003, Pantuliano 2007).

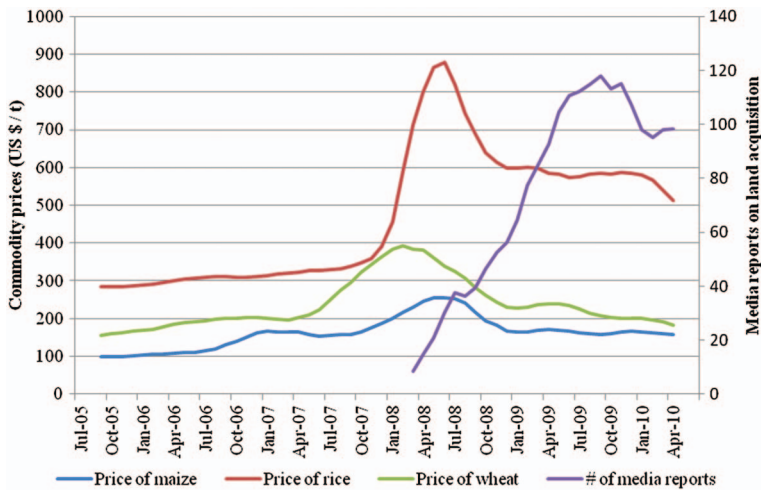


Figure 1. Evolution of commodity prices and media reports on foreign land acquisition.

Africa, this does not require industrial models of farming. To the contrary, owner-operated farms, linked to processors and exporters via contracts or other forms of productive partnerships (including producer organizations), will therefore continue to be a key pillar of rural development.

2.2. *Is the recent land rush different?*

There is considerable debate about potential significant shifts in future demand and supply of land (Hertel 2010). To gain a first appreciation of recent demand for large-scale land acquisition, we draw on the blog by the NGO GRAIN.³ Although it refers to intentions rather than actual land transfers, it can document changes over time and is the only source with global coverage that also allows identifying investor countries. Comparing five-year averages for prices of rice, wheat, and maize to the number of media reports of land acquisitions illustrates that, contrary to the decline in commodity prices, interest in land acquisitions increased rapidly in the wake of the 2007–2008 commodity price boom and remained very high thereafter (Figure 1). To allow more detailed analysis, we coded key variables for all blog entries from October 2008 to August 2009 inclusive.

Press reports point to tremendous growth in interest in land acquisitions and a geographical shift towards Africa. In contrast to past trends, almost half of the projects (48 percent) covering some two-thirds of the total area (39.7 million ha) involved are in Sub-Saharan Africa, followed by East and South Asia (8.0 million ha), Europe and Central Asia (4.3 million ha), and Latin America (3.2 million ha). Of the projects with commodity data, 37 percent focus on food crops, 21 percent on industrial or cash crops, and 21 percent on biofuels, with the rest distributed among conservation or game reserves, livestock, and plantation forestry. The scale of

³Elements from these data have been used by a number of research institutions (Braun and Meinzen-Dick 2009) and interested parties (Uellenberg 2009) to make inferences on the size of the ‘land rush’.

investors' ambition is huge, with a median project size of 40,000 ha and a quarter of all projects involving more than 200,000 ha.

A second finding is that, for most projects, implementation remains limited. Few have acquired land and even fewer use it as intended. In fact, 30 percent were in an exploratory stage; 18 percent had been approved but not started yet; more than 30 percent are at initial development stages; and only 21 percent had initiated farming, often on a scale much smaller than intended. Source countries include China, the Gulf States (Saudi Arabia, United Arab Emirates, Qatar, Kuwait, and Bahrain), North Africa (Libya and Egypt), Russia, and such developed economies as the United Kingdom and the United States. There were marked differences in the share of projects that started activities on the ground with the gap between intent and implementation highest for Libya, India, the Gulf States, and the United Kingdom.

To identify factors that made a country more attractive to investors during the recent increase in land demand, we use some of the above variables to run probit for the likelihood of a country being the target of investor interest. Table 2 points towards a number of interesting results. Investors are more likely to target countries with abundant availability of uncultivated land that is not forested in areas of low population density. Also, in contrast to results on general foreign direct investment, rule of law and a favorable investment climate has only a weak effect on planned, and none on implemented, investment. High levels of unrealized potential do not affect the level of investor interest but make it more difficult to actually implement projects, possibly because of the need for technology and infrastructure that requires public rather than private investment. Finally, the impact of rural land tenure recognition is negative and strongly significant for intentions as well as (at 10 percent) for implemented projects. This finding, which is robust to alternative specifications (e.g. principal component analysis), suggests that, holding other factors constant, not having land rights recognized formally increases the likelihood of a country being subject to land demands by investors.

If countries that fail to formally recognize land rights are more attractive for investors, the social and environmental risks of large-scale land acquisition could be

Table 2. Probability that a country is targeted by investors.

	Dependent variable: probability of attracting:		
	Investor interest		Implemented investment
Nonforest noncultivated suitable land	0.3049**	0.2987**	0.3916***
Forest noncultivated suitable land	0.0503	0.0396	0.0770
Yield gap (in %)	-0.3635	-0.2774	-1.7457**
Rural land tenure recognition ^a	-0.5117***	-0.6906***	-0.3416*
Investment protection rank ^b		-0.0058*	0.0033
Number of countries	104	102	102
Pseudo R-squared	0.311	0.339	0.268

Note: Significant at *** = 1%; ** = 5%; * = 10%. Estimation with robust standard errors. Constant estimated but not shown.

^aVariable B6091 from the 2009 Institutional Profiles Database measuring the share of the population in rural areas whose land rights are recognized. Better recognition implies positive values.

^bDoing Business, 2009 classification of investment protection. The countries protecting investments are attractive if the coefficient is significantly negative.

Source: Arezki *et al.* 2011.

magnified by a lack of proper institutions. Failure to charge prices for land that are close to the social opportunity cost of this asset could easily exacerbate this and result in project choices that do not yield social benefits. Moreover, to the extent that weak recognition of land rights is linked to limited institutional capacity overall, strong civil society monitoring will be needed to prevent abuse and corruption.

Data from secondary sources underlying press reports may be biased or based on unrealistic expectations. We thus complement them with evidence on actual transfers from official registries. Weaknesses in institutional capacity and management of land information in many of the countries concerned made this more difficult than anticipated. Problems include limited screening of proposals, project approvals without due diligence, and in some cases in neglecting of environmental and social regulations in the country's legislation, overlap of responsibilities among institutions, and an air of secrecy surrounding land acquisition. As a result, official records of transfers are often incomplete, making it difficult to put together aggregate statistics that are reliable.

Aggregate inventory data from countries where reliable information could be gathered—often at regional rather than national level—highlight that, even if not all intended purchases result in actual transfers or all transferred land is actually utilized, the amounts of land transferred recently in a few African countries is several times larger than the size of land expansion in the past. Total transfers in 2004–2009 amounted to 4.0 million ha in Sudan, 2.7 million in Mozambique, 1.2 million in Ethiopia, and 1.6 million in Liberia, where it involved mainly renegotiation of existing agreements (Table 3). Virtually everywhere, local investors, rather than foreign ones, were dominant players. Moreover, in most cases, expected job creation and net investment were either not recorded consistently or low. Often, land was not fully used, as in Mozambique where a 2009 land audit found that some 50 percent of transferred land was entirely unused (34 percent) or not used in accordance with the anticipated time schedule (15 percent). The amount of land transferred also depended on policy; for example in Tanzania, where land rights are firmly vested with villages, less than 50,000 ha were transferred to investors in the same time period.

Case studies of 19 projects in seven countries support widespread concerns about the risks associated with large-scale investments. These include (i) weak land governance and a failure to recognize, protect, or—if a voluntary transfer can be agreed upon—properly compensate local communities' land rights (Alden-Wily 2010); (ii) lack of country capacity to process and manage large scale investments, including inclusive and participatory consultations that result in clear and enforceable agreements; (iii) investor proposals that were insufficiently elaborated,

Table 3. Extent of large land acquisitions in selected countries, 2004–2009.

Country	Projects	Area (1000 ha)	Median size (ha)	Domestic share area
Cambodia	61	958	8985	70
Ethiopia	406	1190	700	49
Liberia	17	1602	59,374	7
Mozambique	405	2670	2225	53
Nigeria	115	793	1500	97
Sudan	132	3965	7980	78

Source: Country inventories from Deininger *et al.* 2011.

non-viable technically, or inconsistent with local visions and national plans for development, in some cases leading investors to encroach on local lands to make ends meet; and (iv) resource conflict with negative distributional and gender effects (Tamrat 2010, World Bank 2010). Often, progress with implementation was well behind schedule. As a result, local people had often suffered asset losses but received few or none of the promised benefits.

Field visits also confirmed that investments can provide benefits through four channels: (i) social infrastructure, often supported by community development funds using land compensation; (ii) generating employment and jobs; (iii) providing access to markets and technology for local producers; and (iv) higher local or national tax revenue. Economic viability of investment was a necessary condition for positive effects to materialize. If investments generated profits, social impacts depended not only on the magnitude of benefits, but also on the mix of different types of benefits. For example, entrepreneurial and skilled people could gain from jobs created by an investment, while vulnerable groups or women lost access to livelihood resources without being compensated. This illustrates the importance of clearly addressing distributional issues upfront. Moreover, countries—who are ultimately responsible to ensure that resources at their disposal are used in a way that provides broad-based benefits—have a clear framework in place with which to decide whether, in their specific situation, large scale land acquisition has the potential to contribute to broader development objectives.

3. From land demand to productive potential

3.1. Methodology and data sources

The starting point for gauging the potential supply of land for rainfed cultivation is an assessment of potential yields that can be achieved on a given plot or pixel. To do so, we use the global agro-ecological zoning (GAEZ) methodology developed by IIASA (Fischer *et al.* 2002). It predicts potential yield for rainfed cultivation of five key crops, based on simulated plant growth at each stage of the vegetative cycle, based on factors including soil, temperature, precipitation, elevation, and slope, allowing simulations for different climate change scenarios as well.⁴ Applying a price vector then allows the determination of the crop that produces the highest revenue for any cell. Figures 2 and 3 depict results for Africa and Latin America.

For areas that are currently cultivated, the difference between possible output and what is attained taking crop choice as given provides an estimate of the ‘yield gap’. Areas with high potential can be taken to be possible candidates for area expansion if they are not currently cultivated, not designated as a protected area, non-forested, and have low population density so that whatever existing interests are displaced can be compensated. To identify the relevant subsets, we use a number of

⁴To keep things tractable, we use a 5' x 5' resolution that divides the world into 2.2 million grid cells. Computation of output in each grid cell is based on more disaggregated data and the extent of (meaningful) disaggregation possible in the model is limited only by the quality of the underlying data. Cropped area yields are for 2008. Suitable area is not currently used for crop production, could attain at least 60 percent of the potential yield for this crop, is located in an area with population density less than 10 persons/km², and at 2005 prices will not yield higher gross revenues with any other of the five crops considered here (maize, soybean, sugarcane, oil palm, wheat). Close to infrastructure means a travel distance of less than six hours to the next market based on available transportation.

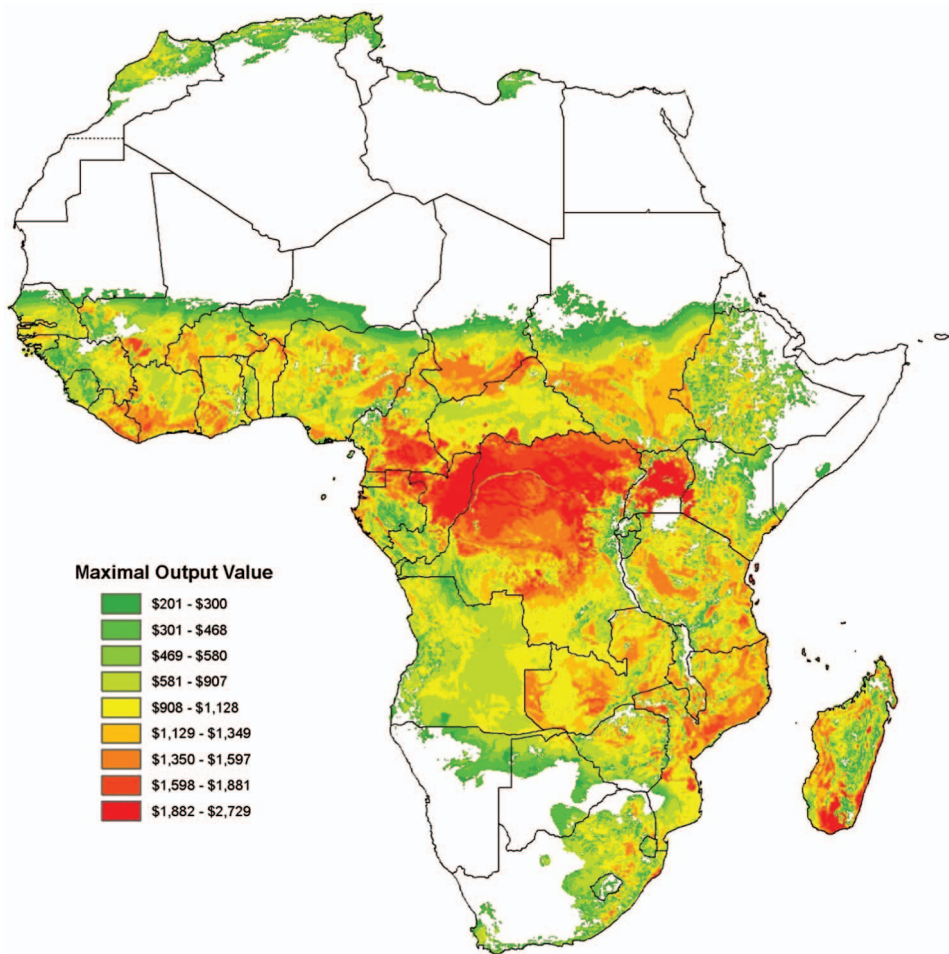


Figure 2. Maximum potential value of output (\$/ha) for Africa.
 Source: Deininger and Byerlee 2001.

datasets including the GLC2000 land cover, the IFPRI Agricultural Extent database and the FAO 2000 Global Forest Resources Assessment to identify land use; the 2009 World Database of Protected Areas to identify protected areas; and LANDSCAN 2003 data on population density to identify areas with less than five, 10, or 25 persons/km², i.e. some 100, 50, or 20 ha per household. Also, as market access will affect transport cost, we classify areas based on whether they are within six hours of an urban center with a population of at least 50,000 based on the World Bank's Global Mobility Database.

Using data on potential to complement the focus on investor demand, which has thus far dominated the debate, with an assessment of potential land supply yields two striking results: First, yield gaps vary widely across regions and are especially large for Africa. In fact, with the exception of South Africa, no country in Sub-Saharan Africa realizes more than 25 percent of potential production. This implies that there is tremendous potential for increasing yields from smallholders by providing access to technology, infrastructure, and markets. If Africa were to attain

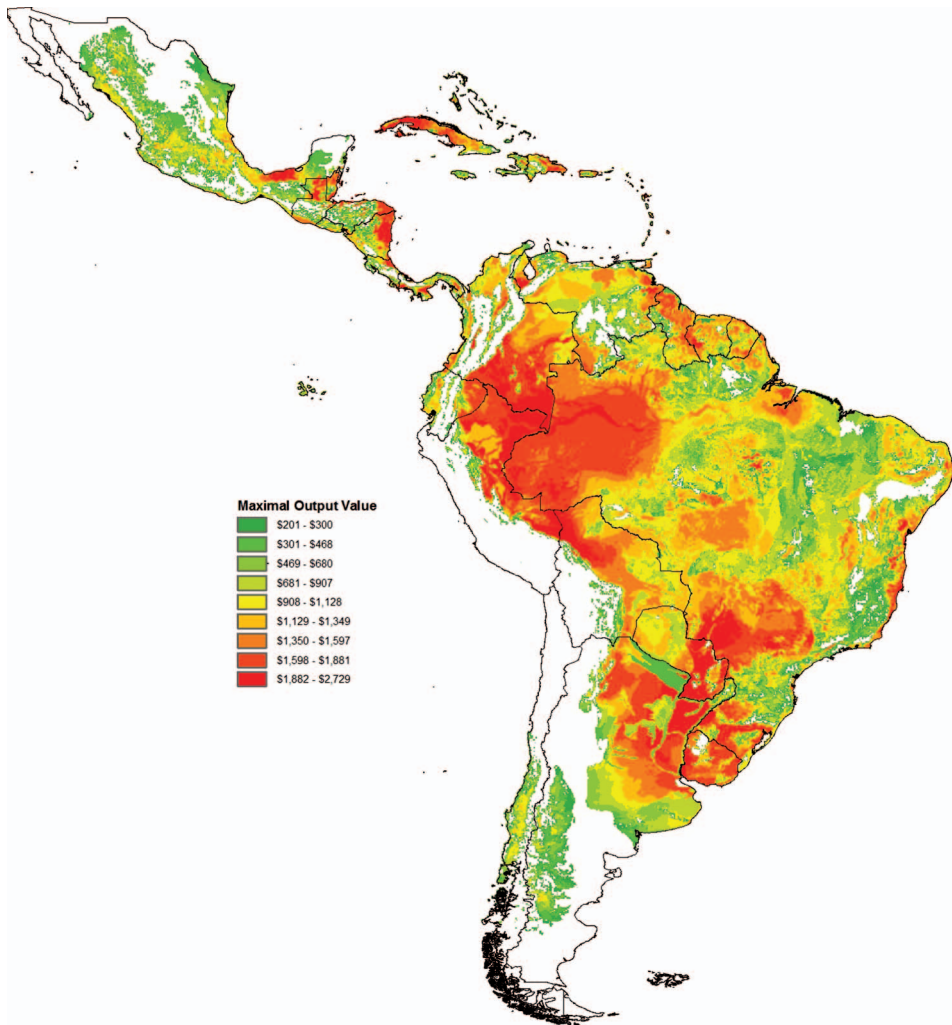


Figure 3. Maximum potential value of output (\$/ha) for Latin America and the Caribbean. *Source:* Deininger and Byerlee 2001.

80 percent of potential yield, a level usually considered economical, it could quadruple its maize output. At current yields, this would be equivalent to an area expansion of 90 million ha, more than the entire area suitable for maize expansion close to infrastructure globally. Policy measures to increase smallholder productivity which are available to all African countries irrespectively of their land endowment could provide significant benefits to local populations and will in most cases involve much lower risks or costs than area expansion.

A second result of interest is that the non-forested, non-cultivated area suitable for rainfed cultivation of at least one of the crops considered here amounts to 446, 306, or 198 million ha for cut-offs of 25, 10, and five persons per km² (Table 4). While this implies that there is enough non-forested land to meet expected demand for area expansion in the foreseeable future, it also suggests the area that could be the subject of demand by investors is large. In all scenarios, non-cultivated area

Table 4. Total, forested, cultivated, and non-forested, non-protected agriculturally suitable area by region and selected countries.

	Total Area	Forest Area	Cultivated Area	Non-cropped, non-protected suitable			
				Forest <25/km ²	Non-forest with pop. density of		
					<25/km ²	<10/km ²	<5/km ²
Sub-Saharan Africa	2,408,224	509,386	210,149	163,377	201,540	127,927	68,118
Angola	124,294	57,941	2930	11,502	9684	6625	4561
Burkina Faso	27,342	2,072	4,817	452	3,713	1,040	256
Cameroon	46,468	23,581	6,832	8,973	4,655	3,205	1,166
Cent. Afr. Rep.	62,021	23,496	1,879	4,358	7,940	6,890	5,573
Chad	127,057	2,280	7,707	680	14,816	10,531	7,061
Congo	34,068	23,132	512	12,351	3,476	3,185	2,661
D.R. Congo	232,810	147,864	14,739	75,760	22,498	14,757	8,412
Ethiopia	112,829	8,039	13,906	534	4,726	1,385	376
Gabon	26,269	21,563	438	6,469	954	927	839
Kenya	58,511	3,284	4,658	655	4,615	2,041	935
Madagascar	58,749	12,657	3,511	2,380	16,244	11,265	6,572
Mali	125,254	3,312	8,338	582	3,908	776	28
Mozambique	78,373	24,447	5,714	8,247	16,256	9,160	4,428
South Africa	121,204	8,840	15,178	918	3,555	1,754	649
Sudan	249,872	9,909	16,311	3,881	46,025	36,400	18,547
Tanzania	93,786	29,388	9,244	4,010	8,659	4,600	1,234
Zambia	75,143	30,708	4,598	13,311	13,020	8,367	3,083
Latin America & Caribbean	2,032,437	933,990	162,289	290,631	123,342	91,576	64,320
Argentina	277,400	33,626	28,154	16,228	29,500	23,835	16,856
Bolivia	108,532	54,325	2,850	21,051	8,317	7,761	6,985
Brazil	847,097	485,406	62,293	130,848	45,472	27,654	15,247
Colombia	113,112	64,543	7,339	31,313	4,971	3,776	2,838
Ecuador	25,152	11,631	3,384	3,663	638	415	313
French Guiana	8,034	7,809	6	3,554	27	27	27
Guyana	20,845	17,737	464	8,501	210	189	156
Mexico	194,218	64,447	25,845	7,206	4,360	2,857	1,719
Paraguay	39,904	19,112	5,419	10,269	7,269	6,035	5,133
Peru	128,972	68,312	3,799	39,951	496	476	438
Suriname	14,460	13,847	86	5,318	6	5	5
Uruguay	17,772	1,323	2,030	731	9,269	8,681	7,340
Venezuela	90,531	48,345	3,912	6,167	8,966	7,725	5,891
Eastern Europe and Central Asia	2,469,520	885,527	251,811	140,026	52,387	29,965	18,210
Belarus	20,784	7,784	6,019	4,853	3,691	868	204
Russian Fed.	1,684,767	807,895	119,985	128,966	38,434	24,923	15,358
Ukraine	59,608	9,265	32,988	2,594	3,442	394	74
East and South Asia	1,932,941	493,762	445,048	46,250	14,341	9,496	5,933
China	935,611	167,202	136,945	10,514	2,176	1,383	843
Indonesia	183,897	95,700	32,920	24,778	10,486	7,291	4,666
Malaysia	32,243	21,171	7,184	4,597	186	119	50
Middle East and North Africa	1,166,118	18,339	74,189	209	3,043	843	236
Rest of World	3,318,962	863,221	358,876	134,700	50,971	45,687	41,102

(continued)

Table 4. (Continued).

	Total Area	Forest Area	Cultivated Area	Non-cropped, non-protected suitable			
				Forest <25/km ²	Non-forest with pop. density of		
					<25/km ²	<10/km ²	<5/km ²
Australia	765,074	88,086	45,688	17,045	26,167	25,894	25,593
Canada	969,331	308,065	50,272	30,100	8,684	8,289	7,598
Papua N.G.	44,926	29,387	636	9,746	3,771	3,193	1,917
United States	930,303	298,723	174,515	74,350	8,756	6,818	5,058
World Total	13,333,053	3,706,457	1,503,354	775,211	445,858	305,711	198,064

Note: 'Suitable' means that at least 60 percent of possible yield can be attained for any of the five rainfed crops considered here (wheat, oil palm, sugarcane, soybean, maize). Countries are included if they have a total of at least three Mn ha of forested or non-forested suitable area for areas with population density <25/km². Suitable ha per cultivated ha area based on non-protected, non-forest suitable area where the population density of the grid cell is <25/km², <10/km², or <5/km².

Source: Deininger and Byerlee 2001.

suitable for rainfed cultivation is highest in Africa (202, 128, and 68 million ha corresponding to 45, 42, and 34 percent of the total, respectively), followed by Latin America. Even within Africa and Latin America, available land is concentrated in a few countries and not always close to infrastructure. Using the 25 persons/km² cutoff, the seven countries with the largest amount of suitable but uncultivated land (Sudan, Brazil, Australia, Russia, Argentina, Mozambique, and Democratic Republic of the Congo, in that order) account for 224 million ha, or more than half of global availability. Thirty-two countries with more than three million ha of land each account for more than 90 percent of available land. Of these, 16 are in Africa, eight in Latin America, three in Eastern Europe and Central Asia, and five in the rest of the world. More strikingly, many of the counties with ample amounts of suitable but uncultivated land have limited amounts of land under cultivation. For example, the area of currently uncultivated land suitable for cultivation is more than double what is currently cultivated in 11 countries and more than triple the currently cultivated area in six countries.⁵

3.2. A country typology based on potential land supply and yield gap

The above evidence suggests that in many countries with uncultivated land suitable for cultivation, constraints related to availability of technology or infrastructure access may prevent realization of the technically feasible level of output. To the extent that these also affect the viability of large-scale investments, the low level of success of such projects could be attributed to other constraints. If true, this could suggest that, unless addressed by public policies—ideally on a more regional basis—such investments may have not achieved their full potential.

⁵Countries where the amount of suitable land is more than double what is currently cultivated include, in descending order, D.R. Congo, PNG, Madagascar, Uruguay, CAR, Angola, Bolivia, Mozambique, Zambia, Sudan, and Venezuela.

To put these two elements together and identify implications for countries' broader development, we classify countries by (relative) availability of land for rainfed cultivation and the share of potential output achieved on areas currently cultivated (the 'yield gap'). Figure 4 illustrates this by plotting relative land availability compared to currently cultivated area (in logs) against the potential for increasing yields, and defining four types of countries depending on whether they are above or below the sample mean/median for these two variables (indicated as a dashed line). Doing so allows us to distinguish four types.

Type 1: Little land for expansion, low yield gap

This group includes Asian countries with high population density, such as China, Vietnam, Malaysia, Korea, and Japan, Western European countries, and some countries in the Middle East with limited land suitable for rainfed production. Agricultural growth has been, and will continue to be, led by highly productive smallholders. To meet expanding demand for horticultural and livestock products, private investors increasingly provide capital, technology, and access to markets through contract farming. As some of these countries reach a declining agricultural population due to rural-urban migration, land consolidation—largely by entrepreneurial farmers leasing or buying plots from neighbors—will gradually increase farm sizes. Well-functioning land markets that allow such processes will thus be of increasing importance. The growing need for land for nonfarm industries, urban

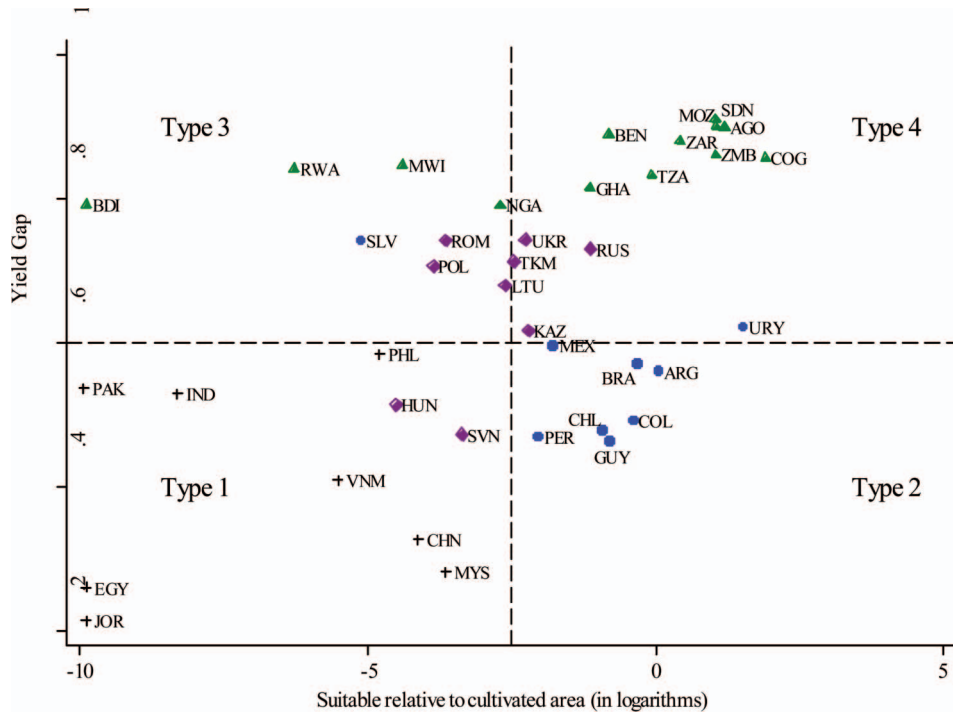


Figure 4. Potential land availability vs. potential for increasing yields.
 Note: Dashed lines indicate average yield gap and fiftieth percentile for relative suitability.

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expansion, and infrastructure also implies a need for good governance of land and related natural resources in facilitating the transition.

Type 2: Suitable land available, low yield gap

This group includes countries where land has reasonably well-defined property rights and where infrastructure access is fairly abundant and technology advanced, mainly in Latin America with countries such as Argentina, Uruguay, and central Brazil as well as a number of countries in Oceania including Australia and Papua New Guinea. It is here where savvy investors have exploited opportunities for cropland expansion. In many of these cases, past investment in technology, infrastructure, institutions, and human capital have helped increase productivity. If property rights are secure, markets function well, and areas with high social or environmental value are protected effectively (possibly using market mechanisms, such as payments for environmental services), the public sector's role is mainly regulatory. The public sector takes care of environmental externalities and allows markets, including those for land, to function smoothly and to encourage expansion into low-grade pastures or degraded forest rather than into areas already occupied or with high biodiversity value. But if land rights are insecure or ill-defined, large-scale land acquisition may threaten forests or lead to conflict with existing land users. Good institutions and land governance will thus be critical to ensure that the technical potential is realized sustainably.

Type 3: Little land available, high yield gap

This group includes the majority of developing countries, including relatively densely populated areas in highland Ethiopia, Kenya, Malawi, the Philippines, Cambodia, Eastern European countries, and Central American countries (such as El Salvador) with limited land availability, as well as North African and Middle Eastern countries, where water availability constrains the expansion of agricultural production. Although there is little land available, large numbers of smallholders may be locked into poverty because the area currently cultivated remains far below the yield potential. Strategic options depend on the size and evolution of the nonagricultural sector. If it is small, higher agricultural productivity will be the only viable mechanism for rapid poverty reduction. This will require public investment in technology, infrastructure, and market development to raise smallholder productivity, following the example of the green revolution in Asia. If the land sector is well-governed, private investment – largely through contract farming – can promote diversification into high value crops, especially for export markets. There is, however, a danger that insecure property rights will allow large-scale land acquisitions to push people off the land. With limited nonagricultural employment, grave equity effects could result in social tensions.

The situation is different if incomes and employment in the nonagricultural sector grow rapidly, land markets work reasonably well, and population growth is low, as in parts of Eastern Europe where there is scope for faster land consolidation and the associated move to larger operational units. Parties will more likely enter into mutually advantageous contracts if the transaction costs of doing so, particularly those of enforcing agreements, are low. Commodity and market characteristics are also in play: contract farming, where investors provide capital and

technology, is easier for crops where the need for processing limits side-selling and makes enforcement easier, such as oilseeds or sugarcane. If the investment needed is larger—for example, for horticulture, perennials, and oil palm or in cases with high upfront investment in irrigation—ownership of land, or at least long-term contracts, is more likely to be chosen.

Type 4: Suitable land available, high yield gap

This group includes many sparsely populated countries in Sub Saharan Africa—such as the Democratic Republic of the Congo, Mozambique, Sudan, Tanzania, and Zambia—with large tracts of land suitable for rainfed cultivation (in areas of sufficient precipitation) as well as a large number of countries from Eastern Europe and the Central Asia region like Russia and Ukraine. This group includes a large share of African countries whose agricultural sector is dominated by smallholders who only achieve a fraction of potential productivity. In some cases, such as Sudan, these areas are located in areas with political tensions and dispute. Labor supply often constrains expansion by smallholders, implying that not all potentially suitable land is used for crop production. The prospect of outside investment can help foster local development. If migration from other regions is inelastic in the medium term, as is often the case, intensification will require larger farm sizes, and labor-saving mechanization may be the most attractive short-term option. In some cases, the investment needed for this transition can be generated locally. However, if it requires the introduction of new crops and farming systems, large investments in processing, or links to export markets, the amounts of skill and capital available locally may not be sufficient, and outside investors can have a role. In these cases, bringing institutional arrangements, technology, and infrastructure together could thus provide a basis for mutually beneficial and agreed on land transfers.

It is this context that defines most of the recent upsurge in investor interest and where there is scope for the private sector to contribute technology, capital, and skills to increase productivity and output in the short to medium term. The most effective way of doing so will depend on local conditions. Capital-intensive activities with low labor absorption, such as annual crops using fully mechanized production, will be appropriate only if population density is low, the likelihood of in-migration is limited, and a vibrant nonagricultural sector can absorb expected future growth of the labor force. Even then, expected changes in the long term, due for example to population growth or climate change, need to be considered as the transition from large-scale mechanized to smallholder farming has not been observed historically. Many countries in this group have weak institutional frameworks for land governance that can create challenges for reigning in opportunistic behavior by elites, e.g. by ensuring proper consultation with local populations.

3.3. Why is agricultural production dominated by family-owned and operated farms?

In most countries, both rich and poor, the average farm size is quite small. The industry is dominated by owner-operated family units that combine ownership of the main means of production with management. The main reason is that, unlike marketing, agricultural production has few technical (dis) economies of scale, implying that a range of production forms can coexist. Only processing and

distribution are characterized by significant economies of scale that have given rise to consolidation and often high levels of industry concentration.

Why does the vast majority of agricultural production originate from small owner-operated farms? The main reason is the spatial dispersion of production, which requires flexibility and an ability to quickly adjust to microvariations in climate or soil conditions. As residual claimants to profit, family workers will be more likely to adjust and work hard than wage workers, who have an incentive to shirk and require costly supervision. Unless they are disadvantaged by policy distortions in favor of large farms (Binswanger *et al.* 1995b), they will produce more efficiently than wage labor-based operations, which need to spend resources supervising workers (Allen and Lueck 1998, Binswanger and Deininger 1997, Lipton 2009).

Three factors are critical determinants of the evolution of the structure of agricultural production over time: access to credit and insurance; lumpy inputs, such as machinery and skills; and the nonagricultural wage rate. Although small agricultural operations have advantages in accessing labor and local knowledge, they in many cases have difficulty acquiring capital. The high transaction costs of providing formal credit in rural markets mean that the unit costs of borrowing and lending decline with loan size and bias lending against small farmers. Unless ways are found to provide small farmers with access to finance (through, for example, credit cooperatives), their inability to obtain financing may outweigh any supervision cost advantages they have. Machinery such as threshers, tractors, and combine harvesters may reach their lowest cost of operation per unit area at a scale larger than the average size of operational holdings. While this could result in economies of scale and increase the optimum operational farm size, machine rental can help small farms use large machinery, circumventing this constraint for all but the most time-bound operations. A second indivisible factor is operators' ability to acquire and process information. This assumes greater importance with more advanced technology, gives skilled managers a competitive edge, and increases the size of the holdings they can manage. It is particularly important for new crops, in which managers skilled in modern methods may enjoy a large advantage that may dissipate with time.

An important exception to the superior performance of owner-operated units of production over those relying on wage labor is in plantation crops, where economies of scale in processing and the need for close coordination with processing make plantations more efficient. The need for quick processing of produce to avoid deterioration, often within 24–48 hours, requires tight adherence to delivery and harvesting schedules. The perishable nature of these crops and the sensitivity of the timing between harvesting and processing transmit economies of scale in processing to the production stage. It usually prompts sugar factories to run their own plantations to ensure at least a base load for processing. In densely populated areas in India and Thailand, for example, mills contract with outgrowers to deliver their cane to the mill and determine which farmers receive technical advice and inputs from the firm.

Why, then, do large farms emerge? One factor relates to rising wages in the nonagricultural sector that will lead farm operators to seek ways to attain incomes comparable to what they can obtain in other sectors of the economy. Normally this implies substitution of capital for labor and an increase of farm sizes over time in line with wage rates. Both variables moved together closely in the United States for most of the twentieth century, suggesting that the desire to obtain a comparable

nonagricultural income was the main factor driving changes in the average size of operational holdings, although even large farms are mostly owner-operated rather than company-owned.

Recent innovations in breeding, zero tillage, and information technology make supervision easier. By facilitating standardization, they allow supervision of operations over large spaces, possibly reducing owner-operator advantages. Pest-resistant and herbicide-tolerant varieties reduce the number of steps in the production process and the labor intensity of cultivation. The scope for substituting information technology and remotely sensed data on field conditions for personal observation to make decisions increases managers' ability to supervise—although it can be equally useful to organize smallholders and provide them access to market information, e.g. through SMS messages. Importing countries' increasingly stringent requirements on product quality and food safety throughout the supply chain increase the advantages of large-scale production and fully integrated supply chains. Establishing such supply chains can be more difficult with smallholder production.

Especially if other markets do not function well, the superior ability of large companies to overcome market imperfections further up in the supply chain can provide them with a competitive advantage in production. This can happen in three ways. First, large firms may be able to access global financial markets where funds can often be obtained at much lower cost than in domestic ones. Also, as markets for agricultural input and output often are highly concentrated, large operators are reported to be able to reduce cost on either side of the market by 10–20 percent. Second, diversification across space can allow large companies to self-insure, thereby generating opportunities to overcome the difficulties for establishing crop insurance created by covariance of risks. This ability could allow large companies to expand strategically by acquiring assets at relatively low prices in periods of climatic or other distress. Third, large firms can substitute for gaps in public services (in transport and logistics or in applied R&D, for example). In Brazil or Ukraine, large companies constructed their own port terminals for export to shield them from public facilities' limitations. High fixed cost and significantly reduced public funding of R&D have prompted (proprietary) research by private firms in a number of crops.

This implies that in sparsely populated countries, with large amounts of land that is currently not cultivated and that can be obtained from local people based on their free prior and informed consent, large scale investors may be part of the policy mix. However, many of these investments fail and policies need to be in a place that allow the transfer of their productive assets (including land) to more productive uses to prevent speculation. There are many examples, from rubber in East Asia to Australia and the US Midwest where mega-farms were eventually replaced by much smaller owner-operated units of production.

Where smallholders already cultivate land, large investments do not have to result in the conversion of small-scale agriculture to large-scale agriculture. To the contrary, institutional arrangements such as land rental and contract farming can help combine investors' assets (capital, technology, markets) with those of local communities and smallholders (land, labor, and local knowledge). As long as property rights to land and, where necessary, water, are well-defined (not necessarily on an individualized basis) and a proper regulatory framework to prevent externalities is in place, productivity- and welfare-enhancing transactions can occur without the need for active intervention by the state. The desirability and the outcomes of partnerships or contracting depend on the institutional context. Parties

will be more likely to voluntarily enter (advantageous) contractual relationships if the cost of doing so, particularly that of enforcing agreements, is low. Arrangements will depend on commodity and market characteristics. Contract farming, with investors providing capital and technology, is expected for crops such as oilseeds or sugarcane where the need for processing makes side-selling difficult. It can also provide opportunities for landless people and women by increasing labor demand. When the share of investment is larger—for example, for horticulture, perennials, and oil palm or in cases with high upfront investment in irrigation—land ownership will be more important.

If rights are well defined, if land markets are not monopolized, and if information is accessible to all, voluntary transactions where land is valued at market prices should ensure that a mutually satisfying outcome is achieved. In this context, entrepreneurs can earn rents by bringing technology to improve productivity on land that is currently used less intensively (and thus available at fairly low prices). Land rights holders can in theory capture some of this rent through well-informed negotiations. With decentralized contracting, market imperfections due, for example, to limited access to markets, or lack of access to technology that affect potential returns from landowners' self-cultivation, will weaken the bargaining position of small producers and the returns they can obtain from their land. The potential impact of such imperfections is illustrated in Ukraine, where high transaction costs in input and output markets and lack of competition in land markets reduce land rents to only a fraction of what is obtained in Argentina, even though the productive capacity of the land is very similar. This implies that there is an important role for the public sector to ensure access to information and a level playing field for all. The public sector needs to be involved only to ensure that no negative external effects on others or the environment are imposed so that land users can make informed and independent decisions.

4. Key policy principles

4.1. Respect for existing rights to land and other resources

Clearly defined rights to land and associated natural resources are important for a variety of reasons. First, investments seldom occur on a blank slate. In almost all cases, land and associated natural resources targeted for investment are subject to existing and often overlapping rights held by communities, individuals, the state, or some combination of the three. Understanding and respecting these rights is important if investments are to be socially legitimate and legally secure. Failure to do so can lead to conflict and strife that will negatively affect the economic viability of land-related investments.

Failure to map and record land rights, even if only at the community level, makes it difficult to identify boundaries and legitimate owners as a basis for engaging in mutually agreed-to land transfers. Recording rights provides outside investors with somebody to talk to, a legitimate and authorized partner to negotiate the nature of investments and compensation. A formal record is also very much in investors' interest as it reduces the scope for fraudulent transactions and the need for costly inquiry to prevent the surfacing of possible undisclosed prior claims or overriding interests (e.g. land use restrictions).

Historically, many countries have considered land and associated natural resources not formally registered as property of the state, which governments could

dispose of at will, often without considering the actual status of occupation. The tendency to neglect existing rights often derives from a legal framework inherited from colonial days—reinforced post-independence—that presumes any unclaimed or unregistered land to be ‘empty’ and thus available for transfer with few safeguards. This bias can take many forms, including the recognition of rights only to land currently cultivated (i.e. excluding fallow land) or stipulations preventing registration of common property (Alden Wily 2010). In Zambia, for example, customary rights of land and natural resources can be neither registered nor surveyed, and the law allows for registration only of individual rights. Thus, although most of the country’s land is managed according to customary rules, the associated rights are impossible to register formally.

The pros and cons of registering land rights if customary systems still function relatively well have long been debated. Titling and registration programs have tended to focus on defining and registering individual parcels and, not least because of their high cost, were often ill-equipped to capture the full range of rights land users may have by custom, including secondary rights and group rights to use common pool resources (Deininger 2003). If done poorly, formalization of land rights can indeed provide an opportunity for sophisticated and well-connected elites to grab land from those less well-equipped to navigate this process by asserting private control over forests and pastures, which by custom were held in common.

Recent years have witnessed the emergence of low-cost and participatory tools that allow the tailoring of registration to more faithfully reflect local perceptions of existing rights rather than impose outside conceptions of property rights. The purpose of doing so would not be the much-vaunted ability to use land as a collateral to access credit—a possibility that will be beyond the reach of most rural areas in Africa for a long time. Rather, registration can be used to document and secure existing rights, often only by defining community boundaries rather than individual plots, and establish an accountable and representative structure for administering them locally. As land becomes more valuable, the need for such tools will increase.

To obtain the full benefits from one-time adjudication of rights through low-cost mechanisms, it will be important to ensure that it is possible to register group rights in a way that allows for community management of basic land administration processes (such as allocation of individual rights, updating of registries, and other internal affairs, according to given bylaws); boundaries are recorded and a clear internal governance structure (with internal control structures) is established to allow interaction with outsiders; records are integrated with those used in the regular land administration system to prevent double-allocation of land, to allow land users to enter into joint ventures with investors, or to allow groups to gradually individualize land rights if desired; and relevant secondary rights, including use rights to land and associated natural resources, such as those held by pastoralists, migrants, and forest dwellers, are recorded and protected, rather than eliminated or ignored, e.g. by documenting them in land use plans that identify cattle tracks, seasonal grazing areas, and watering sources.

Even if local rights are recognized and boundaries demarcated, local elites may try to capture the benefits from expected land appreciation and in some cases may even use efforts at land to strengthen their claims. To prevent this, structures are needed to make decisions about such rights in a way that is understood locally and represents the interests of all rights holders. Two options for doing so are through (elected) local governments in a broader context of decentralization, or through

decision-making bodies that are specific to land, as for Mexican *ejidos* (Deininger *et al.* 2011).

4.2. *Voluntary and welfare-enhancing nature of land transfers*

Although involuntary means, in particular expropriation, are widely used to transfer land to investors, doing so suffers from three weaknesses, namely (i) it is inappropriate conceptually and, by eliminating joint ventures from consideration outright, it unduly narrows the range of options for negotiation; (ii) in many of the countries of concern, regulations for implementing expropriation suffer from deficiencies (e.g. lack of consultation or mechanisms for appeal); and (iii) it implies a high level of centralization that is likely to divert attention from the technical determinants of viability, encourage rent-seeking and political meddling, and create a temptation to impose below market values on communities without a clear justification or tangible benefits.

In some countries, including China, Ethiopia, Sudan, Tanzania, and Zambia, governments do not allow direct transactions between local people and investors without first having expropriated (or, if land is implicitly or explicitly considered state property, 'taken back') the land. In each case, better and less draconian ways to achieve the objective exist. The case of Peru illustrates that acquiring the land needed for a vibrant agricultural industry is not contingent on expropriation and may be easier without it. In this case, constitutional rules tightly circumscribe when expropriation can be used to prevent abuse of power by the state. Expropriations are void unless the state is the direct beneficiary. Public scrutiny and debate of individual expropriations is ensured by the requirement that every expropriation be authorized by the legislature in a law spelling out the future use of expropriated land. To ensure impartial and realistic valuation, property values have to be determined in a court proceeding. Expropriated owners can demand cash payment of the land's market value plus remedies for any damages. There are also clear time limits; congressional expropriation orders automatically lapse after six months if the judiciary process has not started; and after 24 months if court proceedings are not concluded by then. Moreover if within one year of the conclusion of the court process the expropriated property is not used for its planned purpose, it automatically reverts to the original owner. These strict limits have not inhibited agricultural growth—quite to the contrary. Peru's agro-exports have been expanding by about 8 percent a year, making it one of the largest exporters of agricultural produce in the world. More than 70 percent of the land used by the sector has been acquired through auction rather than expropriation, in many cases by investors with little experience in agriculture (Hernandez 2010).

Consultation of affected populations is often required by law, especially if property rights are informal. However, laws are often insufficient for ensuring that consultation is meaningful and results in agreements that can be enforced. Even if consultations are mandatory, their usefulness may be limited by a lack of clarity about who must participate, what information needs to be made available beforehand, and whether the output of such meetings is formally recognized or enforceable. To be effective, consultations must be undertaken before approval, with clear rules on who has to attend, what type of information has to be available in advance, and how outcomes are to be recorded and enforced. To improve the chances of a meaningful process and resultant benefit sharing, local stakeholders need to enter consultations with a clear understanding of their legal rights, the issues at stake, and the rules of engagement.

Low valuation is common in situations where land is either state owned or has to be expropriated before it can be transferred to investors. This is despite the fact that the way in which loss of land, whether voluntary or involuntary, is compensated is critical for livelihood outcomes and the asset position of those affected. If they depend on land access for their income, compensation in land rather than cash to allow displaced owners to maintain their livelihoods at a comparable level is desirable. Compensation should, at a minimum, cover the loss of land, buildings, and other improvements, as well as the disturbance or loss to livelihoods. It should include not only owners but also those with secondary rights to these resources. Although this notion of compensation is often accepted in principle, implementation may not take these considerations into account. Compensation should ensure that those whose rights are affected benefit from the transaction or are at the very least not disadvantaged by it. This requires either a comprehensive valuation of affected people's current livelihoods/income streams or a voluntary decision (and market transaction) based on adequate information and their agreement to exchange their land in ways that protect their livelihoods and food security. Undervaluation of land has not only negative distributional consequences but also encourages projects that would otherwise not be viable, in addition to possibly fostering rent-seeking. As a result, land users may receive less than the benefits they derived from the land earlier, making them objectively worse off.

4.3. *Economic viability and food security*

Economic viability is necessary but by no means sufficient for realizing positive social impacts. Indeed, even if a project is viable, social impacts need not be positive if local land rights or livelihoods are disrupted, net employment generation is low, or if unequal distribution of benefits creates social tensions. At the same time, as it is impossible to find non-viable projects that generated sustainable social benefits, attention to economic viability is critical.

Although the commercial risk associated with success or failure of specific projects is an investor responsibility, an independent and rigorous check on economic feasibility could, in many cases, be appropriate. Why? Because of the high transaction costs involved in negotiating a deal; the irreversibility of many of the actions (for example, clearing natural vegetation); the fact that government often has a direct or indirect interest in the land involved; and the communities' limited capacity to evaluate the technical feasibility of proposed investments.

Recognition of the critical nature of economic viability prompted some governments to aim to evaluate the economic feasibility of investments, partly as an input into land price negotiations. While a positive first step, ensuring its effectiveness will require that reviews focus on substance rather than administrative details, that the implications (rejection or re-submission) are clearly laid out, and responses can be monitored at the proposal and implementation stages.

Which types of cultivation are in line with existing opportunities and needs will depend on a country's endowments with different production factors and the size and speed of expansion by the nonagricultural sector. A strategy for promoting investment in large-scale agriculture based only on ad hoc decisions by often ill-informed investors may not correspond to a host locality's best interest in the long run. It may be advantageous to integrate such investments into a national strategy for agriculture or rural development. Such a strategic approach will be particularly

important because providing complementary public services and infrastructure can significantly increase the benefits and attractiveness of such investment.

Adopting a well-reasoned national strategy for promoting investments also opens up the possibility of addressing food security by setting priorities for the expansion of particular land uses over others. Although many countries emphasize that investments need to be consistent with national objectives, the stated objectives are often not sufficiently operational and lack thresholds for approving or rejecting certain projects. Instead, they are formulated in generic terms ('job creation', 'improved productivity') that make it difficult to determine whether specific projects should be approved or rejected. Earlier discussion suggests that, by designing their overall development strategy in ways that draw in private investment where appropriate and using this to set clear criteria that such investment should meet, governments can use private investors to advance a joint agenda rather than having locations and priorities being determined *ad hoc* without any public input.

Even in countries that lack elected local government structures, the potential outside investment provides an opportunity to put in place structures that can institutionalize participation, and create the preconditions for the emergence of democratic structures by creating revenue at the local level; taxes on land and property are one of the best sources of self-sustaining local revenue. Moreover, the ability to feed them into development planning at the local level is greatly enhanced if documents are public.

4.4. *Impartial mechanisms to implement investments*

Governments can level the playing field and ensure that all parties, including local communities, have access to relevant information. Doing so requires that institutional responsibilities be clear, that administrative requirements be justified and enforceable at reasonable cost, and that reliable information be publicly available. A focus on the speed of completing processes or their cost should not distract from the need to focus on the quality of outcomes.

In many countries, investment applications by foreigners have to go through an investment agency and a sector ministry. Objectives and processes between these institutions are often not fully aligned. Investment agencies try to increase outside investment, while line agencies aim to exercise due diligence in vetting proposals. Although the differing goals can give rise to constructive tension, if coordination remains ill-defined, it can create confusion and red tape that allows investors to play one agency against the other to ensure that proposals are approved, even if they do not fully meet legal requirements or comply with relevant safeguards.

Many of the countries studied consider agricultural investment strategic and thus eligible for certain incentives and benefits in return for the social benefits it presumably provides. A danger in this context is the tendency, observed in several of the case study countries, to try and offload the cost of such subsidies to local land owners by providing land for free to investors without any compensation for the loss of existing rights to local communities. Instead, incentives should be simple, non-distortionary (i.e. available to any investor), applied impartially and in line with prudent financial management, and linked to benefit provision as much as possible.

Some types of incentives may end up attracting speculative investment or undermining governance. This can happen if either of two conditions prevail:

incentives are not given in return for provision of productive infrastructure or other goods that create positive externalities beyond the project area, or incentives are awarded in a discretionary process, with local rights holders rather than the general public bearing the associated cost of using public assets (that is, when land is given away). To benefit from incentives, the investor usually has to show that the project will create jobs, meet minimum levels of investment, and bring new technology. In Ethiopia, incentives for investors are clearly specified, but various privileges are often discretionary and thus may have negative impacts on the incentive scheme. In Africa, another drawback of incentives may be to attract projects that are not economically sound, as many investors engaged in land-extensive projects indicate that subsidies and incentives play a major role in ensuring the viability of their ventures. In addition, because many of these incentives are given up-front (in the form of cheap land, for example) rather than ex-post, there is very limited potential to enforce compliance with eligibility conditions.⁶

Although the reliability and truthfulness of information provided by investors is often open to doubt, few countries have rigorous ways of assessing the aspects most relevant for future performance, especially those related to financial issues. Financial information from investors is often rudimentary, not checked, and not available to other parties or to the public. In Peru, 60 percent of the purchase price plus the value of anticipated investment has to be deposited at the time of making a bid. This simple mechanism seems to have screened out parties who lack the financial capacity for implementation.

Many countries are working to make information on potential land for investors available. But public information is rarely regular or extends to information on key parameters of the investments, land prices paid, and other commitments by the parties. Making this information available publically could reduce mistrust, and gradually eliminate severe informational imperfections. If contractual information and business plans are available to the public, the cost of acquiring information is greatly reduced.

Monitoring is relevant for two reasons. First, it is ineffective to expend large amounts of resources in negotiating agreements without effective mechanisms to ensure that whatever was stipulated will indeed be adhered to. Second, even in the best of circumstances, investments of the type considered here will be risky, and failure of at least a share of them can be expected. In order to not tie up potentially valuable resources, it will be critical to ensure that land assets of non-viable enterprises can be transferred to others who might be able to make effective use of them in an expeditious manner, which does not create incentives for speculation or transfer of risks (and damages) to local communities. Provisions allowing cancellation of concessions that are not performing are required to ensure that such monitoring has real impact.

4.5. *Environmental and social sustainability*

Unless proper regulation is in place, negative social and environmental externalities arising from land transfers that are desirable for individual parties may outweigh or

⁶Indonesia requires that at least 75 percent of an investment be undertaken before any incentives can be claimed, but it provides large implicit subsidies for oil palm development by charging little if anything for forested land intended for oil palm development.

reduce the social benefits from such transactions to the point where they become undesirable. For example, transfers between parties may widen preexisting social inequalities, produce greenhouse gas emissions, or reduce local access to water because of toxic runoffs. In some cases, poor people displaced from their farms migrate to the frontier, where they cut down the forest to cultivate virgin land. Regulation at the national and project level will be needed to align the incentives of private agents with the public interest. Increased awareness of the importance of environmental issues has led to increased emphasis on environmental safeguards in national laws and in voluntary schemes promoted by industry associations (such as the Forest Stewardship Council).

Earlier analysis suggests that there is no need for area expansion into land that is currently being deforested. Still, such expansion continues apace in many countries, largely because the private benefits from such behavior can be high, and existing mechanisms to identify or protect forest areas are ineffective. Having an inventory of economically valuable state-owned land that includes boundary identification and clear assignment of management responsibility is essential for proper asset management and enforcement. The absence of such an inventory provides opportunities for well-connected individuals to establish land rights through informal occupation and squatting, often with negative environmental impacts. In Peru, where community land rights are recognized, a lack of boundary demarcation makes it difficult for communities to exercise their rights and defend them against settlers (*colonos*). These settlers can then illegally log the land and eventually apply to rezone the land, creating a loophole for large-scale agriculture in previously intact forests.

In addition, information on revenues received from public lands—and costs to manage it—should be open to public scrutiny, requiring adequate staff capacity. However, in many countries, inventories of public land either do not exist at all or, if they do, they do not unambiguously identify boundaries of such land. Moreover, responsibility for managing public land is often dispersed among local authorities, sector ministries, and public agencies. The situation is complicated by fact that in many cases categorization of areas as public removes them from community ownership and management.

The general picture emerging from the case studies is a failure to articulate, implement, and enforce environmental regulations. This is possibly caused by stakeholders' desire not to let what is perceived as petty environmental concerns prevent them from capitalizing on what they view as a possibly short-lived bonanza of profitable investments. To avoid a race to the bottom—where eagerness to attract investors leads to neglect of essential regulations—consistently implemented national standards will be important.⁷ This is particularly true regarding the lack of consideration given to indirect effects on the land, and the neglect of risks associated with standard agriculture projects. In many cases, shortcomings in the application of environmental impact assessments (EIAs) or omissions of this requirement prevent effective implementation of environmental regulations and legal frameworks. Such problems are exacerbated if environmental agencies delegate functions to agencies in charge of investment promotion.

In Latin America, some countries established a category of crimes against the environment, prosecuted by a separate entity. Another mechanism for enforcing

⁷Efforts to formulate and implement principles for agricultural investment can be justified by noting that similar arguments apply to competition for investment between countries.

compliance is the prospect of legal action by affected groups, which under some national laws may publicize environmental violations. In Mexico, the environment legislation is the only type of legislation where the law allows a type of class action. This mechanism, which allows injunctions (*recurso de revisión*) to interrupt land use changes by any citizen, provides an incentive for investors to obtain local agreement before submitting the legally required documentation for the environmental impact assessment.

Failure to adhere to social agreements, which can be caused by lack of economic success, can lead to significant negative direct and indirect social impacts. For example, in Liberia, a rice investor initially promised not to cultivate the fertile lowland areas that were crucial for local food production. However, after failing to develop the allocated lands, which were not as fertile, the investor reneged on the agreement and began cultivating the wetlands. This forced 1,000 farmers (30 percent of the local population) to relocate to nearby areas, and put a further 1,500 at risk of being displaced by continuing expansion.

Distributional issues are likely to emerge if there is no correspondence between actual land users (which may involve secondary ones) and the property rights taken into account in investment-related decisions. For example, existing procedures for transferring the land may not take into account the full spectrum of rights (such as temporary rights by pastoralists). Or they may provide compensation to individuals who may not be the actual users of the resources (for example, men rather than women). When property rights are identified, this is less of an issue. But where investors have to make arbitrary judgements about the existence and legitimacy of claims, this can increase transaction costs and moral hazards significantly. A notable phenomenon in some of the case studies was for groups at the margins of affected communities (for example, charcoal producers in Mozambique) to be completely excluded from processes of local consultation—with potentially negative consequences for their livelihoods.

Finally, projects may not be socially sustainable if companies are perceived to treat employees, contract laborers, or contract farmers in ways that are illegal, inequitable, or do not conform to the original understanding of the contract on the part of the community. For example, a rubber plantation in Liberia employed most of its labor on a contract basis ('day labor') with unclear terms and conditions. Considerable resentment was generated because different individuals received different levels and types of payment. By contrast, the formal employees received not only protected benefits but also free access to health and education services. Another issue frequently undermining relationships between communities and investors is the failure to deliver on initial expectations—either for employment or the provision of infrastructure or services. In Mozambique, communities gave up access to common property forest resources in the expectation that jobs and services would materialize—but this has not happened (and some of the 'promises' were of dubious credibility). Clearer frameworks are needed for specifying standards, responsibilities (for communities and investors), and the mechanisms for monitoring and enforcing them.

5. The need for an evidence-based multi-stakeholder approach

The magnitude and often speculative nature of land transactions observed recently has caught many actors by surprise. Demand for land acquisition continues and may

even be increasing. At the same time, scarcity of information on what is happening encourages speculation on a large scale. The review of empirical evidence conducted for this study leads to three main conclusions.

First, the large size of the areas that could potentially be involved (i.e. those that are not currently cultivated but have high agro-ecological potential), the concentration of such land in few countries, and the fact that there appears to be significant interest in countries with weak governance, imply that the risks associated with such investments are immense. Case studies confirm that in many cases public institutions were unable to cope with the surge of demand and quickly screen out nonviable proposals, and that legal provisions were unclear and not well-disseminated or known by right holders. As a result, land acquisition often deprived local people, in particular the vulnerable, of their rights without providing appropriate compensation. In addition, consultations—if conducted at all—were superficial and did not result in written agreements, and environmental and social safeguards were widely neglected. In a number of countries, investors are treated more favorably than local smallholders, for example in terms of tax payments and the ability to obtain land and other resources. Rudimentary project proposals, lack of technical knowhow, and optimistic revenue projections together with highly opaque ways of processing and approving projects, implied that many projects either did not start production at all or operated only on a small fraction of the land they had been allocated. In one country, investors had actually resorted to leasing land back to smallholder farmers. In some cases, investors who were unable to turn a profit due to unrealistic plans then started to encroach on protected areas, or on land that had explicitly been set aside for use by local people, causing environmental damage and threatening local food security.

Second, while it does present challenges, heightened investor interest also provides large opportunities. Some countries have very large areas of land that are currently not cultivated, but suitable for rainfed cultivation of crops with high and growing global demand. In many cases these countries are also home to large numbers of smallholders who eke out a living on tiny plots, unable to access technology or capital, located far from infrastructure, and with yields that are only a small fraction of what is possible. Addressing the underlying constraints in terms of technology, access to capital markets, infrastructure, or institutions, in order to allow increased productivity and effectiveness in the utilization of these assets, could have far-reaching development impacts.

To realize the benefits that could be attained in this way, governments will need to (i) adopt a strategic approach that proactively engages investors based on thorough analysis of existing endowments; (ii) improve land governance and policy to better protect existing rights; and (iii) improve their institutional capacity. Required measures include recognition of local rights to land and associated resources, open and well-documented mechanisms to transfer rights voluntarily instead of having them expropriated by the state, and public institutions with clear mandates and sufficient capacity to prevent negative external effects—whether social or environmental. Although this is a daunting list, a global review of good practices suggests that there are examples to draw from and that the benefits from doing so could be high. More importantly, the high global interest in this issue suggests that country governments willing to embark on this agenda should be able to draw on significant technical and financial support.

Third, while making the necessary institutional arrangements is a responsibility of governments in target countries, a pervasive lack of reliable information on opportunities, actual transfers, and the impact of large-scale investments can lead to negative impacts. Investors unaware of the location of high potential land that current owners might be willing to transfer may spend considerable time and energy searching for land or designing projects that are bound to fail. Communities who have not been educated about their rights to land and associated natural resources, or the potential uses and implied value of these, are more likely to make decisions about the divestiture of land that they may regret and that can lead to conflict. Limited awareness of key economic and technical parameters of relevance for implementing projects will hurt the stakeholders, as it forces them to invest in acquiring knowledge that should be easily available. Finally, weak or nonexistent information on project performance makes it impossible to identify investments that are underperforming and liquidate or transfer them to alternative uses, in order to ensure that environmental and other safeguards are actually adhered to, and to evaluate the effectiveness of policies with a view toward making changes to adapt them to existing needs.

To ensure that information to help make critical decisions and effectively deal with risks is more widely available, concerted multi-stakeholder efforts are needed to improve land governance, define a set of parameters that would be accessible to all interested parties and to provide input into planning, analysis, and policy advice. Exploring the available options and drawing on the lessons from EITI and other initiatives to move rapidly in this direction could help to deal with some of the considerable risks observed. Though greater transparency and standardized disclosure will not be a magic solution, they can foster continued feedback to decision makers in public and private sectors, and also help stakeholders more effectively use the opportunities created by increasing global interest in agricultural land.

References

- Alden-Wily, L. 2010. *Whose land are you giving away, Mr. President?* Washington, DC. Paper presented at the Annual Bank Conference on Land Policy and Administration, 26–27 April, 2010.
- Allen, D. and D. Lueck. 1998. The nature of the farm. *Journal of Law and Economics*, 41(2), 343–386.
- Arezki, R., K. Deininger, and H. Selod. 2010. Interest in large-scale land acquisition for agribusiness investment: Extent and determinants of the global land grab. World Bank Policy Research Working Paper. Washington DC: World Bank.
- Binswanger, H.P. and K. Deininger. 1997. Explaining agricultural and agrarian policies in developing countries. *Journal of Economic Literature*, 35(4), 1958–2005.
- Binswanger, H.P., K. Deininger and G. Feder. 1995a. Power, distortions, revolt and reform in agricultural land relations. *Handbook of development economics*, 3B, 2659–772.
- Binswanger, H.P., K. Deininger and G. Feder. 1995b. Power, distortions, revolt and reform in agricultural land relations. *Handbook of development economics*, 3B, 2659–2772.
- Braun, J.V. and R. Meinzen-Dick. 2009. “Land grabbing” by foreign investors in developing countries: risks and opportunities. IFPRI Policy Brief. Washington, DC: International Food Policy Research Institute.
- Bruinsma, J. 2009. The resource outlook to 2050: by how much do land, water use and crop yields need to increase by 2050? Paper presented at the Expert meeting on how to feed the world in 2050. Rome: Food and Agriculture Organization of the United Nations.
- Collier, P. and S. Dercon. 2009. African agriculture in 50 years: smallholders in a rapidly changing world. Paper presented at the Expert meeting on how to feed the world in 2050. Rome: Food and Agriculture Organization of the United Nations.

- Deininger, K. 2003. *Land policies for growth and poverty reduction. A World Bank policy research report*. Oxford: Oxford University Press.
- Deininger and Byerlee. 2011. *Rising global interest in farmland: can it yield sustainable and equitable benefits?* Washington, DC: World Bank.
- Do, Q.T. and L. Iyer. 2008. Land titling and rural transition in Vietnam. *Economic Development and Cultural Change*, 56(3), 531–579.
- Eastwood, R., M. Lipton and A. Newell. 2010. Farm size. In: P.L. Pingali and R.E. Evenson, eds. *Handbook of agricultural economics*. Amsterdam: Elsevier.
- Eickhout, B., H. van Meijl, A. Tabeau, and E. Stehfest. 2009. The impact of environmental and climate constraints on global food supply. In: T.W. Hertel and S.T.R.J. Rose, eds. *Economic analysis of land use in global climate change policy*. London: Routledge.
- Ekasingh, B., C. Sungkapitux, J. Kitchaicharoen, and P. Suebpongsang. 2007. Competitive commercial agriculture in the Northeast of Thailand. Background paper for the Competitive Commercial Agriculture in Sub-Saharan Africa (CCAA) Study. Washington, DC: World Bank.
- Fairhurst, T. and D. McLaughlin. 2009. *Sustainable oil palm development on degraded land in Kalimantan*. Washington, DC: World Wildlife Fund.
- Fargione, J., J. Hill, D. Tilman, S. Plasky and P. Hawthorne. 2008. Land clearing and the biofuel carbon debt. *Science*, 319(5867), 1235–1238.
- Fischer, G., E. Hiznyik, S. Priler, M. Shana, and H. van Velthuisen. 2002. *Global agro-ecological assessment for agriculture in the 21st century: methodology and results*. Laxenburg and Rome: IIASA and FAO.
- Gardner, B.L. 2002. *US Agriculture in the 20th century: how it flourished and what it cost*. Cambridge, MA: Harvard University Press.
- Government of Sudan 2009. *Study on the sustainable development of semi-mechanized rainfed farming*. Khartoum: Ministry of Agriculture and Forestry.
- Hayami, Y. 2010. Plantation Agriculture. In: P.L. Pingali and R.E. Evenson, eds. *Handbook of agricultural economics*. Amsterdam: Elsevier.
- Hernandez, M. 2010. *Establishing a framework for transferring public land: Peru's experience*. Washington, DC. Paper presented at the Annual Bank Conference on Land Policy and Administration, 26–27 April 2010.
- Hertel, T.W. 2010. The global supply and demand for agricultural land in 2050: a perfect storm in the making? Denver, CO. Presidential address at the AAEA Annual Meeting, 25–27 July 2010.
- Hertel, T.W., W.E. Tyner and D.K. Birur. 2010. The global impacts of biofuel mandates. *Energy Journal*, 31(1), 75–100.
- Johnson, D.H. 2003. *The root causes of Sudan's civil war*. Bloomington, IN: Indiana University Press.
- Koh, L.P. and D.S. Wilcove. 2008. Is oil palm agriculture really destroying tropical biodiversity? *Conservation Letters*, 1(2), 60–64.
- Lipton, M. 2009. *Land reform in developing countries: property rights and property wrongs*. New York: Routledge.
- Lissitsa, A. 2010. The emergence of large scale agricultural production in Ukraine: lessons and perspectives. Paper presented at the Annual Bank Conference on Land Policy and Administration, 26–27 April 2010. Washington, DC.
- Pacheco, P. and R. Pocard Chapuis. 2009. *Cattle ranching development in the Brazilian Amazon: emerging trends from increasing integration with markets*. Bogor, Indonesia: Center for International Forestry Research.
- Pantuliano, S. 2007. *The land question: Sudan's peace nemesis*. Humanitarian Policy Group Working paper. London: Overseas Development Institute.
- Regunaga, M. 2010. The soybean chain in Argentina. Implications of the organization of the commodity production and processing industry case studies. Washington, DC: World Bank, Latin America and the Caribbean Chief Economist Office.
- Rezende, G.C.D. 2005. Políticas trabalhista e fundiaria e seus efeitos adversos sobre o emprego agrícola, a estrutura agrária e o desenvolvimento territorial rural no Brasil. Texto para discussão No 1108. Rio de Janeiro: Instituto de Pesquisa Economica Aplicada (IPEA).

- Tamrat, I. 2010. Governance of large scale agricultural investments in Africa: the case of Ethiopia. Paper presented at the Annual Bank Conference on Land Policy and Administration, 26–27 April 2010. Washington, DC.
- Uellenberg, A. 2009. *Foreign direct investment in land in Madagascar*. Eschborn: GTZ on behalf of the German Federal Ministry for Economic Cooperation and Development.
- World Bank 2009a. *Awakening Africa's sleeping giant: prospects for competitive commercial agriculture in the Guinea Savannah zone and beyond*. Washington, DC: World Bank.
- World Bank 2009b. *Environmental, economic and social impacts of oil palm in indonesia: a synthesis of opportunities and challenges*. Draft Paper. Jakarta: World Bank, Indonesia Country Office.
- World Bank 2010. *Lao PDR: investment and access to land and natural resources: challenges in promoting sustainable development*. Washington, DC: World Bank.

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