This paper is a draft submission to the

Inclusive Growth in Africa:
Measurement, Causes, and Consequences

20–21 September 2013 Helsinki, Finland

This is a draft version of a conference paper submitted for presentation at UNU-WIDER’s conference, held in Helsinki on 20–21 September 2013. This is not a formal publication of UNU-WIDER and may reflect work-in-progress.

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Can large-scale agro-investments serve as an engine for inclusive growth?
Empirical evidence from Uganda & Ethiopia

By Philipp Baumgartner (pbaumgartner@uni-bonn.de)

Abstract: Using a case study analysis of one old and one early stage large-scale commercial rice farm in East Africa, I examine the poverty impact on local communities. The impact is analysed along five impact channels. A combination of ex-ante simulation and ex-post institutional analysis is applied. Results show a mixed picture, with some potential poverty-reducing effects.

JEL-classification: Q1; D63; O13; C63;

Keywords: Rural development, Poverty reduction, Large-scale agriculture production, Africa

1 Introduction

Since the price spike in global food and commodity markets in 2006/07 increasing commercial investments in large-scale agriculture production could be observed across the globe. While such large-scale land acquisitions (LSLAs) are not necessarily a new phenomenon, the extent and speed of acquisitions by foreign and domestic investors makes this ‘wave of investments’ an interesting object to study (Deininger et al., 2010; von Braun & Meinzen-Dick, 2009).

Investments targeting rural areas are desirable and feared at the same time. Proponents argue that they can serve as a type of ‘big push’ to kick-start growth in remote, rural areas, create employment opportunities, bringing about technological change and improve links to regional and international markets through better infrastructure. Critics highlight the danger of depriving legitimate user of their land rights, causing environmental damage and potentially deteriorating local population’s situation in terms of income, food security and resilience (Cotula, Vermeulen, Leonard, & Keeley, 2009).

The objective of the paper is to analyse, if LSLAs do trigger growth in the direct geographic proximity and whether this growth can be considered inclusive. A case study approach is used, to analyse how one investment affects local population’s livelihood situation across five main impact channels. These impacts are analysed using one early stage investment to capture changes caused at the implementation, and one already well established case, to see long-term impacts. The five channels identified are (i) Land, (ii) Labour, (iii) Natural Resources, (iv) Technology, and (v) Institutions. Access to and value of the first three factors of production are assumed to change quickly, while the latter two are only slowly changing.

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Acknowledgements: The results presented in this paper are the outcome of four years of research during which a number of people have significantly contributed to improving the quality and robustness of results. I have hugely profited from guidance of Joachim von Braun, Niolas Gerber and Marc Müller at the Center for Development Research (Uni Bonn), as well as from partners in Ethiopia (Degnet Abebaw, Assefa Admassie) and Uganda (Bernhard Bashaasha, Todd Benson). While comments of these and other have improved the results presented, I am solely responsible for any remain flaw. Thanks also to the Protestant Merit Foundation (Villigst e.V., Germany) and the Fiat Panis Foundation for financial support during the field work. I am grateful to UNU-Wider for a travel grant.

1 LSLAs considers an acquisition, including rent, or an area of 500 hectares or more.
In the following section I briefly present the conception of the phenomena, the methodologies used and cases selected. The third section presents findings from the two cases studies. Section four discusses the results, states limitations and concludes.

2 Methodological approach, data and theoretical foundation of analysis

2.1 Theoretical foundation

Poverty: being and doing well

In a broader view, two interconnected views on well-being can be distinguished, which relate to the above discussion on poverty. The first underlines an individual as capable of doing things and thus entails aspects of choice, freedoms and self-determination. The second view looks at satisfaction and thus underlines the states of being (Dasgupta, 1990). In line with this, poverty can be understood as a status deprived of the freedom to do things (negative freedoms), or a deprivation of satisfaction to an extent that the being is threatened (e.g. hunger or ultra-poverty). This first view will be useful in judging the potential emancipating effect of a large-scale investment, e.g. through the creation of employment opportunities. The second is more applicable when looking at the change in poverty levels expressed by income or other indices.

Distribution of income across a society matters. It not only determines a countries growth dynamic, by affecting productivity and ability to invest, but also people’s well-being. Conceptually, it makes sense to distinguish between inequalities between individuals (vertical inequality) and inequalities between groups (horizontal inequalities). According to Stewart, horizontal inequality is an often 'neglected dimension of development' and “[…]the existence of severe inequalities between culturally defined groups […]” explains the eruption of violent conflicts in many pluralistic societies (Stewart, 2001). This view underlines the importance of groups as a unit of analysis: they are instrumental as any member of a group is constrained, if the group itself is constrained, e.g. excluded from the access to certain ‘club’ goods (quasi-public goods).

Impacts occur across five channels and over time

For my analysis I identified five main impact channels through which the investments are likely to affect the local population’s condition (Figure 1). Firstly, the distribution of land is affected. In addition the property rights governing land might change, as well as the transfer of land, e.g. if markets for land become established. At the same time, or partly as a consequence, the value and price of land might change. Secondly, demand of and supply for labour might change significantly within the region. An investment is likely to create new employment and have an impact on local wage levels. Thirdly, the investment is likely to affect local population’s access and use of natural resources. This might partly happen through direct transfer of prior forest/bush land to the investors use. These first three channels can be considered as the impact on factors of production. In addition, technology might change. The investment can introduce new technologies, crops, etc. which might (or might not) diffuse among locals and affect their productivity and/or organisation of production. Finally, institutions are likely to be affected by the investment in two ways. The investment or supporting policies might affect the de jure and de facto rights of local users regarding land use, etc. In that sense, they influence the rules of the existing rural economic system. Furthermore, the organisation of production will be affected as new opportunities

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3 In classic economic theory the three factors of production would be labour, land and capital. I decided to not consider capital markets directly, but given the importance of natural resource, they can partly be seen as a substitute for capital in many rural locations of SSA.
open up and local producers have to adjust their own production and find ways to interact with the investor (e.g. out-grower arrangements).

**Figure 1 - Conceptual framing of the five main impact channels**

- **Land**
  - property rights
  - transfer of land (market)
  - values / prices
- **Labour**
  - employment generation
  - access to jobs
  - wage levels
- **Natural resources**
  - property rights
  - use (de facto)
  - forest products
- **Institutions**
  - rules (formal / informal)
  - organisation of production
  - governance of contracts
- **Technology**
  - introduction of new tech.
  - diffusion / adoption
  - productivity

*Source:* Author’s composition

### 2.2 Cases studied

**Case 1: Tilda Rice Ltd. (Uganda)**

Eastern Uganda has become the rice basket of the nation. While lowland rice cultivation existed in the country since the Second World War, the crop only became popular in the past two decades. Its spread started in eastern Uganda, and was partly triggered by the large-scale rice schemes located at the wetlands of Kimba and Doho. One of these schemes has been privatized and is now operated as a commercial rice company: Tilda Rice Company Uganda Ltd. (in the following Tilda) started operating in the area in 1997 and is cultivating 1,200 hectares of paddy. Next to the investment’s site, small scale farmers grow rice on plots ranging from 0.1 to 2 acres (ca. 0.05 to 0.8 ha). Most of the existing wetland has been transformed into rice fields, and millers and rice traders are found along the road. In my analysis I consider the scheme since its inception in 1968 as ‘one’ example of a large-scale agriculture project and explore its impact on local population’s livelihood situation today.⁴

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⁴ Thus, I analyse the impact of a project that started more than 40 years ago, as compared to the Ethiopian case that was ‘only’ four years’ old when I collected the primary data.
Case 2: Saudi Star Agricultural Development Plc. (Ethiopia)

Since 2006/07 commercial interest in acquiring farmland abroad has increased. Ethiopia is one of the countries which leased out significant shares of its agricultural land to domestic and foreign commercial investors (Baumgartner, 2012). This trend is especially pronounced in the Western lowland areas, which are less densely populated than the central Ethiopian highland and are seen to have high agricultural potential (MoARD, 2009).

The case used for my analysis, is an Ethiopian-Saudi investor who acquired leasehold over 10,000 ha of farmland in the Gambela region in 2008. Land was cleared in the following year and first crop testing and construction work of the farm and canal systems intensified during 2010. In 2011 production started at small scale (ca. 300 ha) and is currently being scaled-up. According to plans of the investor the full operation size of 10,000 ha shall be reached after 5-8 years. The land converted into the commercial farm was not used for agriculture production in the past. It partly served for local communities as rangeland, to gather dead wood and fruits as well as hunting ground. The investment site is located in one of the most remote corners of Ethiopia, ca. 700 km distant from the capital. Prior to the investment activities in Gambela region, integration into the national economy was limited and transport facilities were few (Mengistu, 2005).

The two case studies are different with regard to several contextual aspects, which limit the comparability. However, a number of similarities allow for comparison and careful triangulation of potential and likely early stage and longer term impacts of large-scale agro-investments on the local communities (Table 1).

Table 1 - Characteristics of both case studies

<table>
<thead>
<tr>
<th></th>
<th>Uganda, Bugiri case (Eastern UG)</th>
<th>Ethiopia, Abobo case (Gambela)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop</td>
<td>Rice (long-grain)</td>
<td>Rice (Basmati)</td>
</tr>
<tr>
<td>Farm-Management</td>
<td>Private sector (Saudi-Ethiopian)</td>
<td>Private Sector (Indian-UK)</td>
</tr>
<tr>
<td>Project start</td>
<td>1968</td>
<td>2008</td>
</tr>
<tr>
<td>Year initiated production</td>
<td>1972</td>
<td>2011</td>
</tr>
<tr>
<td>Operational size (2011)</td>
<td>1,200 ha</td>
<td>300 ha</td>
</tr>
<tr>
<td>Farm size</td>
<td>1,200 ha</td>
<td>10,000 ha (planned)</td>
</tr>
<tr>
<td>Population density</td>
<td>7-15 people / km²</td>
<td>60 – 110 people / km²</td>
</tr>
<tr>
<td>Distance to next big road</td>
<td>0 km</td>
<td>120 km</td>
</tr>
<tr>
<td>Distance to capital</td>
<td>400 km (0.7 days)</td>
<td>770 km (2 days)</td>
</tr>
<tr>
<td>Rain pattern</td>
<td>Bimodal</td>
<td>Bimodal</td>
</tr>
</tbody>
</table>

2.3 Methodology of ex-ante and ex-post impact analysis

Ex-post institutional analysis: analytical narrative

The Kibimba Rice Scheme [KRS] was initiated in August 1968. In 1972, the cultivation of rice fields started and local people – especially from the neighbouring sub-counties, Kibimba, Buwuni and Igogo - were employed and trained in rice growing. The Kibimba wetland subsequently was transformed into the rice scheme, covering initially about 600 ha. In 1992 the KRS was transformed into the Kibimba Rice Company [KRC], a government parastatal that aimed to produce rice on a commercial basis. In 1996, Tilda Rice Company Uganda Ltd. [Tilda] won the tender. The British-Indian management took over operations in early 1997. Today, Tilda operates on 1,200 hectares.

Institutional analysis is a complex issue owing to the multi-dimensional nature of institutions and their evolution. Analysis is prone to focus on the form of institutions (e.g. presence or absence of a cadastre for
property rights), rather than on the function they perform (Chang, 2010). Taking a historical perspective and looking at the evolution and change of institutions over time within one context allows one to see the change in both the form and functioning of institutions. Often the problem with this approach is the lack of comprehensive information over time. To overcome this I combine qualitative and quantitative information to support a ‘probable’ narrative that explains today’s (observable) situation. This analysis was labelled ‘analytical narrative’ (Moore, 1966; Rodrik, 2003).

**Ex-ante analysis using mathematical programming**

For the Ethiopian case, the cross-sectional data serves as a base line from which future impacts are estimated using an optimization program (Hazell & Norton, 1986).\(^5\) Two main groups of locals are distinguished in the simulation of the (potential) future impacts of the early-stage project. While both groups mainly cultivate maize and sorghum, they differ significantly with regard to their cultivation practices, degree of involvement in the cash economy and participation in the labour market (Mengistu, 2005). The first group, Anyuak, are indigenous to the region. They are part of the Nilotic ethnic group and lived in the lowland areas along the streams for the past two centuries (Kurimoto, 1997). They practice shifting cultivation and grow maize and sorghum. Family labour is the main input into agriculture production, hiring of labour is very limited and production is mainly for subsistence. In addition to agriculture activities, fishing and gathering activities are important parts to supplement their livelihood, especially in the dry season. Women are often involved in petty trading and selling of traditional alcohol as a way to generate cash income. The second group, are Ethiopians from the highland areas that were resettled to the area during the 1980s. This settler group has lived in the area for more than one generation already and thus also considered ‘local’. They use ox-ploughs to cultivate their fields. Some run small shops or restaurants along the road. However, they are distinct with regard to their asset based, technologies applied in farming and inclusion in the cash-economy.

In the model I assume an affected area of 100,000 hectares, populated by 8,000 people living in 1,600 HHs. Out of these, 70% belong to the Anyuak group and 30% to the settler group. Endowment levels at initial stage are derived from the household survey data and secondary sources were needed. Out of this area, 10,000 hectares (10% of the total land) is converted into the commercial farm (Figure 3).

\(^5\) The setup and calibration of the agricultural model is described in Baumgartner et. al. (2013).
To simulate the impact of the emergence of the large-scale investment on these two local groups, I assume a transfer of the prior open-accessible resource forestland from the local groups to the investor. Each of the local groups follows a mixed livelihood strategy, which is reflected in seven activities. Each activity requires a number of endowments (inputs) to generate the equivalent of one livelihood unit (output), which is priced a local level market prices.\(^6\) Endowments are constrained. These constraints are derived from the household data (N=131) gathered in the area, which is representative for the approximate 8,000 people living in the vicinity of the investment site (30km radius). In addition, I include a market constraint that limits the demand for locally produced goods and services as well as the amount of off-farm employment opportunities.\(^7\) Finally, a labour constraint is assumed, since most agriculture activities have to take place around the onset of the rain (seasonality).

For my ex-ante analysis of impacts I examine the base run (situation prior to investment) and three scenarios: (i) clearing of the forest land, (ii) operation of the investment at full scale (10,000 ha) and (iii) inclusive rural development policy\(^8\) accompanied with investment on ‘only’ 5,000 ha. The last scenario is a

\(^6\) The activities are: (i) cultivation using hand tools (AGR1); (ii) cultivation using draught animals (AGR2); (iii) land preparation for cultivation (LC); (iv) hunting of game meat (HN); (v) gathering of wild fruits, roots, and fuel wood (GATH); (vi) self-employment activities such as beer brewing or small businesses (SELF); and (vii) off-farm employment paid in cash on a monthly or daily basis (JOB). Each of these activities has different resource requirements, on which the groups spend their endowed resources. The resources are: (i) agricultural land (hectares); (ii) open access land (hectares); (iii) labour during peak harvest season (days); (iv) labour during off-peak season (days); (v) draught animal (Ox days); and (vi) cash and assets (birr).

\(^7\) One example is off-farm employment opportunities, which are initially very limited in the area. Besides the civil service, some few jobs in the local NGO operated hospital and occasional job opportunities for local investors, few jobs existed in the district prior to the arrival of the investor. Similarly, demand for locally produced goods, such as home-brewed alcohol, clothing or construction work, was limited by the amount of cash available by fellow community members.

\(^8\) The RDP scenario assumes public or private investment in smallholder productivity with an assumed increase in yields between 25% and 50% for the various crops/ techniques, plus additional draft animals
utopian alternative policy option to see what a more balanced strategy could achieve in terms of poverty reduction and sustainability.

Data collection

Prior to the collection of survey data, contextual information was gathered through consultation with experts and key-informants, in both countries. Household surveys were conducted using stratified random sample design. In Ethiopia data from all six communities located in direct vicinity of the investment were gathered, as well as from the local small town. In Uganda, due to higher population density, six villages were randomly drawn from prior stratified list of communities. In addition to the household and community surveys, qualitative interviews were used to gather contextual information, rank villages’ challenges and identify most vulnerable groups. In Uganda, semi-structured biographic interviews with 14 rice-farmers in four localities near the investment site were conducted. Using 10 open-ended questions, these questionnaires aimed to stimulate a personal narrative on four aspects of major interest.

3 Findings from country analysis

In the following I present five key findings from the two case studies. The first three build on the Ugandan case, while the final two relate to the Ethiopian case. They complement each other and partly address different impact channels.

3.1 Conversion of wetland to rice fields

The eastern part of Uganda has traditionally been characterized by customary ownership structure. Clans had the user and decision-making rights over natural resources. Until the middle of the last century, only the few plots used for agriculture had individualized rights. Transfer of land was either through inheritance from parents to their children or if the clan leader agreed to re-allocate land to new-comers. Before the arrival of the Kibimba Rice Scheme in 1968, the wetland were mostly used for grazing or left idle. Some farmers were planting yams, sweet potato and some rice in the low-land fields.

“I went to swamp and just started to cultivate the piece of land that I thought I can manage by myself.” (Rice farmer; 50yrs who started in 2002, Buwuni).

Rice growing was relatively new in the area when Chinese experts arrived in 1968 to construct the dam and start developing the first 600 hectares as a rice development and research centre. Interviews with a number of older farmers revealed that some of the initiators started to cultivate rice on their own plots in the mid-70s (B7, B3). Their number increased over the 1970s and 1980s, according to statements from various interviews. The main motivations to grow rice were financial benefits, i.e. additional source of income. In that regard, farmers were pulled into growing rice to augment their income.

A second factor pushing farmers to use wetlands for rice cultivation was the loss of employment for a large number of permanent and temporary workers at two specific points in time. After twenty years, the contract with the Chinese ended in 1988, causing a restructuring of the investment. Many workers were laid-off, less land was cultivated, and some plots rented out to an out-grower organisation, formed by or tractor rental services. Furthermore, smallholder commercialization shall increase labour demand in the area.

9 This is illustrated by a quote of a rice farmer and village vice-head: "Kibimba started in 1971 and farmers who went there for employment acquired skills to cultivate rice, and currently no wetland idle." (B1, Igogo).
former company workers. The government took over management of the company. In 1996 the state-scheme was privatized, and the new management again restructured the worker-base, laying-off a number of the older worker, and expelling the out-grower from the rented land. These two moments can be seen as catalytic for rice-growing sector in the district, as they allowed the broad diffusion of technology.

In addition, two other trends unrelated to the investment contributed to the spread of rice in the area: population growth and a change in relative profitability of cash crops. Population growth increased pressure on land and pushed farmers to convert land that was not yet used for agriculture into farming plots. Conversion of wetlands was one indicator of this. Furthermore, in the early 2000s the price of maize declined, while the price of rice stayed stable or increased (IRRI, 2013).

To summarize, I found that a “scramble for wetlands” started in the mid-1990s, when a significant proportion of the population started taking up rice growing. I identify four factors driving this trend in Bugiri district: (i) technology change/new crop; (ii) organisational change of the investment; (iii) change in relative prices of other crops and (iv) population growth.

3.2 Today’s situation of growing rice and source of knowledge about cultivation practices

Using the household survey which is representative for the surrounding communities of the Uganda investment, I can explore the status of rice growing in early 2011. Some descriptive statistics depict this. I asked farmers whether they knew how to grow rice. Close to two thirds reported that they knew how to grow rice (58 %), with others denying it (41 %) and few declined responses (1 %). Out of those who know how to grow rice, about 55 % stated that they have grown rice in the past season.

Farmers with knowledge about rice growing were asked how they acquired the skills (Table 2). The vast majority of farmers has learnt the techniques either from their parents (33%) or neighbours (40%). 14% had acquired the skills from past work under the Kibimba Rice Scheme, i.e. learnt from the Chinese and another 3% learnt through working at Tilda. A small share mentioned government extension services (4%) or other sources (7%). This indicates that the main source of technology transfer happens from one generation to the other (parents) or through exchange with neighbours or relatives.

Looking at the source of knowledge on rice growing for the group currently cultivating rice, it becomes apparent that as time progresses, learning from parents and neighbours become the two most important sources of knowledge transfer. Neighbours and friends, however, were already named among those members of the first two generations as important knowledge sources. Extension only became a relevant source after the year 2000. Notably, even those farmers starting in the past 10 years mentioned that they had learnt to grow rice from past work experience with Kibimba. This indicates that farmers might have the knowledge from young age, but only start own cultivation once they have generated sufficient income (capital) to invest in cash crop production (rice) or are pushed to do so by other factors such as falling prices for other crops, loss of jobs, etc.

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10 For example, in Igogo village, located approximately 3 km north of the investment site most farmers (or their parents) had started rice growing in 1989. In later interviews it became apparent that in 1988 the Chinese had to lay off half of the permanent staff and reduce production significantly. The local population which had relied on cash income from employment of the investment subsequently applied the learnt skills to existing wetland and started growing rice.

11 Despite this pressure on land, customary land titles have shown to be effective, according to the interviewed farmers. Traditional boundaries demarcate rice plots in the wetland area. Customary rights are protected under the Constitution of Uganda as well as relevant land laws (GoU, 1995, 1998), but recent increased interest in environmental protection lead to overlapping regulations for wetland areas.
Table 2 - Source of knowledge about growing rice by point in time started to grow

<table>
<thead>
<tr>
<th>Year started growing rice</th>
<th>Source of knowledge on growing rice (frequencies of total group, in %)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Parents</td>
<td>Neighbours</td>
</tr>
<tr>
<td>1st Generation (before 1988)</td>
<td>-</td>
<td>33.3</td>
</tr>
<tr>
<td>2nd Generation (1988-1997)</td>
<td>12.5</td>
<td>50.0</td>
</tr>
<tr>
<td>3rd Generation-a (1998-2003)</td>
<td>42.9</td>
<td>50.0</td>
</tr>
<tr>
<td>3rd Generation-b (2004-2011)</td>
<td>50.0</td>
<td>26.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>39.2</td>
<td>37.3</td>
</tr>
</tbody>
</table>

*Source: HH-Survey (2011)*

Farmers very often made a reference to Kibimba regarding their acquisition of skills; either through personal engagement with the scheme or through a husband, relative or parent who learnt skills from there. Younger farmers also indicated that they gained knowledge from working at Tilda. Others gained experience from friends or neighbours. From the qualitative data it can be concluded that most of the first-hand knowledge that led to the uptake and spread of rice cultivation had come from the Chinese.

Three explanations are suggested by local population’s narratives: (i) The Chinese work focused on knowledge transfer and they frequently visited farmers who adopted rice cultivation and helped them to improve their skills and techniques. Related to this, (ii) the Chinese had a more trustworthy relationship with many of the local villagers and were less harsh in communication. I turn this argument around: the “tense” relations between most local communities and Tilda prevented further transfer of knowledge (see discussion below). Finally, there exists what I coin the (iii) life cycle argument: young people are more likely to work as casual workers in the rice plantation before getting married and to accumulate capital to invest in their own farmland.

### 3.3 Emergence of a vivid land rental market, resting on *de facto* rights

In Bugiri district, almost no wetland is left for expansion, but renting was stated as an ‘easy’ option to access land. One young farmer mentioned that further away there was un-used wetland, and this had also been mentioned in a group interview near the investment site. Thus, I argue land expansion was most pronounced in the wetlands directly neighbouring the investment site, and expansion today involves conversion of swamps further away. This finding is supported by differentials in rental prices across the villages, with the highest prices in those villages nearest to the investment site.

The rental agreements are not written, but are verbal in form. Sometimes they are made in front of a third party, but in general they rely on trust. Tenants have to pay the rental fee up-front and the land owner normally rents out his plot on a seasonal basis. This leads to a situation where many tenants cultivate a different plot each season.

Presuming that a major investment, such as investments in land, is recalled appropriately, I use this information to analyse the trend of price change within the district. The usual unit of measurement in this

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12 Land for rice expansion has been available until 2005 in most villages.
part of Uganda is *catala* (16 catala make one acre) and farmers referred to this unit with regard of renting or hiring labour. The nominal price for land was around 1,500 USh per catala in the mid-80s. For the late 1980s and early 1990s farmers in several villages reported rental prices of around 5,000 USh per catala / per season, which seemed to remain constant until the mid-2000s when in some villages prices went up in nominal terms (8,000 – 16,000 USh/ catala). In 2010/2011 the rental prices in most villages were at 20,000 USh/ catala per season.13 Controlling for inflation and converting to per acre prices these few data points indicate the trend across villages and over the past 20 years (Figure 4).

**Figure 4 - Price trend for wetland in selected villages – 1990 – 2013 (Source: own data – recall questions)**

![Trend of rental price for wetland in selected villages](image)

*Note: Prices were deflated using World Development Indicators and standardized for 2010 prices (World Bank, 2013); Prices were converted to seasonal rent per acre even though local farmers usually rent much smaller pieces of land (0.1 - 0.5 acre); Exchange rate from Jan 2011 (oanda, 2011).*

The falling prices in Igogo and among the outgrower group are explained by nominal stable prices that are discounted for 2010 price. Several sources had named the same rental price for the noted years. Igogo was usually the village with the highest rental prices, while Nainala B. seemed to have lower prices. The dashed lines indicate trends for these two villages and thereby depict a range within which the local rental price has evolved over the past two decades. Currently farmers rent wetlands at 320,000 USh/ acre per season: a value close to 120 US$ per acre per season (approx. 300US$ per ha per season).

### 3.4 Change in factor prices due to investments evolution

For the Ethiopian case, I simulate employment effects as the farm size increases, using information from the farm management. At the same time, prior forest land used by the local groups is converted into farmland and thus not accessible anymore. Finally, the market-constraint is relaxed as the investment grows: I assume that workers spent some of their earnings on locally produced goods.14 Based on mathematical programming, shadow prices for those endowments can be derived that face a binding

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13 In Igogo some farmer reported prices of up to 30,000 USh/ catala. (B11).

14 In the model it is assumed that 10% of workers' overall income is spent locally, leading to a 5% increase of demand for local goods for every 1,000 hectare of land under cultivation. For more details on the model's assumptions see Baumgartner et al. (2013).
constraint. The Table 3 lists these prices for both groups for the base run and the following three scenarios.

**Table 3 - Trend in shadow prices of different inputs across scenarios, absolute values for both groups (USD)**

<table>
<thead>
<tr>
<th>Inputs (with positive shadow price)</th>
<th>Base scenario</th>
<th>Forest clearing</th>
<th>Full operation 10,000 ha</th>
<th>Inclusive policy + 5,000 ha</th>
<th>Unit</th>
</tr>
</thead>
</table>
| Ind 
| Forest / bush land                | Hunting       | 0.90            | 0.90                     | 0.90                       | 0.89 | ha/ year |
| Labour                            | Peak season   | 0.43            | 0.43                    | 0.43                       | 0.64 | day      |
| Draft animal                      | Yoke of oxen  | 17.04           | 17.04                   | 17.04                      | 18.44 | day      |
| Set 
| Forest / bush land                | Gathering     | 0.63            | 0.63                    | 0.51                       | 0.46 | ha/ year |
| Labour                            | Peak season   | 0.45            | 0.45                    | 1.45                       | 1.81 | day      |
| Draft animal                      | Yoke of oxen  | 29.63           | 29.63                   | 0.00                       | 0.00 | Day      |

*Note: Based on results from simulation. Exchange rate Jan 2011: 1USD = 16.4 ETB; pppUS: 5.22 (World Pen Table); For details on scenarios see Baumgartner et. al. (2013)*

**Shadow prices in the base scenario**

Land per se has no shadow price. Agricultural land is not scarce in the low-population-density area of Gambela region. As long as forest or bush land can be converted into agricultural land, the labour invested in land is the limiting factor for agricultural expansion. This is reflected in the absence of a positive shadow price for agricultural land in my model.

Forest and bush land has a shadow price. This price differs between the two local groups. The indigenous group uses forest/ bush land for gathering activities as well as hunting. Their price for the use of one additional hectare per year would be 0.90 US$ for hunting and 1.5 US$ for gathering activities in the base scenario, e.g. a total of 2.39 US$/ha/year (assuming complementary use of hunting and gathering). The settler group relies less on this source and thus only shows a shadow price of 0.63 US$ for the gathering activities.

Labour does not show a positive shadow price throughout the entire year. Due to seasonality, only during the peak agricultural season, i.e. 3 months around the onset of the rainy season, labour is scarce and has a positive shadow price. The price is similar for both groups (0.43 and 0.45 US$) in the base scenario. Finally, draft animals have a high value and their service to plough a field for one day has a shadow price of 17 US$ in the case of the indigenous and even close to 30 US$ for the settler group. This reflects different levels in productivity.

**Change in shadow prices across the scenarios**

The opening of the land and clearing of 10,000 hectares of forest / bush land shows no change in prices (scenario 1). As the investment increases in size (scenario 2), the value of a working day increases and the constraint on a pair of oxen to plough the field is not binding anymore, for the settler group. This is explained by a shift away from agriculture activities towards off-farm employment, which is less seasonal. However, as the labour faces higher opportunity costs, the shadow price increases. This becomes even more pronounced with the inclusive development policy (scenario 3), where smallholders’ productivity is
assumed to increase. Value of (peak) labour increases further to a daily shadow wage of 1.81 US$ among the settler and 0.64 US$ among the indigenous group.\(^{15}\)

### 3.5 Changes in composition of livelihood strategies as investment size increases

Once the model is calibrated, the base run reveals the initial level and composition of income for both groups. Thereafter, I use the scenario 2 (full operation) to see how the mix of income activities changed and if the level of income increases. Table 4 presents the results from the simulations.

Prior to the investment’s inceptions, the indigenous group has a balanced mix of six livelihood activities. Manual agriculture accounts for close to a quarter of the group’s overall income, gathering activities generate close to 30% of income and business activities, and off-farm employment 18.5% and 13.3% respectively. Hunting\(^{16}\) builds an important source of livelihood, too. The settler group’s livelihood is much more based on agriculture activities (\(\text{AGR1} + \text{AGR2} = 43.4\%\)). The use of oxen to cultivate maize and sorghum plots builds the main source of the group’s income. Business activities are very important (37.5%), too. At initial stage, wage-employment and gathering only supplement their income.

As the investment increases in operational size, access to open bush land and forest decrease by 10% for both groups. At the same time, off-farm employment opportunities increase significantly causing a reallocation of (family) labour towards off-farm employment and business activities. This can be noted for both groups. The relative importance of natural resource use (Gath + HN) as a source for the overall livelihood situation of both groups decrease by above 40%. Self-employment remains similarly important and off-farm employment increases drastically in relative terms for both groups (increase of more than 200%).

**Table 4 – Changes in composition and income levels between the base scenario and full operation for both groups, Ethiopia case**

<table>
<thead>
<tr>
<th>Group</th>
<th>Status</th>
<th>Livelihood activities (percentage share of group’s total income generated by)</th>
<th>Total income of full group</th>
<th>Total (%-Change)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(\text{AGR1})</td>
<td>(\text{AGR2})</td>
<td>(\text{HN})</td>
</tr>
<tr>
<td>Ind</td>
<td>Base</td>
<td>22.3%</td>
<td>16.7%</td>
<td>29.3%</td>
</tr>
<tr>
<td></td>
<td>Full size</td>
<td>12.4%</td>
<td>9.8%</td>
<td>17.2%</td>
</tr>
<tr>
<td></td>
<td>Change*</td>
<td>44%</td>
<td>-44%</td>
<td>-41%</td>
</tr>
<tr>
<td>Set</td>
<td>Base</td>
<td>1.6%</td>
<td>41.8%</td>
<td>7.0%</td>
</tr>
<tr>
<td></td>
<td>Full size</td>
<td>0.0%</td>
<td>22.7%</td>
<td>4.0%</td>
</tr>
<tr>
<td></td>
<td>Change*</td>
<td>-100%</td>
<td>-46%</td>
<td>-43%</td>
</tr>
</tbody>
</table>

* Note: \(\text{AGR1}\) – manual agriculture, \(\text{AGR2}\) – agriculture using draft animals, \(\text{HN}\) – hunting, \(\text{GATH}\) – gathering wood, fruits & roots, \(\text{SELF}\) – self-employment & SME, \(\text{JOB}\) – off-farm employment/ wage-employment.

* Change = (End/Base) – 100%; it shows the relative change of an activities importance to meet a groups livelihood situation.

The right side of the table shows that overall income of both groups increase by more than 50%. Thus, growing opportunities to generate income from off-farm employment and business activities off-set the losses from forgone natural resource use and lead to significant increase of both groups total income. The gains are even more significant for the settler group, which is explained with higher participation in the off-farm economic activities. However, similar income increases were reached in the simulation of an inclusive rural development strategy with additional investments in smallholder agriculture.

\(^{15}\) Noteworthy, this wage level actually matches what the investor paid daily labour and guards in early 2011 (ETB 23 – 30/day ~ 1.60 – 1.90 US$/day).

\(^{16}\) Hunting includes the use of traps as well as longer lasting group-hunts.
4 Summary of findings and concluding remarks

4.1 What change can be observed across the five channels

Land: value increase depending on other factors

In the low-population density setting of the Ethiopian investment case, agricultural land was not scarce. The shadow prices showed that land per se was not limited.\(^{17}\) With emerging size of the investment and increasing alternative income opportunities, the settler group even showed to cultivate less land, i.e. shifting away from agriculture activities, in relative importance but also absolute terms. In Uganda, where population density is much higher, wetland surrounding the investment case is fully converted into rice fields and no space for future expansion remains. The rental prices for land increased over the past two decades. In Uganda, a local rental market emerged following the introduction of the new crop to the area. This has efficiency enhancing effects.

Labour: Increasing off-farm employment and rising wages at initial stage

The employment effect is probably the most pronounced effect a large-scale investment has on the local communities. However, the direction and degree depends on skill-demand and existing skill-level, the degree of mechanisation in production and not at last the relationship between investor and community. In both cases, off-farm employment opportunities increased significantly after the start of the investment. In Ethiopia, an increase in wage levels was also reported. The increase in shadow prices for labour during the peak season confirms this up-ward trend, which is likely to improve families’ income. In addition to this level-effect, the increasing opportunities can enable local communities to diversify their livelihood strategies. However, the alternative policy scenario in Ethiopia has indicated that similar employment effects could be reached with more investment in small-holder based production, which is more labour intensive and thus equity enhancing (Lipton, 2009).

Natural Resources: loss of access to forest land, & potentially decreasing importance

The loss of access to forest land caused a decrease of overall income for the groups in Ethiopia ranging from 1% to 4.4% for the settler and indigenous group, respectively. This loss is off-set by income gains through the new opportunities (off-farm employment and selling of local produces). The relative importance of natural resource use also decreased for both groups. However, the absolute use of natural resources remains almost constant and the shadow prices only reduce marginally. This indicates that natural resources remain an important supplement for rural population’s livelihood situation. Collecting of wild fruits, roots and fuel wood, as well as hunting activities are not only important additional sources of income, but can serve as a security net in situations of hardship. They are therefore especially important for the vulnerable and the poor.

Technology transfer: partly from working with investor, mainly from peers

Rice growing has become an important income source for many farmers in the Ugandan case study. The technology was adopted well by local people, and contributed to an institutional change (scramble for wetland). The up-take in Uganda was most pronounced by former company work, and catalyzed by

\(^{17}\) This is also confirmed by interviews with the communities, who state that none of their agricultural land was directly affected by the Saudi Star investment case.
restructuring of the company which caused lay-offs. People who had left the income opportunity from working at KRS/KRC, applied acquired skills on the own fields and can gain additional income.18

**Institutions: emergence of property rights over land**

In Uganda, local communities established stable property rights over wetlands to operate them as rice fields. Later these rights became transferable within a vivid land rental market. This confirms earlier findings by Schlager & Ostrom (1992, p. 254): “Users of a resource who have developed de facto rights act as if they have de jure rights by enforcing these rights by themselves.” In that sense, unchallenged de facto rights determine individuals’ behaviour as much as de jure rights. Only if the de facto rights are challenged, the difference becomes apparent. The rights are currently challenged, as the investor plans to expand production. However, for the past two decades, it seems the emergence of rights has enabled a vivid land rental market that allowed additional options (doing) for land owners and increase land owners as well as tenants’ income situation (being).

**Summary of findings**

It can be seen from above presented results that large-scale land acquisitions and subsequent investments impact on the rural economy and local population’s livelihood situation. This impact occurs across a number of channels and is not uniform across time. Overall I observe a mixed picture across the five channels. Employment effects positively across all four dimensions. Change in values of land and use rights have showed mixed effects. Loss of access to natural resources is negative in the short and long run, and makes members less well off. Technological change can be considered growth enhancing, but it is unclear whether the poor participate equally in technology adoption. Property rights over land were created and enforced by local users.

The Ethiopian case showed slightly unequal participation of both groups in the growth process. This increase in intra-group inequality seems to be even more pronounced in the past two years and has already cause conflict at the surrounding of the investment. Thus, horizontal inequality remains an important dimension for judging the inclusiveness of large-scale investments.

**4.2 Limitations**

The paper draws on two cases studies, and thus its results are limited to specific contexts. While some general aspects have been drawn and discussed above, contextual factors remain important in determining the directions of impacts on livelihood situation of the local communities. The ex-ante analysis is by its nature prescriptive. The results rest on a number of assumptions which I believe are reasonable for the given context in Gambela. Nevertheless, the model assumes complete flexibility of household members across activities, and use profit maximizing behaviour as main strategy.19

The analysis does not consider intra-group distributional aspects, and can therefore only partly answer the degree of inclusiveness, i.e. how strong the more vulnerable and poor are included in potential benefits of growth effects. The ex-post analysis in the Ugandan case lacks sound data from earlier points in time and thus has to rely on triangulation of information provided by interviews and existing secondary data.

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18 Unfortunately I have not been able to trace the income effect of rice growing in the Uganda case, but positive effects are documented in the literature (Kijima, Ito, & Otsuka, 2012; von Braun, 1988).
19 Risk-aversion is partly reflected in the configuration.
4.3 Concluding remarks

The paper has shown that large-scale land acquisitions can improve local population’s livelihood situation through increasing diversity of livelihood strategies and increasing incomes. In that sense, large-scale investment can serve as an engine for growth in rural Africa. However, the distributional aspects as well as potential threats to groups’ rights (doing) in both countries, underline the threat that LSLAs can increase marginalization processes, e.g. depriving indigenous groups of legitimate access rights. In addition, the growth might not be pro-poor in the sense that poorer groups among the local community do not gain in a similar way as better off do. This increases inequalities and potential tensions. Technology transfer does not come along automatically.

Therefore, LSLAs need to be either implemented in a participatory mode to allow also the less well off local groups to be considered, or additional policy measures are required to ensure social inclusion and avoid deprivation. Investors might be open to local communities concerns, but pressures from their business activities and investor partners can prevent them from interacting more with the local communities and consider their expectations and needs. Local communities might have too high expectations and frustration after the onset of the investment is likely to harm relationship at initial stage. Donors and governments can try to bridge the gap and ensure that smallholder agriculture remains part of the local production system.

5 References


