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Economic report

Land grabbing: myth or reality?

- Land grabbing involves purchases or leases of agricultural land on a large scale. This phenomenon, which brings together private investors and governments, has grown rapidly in recent years, especially after the spike in agricultural prices in 2007. Since 2006, an area equivalent to France's entire farmland is believed to have been subject to land grabbing.
- At the economic level, the two key drivers for land grabbing are, in roughly equal measure, **food security** and coverage of **energy needs** (biofuels).
- Foreign investment can be a major source of opportunity for recipient countries by boosting government revenues, transferring technologies and improving the daily lives of the poorest populations. In many regions, particularly in Africa, economic and social development still necessarily entails agricultural development. Added to this, in some emerging or developing countries, there is considerable scope to increase agricultural productivity.
- Even so, **numerous ESG risks** (Environmental, Social and Governance) are associated with land grabbing. Water stress, deforestation/biodiversity, the risks posed by first-generation biofuels, acceptance by local communities, exposure to the risk of corruption, the respect of fundamental social rights or political instability are just some of the challenges that can be identified.
- Some governance principles are therefore essential to establish a win-win policy: institutional and organisational mechanisms and the involvement of all interested parties, especially local ones, are the key to success. A rich newsflow on land grabbing appears likely in 2010 with announcements of international initiatives and position-taking by key institutions. In this context, it is not impossible that food manufacturers will enter the debate.
- On the basis of our ESG analysis of a panel of 25 countries, three countries subject to land grabbing emerge very positively as a strong opportunity (1) from our evaluation (Australia, Argentina and Brazil), while four countries emerge as a high risk (4): Mozambique, Ethiopia, Pakistan and Sudan.

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Land grabbing involves purchases or leases of agricultural land on a large scale. This practice is not new. In the 19th Century, during the colonial period and the start of the post-colonial period, foreign-owned plantations existed in many regions of Africa, Asia and Latin America. Crops such as bananas, sugar, tea, peanuts and cocoa were grown there.

In a very different context, this practice of appropriating agricultural land has staged a comeback in recent years. In response to the **food crisis of 2007/2008, which affected many countries across the world,** and new bans or restrictions imposed by more than 25 exporter countries of staple crops, some rich countries (mainly in the Middle East and North Africa, but also China, India and South Korea) have "grabbed" vast tracts of arable land in developing countries to ensure their own food security.

Growing demand for arable land (15-20m hectares of land since 2006) and, above all, the speed at which land grabbing has developed since 2008 have sparked concern among many observers, researchers and environmentalists, fuelling a public debate. Is this a "new green revolution" that could stimulate local agricultural production? Or is it a sort of "new colonialism" with negative effects on small farmers, their livelihoods and environment?

Compared with past operations, the current phenomenon of land grabbing is on a far greater scale, in some cases involving land parcels of more than 100,000 hectares. Another difference is that the crops cultivated are staples (rice, maize, etc.) rather than cash crops. Last but not least, because governments are frequently involved, these operations generally take the form of **agreements**, not military stand-offs or wars as in the past. That said, the land grabbing plans of a South Korean group in Madagascar in 2008 contributed to the fall of the Madagascan government in 2009 and, ultimately, the cancellation of the operation.

All this goes to show that the acquisition (or leasing) of land poses many **problems**. These problems are **geopolitical** and **human**, since they put governments at loggerheads with their populations (we will address this point directly later in this report). They are also **economic:** this is the subject of the first section, in which we examine the scale of the phenomenon and examine the motivations. The principal driving force behind land grabbing operations is the imbalance between the distribution of human populations and arable land. In most cases – but not always - conventional trade in agricultural commodities is sufficient to overcome this problem. Other motivations are more financial in nature. Land is an asset and, as such, can be subject to investment. Anything grown on it (agricultural products and biofuels) is tradable and prices fluctuate, creating an investment opportunity.

These problems also touch on **ESG concerns**. These are discussed in more detail in the second section of this report.



Land grabbing represents an opportunity for host countries if it makes a durable contribution to their development, starting with a sustained improvement in their agricultural potential. Land grabbing can also make it possible to cultivate unproductive land, which represents large areas in some countries, especially in Sub-Saharan Africa and Latin America. In 2009, the Zambian agricultural minister estimated that his country had more than 30m hectares of potentially cultivable land, representing 40% of the country's surface area.

Land grabbing can also facilitate some **technological transfers**, **boost agricultural productivity** and **increase food supply** when projects are sufficiently oriented towards local markets. Host countries can also benefit from tax revenues linked to investments and positive economic repercussions in terms of job creations. Lastly, some projects include **infrastructure building** that improves local living conditions (roads and schools, for example).

However, it is important not to underestimate the many **ESG risks** associated with land grabbing, especially in countries where agriculture plays a predominant role in social and economic life. Land grabbing can intensify water access and deforestation problems or favour the production of first-generation biofuels, which poses a transport versus food dilemma. We have also identified the issues of corruption, acceptance by local communities, the respect of fundamental rights and political instability as being among the many risks that can be associated with land grabbing.

The development of adequate governance principles is therefore a prerequisite for the development of win-win land grabbing policies. This implies an improvement in the institutional and organisational mechanisms governing land grabbing, which need to be made more transparent. It is also essential that property rights receive better recognition in host countries. Lastly, we think more involvement by local communities in decision-making processes is important to ensure that projects are accepted and that investors have a licence to operate.

A revival of land grabbing projects is likely in 2010 after a lull in 2009. International initiatives have been announced and the leading global institutions are due to clarify their positions on this subject shortly. This makes it all the more possible for large food manufacturers such as **Nestlé** and **Unilever** to have a growing say in the debate.

On the basis of our ESG analysis of **a panel of 25 countries**, three host countries of land grabbing emerge very positively as a strong opportunity (1) from our evaluation (Australia, Argentina and Brazil), while four countries emerge as a high risk (4): Mozambique, Ethiopia, Pakistan and Sudan.



Definition and characteristics

The expression **"land grabbing"** refers to the **purchase or leasing** of vast tracts of land by wealthier countries to create agricultural operations producing food or biofuels, the aim being to secure their long-term **supplies.** This is not solely a North-South relationship, as in the past, since some buyers come from countries that, though rich, are still usually included in the "emerging country" category.

This practice, which staged a comeback five years ago, accelerated sharply at the end of 2008 in response to the food crisis of 2007 and the spike in global prices. This surge in prices of agricultural commodities prompted countries lacking sufficient arable land to acquire cultivable tracts in countries most abundant in them, the aim being to guarantee their food security and to protect themselves in the event of a new crisis.

The acquisition of agricultural land takes the form of either land **purchases** or long-term **leases.** This last form is the most common since it is the easiest to implement. In most cases, investors establish joint ventures and partnerships with local companies.

Participants can be public or private players. Transactions take place either between private players or between a private player and a public authority.

	Private	Public
Buyer	Agricultural company Biofuel company Private Equity Individual entrepreneur	Government agency (e.g. Ministry of Agriculture) Sovereign fund
Target	Private owner	Government
TABLE 1	SOURCE: ODDO SECURITIES	

PLAYERS IN LAND GRABBING OPERATIONS

State of play

Demographic/geographic imbalance

One example of an imbalance: China has 20% of the world's population and just 10% of the cultivable A quick look at the distribution of **populations** and **arable land** makes it easy to understand why some countries have used land grabbing to secure their food supplies. The needs of some large demographic concentrations are not covered by available agricultural land. For example, China has to feed 20% of the world's population with just 10% of its cultivable agricultural land. In India, the corresponding proportions are 17% and 11% respectively.



Rank	Country	Population	%	%	Arable land (1000 ha)	Country	Rank
1	China	1 338 612 968	19.7	12.1	170 428	US	1
2	India	1 156 897 766	17.0	11.2	158 650	India	2
3	US	307 212 123	4.5	10.0	140 630	China	3
4	Indonesia	240 271 522	3.5	8.6	121 574	Russia	4
5	Brazil	198 739 269	2.9	4.2	59 500	Brazil	5
6	Pakistan	174 578 558	2.6	3.2	45 100	Canada	6
7	Bangladesh	156 050 883	2.3	3.1	44 180	Australia	7
8	Nigeria	149 229 090	2.2	2.6	36 500	Nigeria	8
9	Russia	140 041 247	2.1	2.3	32 500	Argentina	9
10	Japan	127 078 679	1.9	2.3	32 434	Ukraine	10
	Other	countries			Oth	er countries	
	EU	491 582 852	7.2	7.7	108 564	EU	
25	South Korea	48 508 972	0.7	0.1	1 597	South Korea	89
	Gulf oil-rich states	s 37 739 652	0.5	0.2	3 505	Gulf oil-rich states	
	World	6 790 062 216	100	100	1 411 117	World	
		TABLE 2 SOURCES CIA	FAO O		CURITIES		

RANKING OF POPULATIONS AND ARABLE LAND AREAS

We have calculated the ratio of arable land to population and population to arable land to identify the greatest and weakest densities. An analysis of the results reveals that countries with the highest arable land/population ratio are typically the targets of land grabbing. These countries have "sufficient" arable land to feed their populations and can thus afford to sell or lease land to countries that need it.



RATIO OF ARABLE LAND TO POPULATION

TABLE 3 SOURCES: CIA, FAO, ODDO SECURITIES

Acquirer countries often have a high population to arable land ratio. That said, some countries with the highest ratios in this category are not so much acquirers as targets - in some cases among the biggest ones, such as the Republic of Congo, the Philippines or Indonesia.

This is the crux of the land grabbing problem: some countries that do not even have enough land to secure their own food supplies are willing to sell large swathes of their land.



RATIO OF POPULATION TO ARABLE LAND



Scale of the problem

The **lack of transparency** that characterises most transactions means that it is practically impossible to obtain a precise estimate of the scale of the land grabbing phenomenon. Indeed, a large number of contemplated operations are abandoned, while smaller-scale land purchases, especially by domestic investors, are not taken into account in these estimates. To quantify the volume of land grabbing, it is necessary to turn to surveys and studies, which are incomplete today.

Non-governmental organisation GRAIN has calculated that around 180 agreements were in place as of October 2008. The IFPRI and IIED/FAO/IFAD studies provide a more precise estimate. According to the IFPRI study, since 2006 some **15-20m hectares** of land have been the object of transactions or negotiations (or the equivalent of all the farmland in France and one-fifth of the arable land in the European Union) by about ten rich countries, including South Korea, Japan, Saudi Arabia and China. The IIED/FAO/IFAD study has recorded **2.5m hectares** of land acquired since 2004 in deals covering more than 1,000 hectares. The UN also estimated in the first half of 2009 that at least **30m hectares** of land have been appropriated in total.

Current trends

Leases typically run for **50 to 99 years**, and the acquired land area is often **more than 10,000 hectares**, with a few operations attaining 1m hectares. However, such operations are likely to occur with growing regularity in the years ahead, and the agricultural area acquired will probably be increasingly vast.

Given the lack of transparency, it is very hard to quantify the precise scale of land grabbing. But several tens of millions of hectares are now involved.



> Form

Lease-based transactions predominate, and in these cases the government generally plays a key role in allocating land.

> Participants

The **private sector** plays a predominant role, but governments and sovereign funds are frequently involved in these transactions. They finance private investors, while local governments are responsible for formulating the terms of the transaction. Accordingly, it is difficult to draw a clear distinction between the private and public sectors. Furthermore, direct acquisitions by government agents are extremely rare, and sovereign funds appear to be playing a lesser role today.

It is worth keeping in mind that when we speak of the private sector, few of the companies involved are agrifood specialists. Investment companies, private equity managers and hedge funds often participate in land grabbing. For example, Goldman Sachs and Deutsche Bank are seeking to invest in China, and Morgan Stanley has bought 40,000 hectares in Ukraine. In France, AgroGénération, a company created by Charles Beigbeder, has also acquired 22,000 hectares in Ukraine.





CHARTS 5 SOURCES: WORLD BANK, ODDO SECURITIES

Countries

Typically, it is rich **Gulf States** (United Arab Emirates, Saudi Arabia and Qatar) and **fast-growing Asian countries** (China, India, South Korea and Japan) that "appropriate" land in developing countries. The principal targets are **African** countries, as well as Indonesia, the Philippines, Argentina and Russia. According to the Global Agro-ecological Assessment, 80% of global agricultural reserves are located in Africa (807m hectares of cultivable land) and Latin America. **Half of this arable land is found in just seven countries: Angola, the Democratic Republic of Congo, Sudan, Argentina, Bolivia, Brazil and Colombia.**

When choosing their target, land-grabbers take several criteria into account:

- climatic conditions
- production costs
- geographical proximity

Private investors from Europe, the US and Japan target land in all corners of the world, from Russia to Sudan or Australia. They aim to grow crops



on this land for food and biofuel production. The Gulf states ideally look for countries that are culturally, historically and geographically close to them. Their target countries include Turkey, Pakistan and Brazil, for example. Very recently, they have taken an interest in South-East Asian countries, such as Thailand and the Philippines. Fast-growing Asian countries, such as China, Japan, South Korea and India, principally seek land in Africa and Asia.

THE BIGGEST OPERATIONS ANNOUNCED OR SIGNED SINCE 2007

Year	The land grabbers	Who exactly	The targets	To product what	Area (ha)
			Democratic		
2010	South Africa	Agriculture South Africa	Republic of Congo		10 000 000
	US	Jarch Capital	Sudan		400 000
	China		Zambia	Jatropha for biofuels	2 000 000
	Gulf states, Egypt,				
	South Korea		Sudan		1 500 000
			Australia, Kazakhstan,		
			Latin America, Russia,		
2000	UK		Ukraine		1 200 000
2009		Foras International	Mali, Senegal, Sudan,		
	Saudi Arabia	Investment Company	Uganda	Rice	700 000
	Saudi Arabia	BinLaden	Indonesia	Rice	500 000
	United Arab Emirates	Abraaj	Pakistan		324 000
	Russia	Renaissance Capital	Ukraine		300 000
	Sweden	Alpcot Agro	Russia		161 000
				Rice, maize, sorghum,	
	Saudi Arabia	BinLaden	Indonesia	soya, sugar	1 600 000
`	South Korea	Daewoo	Madagascar	Maize, palm oil	1 300 000
	China	ZTE	Philippines	Rice	1 240 000
			Paraguay, Urugay,		
	Guernsey	Global Farming Limited	Argentina		1 230 000
2008	South Korea	Private sector	Sudan	Wheat	690 000
	Saudi Arabia		Tanzania	Wheat, rice	500 000
	Sweden		Tanzania	Sugarcane for biofuels	400 000
	United Arab Emirates		Sudan		378 000
	Libya		Ukraine		247 000
			Russia, Ukraine,		
	Denmark	Trigon Agri	Estonia	Cereals, dairy	144 000
			Democratic		
	China	ZTE	Republic of Congo	Palm oil for biofuels	2 800 000
2007	Egypt	ļ	Uganda	Palm oil for biofuels	840 000
	China	ZTE	Laos	Rice, cassava	700 000
	Southern Benin		Malaysia, South Africa	Maize, wheat	300 000

South Korean group Daewoo Logistic cancelled its project in March 2009.

The Daewoo affair:

cancelled its project in March 2009. This project had attracted media attention, since the terms of the contract provided for a free 99-year lease on land in exchange for a \$ 6bn investment over 25 years, with South African expertise and a local workforce. This resulted in massive protests, which contributed to the collapse of the regime and the cancellation of the Daewoo project by the new government.

TABLE 6 SOURCES: GRAIN, IFPRI

Key drivers

The two principal motivations for land grabbing are food security and coverage of energy needs. In both these cases, resource problems became more acute in 2007 and 2008 with the spike in prices of almost all commodities, especially agricultural and energy ones. This created a strong incentive either to secure supplies at lower prices or to find cheaper substitutes.

According to the IIED/FAO/IFAD study, the distribution of land grabbing reveals a slight predominance of food products (55%) over fuels (45%), but the share of biofuels is tending to increase.

Food security

This motivation has several dimensions.



> Demographics

First of all, there is the human factor. **Population growth** is a key factor in understanding concerns about food security. According to UN forecasts, there will be more than 9bn mouths to feed by 2050. This represents a 35% increase from today. **Agricultural land area is not extendable** and is even tending to shrink because of urbanisation (see below). Nor is it certain that higher per-hectare yields will satisfy this demographic growth and the food needs associated with it.

DEMOGRAPHIC GROWTH FORECASTS



In addition, this demographic growth is concentrated in the following two regions:

- Africa: potential target of land grabbing (93% increase in 2050 compared with today);
- Asia: land grabbing target/player (26% increase in 2050 compared with today).

This growing demand for food is compounded by **changing eating habits**. Meat consumption is growing across the world, especially in developing and transition countries¹, where it is forecast to reach 37kg and 61kg respectively per head annually by 2030. However, even if meat consumption is rising in these countries, they still lag some way behind industrial countries, where consumption is expected to reach 100kg per head annually. The problem is thus here to stay. For a more in-depth discussion of these questions, please see our Economy report of April 2008 (Soft commodities. Hard inflation?).

This modification of eating habits is partly linked to **urbanisation**, which is accelerating particularly rapidly in emerging countries (China and India), and the associated lifestyle adjustments. For a discussion of urbanisation, we invite investors to consult our ESG report of May 2009.

Africa and Asia are the two priority targets of land grabbing

¹ According to the United Nations definition, this expression refers to countries making the transition from a centrally-planned economic system to a market economy. Examples include China, India, Vietnam, the former Soviet republics and the countries of Central and Eastern Europe.





Geography

In the short term, China has no direct food security problem. In reality, it is the acceleration of **urbanisation** that has led to the disappearance of **agricultural land** and created a problem. Between 1996 and 2006, almost 9m hectares of agricultural land fell victim to urban expansion.

Global urbanisation is likely to continue increasing rapidly, especially in transition countries. Developing countries are also starting to experience this phenomenon, although it is not yet clearly visible. But if this trend continues, arable land in the target countries of land grabbing may also gradually disappear as cities take over.

In addition, the quality of arable land is tending to deteriorate, reducing its productive potential. According to the FAO, **soil deterioration** is increasingly severe and widespread. This problem already affects more than 20% of arable land. By 2020, more than 135m people are at risk of being displaced because of soil deterioration, including 60m in sub-Saharan Africa alone.

Price volatility

The **spike in food prices** in 2007/2008 was the main trigger of the rush for arable land. Prices increased by 30-50% compared with their past tenyear average and, according to the OECD, agricultural commodity prices are likely to remain high for the next decade. Prices of all food commodities are set to increase, especially vegetable oil (+50%), butter (30%), maize (+20%) rice and sugar (+10%).





Energy needs: biofuels

The second and increasingly important reason why countries invest in agricultural land outside their borders is the search for biofuels. Biofuel, or agrofuel, is made from non-fossil organic matter derived from biomass. There are two main types of biofuel:

- Biodiesel: made from palm oil, jatropha or other plants that produce oil;
- Ethanol: made from sugar cane, cereals and other cellulosic crops.

Land grabbing involves first-generation biofuels, which use food products such as wheat, maize, sugar beet and colza.



The sudden explosion in demand for biofuels was principally due to the **spike in the oil price** throughout the 2000s, with a sharp acceleration in 2007 and 2008. The plunge in prices towards the end of 2008 was short-lived, and they have since returned to elevated levels. Even so, some biofuels can be viewed as an alternative energy source that responds to today's ecological challenges, and governments have not hesitated to use price or tax incentives to meet their consumption targets. Demand for biofuels and other organic products derived from agricultural crops is particularly strong in emerging economies (China and India).

Land grabbing involves first-generation biofuels



IS LAND GRABBING SUSTAINABLE?

Foreign investment can be a significant source of ESG opportunities for recipient countries (or not)

The first opportunity is an improvement in the daily lives of the poorest populations of the planet. The rush for agricultural land in developing countries is due in large part to our own failures. We have not been collectively capable of finding a solution to chronic malnutrition in many countries despite their considerable agricultural production potential.

The table below summarises the principal advantages of agricultural investors for the different parties involved.

OPPORTUNITIES OFFERED BY FOREIGN AGRICULTURAL INVESTMENT

Host countries	Investors	Local communities
 Government revenues in exchange for giving the investor access to land: royalties indexed in some cases on the value and volume of production, direct and indirect taxes (profits, imports/exports, VAT), rents (according to the land area, etc.), dividends from joint ventures. Non-tax benefits: commitments by some investors to invest in and develop infrastructure (irrigation, roads, etc.), create jobs, meet precise deadlines, etc. Capital resources from foreign investors. Technology transfers and productivity gains (modernisation of agricultural techniques). Use of tax as a government policy tool in a sustainable development perspective (bonus/malus schemes, etc.). 	 Food and/or energy security (biofuels). Demand for farmland is forecast to rise in the long term. Search for profitability and financial diversification. Also note the existence of domestic investors alongside governments and foreign investors. Economies of scale in some cases (though limited). Interest in acquiring land sometimes goes beyond agricultural issues (acquisition of resources at an advantageous cost): - acquisition of forests for wood extraction or the capture of carbon and the associated credits. acquisition of water resources, - tourism, - mines, etc. Equitable distribution of earnings to strengthen the social licence to operate and to minimise political risks (social responsibility). 	 Local economic development funded by tax revenues, and potentially non-tax revenues, from investment (new local businesses, jobs, etc.). Social progress: social investment programmes (schools, etc.) and access to new infrastructure. Continuity of rights: the right of local communities to continue cultivating land as long as this is compatible with the project's development. Compensation mechanisms for the inconvenience suffered by local populations: financial compensation, compensation in kind (new land), joint ventures with some local communities. Food security. Possibility of a portion of agricultural production being sold on local markets (or requisitioned in the event of national shortages). Some projects can force the investor to sell a minimum portion of harvests on local markets: Prices can be lower than those on world markets

TABLE 11 SOURCE: ODDO SECURITIES



Economic and social development necessarily involves agricultural development

Although economic and social development appeared with the first towns in 8000 BC, it was not until the advent of capitalism in the 19th Century that economic development began to accelerate sharply in parallel with the agricultural revolution of the 18th and 19th Century. Strong growth in agricultural productivity generated huge production surpluses relative to the needs of producers. These farmers had to sell this surplus to a new category of citizens, allowing new businesses or corporations to emerge. They were concentrated around villages built on markets, whose size would grow steadily until they became towns. For farmers, the aim of markets was to bring together potential buyers who necessarily lived close to one another. The rapid urbanisation of Western countries dates from this period, paving the way for the industrial era. In short, industrialisation and urbanisation result from the three founding principles of the social economy: the division of labour, the harnessing of economies of scale and trade.

As we discussed in detail in our May 2009 report on urbanisation, social development (education, healthcare, hygiene, culture, etc.) requires controlled urbanisation.

After Latin America in the 1970s and 1980s or Asia since the 1990s and 2000s, the challenge in many African countries today is to kick-start this process, whose point of departure is the agricultural revolution and the explosion in productivity.

Sources of agricultural productivity in emerging and developing countries remain significant

To meet the challenge of having to feed more than 9bn individuals by 2050, only two levers are available: expand the global area of cultivated arable land or increase the agricultural yields of existing land.

Although it is still possible to boost agricultural yields in developed countries (mainly in the US and Europe), huge investment is required to generate everdiminishing incremental yields, and their environmental or social cost is often high (impact of some pesticides on the bee populations or of GMOs, for example).

Globally, the annual rate of growth in agricultural productivity is expected to fall over the long term. This growth rate has averaged 2.3% since 1961 but is expected to fall to 1.5% between now and 2030 and to 0.9% between 2030 and 2050. According to the IAASTD, which is backed by the UN and World Bank, each hectare of arable land will have to meet the needs of at least six people in 2050, compared with 2.4 people in 1960 and 4.5 people in 2005.

Despite this global trend, the yields of some crops in certain regions could increase sharply as long as the right conditions are met in terms of irrigation, fertilisers, mechanisation, crop varieties and other factors. According to agronomic researchers Cassmann and Dobermann, yields are currently fluctuating at around 80% of their potential across the world, but they generally do not exceed 60% of their potential in many developing countries.

Using similar methods, researchers Monfred and Ramankutty have estimated, for example, that maize production could grow by 50% in East Asia with the right investment. With the exception of North Africa, maize production could at least double in the different regions of Africa, according to these two researchers.



These margins of improvement will require considerable investment and will be impossible to attain in the short and medium term without the aid of foreign capital and technical expertise. Unfortunately, some investments pose a serious threat to soil quality and biodiversity. For example, nitrogen-based fertilisers are still fairly scarce in Africa and their use is not risk free. Nitrogen saturation of soil in the UK and Germany has reduced the yields of some agricultural regions by a third, without speaking of the sanitary risks for people and ecosystems. Lastly, some techniques have already been widely adopted in certain Asian countries for rice, for example. After a doubling of yields in the space of a few decades, rice yields have virtually stagnated in this region.

Two principal technological orientations are possible

Research and Development efforts have traditionally sought to maximise production through strong chemical concentrations. Current research requires greater intellectual input and focuses on more fundamental issues, particularly in two areas:

- research into the DNA sequence with a view to strengthening, for example, the resistance of vegetal tissues to attacks by insects, weeds, sharp temperature variations, etc. Genetic engineering opens the door to tremendous technical progress, including a reduction in the water consumption required by plants to grow. By the same token, these technologies raise important bioethical questions, since it is impossible to know today the long-term effects of these technological innovations. Unfortunately, the example of the past 50 years shows that technologies originally considered to be benign have proved extremely harmful to the environment and human health;
- research into integrated agriculture, which has the advantage of placing more emphasis on environmental considerations. These include "natural" pesticides, such as predators and parasites, natural fertilisers such as compost and nitrogen-fixing plans and irrigation systems based on rainwater or pipes with droppers.

The fundamental difference lies in whether environmental problems are managed reactively or pro-actively. Integrated agricultural methods can harness substantial productivity from soil and preserve the jobs of local populations, since the productivity of the labour factor is often lower. The intimate knowledge of specific soil types and climatic conditions possessed by these populations is also key to the success of techniques that are still young and, in some cases, barely out of the experimentation phase.

In addition, researchers such as Bruno Dorin from the $CIRAD^2$ have shown that these ecologically intensive techniques may be sufficient to feed almost 9bn individuals in 2050 (see AgriMonde).

The adaptation and deployment of these agricultural techniques necessitates capital and expertise, which Western investors can facilitate in the very short term.

² A French research centre working with developing countries to tackle international agricultural and development issues



Russia is the principal host country of land grabbing whose agricultural potential is set to benefit from climate change

Many ESG risks are associated with land grabbing

Environmental risks

Countries whose agricultural potential is set to be impacted by climatic change

To simplify things, the GIEC's long-term forecasts suggest that it is the regions of the Northern Hemisphere whose agricultural potential should benefit from climate change (particularly Canada, Russia and Scandinavia). Conversely, agricultural potential in many regions, both in the Northern Hemisphere and the Southern Hemisphere (Southern Africa, Australia, Brazil, Mexico, Mediterranean countries including Turkey, etc.), is likely to be adversely affected by climate change over future decades as a result of lower precipitation and a reduction of soil moisture. Globally, climate change will probably decrease agricultural production potential, especially on the African continent (by 2050-2100). To our knowledge, Russia is today the principal host country of land grabbing whose agricultural potential is set to benefit from climate change.

CHANGE IN PRECIPITATION AND SOIL MOISTURE IN 2080-2099 COMPARED WITH 1980-1999 (REFERENCE SCENARIO A1B)

a) Precipitation









Projects focusing on intensive agriculture, not on integrated agriculture

Announcements of land grabbing projects and our discussions with practitioners, experts or researchers have revealed a strong focus on intensive farming. To date, only a few land grabbing projects that make a public commitment to integrated agriculture have been identified. AgroGeneration operates a number of the projects identified that apply the criteria of integrated farming. This may change in the future. By integrated agriculture we mean agricultural projects that incorporate environmental considerations and offer a balance between intensive agriculture and organic agriculture, with limits on the usage of fertilisers and pesticides, a reduction in water consumption, adherence to the principle of crop rotation, a modest reduction in yields (10%) and a 30% reduction in energy consumption.

Host countries affected by water stress

Ethiopia, Kenya, Pakistan and Sudan are already suffering from water stress The 25 host countries of land grabbing in our panel have an average potable water potential of $23,820m^3$ per capita per year (down 11.2% from the period 1998-2002), representing water resources 10% above the world average. Four of the 25 countries in our land grabbing panel are already suffering from water stress (<1.700m³ per capita per year).

TOTAL RENEWABLE WATER SOURCES PER INHABITANT (REAL)

(m³/per capita per year)	1998-2002	2003-2007	2008-2012	Change 98/02-08/12
Panel average	26 821	24 276	23 820	-11.2%
World average (available data)	23 303	21 625	21 315	-8.5%
Standard deviation of the panel	52 461	46 899	46 022	-12.3%
Best in class				
Congo (Republic)	261 635	234300	230 152	-12.0%
Liberia	75 891	63 965	61 165	-19.4%
Laos	59 564	54 744	53 747	-9.8%
Brazil	45 963	43 304	42 886	-6.7%
Worst in class: water stress (< 1 700m3 per capita	a/year) or sho	ortage (< 1 00)m3 per capit	a/year)
Kenya	927	813	792	-14.6%
Pakistan	1 452	1 301	1 273	-12.3%
Ethiopia	1 767	1 551	1 512	-14.4%
Sudan	1 772	1 595	1 560	-12.0%

TABLE 13 SOURCE: AQUASTAT

Deforestation/biodiversity: risks of collateral damage are present

Seeing that some countries, such as Uganda, are experiencing rapid deforestation, it is impossible to avoid the question of the potential impact of land grabbing on forested areas and the associated environment issues, such as climate change and biodiversity. Land grabbing projects are present in regions where deforestation is a major issue because of the area covered by tropical forest (Brazil, Equatorial Africa and India). In addition, some projects to extract palm oil, for example, may aim to produce first-generation biofuels.



	FC	DREST AREAS	5				
(1 000 ha)	1995	% of total land	2000	% of total land	2007	% of total land	Chg. in forests 00/07
Panel	2 102 629	36.8%	2 061 938	36.1%	2 004 320	35.1%	-2.8%
World	4 032 942	30.0%	3 988 611	29.7%	3 937 326	29.3%	-1.3%
Std. dev. of panel	183 227		182 024		180 022		-1.1%
Best in class							
Australia	166 275	21.5%	164 645	21.3%	163 291	21.1%	-0.8%
Russia	809 109	47.3%	809 269	47.3%	808 599	47.3%	-0.1%
Turkey	9 866	12.6%	10 052	12.8%	10 224	13.0%	1.7%
Ukraine	9 392	15.6%	9 510	15.8%	9 601	15.9%	1.0%
Worst in class							
Indonesia	107 210	56.3%	97 852	51.4%	84 752	44.5%	-13.4%
Uganda	4 492	18.6%	4 059	16.8%	3 454	14.3%	-14.9%
Pakistan	2 322	2.9%	2 116	2.7%	1 816	2.3%	-14.2%
Philippines	9 262	30.9%	7 949	26.5%	6 847	22.8%	-13.9%

TABLE 14 SOURCE: FAO

Production geared to international trade, not local consumption

Agriculture would be more sustainable if it entered a local production cycle for local consumption. At present, this is clearly not the model employed in land grabbing. Part of the solution may therefore be a commitment to allocate a portion of production to local consumption needs.

Social risks

The archetypal example of food price inflation is the jump in rice prices in 2008. Following floods in India and a drought in Vietnam, as well as a disappointing harvest in Thailand, the price of a tonne of rice, which had been relatively stable for two decades at between \$ 150 and \$ 300, soared to unimaginable levels (see chart). Rice is the principal food of half of humankind. Faced with soaring prices and, in some cases, the impossibility of obtaining sufficient quantities of rice, violent hunger riots broke out in more than forty countries across the world. This episode is symbolically important since this agricultural commodity is only used to produce staple food (unlike maize, whose price can be influenced by the oil price) and is mainly produced and consumed in Asian and African countries affected by the land grabbing phenomenon.





Ethiopia and the

problems

Democratic Republic of

Congo: two countries

with big malnutrition

Licence to operate: what about acceptability in countries where land access for local farmers is a "social time-bomb"?

Land access for farmers in developing and emerging countries (an historical problem in Brazil) remains a key issue. The combination of two issues – land access and land grabbing – creates a local time bomb. Brazil's case is emblematic: a raft of agrarian reforms, including those of 1995-2002, when 500,000 land parcels were allocated, have begun to address the question of land access, but there is still a long way to go for the majority of farmers who are poor and without land. Another example is the 60m herders living in the host countries of land grabbing in sub-Saharan Africa (Sudan, Somalia, Ethiopia, etc.), whose existence - not to mention their potential land usage rights – are often absent from debates. We believe that the licence-to-operate of land grabbing projects will be all the stronger where the proportion of land-owning farmers is highest.

Licence to operate: what about acceptability in countries where malnutrition is a daily reality?

Maslow's hierarchy of needs³ provides a simple reminder that access to food is one of the first-level human needs that must be satisfied. As such, the combination of the two issues of malnutrition and land grabbing is another local time-bomb. Although malnutrition problems have diminished in recent years (according to data before the 2008 crisis), more than a quarter of the population of our land grabbing panel are in a situation of malnutrition. We believe that the licence-to-operate of land grabbing projects will be all the stronger where malnutrition problems (in general and among children) are lowest and/or falling in host countries. Ethiopia and the Democratic Republic of Congo are at risk from this perspective.

Children < 5 years **Total population** (latest available data) (%) Food deficiency Weight Growth Food deficiency 95-97 04-06 Change deficiency etardation Panel average (available data) 31.5% 28.2% -10.4% 19.0% 35.2% 14.0% 13.0% -7.1% 16.4% 31.1% World average (available data) Standard deviation of the panel 16.1% 15.9% -0.7% 11.8% 13.6% Best in class 2.3% 8.2% nd nd nd Argentina Australia nd nd nd nd nd Kazakhstan 4.9% 17.5% nd nd nd Russia 5.0% nd nd nd nd Worst in class Congo (Democratic Republic) 57.0% 75.0% 31.6% 28.2% 45.8% Ethiopia 64.0% 44.0% -31.3% 34.6% 50.7% Zambia 45.0% 9.8% 23.3% 52.5% 41.0%

MALNUTRITION PROBLEMS

TABLE 16 SOURCES: FAO, WHO

What about the development of land grabbing in countries that are structural importers of agricultural products?

In the long term, we think that land grabbing projects should be favoured in food self-sufficient countries that are modest importers of agricultural products. While some countries already have an encouraging profile within our land grabbing panel (Argentina, Australia, Brazil, etc.), this is clearly not the case for others, such as Pakistan and Sudan.

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³ Maslow's hierarchy of needs ranks human needs at five principal levels. It places physiological needs (eat, drink, sleep, etc.) as the first needs that human seek to satisfy.



FOOD DEPENDENCY

Exports (X) and Imports (M) in millions of current USD	(X - M) 2000	(X - M) 2008	Ratio (X / M) 2008	Change (X - M) 00/08
Agricultural products				
Panel average World average Standard deviation of the panel	-240 271 -47 006 1 108 863	1 637 719 -71 819 7 479 990	1.9 0.9 2.6	ns 52.8% 574.6%
Best in class Argentina Australia Brazil Indonesia	10 311 12 212 10 703 2 038	34 259 15 707 51 709 19 546	11.6 2.5 6.3 2.5	232.3% 28.6% 383.2% 859.3%
Worst in class Pakistan Sudan	-648 209	-3 202 -827	0.5 0.3	394.2% ns
Panel average World average Standard deviation of the panel	-225 504 -37 621 1 039 842	71 165 -58 785 305 549	1.9 0.9 3.2	ns 56.3% -70.6%
Best in class Argentina Australia Brazil Indonesia	10 224 9 338 9 143 2 190	34 202 12 575 46 746 14 706	14.1 2.4 7.2 2.6	234.5% 34.7% 411.3% 571.5%
Worst in class Russia Mali Mongolia Sudan	-4 487 -114 -84 148	-18 467 -280 -399 -929	0.4 0.3 0.1 0.2	311.6% 146.7% 376.2% ns

TABLE 17 SOURCE: WTO

First-generation biofuels: what about new projects that cause an "eat or drive" debate?

The combined risks posed by an increase in first-generation biofuel production and food price inflation became clearly apparent in 2008. We believe that the licence-to-operate of land grabbing projects will be all the stronger where agricultural production is earmarked for human consumption, followed by animal consumption and, in last place, biofuel production.

Governance risks

Countries where exposure to the risk of corruption is 30% above the world average

The average exposure score of the land grabbing panel used in our report (25 countries) is 2.8 based on the database of Transparency International, which was updated in September 2009. This score is 30% below the average global score of 4.0. Accordingly, it calls for caution with respect to host countries, with the notable exception of Australia. More encouragingly, among the principal investor countries (five countries: Saudi Arabia, China, South Korea, the United Arab Emirates and Japan), the score for exposure to the risk of corruption in our panel stands at 5.5, significantly above the global average.

Host countries: exposure to the risk of corruption is 30% above the world average



EXPOSURE TO THE RISK OF CORRUPTION

2.8
4.0
1.4
8.7
4.4
1.5
1.9
1.9

TABLE 18 SOURCE: TRANSPARENCY INTERNATIONAL

Respect of fundamental social rights: fairly encouraging levels of adherence

Aside from a few countries (Laos, Sudan, etc.), the levels of adherence are encouraging, although they still lag behind the big global economies of the G8 (Germany, Canada, US, France, UK, Italy, Japan and Russia).

	ADHERENCE TO INTERNATIONAL	L LABOUR RULES	
	Number of ratifications of the ILO's 8 core conventions	Total number of ratifications (international labour standards)	Number of conventions not respected
Panel average	7.6	34.7	3.5
G8 average	6.6	58.8	10.3
Standard dev. of panel	0.8	17.7	3.7
Best in class			
Argentina	8.0	66.0	9.0
Brazil	7.0	81.0	14.0
Russia	8.0	53.0	9.0
Turkey	8.0	52.0	4.0
Ukraine	8.0	56.0	8.0
Worst in class			
Laos	5.0	8.0	0.0
Soudan	7.0	14.0	0.0
	TABLE 19 SOURCE ILO		

> Human rights: many host countries under surveillance

The degree of ratification of the principal international treaties relating to human rights varies sharply within our panel of host countries of land grabbing.

COMMITMENT TO HUMAN RIG	GHTS		
(Ratification of six of the principal treaties relating to human rights)	Treaties ratified	Signed but not ratified	Total
Panel average Standard deviation of the panel	3.6 1.2	0.6 0.6	4.2 0.9
Best in class Argentina Australia Philippines Turkey Ukraine	6.0 5.0 5.0 5.0 5.0	0.0 0.0 0.0 0.0 0.0	6.0 5.0 5.0 5.0 5.0
Worst in class Laos Pakistan	1.0 1.0	2.0 2.0	3.0 3.0

Benchmark based on six international treaties relating to human rights: the International Covenant on Civil and Political Rights (ICCPR) (1966), the first facultative protocol to the ICCPR (1966), the second facultative protocol to the ICCPR (1989), the Convention on the Rights of Children (1989), the Convention against torture (1984) and the International Convention against the taking of hostages.

TABLE 20 SOURCE: AMNESTY INTERNATIONAL



The debate between local communities, media, NGOs, public opinion and politicians is set to grow

Political risk: possible denunciation of a new form of colonialism?

Land grabbing projects have an inherent political dimension. In the years ahead, it is impossible to rule out an intensification of the social and political debate between local communities, political decision-makers, the media, NGOs and public opinion, especially around criticisms of the return to a form of colonialism associated with land grabbing projects. In this context, the degree of political instability will be a key factor in the sustainability of such projects.

POLITICALS	STABILITY AND A	BSENCE OF VIOL	ENCE/TERRORISM	И
(World Bank scoring: scores of -3.28 to 1.52 in 2008)	1996	2002	2008	Change 96/08 (in absolute value)
Panel average World average Standard deviation of the panel	-0.72 -0.11 0.98	-0.74 -0.08 0.97	-0.62 0.00 0.95	0.10 0.11 -0.03
Best in class (2008) Australia Kazakhstan Mongolia Mozambique	1.21 -0.42 0.58 -0.63	1.20 0.13 1.06 0.29	1.08 0.51 0.35 0.29	-0.13 0.93 -0.22 0.92
Worst in class (2008) Pakistan Sudan Congo (Democratic Republic)	-1.44 -2.55 -2.13	-1.56 -2.02 -2.47	-2.61 -2.44 -2.34	-1.17 0.11 -0.21

TABLE 21 SOURCE: WORLD BANK

The following review of long-term success factors and win-win approaches to land grabbing is the best response to these types of questions.

Governance principles for a win-win policy

First, a clarification is necessary: the media outcry over land grabbing announcements appears to have gone overboard. Our different contacts with a range of experts on this subject show that there is often a considerable gap between the way in which the facts are reported and the reality on the ground. In Tanzania, for example, a World Bank study demonstrated that while there was investor demand for 4.4m hectares – the figure reported in the press – only 1.5% of this demand had been accepted.

Similarly, these contracts have often been presented as sales of arable land by governments, whereas in the vast majority of cases they are lease contracts for periods of between 20 years to 99 years.

However, the emotion raised by this subject is legitimate and focuses the attention of all those involved, allowing possible malpractices to be avoided. Although food has an altogether more important character, the experience of mines or oil fields demonstrates that some mechanisms designed to ensure more equitable treatment can help avoid major disappointments.

Lastly, it is worth underlining that we do not consider the sale of arable land by one country to another country or an investor from another country to be the solution offering the most security to the different parties involved. We are strongly in favour of leasing and the different forms it can take.



Several institutional and organisation mechanisms seem necessary

> Hand back the earth to those to whom it belongs!

One of the main risks for rural populations is to suffer confiscation of land and its associated resources (water, forests, pasture, etc.). This risk is all the greater when this land is already put to use by farmers, making it particularly attractive for foreign operators.

However, the interest of foreign operators for the arable land of a particular country can be an opportunity to overhaul the management of property deeds and land law. The virtual absence of an up-to-date and exhaustive land register often makes it very complicated to recognise officially the land rights of populations who, in some cases, have cultivated a piece of land for several generations. Work is needed upstream to ensure that a fair and equitable sale or lease contract recognises and secures the rights of rural farmers in the form of a land certificate.

> Ensure complete transparency and wide consultation

Contractual relations between countries and economic players must be underpinned by clear rules that are accessible to everyone. This is a prerequisite to ensure that transactions are accepted over time by all parties involved and that the terms of contracts are not called into question at a later stage.

The involvement of local players, such as districts and other territorial authorities, is highly desirable, although the main difficulty lies in defining the responsibilities and roles of the different parties concerned. The local social fabric is often the most effective vector to take decisions on highly concrete questions where the common interest clashes with the interest of a minority. The effective implementation of contracts has not always been respected (Mozambique or Ghana).

These territorial bodies are an indispensable part of any rural development and regional planning policy, and foreign investors and operators take them into account when making investment decisions.

Lastly, governments can adopt environmental and social indicators to select projects. It is important that these indicators are monitored over time by independent certification institutions, NGOs, policymakers and local populations to ensure they are properly respected.

Moves to associate the different parties involved are the key success factor in the long term

Several projects have proved particularly disappointing for foreign operators, mainly because of their purely theoretical knowledge of the specific nature of soil types and climatic conditions. The apparently low cost of leasing arable land (often around one euro per hectare per year in Africa) masks a raft of hidden costs for investors lacking thorough knowledge of local conditions.

Roles can be distributed intelligently to ensure a win-win relationship

The technical expertise of agronomic engineers in developed countries and some emerging countries is a considerable advantage when it is applied intelligently to specific local conditions.



Similarly, the financial clout of foreign operators can make a strong contribution to the development of infrastructure, such as transport, communication and water distribution and purification. The expertise of these operators in the areas of fertilisers or international agricultural trade and access to global markets is a very important source of added value.

It is therefore desirable that governments include clauses committing operators to invest in the development of regional territories. These clauses can contain control mechanisms and financial penalties.

We think two types of contract are preferable:

- Contract farming agreements: these consist of an agreement between a buyer and a producer that sets the conditions for the production and sale of one or more agricultural products. In general, the farmer agrees to provide certain quantities of a given agricultural product that meets quality standards determined by the farmer and that must be ready at a date set by the buyer. In exchange, the buyer agrees to purchase the product and, in some cases, to support production by supplying, for example, material inputs, land planning and technical opinions. That said, the production risk is shouldered by the farmer and there is no guarantee that the farmer is paid a decent price.
- Joint ventures seem to us an even better solution: they allow for a complete aligning of the interests of the different parties involved, although it is essential that good governance of the JV is established and respected. The principle is to share the risks and profits of the agricultural company while ensuring the employability of local farmers. In addition, same clauses can be added to the terms of JV whereby the operator commits to sell a minimum part of its production on the local market to avoid a simultaneous situation of agricultural profits and food shortages.

All in all, we think it is important to differentiate between the strategies adopted by investors according to their profile and expectations in order to favour long-term projects dependent on the social and environmental equilibrium of the local fabric.

Several initiatives are underway and some institutions are set to take a position shortly

The international controversies of 2007 and 2008 surrounding the subject of land grabbing helped to raise political awareness of this issue in host countries. The FAO sponsored and organised workshops in Africa on land governance that laid the groundwork for collaboration of investors from foreign countries.

Added to this, fairly general codes of good conduct have already been drawn up. Several NGOs, governments and international institutions have set up working groups to fine-tune and strengthen these codes. These working groups are due shortly to publish the results of their collaborative effort. The World Bank, the FAO, the IFPRI, the CNUCED and the European Commission are set to publish their recommendations by the end of 2010. Although these recommendations lack the rigour and security of regulations, our discussions with experts who participated in these groups makes us confident that they will have a very positive impact, as long as they are correctly implemented and respected.



What if industrial groups also participate in the debate?

Faced with the growing number of land grabbing contracts, large food manufacturers cannot turn a blind eye to this issue indefinitely. Giant groups such as Nestlé, Unilever and Lindt seem to have taken an interest in recent months in certain countries or agricultural production sites which they depend upon for key commodities used in their end products, such as cocoa or coffee grains. Nestlé, for example, is seeking to reduce its dependency on Côte d'Ivoire because of the significant political risk in this country. Similarly, Danone has developed experimental mega farms for milk production, one in Mexico and another in Egypt.

Although it is difficult to imagine a total depletion of cocoa or coffee supplies, food price inflation can be detrimental to these operators. The example of Arcelor-Mittal's partial vertical re-integration may attract imitators. Another example may inspire the food giants: that of champagne producers. The business model of champagne producers such as Laurent Perrier or Vranken Pommery is highly dependent on their capacity to source specific grapes from a multitude of small vineyards. In the face of this risk, the leading champagne houses have sought over time to acquire vineyards representing at least part of their grape needs. The highest proportion of internal production is boasted by LVMH, at 25%, well above that of its competitors (around 10% for number two champagne group Boizel Chanoine Champagne). As such, we do not think it unlikely that the leading food groups will make land investment deals in the near future.

In light of such projects, the licence to operate and past developments in terms of corporate responsibility will be key to the acceptance of these players in these regions. In this Business to Consumer segment, operational risk is high and there is every reason to think that these companies will intelligently incorporate the ESG dimension in their land investments.

Macroeconomic ESG scoring – Our preferred land grabbing host countries and those at risk

Pending better microeconomic ESG visibility on land grabbing projects, we have adopted a macroeconomic ESG approach to host countries. We have established an ESG scoring of 25 host countries where land grabbing projects were concentrated in 2008-2009 based on the information available to us. The details of our model (11 criteria) and the results are presented in the appendix of this report.

Three countries emerge very positively as a strong opportunity (1) from our evaluation: Australia, Argentina and Brazil. Note that the Republic of Congo (not to be confused with the Democratic Republic of Congo), Indonesia, Cameroon, Kazakhstan and Mongolia also emerge strongly from our scoring as an opportunity (2). Lastly, four countries emerge from our evaluation as a high risk (4): Mozambique, Ethiopia, Pakistan and Sudan.

Host countries of land grabbing: we are long on Australia, Argentina and Brazil and short on Mozambique, Ethiopia, Pakistan and Sudan APPENDIX 1: ESG SCORING & RECOMMENDATIONS – LAND GRABBING HOST COUNTRIES

		ENVIRONM	ENT				SOCI	AL			GOVERN	ANCE			GENERAL TOTAL		
ESG SCOKING	Climate change	Water Defo	restation	Sub- total	Gini	HDI M	alnutrition	Agricultural independence	Sub- total	Corruption lab	International our standards	Human rights	Political stability	Sub- Total	ESG	Ranking	Land grabbing recommendation
Maximum score	8.0	16.0	9.0	33.0	5.0	5.0	12.0	11.0	33.0	16.0	5.0	6.0	7.0	34.0	100.0	•	
Australia	3.0	10.5	7.0	20.5	3.5	5.0	11.5	7.5	24.0	16.0	4.0	4.5	6.5	31.0	75.5	-	Strong opportunity (1)
Argentina	6.0	10.0	4.0	20.0	0.5	4.0	11.5	10.5	26.0	7.0	5.0	6.0	4.5	22.5	68.5	0	Strong opportunity (1)
Brazil	3.5	11.5	3.0	18.0	0.5	3.5	11.5	9.0	24.0	7.5	5.0	3.5	4.5	20.5	62.5	e	Strong opportunity (1)
Russia	6.5	11.0	8.0	25.5	3.0	3.5	15.0	2.5	21.0	3.0	5.0	2.5	3.0	13.5	60.09	4	Opportunity(2)
Ukraine	7.0	6.0	6.5	19.5	4.5	3.5	9.5	7.0	20.0	3.0	5.0	4.5	4.5	17.0	56.5	5	Opportunity(2)
Turkey	1.0	6.0	6.5	13.5	2.0	3.5	10.0	6.0	19.5	9.0	5.0	4.0	2.5	20.5	53.5	9	Opportunity(2)
Congo (Republic)	7.0	16.0	5.0	28.0	1.0	2.5	7.5	4.5	14.5	2.0	2.0	3.5	3.0	10.5	53.0	7	Opportunity(2)
Kazakhstan	5.0	7.0	5.0	17.0	3.5	3.5	9.5	5.5	18.5	6.5	1.5	2.5	5.0	15.5	51.0	80	Opportunity(2)
Cameroun	7.0	9.5	3.0	19.5	2.0	1.5	6.5	4.0	12.0	3.0	4.5	3.0	3.5	14.0	45.5	0	Opportunity(2)
Indonesia	6.5	9.0	0.5	16.0	3.0	3.0	8.0	5.5	16.5	6.5	1.5	2.5	2.0	12.5	45.0	10	Opportunity(2)
Mongolia	5.0	9.0	3.0	17.0	4.0	3.0	7.0	1.5	11.5	6.5	1.0	3.5	5.0	16.0	44.5	1	Opportunity(2)
Madagascar	3.0	10.0	4.5	17.5	1.0	2.0	3.0	5.0	10.0	7.0	3.5	3.0	3.5	17.0	44.5	12	Opportunity(2)
Laos	7.0	12.0	4.0	23.0	4.0	2.5	5.5	4.5	12.5	3.0	0.5	0.5	4.5	8.5	44.0	13	Moderate risk (3)
Uganda	7.0	5.0	1.0	13.0	2.5	1.5	7.5	7.0	16.0	5.5	2.5	3.5	2.5	14.0	43.0	14	Moderate risk (3)
Philippines	7.0	6.5	1.0	14.5	2.0	3.0	7.5	3.5	14.0	4.5	3.0	4.5	1.5	13.5	42.0	15	Moderate risk (3)
Mali	4.5	7.5	3.0	15.0	3.0	0.5	7.5	2.5	10.5	6.5	2.0	3.5	4.0	16.0	41.5	16	Moderate risk (3)
Liberia	3.5	13.0	2.0	18.5	0.5	1.0	4.5	4.5	10.0	7.0	1.0	2.5	2.0	12.5	41.0	17	Moderate risk (3)
Zambia	3.0	7.5	2.5	13.0	0.5	1.0	3.0	5.5	9.5	7.0	4.0	2.5	5.0	18.5	41.0	18	Moderate risk (3)
Kenya	7.0	2.0	4.5	13.5	1.0	2.0	6.0	7.0	15.0	3.0	4.0	3.0	2.0	12.0	40.5	19	Moderate risk (3)
Tanzania	5.5	5.0	2.5	13.0	3.5	2.0	5.0	5.0	12.0	6.0	3.0	1.5	4.5	15.0	40.0	20	Moderate risk (3)
Congo (Democratic Republic)	7.5	10.0	5.0	22.5	2.0	0.5	2.5	4.5	7.5	2.0	3.5	2.5	1.0	9.0	39.0	21	Moderate risk (3)
Mozambique	3.0	8.0	5.0	16.0	1.0	0.5	3.0	3.0	6.5	5.5	1.5	2.5	5.0	14.5	37.0	22	High risk (4)
Ethiopia	7.0	3.5	2.5	13.0	4.5	1.0	2.0	5.5	8.5	6.5	2.0	2.0	1.5	12.0	33.5	23	High risk (4)
Pakistan	4.0	3.0	1.0	8.0	4.0	2.5	5.5	4.0	12.0	4.5	3.0	0.5	0.5	8.5	28.5	24	High risk (4)
Sudan	6.5	3.5	2.5	12.5	1.5	2.0	5.0	1.5	8.5	1.0	1.0	1.0	1.0	4.0	25.0	25	High risk (4)
Panel average	5.3	8.1	3.7	17.1	2.3	2.3	7.0	5.1	14.4	5.6	3.0	2.9	3.3	14.7	46.2		
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Empirical Research

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