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The geographic and sectoral patterns of large-scale farmland investments in sub-Saharan Africa

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ABSTRACT

Following the food and energy price crises of the mid 2000s, sub-Saharan Africa has become one of the largest recipients for large-scale farmland investments. While much has been written on the phenomenon, scant reliable empirical evidence is available as to the precise geographic and sectoral patterns and underlying drivers. Employing strict data quality requirements, this paper addresses these knowledge gaps by analyzing 563 farmland projects that have been established between 2005 and 2013 in sub-Saharan Africa. Findings show that the investment intensity and associated risks are not geographically uniform. Moreover, the study highlights a number of popular misconceptions regarding investor origin and their sectoral interests and motives.

Introduction

The confluence of the commodity crises of the mid 2000s exposed structural long-term global food and energy security issues (Deininger, 2011; McMichael, 2012). In the context of increasingly volatile commodity markets, rapidly growing global populations, changing consumption patterns, finite fossil fuel supplies, and climate change, security of access to natural resources to produce essential reproductive goods is becoming an economic imperative (von Braun and Meinzen-Dick, 2009; Zoomers, 2010; de Schutter, 2011). As the geographies of supply and demand consequently become more distinct, the private sector is repositioning itself to capitalize on the trade opportunities this creates (e.g. by control of upstream value chain activities). As a result, recent years have witnessed an unprecedented surge in demand for large areas of farmland for the production of food crops and biofuel feedstocks – especially in the global South, where fertile farmlands are comparatively cheap and abundant.

Despite consensus that this trend signifies structural changes in the global economy and is, therefore, unlikely to be transient, insufficient empirical evidence is currently available about its precise scope and scale. Nevertheless, the media, academia, and civil society organizations have tended to draw on exaggerated and poorly substantiated area claims to illustrate the severity of the global 'land grab', without questioning the credibility of underlying data. Such claims range from 15 to 20 million ha (von Braun and Meinzen-Dick, 2009) and 56 million ha (World Bank, 2011), to a staggering 203 (Anseeuw et al., 2012a) and 230 million ha (Kugelman, 2013). However, there are a number of problems with these estimates. For example, since they cover different time periods, regions, and sectors, they cannot be properly reconciled and compared (Cotula and Polack, 2012). Moreover, due to the opacity of deals that involve land and lack of reliable and publically accessible information, such reports tend to rely heavily on (what is often alarmist or speculative) media reports or crowd-sourcing, which also introduces a selection bias (Schoneveld, 2011; Cotula, 2012; Oya, 2013). Typically, they also neglect to adequately distinguish between investments that are planned, under negotiation, or are known to have failed. Without proper disaggregation, it is difficult to disentangle good from bad data.

That said, some though have questioned the utility of area-based aggregation analyses altogether. Edelman (2013), for example, considers this "fetishization of the hectares...to lead researchers and activists to ignore other...issues of scale, such as the capital applied to the land, the control of supply chains, and the labour relations" (p. 488). As pointed out by Rural Modernity (2012a) and Scoones et al. (2013), when researchers circulate weak data without proper qualification that contributes to the perpetuation of excessively simplistic, inaccurate, and counter-productive narratives. One such example is the popular, but overstated, perception, as Schoneveld (2011) and Bräutigam (2012) have already shown, of China's supposed ravenous demand for Africa's farmland.

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This article seeks to overcome some of these concerns by producing an analysis based on data that conforms to strict reliability requirements and focusing exclusively on plantation production systems.[1] Rather than generating large aggregation figures, it applies clearly defined data quality categories to generate meaningful and empirically-grounded insights into trends and associated risks and opportunities. The analysis is focused exclusively on sub-Saharan Africa; on the one hand, since early insights suggest it is a key investment beneficiary (World Bank, 2011; Anseeuw et al., 2012a,b), while on the other, since the prevalence of relative insecure customary property regimes and weak governance systems exacerbate the potential adverse effects of large farmland investments, related, for example, to displacement of customary land uses and environmental degradation (Alden Wily, 2011; German et al., 2013; Schoneveld, 2013).

The following section highlights some of the key challenges in quantifying the magnitude of farmland investments in sub-Saharan Africa. Section 'Methodology' proceeds to discuss the methodological approach and Section 'Understanding patterns of investment' presents the study's key findings and identifies the main geographic and sectoral investment patterns. Section 'Understanding potential host country impacts' reflects on the potential impacts of these farmland investments, focusing on land use competition and domestic food and energy security. Finally, the paper concludes with a reflection on findings and implications for governance.

Challenges in quantifying large-scale farmland investments

One of the key challenges in quantifying farmland investments in sub-Saharan Africa is that comprehensive and disaggregated data is not made publically available by most host governments. While the political sensitivity of these investments often restricts the level of public access to this data, in most cases, data is not consolidated and maintained in a central location – implying that the government itself is often unaware of its precise scope and scale. Frequently, the ministries that allocate land titles to investors have highly antiquated, non-computerized land registry systems. In some cases, this is further complicated when land administration functions are decentralized (e.g. in the Democratic Republic of the Congo (DRC), Ghana, and Nigeria), which often implies that centralized records are either nonexistent or incomplete.

As a result of these challenges, as mentioned, most information is obtained from media reports. The data presented by von Braun and Meinzen-Dick (2009), Görgen et al. (2009), Friis and Reenberg (2010), and World Bank (2011), for example, were all based exclusively on media reports – most of which obtained from the GRAIN blog, farmlandgrab.org. However, when scrutinizing blog entries, numerous reports of multi-million hectare mega-deals can be found that never materialized or have turned out to be much smaller in extent than initially claimed – the inclusion of such investments tends to generate heavily skewed results.[2] The Land Matrix, an independent initiative for monitoring land deals that was launched in April, 2012, while drawing on research reports and other more reliable data sources, has struggled with similar issues.[3] Figures of total land deals exceeding 200 million ha that were quoted in Anseeuw et al. (2012a), Oxfam (2012), and Kugelman (2013) originated from the Land Matrix initiative. Although it employed data quality categories, the heavily cited initial version included without any distinctions both verified and unverified deals and even deals that had failed or were still under negotiation or planned.[4] Since early criticisms, the Land Matrix has significantly improved the quality of its dataset; by the time the second version of the Land Matrix was launched in June, 2013, its global estimate of finalized land deals had been revised downwards to 42.3 million ha; 20.2 million ha of which located in Africa. While the current version now does distinguish between the statuses of different deals, it has altogether abandoned its system of reliability codes. Since it now publishes data sources, it was argued that users are better positioned to make their own judgment about data quality (Anseeuw et al., 2013). However, since many data users neglect to be sufficiently critical of the integrity of underlying data, it is questionable whether this decision will contribute to more accurate and responsible reporting.[5]

Another methodological challenge relates to how different sectors should be treated in an aggregated analysis of this sort, particularly when the analysis is based around area figures. For example, commercial pressures on land are also prevalent in the mining, tourism, real estate, infrastructure, and conservation sectors (Zoomers, 2010). Since the underlying drivers and the innate environmental and developmental impacts of land acquisitions are highly specific to different sectors and business models, comparing these on the basis of area figures does not enable us to draw meaningful conclusions.

For example, in cases of land allocated for spatially extensive activities, such as mineral prospecting or industrial logging, the extent of impact on land use and rights of access tends to be more limited than plantation production systems. In industrial logging concessions in Africa, concessionaires typically only have the right to harvest timber (selectively) and are often subject to a harvesting quota (e.g. allowable annual cut). Unlike plantations, where in most cases, though not all, the entire 'bundle of rights' is affected, in logging concessions this is usually limited to timber withdrawal rights (Karsenty, 2011). On the other hand, since the area under commercial logging concessions is manifold larger than that under plantation production systems, their impact, while less intensive, may certainly be more extensive. For example, in Central Africa, 30–40% of remaining forest is under concession, with numerous individual companies holding rights to areas covering several millions of hectares (Karsenty, 2007; Clark et al., 2009). Similarly, land privately acquired for conservation (e.g. for the purpose of ecotourism and carbon finance) is unlikely to entail environmentally detrimental land use changes and is more likely to have had some form of protected status prior to acquisition (Carter et al., 2008), thus reducing, though certainly not eliminating, the risk of conflict with customary land uses and ecosystem services. In the Land Matrix's third largest investment recipient, South Sudan, a 2.28 million ha management contract for an existing national park is equivalent to approximately half the total area 'acquired' in the country, while in its largest and fourth largest investment recipients, Papua New Guinea and the DRC, more than three-quarters of the area acquired constitutes logging concessions (Land Matrix, 2013). Including these investments in the calculus will cause to overstate the magnitude of investment and associated risks and undermines the utility of cross-country comparisons.

[1] Plantations are an economic unit producing agricultural commodities for sale and employing a relatively large number of unskilled laborers whose activities are closely supervised.

[2] These include, for example, 10 million ha by South African farmers organization Agri SA that in reality concerned only 80,000 ha and two Chinese deals – ZTE in DRC and Wuhan Kaidi in Zambia for 2.8 and 2.0 million ha respectively, which turned out to be 100,000 ha and 79,300 ha (Schoneveld, 2011).

[3] The Land Matrix initiative is an investment inventory relying on crowd-sourcing, led by the International Land Coalition (ILC). It included projects that were established after January 1, 2000, and exceed 200 ha in size.

[4] See communications between the ILC and the commentators of the Rural Modernity blog; Rural Modernity (2012b).

[5] A number of authors have nevertheless used such data to draw strong conclusions on trends and outcomes. Notable examples published in prestigious media include Deininger (2011) and Arezki et al. (2011) using the World Bank (2011) dataset and Sassen (2013) and Rulli et al. (2013) using the Land Matrix.

For many other types of investments pertinent to the land grab debate, such as mineral extraction, real estate, industrial development, and much of the tourism sector (with the exception of private conservation areas), the average allocated area of land tends to be a fraction of that for large-scale plantations. However, that does not imply that the impacts of these types of investments are more limited. For example, while the degree of direct land use change and impact on land use rights are generally more limited, indirect impacts may be more profound as a result of high levels of in-migration, economic spill-overs, rapidly rising land values, and pollution. Area data for such sectors is, therefore, unlikely to be a useful indicator of impact, especially when applied for purposes of cross-sectoral comparison or aggregation.

Methodology

Land acquisition analysis

The analysis of the geographic and sectoral patterns of large-scale farmland investments is based on a dataset of projects developed from October 2008 to July 2013. The analysis includes only those projects from the forestry and agricultural sector that are engaged in plantation production models. It excludes agricultural and forestry investments adopting smallholder-oriented business models (e.g. tenant farming or outgrower schemes), industrial logging concessions, and livestock. The projects incorporated into the analysis involve the transfer of use or ownership rights over contiguous areas of land larger than 2000 ha in all countries in sub-Saharan Africa, without discriminating between investor origin, type, and orientation.[6] In the African context, such transfers are realized overwhelmingly through leasehold agreements, with freehold interests in land rarely recognized by law. Only land transfer agreements that were entered into after January 2005 are included. This date was taken as the cut-off date due to significant changes in global market conditions for relevant commodities since that time.[7]

In recognition of the methodological challenges discussed in Section 'Methodology' and the importance of distinguishing between data on the basis of reliability, collected data was divided into three quality categories (see also Table 1). The three categories are as follows:

- *Category 1:* Data in this category represents data with the highest level of accuracy and is derived exclusively from the following data sources:
  - leasehold or land sale contracts;
  - environmental impact assessments and associated documents;
  - government databases and registries, maintained by, for example, land, investment or agricultural ministries;
  - official government communications (e.g. parliamentary meetings, press releases, presentations);
  - official company communications (e.g. annual reports, press releases, corporate presentations);
  - financial databases (e.g. home country corporate registries, Bloomberg, Thomson Reuters);
  - personal communications with key public and private sector actors;
  - in-country research by the Center for International Forestry Research (CIFOR) and its partners and Master's and Ph.D. students conducting research under the Netherlands IS Land Academy (LANDac), hosted by Utrecht University.

Table 1
Distribution of data on farmland investments > 2000 ha by type of data source.

Type of data source	Area acquired (ha)	Number of projects
Company sources	6,258,652	139
Contracts	4,455,446	62
ESIA/PIN documents	1,760,777	43
Field research activities	867,369	19
Government sources	4,936,033	174
Media reports	980,659	34
Other research	3,468,521	103

Data from these sources is only included when the land transfer agreement is legally enforceable and it is explicitly indicated that the agreement has been finalized. This category also includes conditional land lease agreements. This concerns contractualized agreements that land of pre-specified extent is to be allocated once performance requirements are met. Data from other research papers is included only when data is obtained from Category 1 sources, each entry is properly referenced, and there are no reasons to question the research's integrity.

- *Category 2:* Data in this category represents the lowest level of data accuracy that is included in the analysis. It includes secondary data sources that do not explicitly specify data origin, such as some media reports and research publications. Data from these sources is only included when the following three conditions are met: (i) there are no conflicting reports or reasons to doubt data validity, (ii) it is expressly indicated that a land agreement has been finalized, and (iii) supplementary information on investor operations is available in the form of corporate websites, entries into company registries, or the allocation of investment licenses.
- *Category 3:* Data that does not fall into the above two categories is omitted from this analysis. Land agreements that are not legally enforceable (e.g. memoranda of understanding and good-faith agreements), that are in the process of being negotiated, and land areas based on projected expansion plans are, thereby, excluded.

While some projects included in this analysis have had their land titles revoked, bankrupted, or permanently ceased operations, data from these projects has been incorporated. By and large, projects are either acquired by other operators, the land is sub-leased, reallocated by the government for other commercial purposes, or is permanently alienated from the customary domain (e.g. due to reclassification to state land). When land is sub-leased or re-acquired by another operator, entries are not double counted.

Although this study sought to overcome some of the key methodological challenges, it recognizes that limitations remain. For example, it may under-represent domestic projects. These may be less 'publically visible' and less likely to be documented by the public administration, as they are often less closely monitored than foreign investments. Additionally, investments in some countries may not be captured as well as in others due to decentralized

[6] Although this area is admittedly arbitrary, with the concept of 'large-scale' and 'commercial/industrial' used for census purposes differing greatly between countries, the 2000 ha threshold used by Rahmato (2011) and in Ethiopia is here considered as a reasonably accurate representation of large-scale plantation production systems in sub-Saharan Africa. Although 100–2000 ha plantations are still large by African standards and are more likely to capture large numbers of domestic investors, they are difficult to accurately identify. For example, in many countries, only ministers or presidents can approve land deals exceeding a certain area threshold (typically for areas larger than 1000–2000 ha); with smaller deals only requiring district or provincial-level approval. The inclusion of such deals would, therefore, impose numerous methodological challenges.

[7] The food price crisis was generally thought to span the period early 2007 to mid 2008. The oil price crisis was prompted by more gradual inflation starting from early 2005, before climaxing in mid 2008.

information management, controls on public access to information, or weaker regulatory oversight and/or administrative capacity.

Land use competition analysis

Section 'Threat of land use competition' assesses the potential availability of agro-ecologically suitable land in the different countries and contrasts this with the area of land acquired by documented investment projects to determine relative risk of land use conflicts. This was calculated by overlaying land classified as protected, forested, artificial, and under cultivation and land with a population density of more than 20 persons per square kilometer with agro-ecologically suitable land.[8] Agro-ecologically suitable lands were considered those where moderate to very high yields are attainable (Suitability Index > 25) under high inputs and under both rain-fed and irrigated conditions (derived from IIASA (2012)). Forested land involved spatially merging all land with a forest cover of more than 15% and all permanently cultivated and mosaic farmland, permanent pasture, and land fallowed for 5 years or less (both derived from ESA (2011)). Protected areas include all areas, including non-IUCN recognized areas, where plantations are legally restricted (derived from UNEP (2012)). The land use analysis was performed using geographic information systems (GIS).

Understanding patterns of investment

A total of 563 projects larger than 2000 ha were identified across 37 countries in sub-Saharan Africa, covering an area of 22,727,457 ha (Table 2).[9] This is equivalent to 9.60% of the total area harvested in the region in 2012 (calculated from FAO (2013)). 19,275,506 ha fulfill the Category 1 requirements (of which 1,358,800 being conditional) and 3,451,951 ha the Category 2 requirements. The median project size is 12,300 ha and the mean project size 40,368 ha. The largest 10% accounted for 54.4% of the total area acquired, with 53 projects having gained access to areas in excess of 100,000 ha.

Target countries

The total areas of land acquired vary greatly between countries (Fig. 1), indicating that this rush for farmland in the region is not uniform in intensity. For example, the six countries (Ethiopia, Ghana, Madagascar, Mozambique, South Sudan, and Zambia) where more than 1.5 million ha have been acquired constitute 52.8% of the total area acquired, while, collectively, they cover only 17.0% of sub-Saharan Africa's surface area. On the basis of category 1 land acquisitions, excluding conditional allocations, the largest area is acquired in Mozambique. When aggregating all data categories, Ethiopia is the largest recipient, both in terms of area acquired and in number of investments (see Appendix A for a tabulated overview).

Why these countries have become such desirable investment destinations is, however, not immediately self-evident. Employing statistical analyses for this purpose does not yield any conclusive insights (Table 3). For example, while a relationship might be expected between the area of land acquired and the availability of agro-ecologically suitable land, no statistical relationship is discernible. Relatively small countries with a scarcity of suitable land (e.g. Ghana, Sierra Leone, and Liberia) have become key investment recipients, while other countries with abundant reserves of suitable and available land (e.g. Angola and the DRC) have not. Additionally, there is no statistically significant correlation with political stability or public security, as is illustrated by investment flows to countries such as Ethiopia, Madagascar, and Nigeria. Relative ease of doing business is neither an outcome determinant. While some governments, notably in Ethiopia, Liberia, Mali, and Republic of Congo, were able to successfully attract large farmland investors by direct and centralized allocation of land, countries such as Ghana, Madagascar, and Mozambique became major investment destinations despite more convoluted land acquisition procedures.

Table 2
Summary of farmland investments > 2000 ha.

Variable	Area (ha)	Number of projects
Total area acquired	22,727,457	563
Category 1 data (total)	19,275,506	481
Category 1 data (conditional)	1,358,800	11
Category 2	3,451,951	82
Mean	40,368	–
Median	12,300	–

Moreover, country selection could arguably be influenced by domestic market needs and opportunities. However, this does not appear to be an underlying determinant of investment either, as is illustrated by the weak relationship with such indicators as the national agricultural trade balance, vulnerability to oil price shocks, and the Global Hunger Index. Although exploitation of governance deficiencies could generate economic opportunities, no inverse relationship could be observed between investment intensity and, for example, quality of natural resource governance, labor rights, and land tenure security either. This contradicts findings from the World Bank (Arezki et al., 2011; Deininger, 2011) that suggest investors specifically target countries with weak tenure regimes. This is illustrated by the fact that countries that afford some of the most far-reaching protection to customary land rights (e.g. Ghana, Mozambique, Tanzania, and Zambia – see Alden Wily, 2011, 2012a; Amanor, 2012), have nevertheless become major farmland investment destinations.

Clearly, generalisations and statistical tests of this sort do not do justice to the complex interplay of unique factors that shape a country's relative attractiveness as a farmland investment destination. Ultimately, investments are driven by a host of insufficiently quantifiable variables at the level of the individual investors, such as, for example, historical, cultural, and political relations between host and home country, access to local social and business networks, regulatory provisions conducive to particular crops, established domestic markets and infrastructure, market orientation, and agro-ecological conditions – as the following sections will also show.

Target crops and sectors

Analysis of target crops highlights clear biases towards certain types of crops. For example, investments into oilseed cultivation constitute 60.4% of the total area acquired, followed by timber and pulpwood trees (15.0%) and sugar crops (13.2%) (Fig. 2). With investments into food crop cultivation, such as cereals, roots and tubers, and vegetables collectively accounting for 6.7% of the area acquired, albeit with some curious exceptions, many investors appear inclined to focus on the cultivation of traditional export/cash crops and typically within areas where investors can capitalize on established systems of production, markets, appropriately skilled labor, and physical infrastructure.

[8] Population density is used merely as a final control variable – the vast majority of land that is permanently settled is already accounted for by the anthropogenic land use categories (e.g. agricultural land).

[9] For the purpose of this analysis, a legal entity constitutes a project. Therefore, should one company be developing numerous plantations, each with different legal partners, then each plantation is considered a separate project. By this definition, therefore, if the same legal entity, with the same partners, is developing numerous plantations, then these plantations are all considered to be part of a single project.

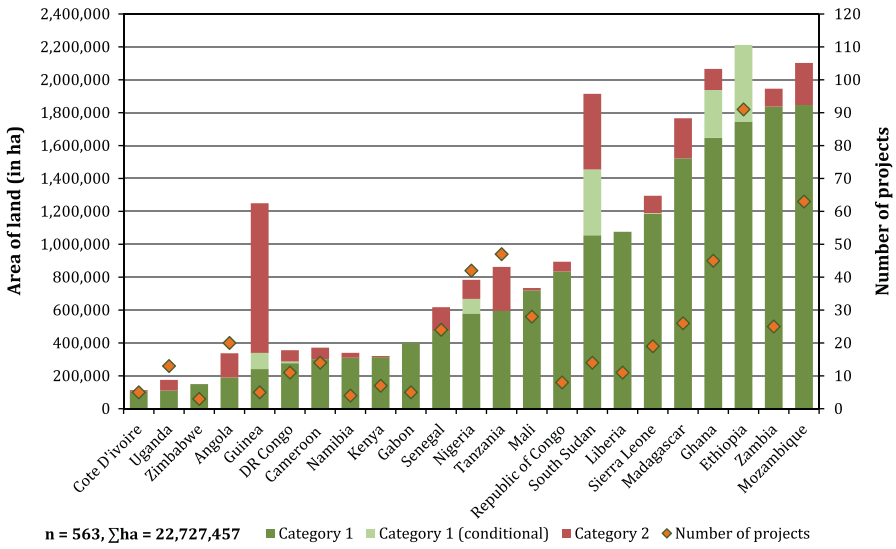

Fig. 1. Major investment destinations > 2000 ha, by total land area acquired.

Table 3
Bivariate correlations for area of land acquired by country.

Explanatory variable	Description	Pearson's correlation coefficient	Significance (2-tailed)
Availability of suitable land	Total area of agro-ecologically suitable land that is potentially available (derived from ESA (2011), IIASA (2012) and UNEP (2012))	0.28	0.313
Ease of Doing Business ranking	The conduciveness of the regulatory environment to business operations (IFC, 2012)	−0.377	0.107
Foreign land ownership	The extent to which non-nationals, in practice, have the right to access land (CEPII, 2009)	0.072	0.726
Global Hunger Index	Prevalence of undernourishment, underweight children, and child mortality (IFPRI, 2012)	0.256	0.216
Land tenure security	Proportion of rural population with no formally registered land rights (CEPII, 2009)	−0.112	0.593
Net agricultural trade	Difference between the value of exports and imports of agricultural commodities (FAO, 2013)	−0.121	0.645
Political stability	Perceived likelihood that government will be overthrown or destabilized (World Bank, 2013a)	0.042	0.842
Public security	Domestic incidence of violent disputes (CEPII, 2009)	0.061	0.766
Quality of natural resource governance	Transparency of management of income orienting from natural resource industries (CEPII, 2009)	0.143	0.573
Respect for laws	Perceived extent to which societal rules are followed and contracts enforced (World Bank, 2013a)	0.113	0.582
Respect for worker rights	Level of observance of labor rights and measures (CEPII, 2009)	0.086	0.678
Vulnerability to oil price shocks	Value of net oil imports relative to GDP (derived from EIA (2012) and World Bank (2013b))	0.191	0.383

This is particularly the case for crops such as oil palm and sugarcane, the second and third largest crop in terms of area acquired (21.8% and 12.9%, respectively).[10] These investments tend to concentrate in regions with long histories in their cultivation. For example, 57 of the 67 documented oil palm investments are located in the coastal areas of West Africa and in Central Africa, where humid-tropical conditions are especially suitable for oil palm. Under French and Belgian colonial administration and during the statist period following decolonialization, these areas developed large plantation economies; both through smallholder cultivation and European and state-owned enterprise. However, as a result of civil and political turmoil that ensued in many of these countries, most large plantations were abandoned in the 1970s and 1980s (Hill, 1977; Eicher and Baker, 1982).[11] Only Cote' d'Ivoire remained a net palm oil exporter (FAO, 2013). This new wave of oil palm investors has to date targeted in particular Sierra Leone (511,045 ha), Republic of Congo (644,000 ha), and Liberia (948,749 ha); most of which established with direct government support in acquiring land. With governments in countries such as Cameroon and Nigeria also actively courting large oil palm investors in order to recapture their position as major palm oil exporters (Hoyle and Levang, 2012; Schoneveld, 2013), other countries in the region are also destined to become major investment recipients. Since oil palm tends to deplete the soil of its nutrients towards the end of its commercial life, despite the abundance of abandoned or neglected estates, only 15 of the 67 projects involved the rehabilitation of previously established estates.

Sugarcane investors, on the other hand, have in recent years principally targeted the traditional sugar cultivating areas in Eastern and Southern Africa, involving 50 out of the 70 documented sugarcane projects.[12] Having become one of the most profitable crops for British settler farmers in the late 1800s, due to its economic potential and the prevalence of dumping practices on international sugar markets, in most countries in the region the sector long attracted state

[10] Other crops within the 'sugar crops' category include sweet sorghum and sugar beets. However, they constitute only a fraction of the area acquired.

[11] Some major companies that established plantations under colonial rule have continued to operate plantations; these include Bolloré/Socfin (France), SIAT (Belgium), and Unilever (UK). The latter has in recent years divested most of its plantation assets, while those of the former two remain operational (but only a few of their plantations are captured in this analysis, since many were established prior to 2005).

[12] These two regions account for approximately 86% of sugarcane output in sub-Saharan Africa (FAO, 2013). Many countries in the region are also some of the most efficient producers in the world (both in terms of yield and cost of production) (Roseboom, 2007).

interference (Lewis, 1990; Garside et al., 2005). In many countries this produced (especially state-controlled) monopolies. However, in the context of neoliberal reforms and the harmonization of pricing policies as a result of regional economic integration (Johnson and Rosillo-Calle, 2007), most state sugar production assets were privatized in the late 1990s and conditions became increasing amenable to competition. The largest recipients of sugarcane investments are Ethiopia (529,583 ha) and Mozambique (337,604 ha), where sugarcane is considered a priority crops and incentives are in place to promote private investment (Schoneveld and Shete, 2014; Dias, 2013). With most estates privatized before 2005, only 12 of 70 documented projects involved previously established estates.

Interestingly, other major African cash/export crops, such as, for example, coffee, tea, cocoa, rubber, tobacco, and cotton, have received only limited investor interest. For all, bar rubber, the food price crisis of 2007/2008 had a comparatively minor inflationary effect and global market conditions have remained comparatively stable.[13] Global sugar and palm oil markets, on the other hand, have exhibited considerably more volatility, with long-term market prospects appearing especially strong. This has numerous contributing factors. With rapidly rising per capita purchasing power and changing consumption patterns, strong demand is anticipated from the emerging economies China and India; expected to become the largest two net importers of these commodities, predominantly for use in the food sector (FAPRI, 2011; OECD–FAO, 2011). Moreover, national and international trade policies have tended to favor Africa-based producers. Under the Everything-But-Arms (EBA) treaty with the European Union (EU) and the Africa Growth and Opportunities Act (AGOA) in the United States (US) all products derived from both crops are exempt from duty payments and quotas when they originate from an African Lesser Development Country (LDC).[14] In the case of palm oil, this advantage is compounded by the substantial export tariffs imposed in the largest international palm oil producers Indonesia and Malaysia to protect against shortages within their domestic markets. Since most African countries are also large net importers of both sugar and palm oil and domestic prices generally exceed international prices (Garside et al., 2005; Hardman, 2011), processes of regional economic integration provide investors with ample regional prospects. Additionally, the deregulation of the global sugar market and increasing difficulties for investors in Indonesia and Malaysia to access land for oil palm expansion (e.g. in an effort to curb deforestation) has created competitive pressures to seek new avenues for reducing cost of production. With land prices in much of sub-Saharan Africa rarely exceeding US$5 per ha per annum (Schoneveld, 2013), as compared to between US$200 and 400 in Southeast Asia and between US$150 and 300 in major large-scale farming areas in Latin America (Manciana et al., 2009; Olam, 2010), and with land market liberalization of the 1990s, easy access to cheap land is undeniably a major driver.

The most important driver underlying the renewed investor interest in these crops, especially in contrast to other traditional cash/export crops, is arguably the (perceived) rise in demand for first-generation biofuels. As illustrated by Fig. 3, 54.2% of investors target to varying degrees the biofuel end-market. Following the oil price crisis and the enactment of domestic blending mandates in many industrialized countries over the 2000s, particularly the US and the EU are expected to become major biofuel consumers; by 2020 they are projected to account for 67.1% of global biofuel consumption and 81.2% of imported biofuels (derived from FAPRI (2011) and OECD–FAO (2011)).[15] Oil palm and sugarcane are the cheapest and most productive biofuel feedstocks, as compared to common alternatives such as rapeseed, soybean, and maize (Kojima and Johnson, 2005). An added advantage of these crops is that their fungibility enables producers to hedge against market fluctuations (Hall, 2011; Borras et al., 2013); therefore, producers can easily switch between end-markets to capitalize on price differentials.

The prominent role of global biofuel market prospects in driving investment in sub-Saharan Africa is further illustrated by the area acquired for the purpose of cultivating *Jatropha Curcas* L. (jatropha); an inedible oilseed bearing shrub touted for its purported ability to generate high yields under arid and low input conditions. Despite it being a largely undomesticated crop for which little agronomic experience has been gained and with only one economically significant end-use, in the period 2007–2009 many investors sought to cultivate it on an industrial scale. Jatropha investments accounted for 96 projects and 31.1% of the total area acquired; with the largest areas acquired in Madagascar (979,610 ha), Zambia (707,476 ha), and Ghana (671,951 ha). Due to the variety of agro-ecological conditions under which the crop can be cultivated and with no established markets, unlike oil palm and sugarcane, no clear geographic patterns can be discerned, with investments spread across 20 countries.

Where the comparatively high start-up costs associated with oil palm and sugarcane projects has largely attracted established agri-businesses or industrial conglomerates, most jatropha investors were poorly capitalized start-ups. Lack of experience, inabilities to raise operational funds as a result of the Financial Crisis, bad publicity, and unrealistic and poorly substantiated business plans have led to the failure of most jatropha projects. Only rarely have investors realized projected yield; although many ceased their operations well before the plant reached maturity (5–7 years). Investors typically switched to more conventional crops, temporarily ceased operations awaiting funds, or sold assets to new investors. However, as more agronomic experience is being gained and genetic improvement programs are starting to commercialize high yielding and non-toxic cultivars, it may be too early to dismiss jatropha projects altogether. Ongoing policy dialogues in the EU that proposes to restrict the use of food-based biofuels could also improve market prospects for non-edible feedstocks such as jatropha.

Although the initial rise in interest for Africa's farmland is attributable largely to the incipient biofuel sector, over the 2010s this has increasingly given way to food crop investors. While most food projects focus on sugarcane and oil palm, rice is becoming an increasingly important investor crop, responsible for 76.4% of the area acquired for cereal investment.[16] Rice investments are mostly located within traditional rice growing areas, especially West Africa and to a lesser extent East Africa, with the largest investments located in Tanzania (69,124 ha), Mali (142,400 ha) and Nigeria (163,122 ha). Despite it being a major staple crop in West Africa,

[13] Of the major cash crops, prices in the rubber sector have been most favorable over recent years – by 2011, international market prices had increased almost tenfold over 2000 levels. While a number of defunct rubber estates were acquired in West Africa, investors have curiously shown little interests in the development of Greenfield plantations. As noted by Byerlee (2013), with most large tire companies having significantly downscaled their direct participation in rubber cultivation, rubber is produced primarily by Chinese companies, which have tended to focus their cultivation activities in nearby Laos and Cambodia.

[14] African countries not eligible under the EBA, but who were signatories of the unilaterally abrogated African, Caribbean and Pacific (ACP) Sugar Protocol are also eligible for duty- and quota-fee access to the EU market. ACP countries also received US$ 1.2 billion from the EU as adaption support for market deregulation (Roseboom, 2007).

[15] The EU Renewable Energy Directive, implemented in 2010, requires that 10% of energy consumption in the transportation sectors be derived from renewable energy sources by 2020. The 2010 US Renewable Fuel Standard (RFS2) sets annual blending targets for the transportation sector, rising to approximately 7% of total fuel consumption for the sector by 2022. Largely as a result of these mandates, global consumption increased from 35 billion to 129 billion liters per year between 2005 and 2011 (EIA, 2012).

[16] Rice typically has a higher return on investment and produces more energy and protein per hectare than other cereal crops (Kiple and Ornelas, 2000; UNEP, 2005).

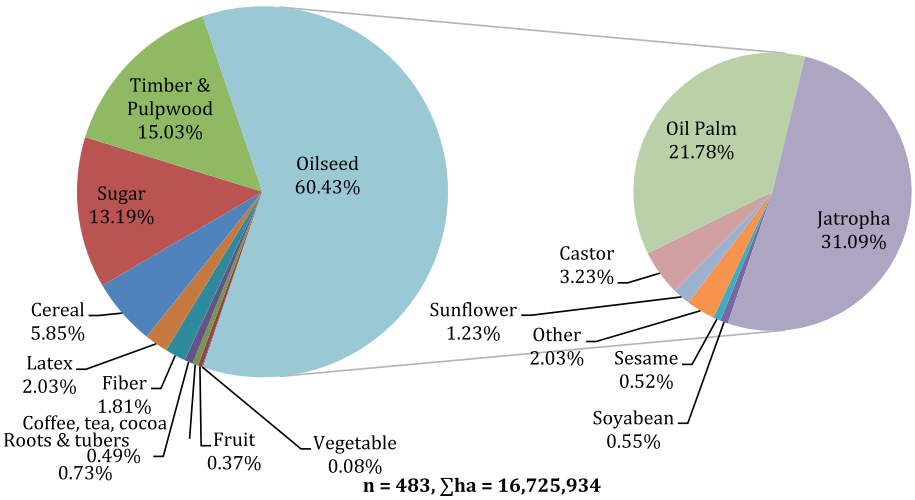

Fig. 2. Primary crop (type) cultivated, as proportion of total land area acquired. *Note:* Projects that plan to cultivate a number of different crops are only included in these figures when they specify that they are primarily targeting the cultivation of one crop. Many large projects that cultivate a wide range of different crops are excluded since disaggregated area figures were rarely provided.

all West African countries are net rice importer. As a result of the food price crisis, governments have increasingly been leveraging public funds to enhance rice self-sufficiency, including lending support to private investors (WARDA, 2007; SWAG-OECD, 2011). While incentives and local market prospects have been integral to promoting investment, the food price crisis has also highlighted the risk of dependency on major Asian rice producers; many of which imposed rice export bans to protect domestic markets (Slayton, 2009). Although a smaller number of other cereal projects (e.g. maize and wheat) were established in Eastern and Southern Africa – typically on former state cereal farms – due to disproportionately high transport costs and comparatively small profits margins, investors have tended to favor conditions in countries such as Ukraine, Kazakhstan, and Russia (World Bank, 2011; Byerlee, 2013).

In contrast to agriculture, forestry has not been a major driver of farmland investments; responsible for 15.0% of the total area acquired. Most forestry projects target the wood products end-market (e.g. construction, pulp and paper), with approximately one third of the projects targeting the biofuel market (e.g. electricity generation, briquette production). The most widely cultivated tree species are, in descending order, eucalyptus, pine, acacia and teak. Almost 64% of the area acquired is attributable to projects in Ghana (426,364 ha) and Mozambique (1,130,725 ha). Northern Mozambique has become a prime area for plantation forestry in particular; largely due to efforts by the local non-profit organization, Malonda Foundation, in attracting and facilitating large forestry investments in the area.

Investor origin

With regards to investor origin, few lead investors were found to be of domestic origin. Of the 520 projects for which investor origin could be established, only 102 projects, accounting for 13.9% of the total area acquired, had a local operator leading the development – highlighting the critical enabling role of international capital in driving large-scale farmland investments. Of greater interest is that the data confirms that traditional investors from industrialized countries are the dominant farmland investors, rather than wealthy Gulf or East Asian countries, as has been popularly depicted in the media and by some researchers (see Smaller and Mann, 2009; Görgen et al., 2009; Friis and Reenberg, 2010; AFP, 2011; Economist, 2011; New Scientist, 2011; Reuters, 2011; Anseeuw et al., 2012a). As illustrated by Fig. 4 and in the Appendix A, the United Kingdom (UK) and the US are the two largest investors by a considerable margin, followed by India. From a regional perspective, Europe is clearly the dominant investor region, responsible for 40.5% of the total area acquired, following by Asia (19.4%) and North America (15.0%).[17]

For some investor countries, clear patterns emerge when scrutinizing target countries. For example, in the case of Portugal, 10 of its 20 investments have been made in Angola and 9 in Mozambique (the only Lusophone countries in Africa), while in the case of France, 16 out of its 20 projects are located within Francophone Africa. Clearly, linguistic and historical links play an important role in the investment decisions of investors from these countries. However, in the case of the UK, this is less apparent; with only 31 out of its 57 projects located in Anglophone Africa. The only other statistical outlier is the relatively high concentration of Indian investors in Ethiopia, where 18 of its 48 projects are located. Interviews with Indian investors showed that diplomatic ties between their respective governments, security of large numbers of other Indian investors, and cultural similarities were important drivers.

While such affinities partially explain some of these geographic patterns, some authors have pointed at legalistic dimensions. For example, it is argued that investor decisions are shaped by the existence of Bilateral Investment Treaties (BIT) between host and home government that offer *inter alia* legal protection against expropriation and unfavorable changes in host country legal frameworks and enables international arbitration in case of disputes (see, for example, Malik, 2011; Perez et al., 2011; Alden Wily, 2012b). The data, however, does not confirm any such relationship; a BIT between Angola and Portugal has yet to come into force, as has a BIT between India and Ethiopia (there are currently no BITs in force between India and a country in sub-Saharan Africa). For the two largest investors, UK and US, only 26 out of 57 projects and 17 out of 41 projects, respectively, are governed by BITs.[18]

As regards the sectoral focus of different investor countries, more distinctive patterns emerge. The prominent role of European investors is largely an illustration of the perceived long-term demand for biofuels in their markets of origin; with European inves-

[17] For the purpose of this analysis, 'Europe' constitutes the 27 countries of the European Union (EU) plus Norway and Switzerland.

[18] BITs with the UK are in force in 12 sub-Saharan African countries and with the US in six countries.

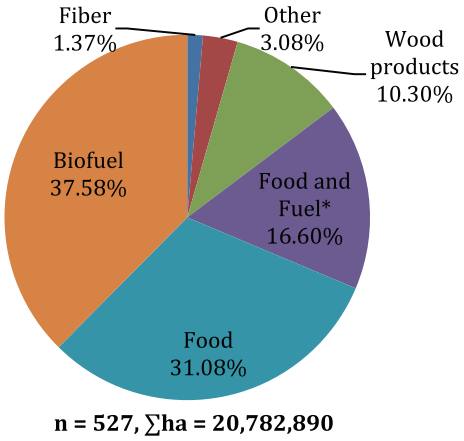

Fig. 3. Primary end-market, as proportion of total land area acquired. *In addition to biofuel end-markets, integrated food and fuel projects target food end-markets as a secondary distribution outlet; typically the case for sugarcane and oil palm projects. The relative contribution to each market typically depends on global price differentials between the different end products (e.g. between crude palm oil and biodiesel).

tors accounting for 58.1% of land acquired for biofuel production (5,451,109 ha) and European biofuel projects accounting for 62.4% of the land acquired by European investors. These findings strongly contradict an EC-supported evaluation of the impacts of its renewable energy policies, which claims that "between 50,000 and 160,000 ha of land deals with concerns about socioeconomic impacts and land-use rights could be linked to the EU market" (EC, 2013, pp. 302). Coincidentally, the three countries that are expected to become the largest net importers of biofuels in the EU by 2020, the UK, Germany, and Italy, are also the most active European biofuel investors in sub-Saharan Africa, both in terms of area acquired and number of projects.[19]

Since most large oil palm conglomerates investing in Africa, such as Sime Darby, Wilmar, and Golden Agri-Resources, are based in either Malaysia or Singapore, and considering their expansion constraints within Southeast Asia, it is unsurprising that palm oil production is the primary driver of investment for these countries (constituting 88.5% of the area acquired by investors from these countries). The geographic concentration of Southeast Asian companies in West and Central Africa is thus a reflection of their crop, rather than geographic, interests. As opposed to European investors, these investors are less inclined to produce palm-based biodiesel and target primarily the global food and pharmaceutical end-market.[20]

Since India is still largely self-sufficient in most major food commodities, with the exception of pulses and vegetable oil (FAO, 2013), like Southeast Asian investors, its investors are driven less by domestic market needs, but more by domestic expansion constraints. As a result of high population pressures, escalating land prices, fragmented landholdings, water shortages, and regulatory obstacles, gaining access to large contiguous areas of land in India for commercial agriculture is becoming prohibitively difficult (Rowden, 2011; Carmody, 2013). The importance of global market opportunities, rather than domestic market needs, in driving these investments is reflected in the primary target crops of Indian investors. As regards traditional Indian export crops, for example, Indian investors are the second largest investors in sugarcane cultivation (after South Africa) and the largest in tea and cotton. Although Indian investors are also prolific in the production of oilseeds, not a single Indian investor targeted pulses as their focal crop, despite it being the most important crop-type from the perspective of Indian food security.[21] While Indian investors are often depicted as producing staple crops for its own consumption, the data suggests that investors in such crops constitute only a minority (nine out of 48 investors, six of which cultivating rice). South African investors have exhibited similar tendencies: faced by growing barriers to accessing farmland domestically, its white commercial farmers are actively negotiating access to farmland beyond national boundaries.[22] With a well-established domestic export-oriented sugar sector, many South African sugar companies have also sought to overcome domestic land constraints by acquiring land in other countries in Southern Africa.

The only investors to actively target their market of origin for the purpose of alleviating domestic food insecurity originate predominantly from chronically food-insecure countries in North Africa and the Middle East. For example, 66.8% of the area acquired by Djibouti, Egypt, Libya, and Saudi Arabia was for the purpose of cultivating cereal crops, primarily rice (hence are concentrated predominantly in traditional rice producing countries). The vast majority of these projects are either state-owned or linked to Emirati royalty. The prominent role of state actors, as compared to other countries, except China, suggests that the state plays a critical role in aligning investment objectives with domestic food security objectives.

Since China, like India, is largely self-sufficient in its staple food crops, most of its investors have targeted an array of traditional cash/export crops, highlighting the predominantly commercial objective of its investors. With more than 50% of Chinese GDP generated by state-owned companies (Szamosszegi and Kyle, 2011), the comparatively high proportion of state-owned companies investing in African farmland reflects merely China's economic structure and not necessarily its investment motives. While not necessarily constituting a clear trend, with China being the largest rubber investor in sub-Saharan Africa in the period under review (38.5% of the total area acquired for rubber and 30.6% of the area acquired by Chinese investors), highlights also its more industrial orientation. In contrast to conventional wisdom, recent Chinese investments are not aimed at securing land to grow food crops for Chinese consumption; even China's official policy guidance catalogues promote overseas investments in traditional cash crops and not cereal crops (Bräutigam and Zhang, 2013). Some African countries even import cereals from China (Bräutigam and Zhang, 2013).

US investors neither exhibit a clear sectoral orientation, with investments spanning across crops and sectors. Although it is expected to become a major net biofuel importer like the EU, it is anticipated to remain self-sufficient for biodiesel and to import most of its future ethanol from Brazil (OECD–FAO, 2011).[23] Hence, its investors are likely driven largely by opportunities within global commodity markets rather than specific domestic market opportunities. Moreover, the prominent role of the US, and also the UK and

[19] According to their National Renewable Energy Action Plans (NREAP), the UK, Germany, and Italy expect that total imports will constitute 88%, 59% and 39% of their total biofuel consumption by 2020, respectively. The UK is anticipated to become the EU's largest biofuel importer by 2020, expected to account for 34% of all EU biofuel imports (derived from Atanasiu, 2010).

[20] Due to the reluctance of their home governments to enforce biodiesel blending mandates, the comparatively high global price of crude palm oil over recent years relative to crude oil prices, and the imposition of regulatory obstacles in accessing the EU biofuel market have deterred most Southeast Asia oil palm companies from investing in biodiesel refineries (Schoneveld et al., 2010).

[21] None of the Indian food crop investors interviewed in Ethiopia expressed an interest in exporting to India either. Due to high transportation costs and comparatively high regional market prices, most crops, including staple crops such as maize, were sold locally or regionally.

[22] Land is being acquired through its commercial farmer organization Agri SA. Land has already been allocated to its members in the Republic of the Congo, a framework agreement has been signed in Mozambique, and negotiations are ongoing in Ghana, South Sudan, and Zambia (Agri SA, 2011).

[23] Although many African countries have been granted trade privileges under the AGOA, the removal in 2012 of contentious US tariffs on Brazilian ethanol has eroded ethanol trade opportunities, especially since Brazil is the cheapest ethanol producer (Kojima and Johnson, 2005).

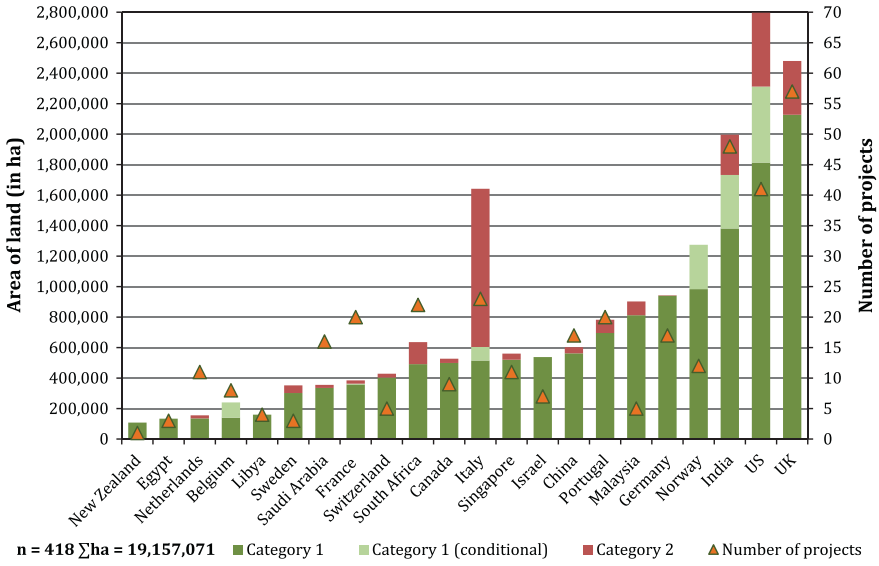

Fig. 4. Origin of non-domestic investments > 2000 ha, by total land area acquired. *Note:* When projects are registered in offshore financial centers despite being headquartered elsewhere, the latter is considered to be the origin of investment. Furthermore, where projects have been originated in the form of a partnership or joint venture agreement, only the origin of the investor with the majority share is included.

Table 4
Projects led by established entities.

Origin	Number of projects led by established entities	Number of projects led by start-ups	Proportion of projects led by established entities (%)
UK	1	56	1.75
US	9	32	21.95
Germany	4	13	23.53
Italy	15	8	65.22
India	35	13	72.92
Norway	9	3	75.00
Malaysia	4	1	80.00
China	15	2	88.24
Portugal	18	2	90.00
Singapore	11	0	100.00

Note: 'Project led by established entities' include those projects where the largest shareholdings are held by an industry incumbent. Conversely, projects initiated by 'new market entrants' are those led by investors that have no formal affiliation with industry incumbents.

Germany, appears to be of a more speculative nature than investors of other countries, which could also partly explain their greater geographically diffusion.[24] For example, compared especially to Asian investors, where the majority of lead investors are (subsidiaries of) established agribusinesses or conglomerates, most projects from the US, UK, and Germany involve new market entrants (Table 4). These projects are typically established by individuals with support from either private capital, alternative stock exchanges, or venture capital and private equity funds; typically financial sources with a considerably higher risk propensity. However, in the context of the global credit-crunch, while most Asian investors are still actively developing their investment projects, most UK- and US-based projects have in the absence of secure financial backing either bankrupted or temporarily ceased operations. Large UK- and US-based agribusinesses, such as, for example, Bunge and Cargill, have either focused their expansion plans on traditional export markets within Latin America or, like Dunlop Tyres and Unilever, have divesting from direct production in Africa altogether.

[24] For example, some investors could be more inclined to pursue specific opportunities to obtain large areas of land cheaply than carefully evaluating the risks and merits of different countries and crops through expensive feasibility studies.

Understanding potential host country impacts

Threat of land use competition

Analysis of the competing uses of agro-ecologically suitable land offer valuable insights into the relative productivity of the different crops in agricultural/densely populated and forested areas. By contrasting suitability with availability one can assess the relative risk of land use competition in the absence of mechanisms to effectively regulate land conversion.[25] Since governments in most major investment destinations are ill-equipped or are disinclined to adequately regulate farmland investments – for example, because of new opportunities for rent-seeking or the perceived need to attract foreign capital – few effective checks and balances are in practice placed on land use change to plantation agriculture or forestry (German et al., 2013; Schoneveld, 2013). Preliminary evidence has shown that this could lead to a loss of biodiversity and forest cover (Gordon-Maclean et al., 2009; Rahmato, 2011; Nguiffo and Schwartz, 2012; Schoneveld, 2013), in turn detracting from the potential contribution of biofuels to improving the carbon balance, and displace traditional livelihood activities due to inadequate statutory protection of customary user claims, which in turn undermines local food and income security (Schoneveld et al., 2011; Väth, 2012; Shete, 2013).

Fig. 5 shows the areas of suitable land that overlap with agricultural and/or densely populated land and with forests for the four most prominent investment crops. On aggregate, of the total area of land suitable for agriculture in sub-Saharan Africa, 74.8% is found to be under competing uses, particularly other agricultural activities, with approximately 361.3 million ha potentially available out of a total of 1.431 billion ha that is suitable for crop production. To date, only Ethiopia and Mozambique have made nation-wide efforts to spatially plan investments to minimize land use conflicts; though both suffer from limitations, such as lack of

[25] While offering an indication into major land use conflicts, it should be recognized that the concept of 'available land' is highly contentious and cannot be determined solely through remote sensing analyses. For example, since those typically follow FAO Agro-Ecological Zoning (AEZ) methods and classifications, such analyses typically fail to capture land fallowed for more than five years, forestry uses, or periodic and seasonal land uses such as pastoralism and opportunistic agriculture, which, in the African context, deserve to be accounted for since such lands do retain important long-term social and economic functions.

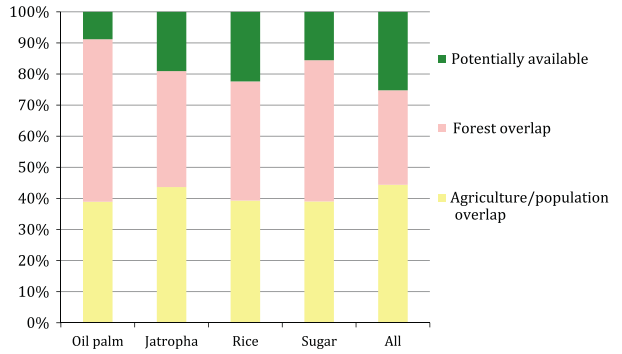

Fig. 5. Proportion of suitable land under competing uses. *Source:* Own computations based on ESA (2011), UNEP (2012), and IIASA (2012).

Table 5
Farmland investments and land availability in key investment destinations.

Country	Total area potentially available (ha)	Land acquired, as % of total available land (%)	
		Category 1 data	All data categories
Sierra Leone	389,450	305.48	332.47
Liberia	700,650	153.56	153.56
Nigeria	769,850	86.74	101.81
Ghana	2,076,400	93.35	99.53
Ethiopia	7,750,050	28.54	28.54
Senegal	3,209,150	14.72	19.24
Mozambique	12,456,300	14.82	16.88
Gabon	2,456,600	16.28	16.28
Republic of the Congo	6,816,200	12.23	13.11
Zambia	15,699,950	11.70	12.39
Tanzania	7,144,900	8.33	12.07
South Sudan	22,860,000	6.36	8.38
Mali	10,630,850	6.77	6.90
Cameroon	5,510,050	5.47	6.74
Madagascar	28,216,300	5.39	6.26
DR Congo	17,810,350	1.61	2.00
Kenya	17,302,100	1.81	1.85
Sub-Saharan Africa	361,284,550	5.33	6.29

Source: 'Potentially available land' calculated from ESA (2011), UNEP (2012), and IIASA (2012) – see 'Methodology' for details.

participation of local stakeholders, low resolution of land use maps, and limited on-the-ground verification (Schut et al., 2010 Schoneveld and Shete, 2014). Although some countries (e.g. Ghana, Mozambique, Tanzania, South Sudan, and Uganda) have since the 1990s begun to extend legal recognition to customary user rights without requiring legal formalization (Alden Wily, 2011, 2012a; Amanor, 2012), as a result of poor implementation and enforcement of land laws, elite capture, and limited capacity of land users to claim their legal rights, even in these 'best-practice' countries the outcomes of farmland investments do not differ materially from countries with more repressive land laws, such as Ethiopia and Nigeria (German et al., 2013; Schoneveld, 2013).

The threat that farmland investments compete with other land uses does, however, vary greatly between countries (Table 5). These risks are found to be particularly high in West Africa. In Liberia and Sierra Leone, where, respectively, only 7.2% and 6.1% of suitable land is found to be potentially available, more land has been acquired for investment than is potentially available. In West Africa, land acquisitions are threatening to conflict particularly with subsistence agriculture (Fig. 6). In the Congo Basin, particularly in Gabon and Republic of Congo, it is particularly rainforest that is threatening to be converted, with 93.2% and 85.6% of suitable land classified as forest.

Although the proportion of total suitable and available land acquired in countries such as Madagascar and South Sudan is significantly smaller than other major investment destinations, due to the absence of regulations to guide land allocations and the tendency of the most strategically located lands (e.g. those close to major ports and marketing centers) to already be densely populated and intensively used that does not necessarily imply that socio-economic impacts are less profound. For example, new public–private spatial development initiatives aimed at attracting large-scale farmland investments, such as the Beira Agricultural Growth Corridor (BAGC) in Mozambique, the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), the Green Belt Initiative in Malawi, and the Farm Block Development Program (FBDP) in Zambia, are located along important transportation corridors, which, due to their strategic location, are likely to conflict with important anthropogenic land uses. Moreover, in countries such as Kenya, Mali, South Sudan, and Tanzania, availability assessment will, due to inherent methodological constraints (see footnote 25), fail to capture some of the important agro-pastoral livelihood systems that 'available' semi-arid, though potentially productive, landscapes in these countries often support. Conversely, preliminary evidence has shown that some investors purposely target densely land of high conservation value; for example, in order to recuperate establishment costs by harvesting valuable timber species within the project area (Gordon-Maclean et al., 2009; Rainforest Foundation, 2013; Schoneveld, 2013).

Although the threat of land use competition could arguably be minimized when existing plantations are acquired, only 54 projects, covering 7.9% of the area acquired, concerned land used for plantation agriculture or forestry prior to 2005. Such projects typically involve colonial or early post-Independence era tree crop estates in countries such as DRC, Liberia, and Nigeria. However, as case studies in Nigeria have shown, as a result of demographic shifts that accompany boom and busts, many of these estates have experienced heavy encroachment. Therefore, despite more limited direct environmental effects, the socio-economic effects of estate rehabilitation are often more profound than Greenfield developments (Schoneveld, 2014).

Even though host country governments in practice have negligible influence over project siting, third party certification systems involving periodic performance audits are increasingly being embraced by investors as a means ameliorate reputational risk. Since many such 'soft' regulation schemes require investors to respect customary land rights and the right to self-determination and to avoid ecologically significant landscapes, they could in theory serve to minimize land use competition and resolve public good problems arising from the 'hard' regulation vacuum. However, emergent schemes such as the Roundtable on Sustainable Palm Oil (RSPO), Bonsucro, Round Table on Responsive Soy (RTRS), Roundtable on Sustainable Biofuels (RSB), and International Sustainability and Carbon Certification (ISCC), while gaining traction in Latin America and Southeast Asia, are failing to gain critical mass in sub-Saharan Africa. For example, while six of the largest schemes certified a total of 1612 projects by the September 2013, only seven were located in Africa, involving only one of the 563 projects profiled in this research (Table 6).[26] Further research would be needed to identify factors underlying low adoption rates in Africa, although early evidence suggests that some companies may have underestimated the complexity of African land property relations (Schoneveld, 2013). Moreover, since most sugarcane and oil palm companies are targeting local and emerging markets, where, arguably, certification has, in contrast to Northern markets, little

[26] The RSB has certified the sugarcane-based ethanol project Addax in Sierra Leone. The other six projects were either small in extent than 2000 ha or involved only groups and cooperatives of smallholders.

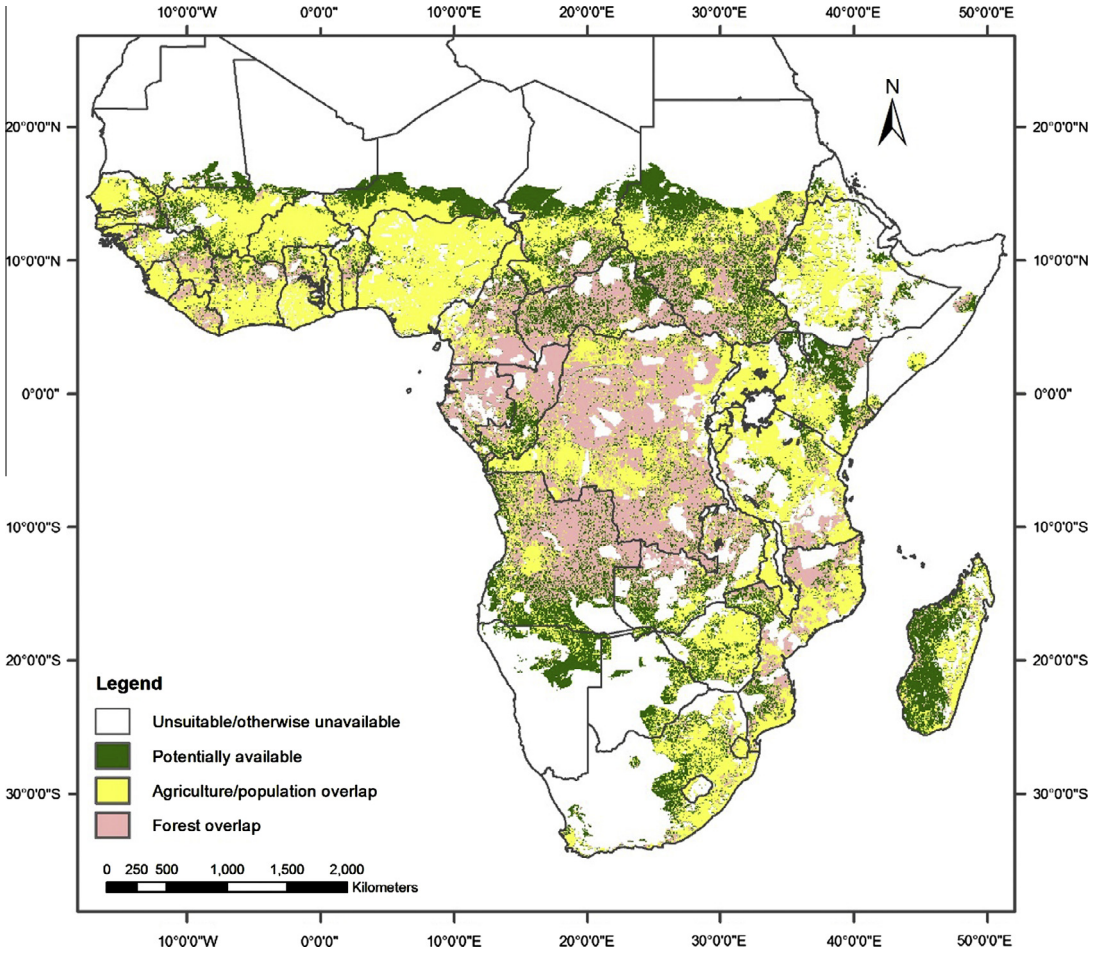

Fig. 6. Map of suitability overlaps. *Source:* Own representation, based on ESA (2011), IIASA (2012).

Table 6
Number of active certified projects for biomass production in September 2013.

Certification scheme	Sub-Saharan Africa	Europe	Latin America	Australasia	North America	Asia	North Africa and the Middle East	Total
2bsvs	0	412	63	12	0	0	0	487
RSB	1(1)	1	2	1	2	0	0	7
Bonsucro	0	1	11	1	0	0	0	13
ISCC	5(0)	671	25	5	29	117	4	856
RSPO	1(0)	0	5	10	0	205	0	221
RTRS	0	0	17	0	4	7	0	28
Total	7(1)	1085	123	29	35	329	4	1612

Source: Datasets from individual schemes.
Note: Numbers in brackets depict the number of projects captured by the dataset used in this study.

Table 7
Number of projects that received financial support from major development banks by September 2013.

Development bank	Sub-Saharan Africa	Europe	Latin America	Australasia	North America	Asia	North Africa and the Middle East	Total
MIGA	6(3)	1	1	0	0	0	0	8
IFC	8(4)	2	16	0	0	2	0	28
AfDB	2(2)	0	0	0	0	0	0	2
SwedFund	1(1)	0	0	0	0	0	0	1
Proparco	3(0)	0	1	0	0	2	1	7
NorFund	8(4)	0	0	0	0	0	0	8
CDC	4(1)	0	1	0	0	7	0	12
Total	32(15)	3	19	0	0	11	1	66

Source: Datasets from individual development banks.
Note: Numbers in brackets depict the number of projects captured by the dataset used in this study.

Table 8
Potential contribution of documented biofuel projects to energy security.

Country	Value of net oil imports, as % of GDP (%)	Blending mandates (targets in brackets)	Biodiesel prod. potential, as % of total petro-diesel consumption [a] (%)	Ethanol prod. potential, as % of total gasoline consumption[a] (%)
Angola	0	(E10)	13.33	29.00
Ethiopia	4.9	E10 in Addis Ababa	37.27	27.06
Ghana	9.2	(E10/B10)	66.53	12.85
Kenya	7.6	E10 in Kisumu	18.46	24.99
Liberia	16.5	None	105.24	0.00
Madagascar	6.9	None	606.67	369.02
Malawi	5.9	E10	6.90	0.00
Mali	1.9	None	933.78	80.48
Mozambique	5.1	E10/B5 by 2015	98.88	465.14
Nigeria	0	(E10)	67.33	2.17
Senegal	9.6	None	30.92	0.00
Sierra Leone	14.5	None	163.74	43.66
Tanzania	5.1	None	68.00	80.31
Zambia	3.6	(E10/B5)	1273.31	67.10
Zimbabwe	n/a	E5	0.00	275.12

Sources: 'Value of net oil imports, as % of GDP' derived from EIA (2012) and World Bank (2013b); 'Blending mandates' derived from individual country laws and policies; 'Ethanol and biodiesel production potential' derived from own data, UN, 2012.

[a] Calorific differences between petroleum products and biofuel products are accounted for using the conversion factors adopted from USDA FAS (2009): 1000 l of ethanol = 0.507 toe; 1000 l of biodiesel = 0.788 toe. Yield of biofuel per hectare used in the calculations is conservatively estimated at: jatropha = 1000 l/ha; oil palm = 4000 l/ha; castor = 800 l/ha; sunflower = 800 l/ha; cassava = 2000 l/ha; sweet sorghum = 5000 l/ha (assuming 2 harvests per year); pongamia = 1800 l/ha; rapeseed = 1100 l/ha; croton megalocarpus = 1500 l/ha.

Table 9
Potential contribution of cereal projects to food security.

Country	Global Hunger Index	Total domestic cereal production, as % of total consumption (%)	Area of cereal investment, as % of total area harvested[a] (%)
Angola	24.2	42.13	2.30
Burkina Faso	17.2	77.12	0.08
Cameroon	17.7	67.42	4.54
DRC	39.0	53.09	1.01
Ethiopia	28.7	88.21	0.66
Ghana	8.7	63.25	2.58
Liberia	21.5	32.53	6.06
Madagascar	22.5	80.79	0.29
Mali	19.7	108.51	4.07
Mauritania	12.7	26.37	17.53
Mozambique	22.7	55.68	0.99
Nigeria	15.5	84.88	1.19
Sierra Leone	25.2	94.60	0.83
Tanzania	20.5	89.11	3.19
Zambia	24.0	82.03	4.46
Sub-Saharan Africa		77.13	1.10

Source: 'Global Hunger Index' from IFPRI (2012); 'Total domestic cereal production' derived from FAO (2013); 'Area of cereal investment' derived from own data, FAO, 2013.

[a] This indicator calculates the total area of land acquired by investors for cereal crop production, as a proportion of total land area harvested for cereal crops in the country in 2012. This gives an indication by what factor total cereal production might increase should these investments come to full fruition.

premium, investors are less encouraged to invest in compliance (Vogel, 2006; McCarthy and Zen, 2010).

Another area where the adoption of sustainability standards is prevalent is further upstream in the value chain in project finance. The IFC Performance Standards on Environmental and Social Sustainability, formally adopted in 1998 and revised in 2006 and 2012, is widely considered to be an important benchmark for project finance. It is applied to IFC and Multilateral Investment Guarantee Agency (MIGA) financing decisions and is often adopted as part of due diligence procedures by other development bank. In contrast to media portrayal, however, development banks are not prominent financiers of large-scale farmland investments in Africa. As illustrated by Table 7, while the largest number of development bank-funded projects related to biomass production are located in sub-Saharan Africa, with only 15 out of 32 relevant development bank-funded projects captured by the dataset.

Alignment with domestic market needs

As discussed above, the anticipated growth in global biofuel consumption is a major driver of investment. With sub-Saharan Africa being the most vulnerable region in the world to oil price shocks (with the value of oil imports equivalent to 5.5% of GDP, in contrast to a global average of 2.8%) (Schoneveld, 2010), the development of domestic alternative energy markets could help alleviate the macro-economic instability associated with global oil price fluctuations. However, as shown in Table 8, few countries in sub-Saharan Africa are actively encouraging domestic biofuel uptake (e.g. through blending mandates); in most countries, legal provisions to that effect are entirely absent or are based solely on non-regulated targets. Blending is currently being undertaken only in selected cities in Ethiopia and Kenya and nation-wide in Malawi and Zimbabwe. Experience to date has shown that substantial public investments are needed in mass storage and blending facilities and periodic subsidies to offset price differentials (e.g. between a crop's food use and fuel prices) (Jumbe et al., 2009; Schoneveld et al., 2010). Considering high opportunity costs of public funds, many African countries have as a result been reluctant to follow through on renewable energy plans.

Without a guaranteed domestic market, in the medium-term, domestically produced biofuels will largely be destined for export markets (especially the EU). This tendency will be reinforced by the global price differentials created by market distortions in the mandated EU and US markets. Land use change to biofuel feedstock cultivation is, therefore, largely a product of global markets, not domestic demand. Considering that in most countries that have attracted biofuel investments, the hypothetical production capacity of these investments exceeds a typical 10% ethanol (E10) and biodiesel (B10) blending mandate by multiple factors (Table 8), highlights the importance of developing domestic capacities to effectively capitalize on this production potential.

While the macro-economic contribution of most biofuel projects is largely limited to enhancing foreign exchange earnings, greater societal benefits could be derived from the food projects.[27] Not only could these contribute to local food availability, but, like

[27] However, most countries permit the full repatriation of profits, which could threaten to offset the contribution of foreign exchange earnings from biofuel exportation to the current account balance.

biofuels, could reduce national exposure to food price shocks by reducing dependency on imports. For net food buying households, which in many African countries is the majority of the rural population, food price fluctuations can severely undermine household capacity to meet basic needs (Aksoy and Isik-Dikmelik, 2008). Most households are susceptible in particular to changes in the price for cereal, which typically constitute between 40% and 60% of total calorific intake (FAO, 2012). However, sub-Saharan Africa is only able to meet 77% of cereal demand through domestic production, with the remainder sourced from external markets.

Despite this, as discussed in the preceding section, few investments explicitly target this sector. As can be observed from Table 9, the hypothetical cereal production capacity of documented investments to date is in most countries equivalent to a fraction of total area harvested for cereal crops. Therefore, it is unlikely that these investments will make structural contributions to national cereal self-sufficiency. Moreover, since many projects are led by investors from countries that too are food insecure and have strong ties to the governments from their countries of origin, an imperative to export is likely. For example, the cereal investments in Mauritania (equivalent to a comparatively sizeable 17.5% of area harvested) all originate from Saudi Arabia, while in Liberia these originate from Libya. This, however, does not imply that all cereals will necessarily be exported; Ethiopia and Tanzania, for example, periodically put in place temporary cereal export bans to manage price fluctuations.[28] Moreover, due to high transportation costs, lesser profitable cereal crops such as maize that are produced under purely commercial conditions will likely target domestic markets.[29]

Conclusion

This article has highlighted the complex interplay of factors that shape the geographic and sectoral patterns of farmland investments in sub-Saharan Africa. Contrary to conventional wisdom, the majority of investors were found to originate from Europe and North America, rather than Asia and the Middle East. Moreover, the most significant impetus has undeniably been artificial EU biofuel demand and favorable trade conditions for high-value cash crops, rather than food security. Since Northern investors also have a greater propensity to invest in unproven crops such as jatropha and not to be supported by established entities also points at the role of speculation and risk capital in enabling these investment flows. Although Chinese and Indian investors are often implicated for investing in staple crops for their own consumption, in reality, investors from both countries are more inclined towards the cultivation of traditional export crops, and, where staple crops are cultivated, these tend to be marketed locally. Examples from investments originating from chronically-insecure countries in North Africa and the Middle East, albeit comparatively minor, highlight how home country government participation is a prerequisite for aligning investment objectives with domestic food security objectives; with most private investors naturally disposed to targeting more profitable cash crops.

Although some countries are clearly more preferred investment destinations than others, as opposed to the popular portrayal of investors actively exploiting countries with weak governance regimes, this study shows that a country's relative attractiveness for investors is shaped by a host of insufficiently quantifiable factors. This includes historical, cultural, economic, and political relations between host and home country, access to local social and business networks, established markets and infrastructure, and, perhaps most importantly, domestic crop-specific support and incentives, notably for oil palm, sugarcane, and rice.

Despite a wide diversity of drivers, most investors are ultimately driven by the same issue, namely declining domestic resource access or availability and expansion constraints. While some argue that this places host countries in an economically advantageous position, it is questionable whether these extra-territorial resource constraints are effectively exploited by host country governments. Findings suggest that due to market composition (few domestic investors), market orientation (oriented towards export markets), and type of product (dominance of biofuels), besides foreign exchange earnings, these farmland investments are unlikely to make far-reaching contributions to domestic market needs. Research has shown that mechanisms to capture potential gains are also typically lacking and host governments tend to be ill-equipped or unwilling to effectively regulate these investments. Consequently, socio-economically and environmentally valuable land is increasingly concentrating with (expatriate) capitalist interests, typically on terms that do not reflect the land's true economic value. However, advocacy campaigns by civil society organizations (CSO) in countries such as Cameroon, Liberia, Mozambique, Tanzania, and Senegal do show that important domestic processes of collective action are emerging around these issues, which has the potential to evolve into an important counterbalance to insufficiently accountable state institutions. While CSO's could play an important intermediary and representative role in the land alienation process (e.g. in ensuring principles of free, prior, and informed consent are respected and issues related to inequalities of arms are overcome), since negotiation processes over land are often opaque and non-inclusive, in practice CSO's tend to miss opportunities to that effect. Despite this, CSO's could make important contributions to enhancing community capacity to claim their legal rights in the context of rights infringement and campaign for the adoption of simple and enforceable safeguards. This could involve increasing land rental rates, allocation of (parts of) land revenues to host communities, reducing the duration of leaseholds, return of the land to host communities upon expiration of leaseholds, and allocating returns from foreclosure to host communities.

Despite the geopolitical significance of the problem, international regulatory frameworks at present have little direct bearing on the practices of foreign investors or are able to address gaps in host country governance. Although non-state, market-based instruments, such as voluntary certification systems and adherence to bank sustainability standards, are gaining reputational value, there relevance in Africa has to date been negligible. Additionally, issues of national sovereignty and World Trade Organization (WTO) rules on protectionism deter consumer country governments from excessive interference in extra-territorial production.[30] Therefore, with both the market and consumer countries failing to adequately internalize and regulate the negative externalities of global resources scarcities, in order for farmland investments to translate into tangible developmental opportunities, greater emphasis should be placed on identifying and addressing the structural issues that underlie host country governance deficiencies and promoting alternative, more sustainable and inclusive, business models.

[28] However, in Ethiopia, agreements are in place with a Saudi rice investor and a government of Djibouti wheat project that exempts them from this ban.

[29] Maize investors interviewed in Ethiopia and Zambia for this reason sold exclusively on the domestic market.

[30] The biofuel sustainability standards of the EU Renewable Energy Directive do require operators seeking to market biofuels within the EU to meet minimal environmental criteria; however, for technical, legal, and political reasons, the EC has been reluctant to introduce social criteria (German and Schoneveld, 2012).

Appendix A. Geographic distribution

Table A1. Target countries.

Target country	Data quality category			Total	Number of projects
	Category 1	Category 2	Category 1 (conditional)		
Gambia	0	10,000		10,000	1
Burkina Faso	2000	3000		5000	2
Mauritius	2500			2500	1
Togo	2700	3023		5723	2
Sao Tome & Principe	5000			5000	1
Central African Republic	13,838			13,838	2
Niger	15,922	8472		24,394	3
Botswana	21,400			21,400	1
South Africa	29,000			29,000	2
Rwanda	39,500	8000		47,500	4
Swaziland	46,584			46,584	2
Mauritania	53,302			53,302	4
Malawi	82,001			82,001	5
Benin	98,288	200,000		298,288	3
Cote d'Ivoire	103,222	10,000		113,222	5
Uganda	110,449	65,000		175,449	13
Zimbabwe	149,913			149,913	3
Angola	190,150	147,000		337,150	20
Guinea	241,115	910,000	98,400	1,249,515	5
DR Congo	277,231	68,750	10,000	355,981	11
Cameroon	301,471	70,000		371,471	14
Namibia	310,000	30,000		340,000	4
Kenya	313,705	6885		320,590	7
Gabon	399,814			399,814	5
Senegal	472,350	145,000		617,350	24
Nigeria	579,082	116,000	88,718	783,800	42
Tanzania	595,473	267,000		862,473	47
Mali	719,943	14,000		733,943	28
Republic of Congo	833,930	60,000		893,930	8
South Sudan	105,4850	460,000	400,000	1,914,850	14
Liberia	1,075,903			1,075,903	11
Sierra Leone	1,184,710	105,099	5000	1,294,809	19
Madagascar	1,522,100	244,100		1,766,200	26
Ghana	1,647,216	128,310	290,682	2,066,208	45
Ethiopia	1,745,833		466,000	2,211,833	91
Zambia	1,836,994	109,000		1,945,994	25
Mozambique	1,846,500	256,027		2,102,527	63
Total	17,923,991	3,444,666	1,358,800	22,727,457	563

Table A2. Origin of lead companies (non-domestic).

Origin of lead	Data quality categories			Total	Number of projects
	Category 1	Category 2	Category 1 (conditional)		
South Korea	0	15,000		15,000	1
Vietnam	0	30,000		30,000	1
Mexico	2000			2000	1
Australia	9500			9500	1
Austria	10,000			10,000	1
Burkina Faso	10,000			10,000	1
Cote d'Ivoire	10,000			10,000	2
Sudan	11,302			11,302	1
Iran	12,117			12,117	2

(*continued on next page*)

(*continued*)

Origin of lead	Data quality categories			Total	Number of projects
	Category 1	Category 2	Category 1 (conditional)		
Uganda	13,000			13,000	1
Zimbabwe	13,000			13,000	1
Finland	19,600			19,600	1
Luxembourg	23,000			23,000	1
UAE	25,983			25,983	2
Kenya	27,885			27,885	3
Pakistan	28,000		15,000	43,000	1
Turkey	31,000			31,000	4
Nigeria	40,000			40,000	1
Cyprus	50,000			50,000	1
Mauritius	54,584	6885		61,469	6
Spain	58,508	70,000		128,508	6
Japan	59,154	30,000		89,154	3
Djibouti	59,823			59,823	2
Brazil	73,100	75,000		148,100	7
Indonesia	80,000			80,000	1
Denmark	93,692			93,692	5
Lebanon	100,000			100,000	1
New Zealand	108,000			108,000	1
Egypt	133,895			133,895	3
Netherlands	135,732	20,000		155,732	11
Belgium	140,244		100,000	240,244	8
Libya	160,000			160,000	4
Sweden	302,155	50,000		352,155	3
Saudi Arabia	335,401	20,000		355,401	16
France	358,203	21,472	5000	384,676	20
Switzerland	403,505	25,000		428,505	5
South Africa	491,599	144,174		635,773	22
Canada	499,092	28,000		527,092	9
Italy	515,363	1,037,505	88,718	1,641,586	23
Singapore	520,338	40,000		560,338	11
Israel	538,000	0		538,000	7
China	562,394	40,000		602,394	17
Portugal	695,612	87,000		782,612	20
Malaysia	812,487	90,000		902,487	5
Germany	940,071	3023		943,095	17
Norway	983,659		29,0682	1,274,341	12
India	1,381,334	264,300	351,000	1,996,634	48
United States	1,813,744	484,750	498,400	2,796,895	41
United Kingdom	2,127,055	353,028		2,480,084	57
Total	14,873,134	2,935,137	1,348,800	19,157,071	418

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