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## **Land? Gone. Water? Gone. What Next?**

A Systematic Review of Impacts of Large-Scale Land  
Acquisitions on Water Security of Smallholders in Sub-Saharan  
Africa

Author: **Ahmed Asadullah**

Supervisor: **Mads Barbesgaard**

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## **Abstract**

Recent land grabs in Sub-Saharan Africa are influenced by both land availability and access to water resources beyond seasonal rains. However, much of the literature has treated land grabs and their attendant water resource appropriations as separate phenomena until recently. This paper examines the complex interplay of large-scale land acquisitions and their impacts on the water security of smallholders in Sub-Saharan Africa. Using systematic literature review, qualitative thematic analysis, and theoretical insights from political ecology and the hydrosocial cycle, it explores the local conditions, actor interests, motivations, and power relations; decision making; and institutional lapses that enable land grabs to go in tandem with water resource appropriations. The results show that although land and water grabs were intricately intertwined, investor negotiations for land rarely included water use rights. Motivated by the notion of abundant, unused water, investors carefully negotiated access to water for irrigation, including offering social benefits in exchange for unrestricted water use. Uneducated traditional leaders were mostly oblivious to national legislation and institutional arrangements for land and water use and sometimes unknowingly sanctioned unlimited water use by investors. Farmers were more concerned about land dispossessions and agrochemical threats to water quality, not water rights abuse. The findings expose often-overlooked forms of water appropriations driven by land grabs and highlight their hydrosocial ramifications in the Sub-Saharan Africa.

**Keywords:** Large-Scale Land Acquisition (LSLA), Water Security, Smallholders, Impact, Sub-Saharan Africa (SSA), Hydrosocial Cycle

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## Abbreviations

<b>FAO</b>	Food and Agriculture Organisation
<b>MENA</b>	Middle East and North Africa
<b>NEMA</b>	National Environmental Management Act
<b>PRISMA</b>	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
<b>REDD+</b>	Reducing Emissions from Deforestation and Forest Degradation
<b>UNCTAD</b>	United Nations Conference on Trade and Development

# 1. Introduction

The rise of large-scale land acquisitions has become a global phenomenon with profound implications for food security, sustainable development, and the rights of local communities. These acquisitions, also called land grabs, involve the takeover of large tracts of agricultural land by corporations, investors, and governments, often at the expense of smallholder farmers and indigenous communities (Deininger et al., 2011; Borras and Franco, 2012). Motivated by factors such as the global food and financial crises, growing demand for biofuels, and speculative investments, land grabs have captured attention as a pressing issue in the field of agrarian studies (Borras and Franco, 2012). The significance of responsible land governance in the context of national food security has been recognised by international organisations, with an emphasis on the need for equitable and inclusive approaches. This recognition, including the stance of the United Nations Committee on World Food Security in 2012, highlights the importance of considering fair and inclusive measures in managing land resources (UN Committee on World Food Security, 2012). However, while land grabs have received considerable scholarly and policy attention, the specific impact of these acquisitions on water security, particularly for smallholder farmers in Sub-Saharan Africa, remains understudied.

Wolford et al. (2012) emphasise that the governance and regulation of global land deals, including their impact on water resources, are shaped by the actions and policies of state actors. The state's role in mediating these processes becomes increasingly relevant in safeguarding the rights of marginalised communities and striking a balance between economic development and equitable resource management. Furthermore, Borras and Franco (2013) shed light on the emergence of political reactions 'from below' as a response to global land grabbing, highlighting the mobilisation of local communities and social movements to resist the adverse consequences, including those related to water security. Such resistance is indicative of the urgent need to examine the intricate connections between land acquisitions and water access and management.

Furthermore, research indicates that land grabs are often accompanied by the appropriation and control of water resources, contributing to water scarcity and ecological degradation (Borras and Franco, 2012; Anseeuw et al., 2012). This



intertwining of land and water grabs intensifies the challenges faced by local communities, who rely heavily on these resources for their livelihoods and overall well-being (Anseeuw et al., 2012). The consequences of land grabs on water security, particularly in Sub-Saharan Africa, where a significant number of acquisitions have taken place, are critical to understand (Deininger et al., 2011). Smallholder farmers, who make up a substantial portion of the agricultural sector in the region, are particularly vulnerable to disruptions in their access to water resources, with potential implications for their agricultural productivity, livelihoods, and overall resilience (Borras and Franco, 2012; Deininger et al., 2011).

To address this research gap and contribute to the understanding of the complex interactions between land grabs and water security, this thesis examines the impact of large-scale land acquisitions on the water security of smallholder farmers in Sub-Saharan Africa. Specifically, it investigates how land grabs affect smallholders' access to water for agricultural production, as well as their water-related needs for health, hygiene, and ecological resilience (Anseeuw et al., 2012; Deininger et al., 2011). Additionally, the study explores the strategies adopted by smallholders in response to the water insecurity created by these land grabs, shedding light on their agency and resilience in the face of such challenges (Borras and Franco, 2012). By examining the interplay between land grabs, water security, and smallholder livelihoods, this research aims to contribute to policy discussions and efforts towards more equitable and sustainable land and water governance in Sub-Saharan Africa.

Large-scale land acquisitions (LSLAs) in Sub-Saharan Africa (SSA) have gained significant attention within the academic discourse, raising concerns about their multifaceted impacts on sustainable development and agrarian dynamics (Borras and Franco, 2012; Zoomers, 2010).

Africa remains a prominent target for LSLAs, with 422 concluded agricultural deals within the continent and 42% of land acquisitions globally, corresponding to ~10 million hectares of land. Additionally, there are 147 intended deals in Africa, aiming to acquire 13.2 million hectares of land (Kerstin et al., 2016), thus highlighting the importance of this region when studying the impacts of LSLAs. Notably, LSLAs tend to be concentrated along major rivers and in East Africa, indicating the critical role of water resources in driving these acquisitions (Ibid.).

Despite extensive research on the social and economic consequences of LSLAs, there remains a notable gap in the literature regarding their specific implications for water security, particularly for smallholder farmers in the region (Scoones et al., 2009; Derman et al., 2014).

Borras and Franco (2012) argue that the phenomenon of global land grabbing, of which LSLAs are a key component, has profound implications for the trajectories of agrarian change worldwide. By examining the role of water resources in this context, it becomes evident that understanding the interaction between land acquisitions and water security is of paramount importance.

Against this backdrop, it is imperative to explore the intricate relationship between LSLAs and water security, with a specific focus on the experiences of smallholder farmers in SSA. By investigating the impacts of LSLAs on smallholders' access to water resources and overall water security, this research aims to contribute to a deeper understanding of the complex interplay between land grabbing dynamics and sustainable livelihoods in the region. Additionally, an examination of the strategies adopted by smallholders in response to LSLAs in the context of water security will provide valuable insights into community resilience and adaptive practices.

The first research question seeks to examine how LSLAs affect the water security of smallholder farmers in SSA. Water security encompasses multiple dimensions, including access to water for livelihood purposes, such as irrigation for agriculture and livestock, as well as access to water for health and hygiene, ecosystem sustainability, and resilience against natural hazards (Kerstin et al., 2016; UN Water, 2013). Smallholder farmers, who heavily rely on water resources for their subsistence agriculture and overall well-being, may face challenges due to LSLAs that alter the dynamics of water availability and access. By investigating the impacts of LSLAs on smallholders' water security, this study will contribute to a deeper understanding of the complex interactions between large-scale land acquisitions and water resource management in SSA.

The second research question aims to explore the common strategies adopted by smallholders in response to LSLAs, specifically in the context of water security. As smallholders navigate the challenges posed by LSLAs, they may employ various strategies to safeguard their access to water resources, protect their livelihoods, and

maintain their water-related practices (Borras et al., 2011; Anseeuw et al., 2012). Understanding these strategies will shed light on the agency and resilience of smallholders in the face of changing land dynamics and highlight potential pathways for mitigating the negative impacts of LSLAs on water security.

To investigate the research questions outlined above, this study will employ a systematic literature review methodology. A literature review approach is chosen due to its ability to comprehensively analyse existing research, reports, and academic articles related to the impacts of LSLAs on water security in SSA. By synthesizing and analysing a wide range of secondary data, this study will provide a comprehensive understanding of the multifaceted dimensions of the research topic.

### **1.1. Research questions**

- How do LSLAs impact water security of smallholders in Sub-Saharan Africa?
  - Smallholders' access to water for livelihoods
  - Smallholders' access to water for health and hygiene, ecosystem, and natural hazard resilience.
- What are common strategies adopted by smallholders against LSLAs in the context of water security?

### **1.2. Thesis outline**

With this identification of the problem and setting up of clear research questions, the following chapters shall be structured as.

Chapter 2 will include background of LSLAs and some facts surrounding them. The drivers and impacts in existing literature. Definition of water security, water scarcity and associated concerns. Finally, placing the problem within the existing literature surrounding LSLAs and water.

Chapter 3 will then include discussion on possible theories that explain LSLAs particularly the lens of political ecology, culminating into a theoretical framework against which the analysis shall be performed.

Chapter 4 details the research design involving data collection with systematic literature review method, why and how it is operationalised to get required data and the limitations.

Chapter 5 covers the findings, results, and discussions on how the data answers the research questions.

Chapter 6 includes the conclusion of the thesis, recapping the aim of the thesis, methods applied, major results and discussions and way forward for future research within the domain.

## 2. Literature Review

### 2.1. Large-Scale Land Acquisitions

The food crisis of 2008 brought global attention to the issue of food security. The crisis was caused by a combination of factors, including rising oil prices, droughts, and biofuel production, but it highlighted the vulnerability of countries that were heavily dependent on food imports (Deininger *et al.*, 2011; Schoneveld, German and Nutako, 2011). Oil rich countries in the Middle East such as the United Arab Emirates and Saudi Arabia, which have environments inconducive to large-scale agriculture particularly due to the weather and availability of water. In response to the crisis, such countries began to look for ways to solve their food security issues, and LSLAs became an attractive option (Margulis, McKeon and Borrás, 2013; Edelman, Oya and Borrás, 2016).

One of the purposes of LSLAs is to meet food security demands by acquiring fertile land in lesser or undeveloped countries, turning the small-scale labour intensive model into large-scale commercial farms that have specialised equipment and staff to ensure high productivity (Yang and He, 2021). The produce is then exported to the investing country thus solving the lack of available land and food issues whilst developing the land and creating socio-economic benefits in the target country. The expansion of cropland has been a longstanding phenomenon, increasing by 1.9 million hectares per year from 1990 to 2007 (Edelman, 2013). The regions with the highest expansion have been Sub-Saharan Africa, Latin America and the Caribbean, and Southeast Asia, driven by population and income growth, biofuel mandates, and greater trade (Deininger *et al.*, 2011). However, agricultural land with sufficient water has not grown in some countries like the Middle East and North Africa and in China and India (Ibid.). The expansion of cultivated land is expected to continue in the future due to population growth, rising incomes, and urbanisation. It is estimated that, in developing countries, 6 million hectares of additional land will be brought into production each year until 2030, with two-thirds of this expansion taking place in Sub-Saharan Africa and Latin America (Borrás and Franco, 2011; Deininger *et al.*, 2011).

The establishment of Large Scale Land Acquisitions (LSLAs) involves a transfer of property rights, including rights to use, control, or ownership of land (De Schutter, 2009). This transfer can occur through various mechanisms, such as government

leases, government policies, and direct or indirect purchase. LSLAs are only considered as such if they were initiated after the year 2000, reflecting a recent increase in foreign land acquisitions by governments and firms (Neudert and Voget-Kleschin, 2021). Additionally, LSLAs are defined as involving an area of 200 ha or more. LSLAs may involve the conversion of land from smallholder production, local community use, or important ecosystem service provision to commercial use, such as agriculture, logging, timber plantations and forestry, livestock, conservation, carbon sequestration and REDD+, industry, mining, oil/gas extraction, and tourism (Ibid.). These LSLAs are usually commercially oriented, with the presence of an investor meaning that they face less capital constraints than smallholder households (Margulis, McKeon and Borrás, 2013; Seto and Reenberg, 2014). They are capital intensive and less labour intensive, mainly managed by employed and trained specialists, and are mainly profit-oriented (Seto and Reenberg, 2014). However, they are also influenced by conditions in the target countries such as insecure tenure rights, difficult market access, and underdeveloped infrastructure.

Contemporary land grabbing is the capturing of control of relatively vast tracts of land and other natural resources through a variety of mechanisms and forms that involve large-scale capital that often shifts resource use orientation into extractive character, whether for international or domestic purposes, as capital's response to the convergence of food, energy and financial crises, climate change mitigation imperatives, and demands for resources from newer hubs of global capital (Borrás and Franco, 2012).

When talking about scope of land deals, we have to engage with the most consequential database on land deals: the Land Matrix (henceforth, 'LM') (Anseeuw and Bending, 2012; Nolte and Váth, 2015). LM defines 'large-scale land acquisition' as those that involved transnational and domestic investors, involving a land size greater than 200 ha, mostly contracted in 2000 or later. LM refines this further by offering two regularly updated, in-house, official tallies. Tally 1 is the complete database of land deals that are transnational and domestic in character, involving land size greater than 200 ha, mostly contracted in 2000 or later. Tally 2 is Tally 1 minus deals involving oil/gas extraction, mining, contract farming and forest concessions. Furthermore, and cutting across both tallies and in terms of land deal status, there are four LM categories, namely: (i) 'Concluded': means the contract was formalised, with

sub-categories of status: (a) not started yet, (b) start-up phase, (c) in operation, (d) abandoned, and (e) 'none', meaning LM has no information; (ii) 'Failed': means the deal was started but abandoned; (iii) 'Intended': the deal is neither concluded nor failed; (iv) 'Other': covers two sub-categories: (a) contract expired, and (b) change of ownership. Based on the LM dataset, the general estimates of the scope of the global land rush in academic publications range between 30 and 90 million hectares of land (Cotula *et al.*, 2009; Deininger *et al.*, 2011; Zoomers, 2018) even when the complete LM dataset (Tally 1) itself showed a total of 193.35 million ha that have been implicated in various ways (as of November 2020) as per Borrás *et al.* (2022).

### 2.1.1. Drivers of LSLAs

The interest in farmland is increasing due to various factors such as commodity price volatility, food security concerns, and environmental and human pressures (Deininger *et al.*, 2011). Developing countries have a significant amount of land that is either not cultivated or underutilised, which presents an opportunity to improve agricultural productivity, reduce poverty, and promote sustainable development (*Ibid.*).

Large-scale land leases or acquisitions are driven by a variety of factors, including the push for agrofuels as a substitute for fossil fuels, the need for food security in countries with growing populations and limited resources, increasing concerns over access to freshwater, and rising demand for certain raw materials from tropical countries (Cotula *et al.*, 2009; Anseeuw and Bending, 2012). The global food crisis of 2007-2008 also contributed to this trend, as countries sought to secure their own food supplies in the face of unstable and volatile agricultural markets. Private investors, including large investment funds, have also been buying land for speculative reasons, due to the belief that the value of farmland will continue to rise in the future (De Schutter, 2009)

The acquisition of large-scale land by foreign investors is driven by various factors, including concerns about food security and the biofuels boom. Investment in land may bring economic benefits, such as GDP growth and increased government revenue (Cotula *et al.*, 2009; D'Odorico *et al.*, 2017).

### 2.1.2. Impacts of LSLAs

Recent reports of large-scale farmland acquisition by big investors have raised concerns about potential violations of local rights and other issues (Schoneveld, 2017; Yang and He, 2021; Borrás *et al.*, 2022). Despite this, many countries have land that

is underutilised and increasing productivity on currently cultivated land could slow land expansion while creating significant benefits for existing farmers (Yang and He, 2021). Case studies have revealed a number of risks associated with large-scale investments in farmland, including weak land governance, lack of country capacity to process and manage investments, inadequate investor proposals, and resource conflicts (Keulertz, 2016; Neudert and Voget-Kleschin, 2021). In many cases, implementation of these investments is behind schedule and local communities have suffered asset losses without receiving promised benefits (Hall *et al.*, 2015). However, investments can also provide benefits through supporting social infrastructure, generating employment, providing access to markets and technology for local producers, and increasing local or national tax revenue (Deininger *et al.*, 2011). The distributional impact of these benefits is also crucial, as it can vary greatly depending on the type and mix of benefits, and it is important to address these issues upfront (Ibid.).

The findings of the Commercial Pressures on Land project indicate negative consequences for host countries and local communities. While some commercial ventures may be successful, many are speculative and have resulted in delays and difficulties (Anseeuw and Bending, 2012). Large-scale transfer of land tenure rights to investors often leads to displacement of local land users, inadequate compensation, and limited economic opportunities for local communities. This disproportionately affects marginalised groups, including rural communities, women, and those who rely on access to common resources (Ibid.).

Land deals also pose risks to local communities who may lose access to essential resources such as land, water, wood and grazing (Cotula *et al.*, 2009). The success of these investments depends on various factors, including the assessment and mitigation of risks, the use of appropriate business models, the fair distribution of costs and benefits, and the involvement of local communities in decision making (Ibid.).

While these land investments are often seen as an opportunity for economic development, there are concerns about the negative impacts on local communities. Large-scale land acquisitions (LSLAs) often lead to the privatisation and commodification of land, and displacement of local communities from land and water resources that are essential to their livelihoods (Dell'Angelo, D'Odorico and Rulli, 2017). Critics argue that such investments do not always lead to improved food security for local populations, and that the change in land use from small-scale farming



to commercial farming for non-food crops can have negative environmental impacts (Cristina Rulli and D'Odorico, 2014; D'Odorico *et al.*, 2018).

Investment in the agricultural sector by private entities has the potential to benefit countries with functioning markets through improved access to capital, technology, and skills, job creation, and increased productivity (UNCTAD, 2010). New technology, the growth of value chains, and consumer demands may also favour larger scale and integration in the agricultural sector (Yang and He, 2021). Some large investments have been successful in creating broad-based benefits, such as contract farming, joint ventures with local communities, and land leasing (Oya, 2013). However, in situations where rights are not clearly defined, governance is weak, or those affected lack a voice, there is a risk of negative consequences such as displacement of local populations, loss of existing rights, corruption, reduced food security, environmental damage, loss of livelihoods, and political instability (Hall *et al.*, 2015; van der Ploeg, 2018). Additionally, many past large farming ventures have proven unsuccessful, often due to the mistaken belief in economies of scale rather than value addition and better market linkages, resulting in subsidy-dependent large farm sectors that provided few benefits (UNCTAD, 2010).

## **2.2. Water Security**

Water security is a fundamental aspect of human life that has been recognised as a global challenge (UN Water, 2013). It is the availability of sufficient quantities of clean water for drinking, agriculture, industry, and other purposes. Water security has been measured using several indicators, such as the availability of water resources, access to safe drinking water, and the efficiency of water use (Mabe *et al.*, 2019; Schröter *et al.*, 2020). Smallholders' water security is particularly important, as they rely on water for subsistence farming and livelihoods. However, the commodification of land and water has posed significant challenges to smallholders' water security (UN Water, 2013).

Water security is a comprehensive objective that has been defined by various scholars. According to Grey and Sadoff (2007), Cook and Bakker (2012), Wheeler and Gober (2015), water security entails ensuring that every individual has access to an adequate and safe water supply, which is affordable and supports a clean, healthy,

and productive life. Furthermore, water security involves safeguarding the environment and preventing water-related disasters such as droughts and floods.

Within the agricultural sector, the reliability of water supply holds significant importance. It allows farmers to plan their water usage effectively for their farming practices. (Singh, 2017) defines water security as the continuous availability of sufficient water of good quality to meet diverse needs. Singh emphasises that both the quantity and quality of water, as well as uninterrupted access, are vital components of water security.

From a legal perspective, water security is often associated with the establishment of allocation rules that aim to secure rights to a desired quantity of water (Tarlock and Wouters, 2010). Additionally, water security entails power-sharing in the governance and management of water (Ncube, Mupangwa and French, 2018) and the ability of water users to assert their rights to water in relation to other users (Sinyolo, Mudhara and Wale, 2014).

Water security encompasses the overarching objective of ensuring universal access to adequate and safe water, while concurrently safeguarding the environment and mitigating water-related disasters (UN Water, 2013b). This multifaceted concept incorporates several key components. Firstly, it entails ensuring the reliability of water supply in the agricultural sector, thereby enabling farmers to effectively plan their water usage for agricultural practices. Climate-related factors, such as droughts and floods resulting from climate change, pose significant risks in this context (UN Water, 2013b; Pahl-Wostl, 2015).

Moreover, water security involves infrastructural considerations, encompassing the availability, type, and performance of constructed water infrastructures, including dams, canals, pipes, and pumps (Pahl-Wostl, 2015). The availability of funding and the capacity to manage these infrastructures are also critical factors to be taken into account.

Water governance is another fundamental aspect of water security (Besada and Werner, 2015; FAO, 2019). This facet encompasses various elements, such as the legislative framework governing water resources, water allocation mechanisms, water rights or permit systems, and the active participation of water users in water management-related activities (Mugejo and Ncube, 2022). Additionally, establishing

linkages between land and water reforms is crucial to ensuring equitable water access. Water governance also necessitates addressing social, economic, political, institutional, and organisational dimensions in order to achieve comprehensive water security (Ibid.).

### **2.3. Position of this study**

The phenomenon of large-scale land acquisitions (LSLAs) and its impact on water resources has received considerable attention in the literature, revealing water to be both a driver and a target in such transactions (Mehta, Veldwisch and Franco, 2012; Allan, 2015; Dell'Angelo, Rulli and D'Odorico, 2018). While previous studies have acknowledged the interconnectedness of land and water in these grabs, the specific implications for water security, particularly in cases where shared water resources are affected alongside land acquisitions, remain relatively unexplored. This research gap highlights the need for a dedicated investigation into the impacts on smallholders' water security when water provisions are overlooked in land deals.

The primary objective of this study is to address this research gap by examining the direct and indirect impacts of land-water grabs on the water security of smallholders in Sub-Saharan Africa. By focusing on cases where shared water resources have been affected, despite the absence of explicit water-related provisions in the land deal propositions, this study aims to shed light on the often-neglected dimension of water security within the context of LSLAs. Through a qualitative research approach, a comprehensive understanding of the challenges faced by smallholders and their strategies for coping with changes in water security will be generated.

The significance of this study lies in its potential to contribute to policy development and decision-making processes related to land and water resource governance. By exploring the complex interactions between land-water grabs and smallholders' water security, the findings can inform the development of sustainable land and water management practices that prioritise the rights and needs of smallholders. Moreover, insights from this study can guide the formulation of appropriate safeguards and regulatory frameworks to ensure responsible and inclusive management of land and water resources.

It is important to note the unique ecological and socio-economic context of Sub-Saharan Africa, particularly the savanna ecosystems characterised by water

insecurity, which attract large-scale plantation investors aiming to enhance agricultural productivity through irrigation (Woodhouse, 2012b). However, excessive water abstraction accompanying land acquisitions can disrupt hydrological fluxes, thereby impacting both ecosystems and livelihoods (Kizito *et al.*, 2012). Furthermore, intensive water use from LSLAs may have adverse effects on groundwater resources in terms of both quantity and quality (MacDonald *et al.*, 2012)). The acquisition of land for irrigated agriculture can also undermine local water rights and agrarian livelihoods, as observed in previous studies (Mann and Smaller, 2010; Bues and Theesfeld, 2012; Williams *et al.*, 2012). Through a detailed examination of specific case studies, this study aims to contribute to the conceptual understanding of water grabs by examining the different forms of water appropriation and the local conditions under which these appropriations occur.

Building upon the political ecology framework and the hydrosocial cycle concept, this study endeavors to unpack the dynamics of land-water grabs and their implications. This theoretical lens enables an understanding of the complex interplay between water and land rights, as well as the underlying factors that contribute to the exclusion of water considerations in land grab contracts. Factors such as investors' perceptions of abundant water resources, traditional leaders' limited knowledge of water rights, and institutional gaps in land tenure and water resource management all contribute to the neglect of water in the land grab literature (Mehta, Veldwisch and Franco, 2012).

### 3. Theoretical Grounding

In my thesis, I aim to investigate the effects of large-scale land acquisitions (LSLAs) on the water security of smallholder farmers in Sub-Saharan Africa. To achieve this, I intend to adapt the framework proposed by Adams *et al.* (2019) by incorporating the hydrosocial cycle concept. This adaptation will allow me to establish linkages between water security components and the impacts of LSLAs on smallholder communities. Additionally, I will employ the environmental justice lens of political ecology to delve into the intricate interactions between political processes and their influence on water as a natural resource.

The theoretical foundation for my research draws upon the works of Robbins (2012) and Adams *et al.* (2019). Robbins (2012) presents a comprehensive overview of political ecology as a theoretical framework for analysing the socio-political aspects of environmental issues. They argue that environmental conflicts are not solely the result of ecological factors but are intricately intertwined with social and political structures. By applying this lens to my research, I aim to uncover the power dynamics, inequalities, and injustices embedded within the context of LSLAs and their impacts on water security.

Robbins (2012) highlights four theses in the domain of political ecology which can help unpack and understand the socio-political interaction in different scenarios. The first thesis, referred to as the political nature of environmental issues, highlights that environmental conflicts are not solely determined by ecological factors, but are deeply intertwined with social and political structures (Robbins, 2012). Numerous case studies support this thesis, such as the analysis of struggles over access to water resources in India by Bakker (2007), which demonstrates how power relations and political processes shape water allocation and governance.

The second thesis, known as environmental conflict and its relation to power, explores how power relations and inequalities influence the distribution and management of natural resources. This thesis argues that environmental conflicts often reflect broader struggles for social and political power (Robbins, 2012). For instance, de Schutter (2011) and Seto and Reenberg (2014) investigate the political-economic forces driving land grabs and displacement in the global South, emphasizing how powerful actors exploit vulnerabilities to secure control over resources.

The third thesis, termed the political economy of natural resource access, examines the ways in which economic structures and processes contribute to environmental conflicts. It underscores how the unequal distribution of resources and the pursuit of profit by dominant actors can lead to resource grabs and exacerbate socio-environmental inequalities (Robbins, 2012). Martinez-Alier *et al.* (2016) study the socio-environmental conflicts surrounding mining projects in Latin America, illustrating the tensions between economic interests and the well-being of local communities.

The fourth thesis, termed the political ecology of knowledge, emphasises the importance of understanding the production and dissemination of knowledge in shaping environmental conflicts and decision-making processes. This thesis calls for critical examination of how knowledge is generated, legitimised, and deployed to support particular interests (Robbins, 2012). Studies like Clements and Fernandes (2013) analysis of the production of environmental knowledge in the context of soybean large-scale farming systems in Brazil and Mozambique shed light on the ways in which knowledge systems can be contested and manipulated to serve vested interests.

The environmental justice framework, as discussed in the works of Busscher, Krueger and Parra (2020) and Prieto López, Duarte-Abadía and Boelens (2021), provides a valuable lens for comprehensively examining large-scale land acquisitions (LSLAs) and their impacts. This framework proves useful due to its focus on addressing the distribution of environmental benefits and burdens, particularly in relation to social and ecological dimensions. Prieto López, Duarte-Abadía and Boelens (2021) emphasise the aptness of the "echelons of rights analysis" (ERA) framework within the context of LSLAs, as it enables the analysis of water-related distributions in terms of needs, rights, obligations, and privileges across various social sectors. By adopting this framework, researchers can shed light on the power dynamics, inequalities, and injustices embedded within LSLAs, particularly regarding access to and control over water resources. Moreover, Busscher, Krueger and Parra (2020) highlight that the environmental justice framework broadens the understanding of land grabbing by incorporating considerations of representational justice and cultural justice. Through analysing the participation and recognition of marginalised communities and their traditional knowledge systems, this framework exposes the underlying power relations and socio-political processes that shape land grabs. Additionally, both studies

emphasise the importance of ecological justice in ensuring the socio-ecological integrity of ecosystems and sustaining water-based livelihoods, underscoring the need to consider the long-term implications of LSLAs. Overall, the environmental justice framework provides a robust theoretical foundation for comprehensively examining the multifaceted impacts of LSLAs, encompassing socio-political, environmental, and justice-related dimensions.

Moreover, Adams *et al.* (2019) offer valuable insights into the hydrosocial cycle, a concept that elucidates the complex interplay between water's physical attributes and the societal processes governing its use. This framework considers water as a socio-natural phenomenon, acknowledging the mutual shaping of water and society. By employing the hydrosocial cycle in my research, I intend to explore how water-related decisions, governance structures, and management practices intersect with the consequences of LSLAs on water security for smallholder farmers in Sub-Saharan Africa.

The hydrosocial cycle provides a holistic perspective on water availability, access, use, and governance. This conceptual framework recognises water as a social and cultural resource, embedded in social systems and shaped by human activities. It explores the complex interactions between society and water, acknowledging the influence of institutions, power relations, and cultural practices on water management. By employing the hydrosocial cycle, we can understand how water resources are affected by land-use changes resulting from LSLAs and how smallholders' water security is impacted. The hydrosocial cycle emphasises the need for an integrated approach that considers social, economic, and ecological factors, and their interdependencies, in order to effectively address water security challenges.

### **3.1. Conceptual Framework**

To analyse the impacts of LSLAs on the water security of smallholders in sub-Saharan Africa, a mixed framework can be developed. This framework integrates the elements of environmental justice and the hydrosocial cycle to address the four components of water security for smallholders: access, water for livelihoods, water for health and hygiene, and water for ecosystems.

The environmental justice component of the framework examines power dynamics, land tenure systems, and socioeconomic impacts of LSLAs. It analyses the influence

of global investors, governments, and local elites in land acquisitions, taking into consideration the livelihood disruptions and food security implications for smallholders. This component emphasises the importance of understanding the unequal distribution of resources and the social and economic consequences for marginalised communities. By considering the political and economic factors underlying LSLAs, this framework enables a deeper understanding of the power structures that shape land grabbing and its subsequent impacts on water security.

The hydrosocial cycle component focuses on water availability, access, use, and governance. It assesses how land-use changes resulting from LSLAs impact water resources, irrigation practices, water quality, and ecosystem integrity. This component also considers the social equity aspects of water allocation, addressing issues of water access and rights for smallholders. It highlights the need to ensure equitable and sustainable water management practices to safeguard the water security of smallholders. By incorporating the hydrosocial cycle, the framework recognises that water security is not solely determined by physical availability but also by socio-political processes that shape water access and governance.

By combining the hydrosocial cycle and the environmental justice lens of political ecology, my thesis seeks to provide a comprehensive understanding of the impacts of LSLAs on the water security of smallholder farmers. This theoretical grounding will enable me to examine the socio-political factors underpinning these land-water grabs and unravel the ways in which power dynamics and political processes influence water as a vital resource. Ultimately, this research aims to contribute to the existing literature on land acquisitions, water security, and environmental justice in Sub-Saharan Africa, shedding light on the actual impacts that have occurred on smallholder communities and providing insights for more equitable and sustainable water governance practices.



## 4. Methodology

### 4.1. Research Approach

Systematic literature review (SLR) (Moher *et al.*, 2016) and qualitative thematic analysis (QTA) (Dey, 2003; Nowell *et al.*, 2017) were used for data collection and extraction, respectively. Relevant journal articles were selected from online databases and through “snowballing” as per the PRISMA protocol (Moher *et al.*, 2016). These studies were filtered through a multistep screening process which assessed their relevance, quality, and risk of bias. The finalised sample was analysed for deriving evidence-based conclusions. Since the research design involved no primary data collection, SLR was used to effectively accumulate all relevant data and QTA for pattern identification across studies. This ensured a comprehensive and effective analysis of my topic in focus.

### 4.2. Data Collection

#### ***Platforms/Databases***

There are several databases available to try, test and gather data from such as Google Scholar, Scopus, Web of Science etc. However, there are limitations such as lack of access, small collection size and lack of filtering functionality. Therefore, two databases were chosen: (i) LUBSearch database and (ii) JSTOR. LUBSearch allows search across several databases, including Scopus, and JSTOR provides coverage across multiple journals relevant to my study.

#### ***Search strings and their cases***

The first step in the data collection process was to identify keywords from within the research question(s). These keywords were used in combination to develop search strings towards efficiently accumulating relevant data from the database(s). Following keywords were derived from my research questions:

- Large-scale Land Acquisition(s)
- Impact
- Smallholders
- Water
- Africa

## LUBSearch:

For running a TITLE-ABSTRACT-KEYWORD search in the LUBSearch database, the keywords were combined through Boolean operators into a search string:

*"(((LSLA OR large-scale land acquisition OR land grab\*) AND case study AND Africa AND impact)) OR (LSLA AND water AND case study)"*

## JSTOR:

A full text search was performed in JSTOR using the following search string.

*"(("LSLA" OR "large scale land acquisition" OR "land grab\*") AND ("case study" OR "case studies") AND "Africa" AND "impact")"*

The TITLE-ABSTRACT-KEYWORD search was not recommended as this database contains the abstracts of only 10% of its total content [REF]. The number of hits provided by this search was large i.e., ~16,400. The results were narrowed down to ~1000 by adding the word “smallholder” to the search string, then to 532 by adding “water”.

A summary of all 4 searches is listed below:

*Table 4-1 Search Parameters for LUBSearch*

Database: LUB Search	
<b>Search string</b>	<i>(((Isla OR large-scale land acquisition OR land grab*) AND case study AND africa AND impact)) OR (Isla AND water AND case study)</i>
<b>Search string details</b>	
<b>Parameters</b>	Year: 2008 to 2023 Peer Reviewed Articles Include: Research papers, Theses/Dissertations, Journal Articles Exclude: Books, Ebooks, and others
<b>Initial Result Count</b>	51

*Table 4-2 Search Parameters for JSTOR (1st Attempt)*

Database: JSTOR - 1	
<b>Search string</b>	<i>((("Isla" OR "large scale land acquisition" OR "land grab*") AND ("case study" OR "case studies") AND "africa" AND "impact")</i>

<b>Search string details</b>	<ul style="list-style-type: none"> <li>- Advanced search had a word limitation hence the search string was reduced but similarity is maintained.</li> <li>- Only 10% of JSTOR data has abstracts, hence search performed on full text</li> <li>- Search yielded results in thousands (~83,000), hence 'double inverted commas keywords' (must include keywords) feature is added.</li> </ul>
<b>Parameters</b>	<p>Year: 2008 to 2023</p> <p>Peer Reviewed Articles</p> <p>Include: Journal Articles</p> <p>Exclude: Research papers, Book chapters, Books, Ebooks, and other types</p>
<b>Initial Result Count</b>	16,413

Table 4-3 Search Parameters for JSTOR (2nd Attempt)

<b>Database: JSTOR - 2</b>	
<b>Search string</b>	(((((("Isla") OR ("land grab*")) OR ("large scale land acquisition")) AND ("case study")) OR ("case studies")) AND ("africa")) AND ("impact")) AND ("smallholder")
<b>Search string details</b>	Additional parameters introduced due to results in thousands (~16,500). Added "smallholder".
<b>Parameters</b>	<p>Year: 2008 to 2023</p> <p>Peer Reviewed Articles</p> <p>Include: Journal Articles</p> <p>Exclude: Research papers, Book chapters, Books, Ebooks, and other types</p>
<b>Initial Result Count</b>	996

Table 4-4 Search Parameters for JSTOR (3rd Attempt)

<b>Database: JSTOR - 3</b>	
<b>Search string</b>	(((((("Isla") OR ("land grab*")) OR ("large scale land acquisition")) AND ("case study")) OR ("case studies")) AND ("africa")) AND ("impact")) AND ("smallholder") AND ("water")
<b>Search string details</b>	Additional parameters introduced due to results in thousands (~16,500). Added "smallholder" AND "water".
<b>Parameters</b>	<p>Year: 2008 to 2023</p> <p>Peer Reviewed Articles</p> <p>Include: Journal Articles</p> <p>Exclude: Research papers, Book chapters, Books, Ebooks, and other types</p>

Initial Result Count	532
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### 4.3. Screening 1: Eligibility Screening

The eligibility criteria for screening of the search hits involved the following:

- Publication Year: 2008 to 2023. Studies conducted before 2008 were excluded. This is so that the data includes recent literature that is based on concepts of LSLAs post food price crisis of 2008.
- Language: English. This is a limitation on the part of the author since some useful French documents could not be understood due to no proficiency in French.
- Type of Document: Peer-reviewed Article. Grey literature, books, book chapters were excluded so that independent evaluation studies could be gathered.

All the search hits were then sieved through a quick abstract-screening process. Studies containing multiple keywords especially LSLA and impacts were included. Broader or irrelevant studies were excluded.

### 4.4. Screening 2: Quality Screening

The full texts of the sample studies were then read in detail and exclusions were made based on the following criteria:

- *Excluded: No case descriptions of individual LSLA.* Studies that had a very high number of studies covered without details on individual LSLA characteristics such as size, crop type, year of contract, state of LSLA etc. were excluded since the impacts could not be established against the LSLAs.
- *Excluded: Insufficient Detail on Water Impacts.* If the study did not have enough information or no information at all on water impacts of the LSLAs, the study was discarded since it does not help answer the research question.
- *Excluded: Out of LSLA definition or scope conditions.* If the LSLA covered is less than the defined scope e.g., Size smaller than 200 hectares, the case was discarded.
- *Excluded: Case already covered.* If the LSLA was already covered in another study of the sample, then only the study giving more clearer information was maintained. The other was discarded.

Articles pre-included through LUBSearch were excluded from JSTOR after quality screening. A summary of the final sample is as follows:

*Table 4-5 Summary of Search Results*

	LUBSearch	JSTOR
Search Hits	51	532
After Eligibility Screening	26	9
After Quality Screening	12	2

#### 4.5. Thematic Analysis / Coding Framework

A deductive approach was used for the coding of the case studies with inspiration drawn from Sändig's study of conflicts (Sändig, 2021). Since, the impacts of LSLAs have been covered in detail especially within the political ecology perspective, developing codes and linking them with the theoretical framework was clear and relatively direct. The detailed codebook is provided below (Table 4-6).

Nvivo was used for coding and compiling the case studies. It is a software program designed for qualitative data analysis, particularly for coding and organising data (Phillips and Lu, 2018). It streamlines the analysis and comparison of different data segments. Additionally, some codes were transformed into binary for statistical analysis.

*Table 4-6 Codebook for the study*

<b>CODEBOOK</b>		
<b>Study Characteristics</b>		
	Publication Outlet	Assign by the name of the journal or the reference to the article's source.

	Number of Cases	Assign by the total number of investment cases (including agricultural and non-agricultural) in the study. If the study contains no individual investment cases, code as "Not applicable". Use one code per study.
Methodology	Qualitative Analysis	Assign if the study uses mainly qualitative methodology.
	Quantitative Analysis	Assign if the study uses mainly quantitative methodology (e.g., survey, statistical methods, and large-N design).
	Mixed Qualitative-Quantitative	Assign if the study uses both qualitative and quantitative methods.
	Field Research	Assign if the study is to a significant extent (i.e., more than a few interviews or a short field trip) based on data collected during field research among the affected community (e.g., by interviews, focus groups, participant observation, survey).
	Theoretical Perspective(s)	Assign freely by the predominant theoretical perspective of the study. Assign multiple codes if studies combine different perspectives.
Case Sample	Included	Assign if at least one case from the study was included in the case study sample.
	Excluded: No case descriptions of individual LSLAs	Assign if the case(s) of the study were excluded from the case study sample due to the lack of descriptions of individual LSLAs.
	Excluded: Insufficient detail on water impacts	Assign if the case(s) of the study were excluded from the case study sample due to insufficient detail on water impacts.
	Excluded: Out of LSLA definition or scope conditions	Assign if the case(s) of the study were excluded from the case study sample because they did not match the LSLA definition or scope

		conditions of the study (e.g., time frame, region of interest).
	Excluded: Case already covered	Assign if the case(s) of the study were already covered in the sample by evidence from another study.
<b>LSLA Characteristics</b>		
	Investor Name	Code by the name of the investing company that affects the local community, which is at the centre of the case study. If multiple investors are present, code as "Multiple investors". If no names are mentioned, code as "Unknown name." Use only one code per case.
	Investor Origin	Assign by the investor's country of origin: "Transnational", "Domestic". Assign only one code per case.
	Year of Land Acquisition	Code by the year in which the investment contract (e.g., lease agreement) was signed. Alternatively, code by the year in which the plantation was created, its operations began, or the land negotiations started. In case of multiple LSLAs, code by the earliest year. If the year is not specified, code as "Unclear year." Code only one year per case.
	State of LSLA	Code by the state of the LSLA, whether the investment is "in production", "cancelled" or "unknown"
	Size of LSLA	Code by the scale (in hectares) of the LSLA, as defined in the investment agreement. If not reported, code by the scale of the actually acquired land, of the renegotiated agreement, or ultimately of the intended investment. If multiple LSLAs are present, add their sizes. If

		the size is not reported, code as "Unclear size." Code only once per case.
	Crop	Assign by the main crop that was planted or intended. Code as either: "Oil palms", "Rubber", "Trees for wood and paper", "Sugar cane", or as "Other crops." In case of multiple or unclear crops, code as "Unclear/multiple crops". Assign one code per case.
	Country	Assign by the name of the country where the LSLA was implemented or intended. Use only one code per case.
	Water Abstraction in Contract	Assign if the LSLA had mentioned water abstraction in contract.
	Water Use of Existing Sources	Assign if the LSLA used water from existing water sources such as irrigation systems, lakes, groundwater etc.
	Development of New Water Sources	Assign if the LSLA developed new water sources for irrigation such as dams, canals etc.
<b>Impacts on Smallholder</b>		
Benefits to Smallholder	Contract Farming	Assign if the investor actually created contract farming/outgrower schemes for the smallholders
	Jobs on LSLA	Assign if the investor actually gave jobs to smallholders on the plantation
	Land Compensation	Assign if the government gave Land as compensation to smallholders
	Monetary Compensation	Assign if the investor gave monetary compensation to smallholders
Consequences to Smallholder	Dispossession of Land	Assign if the LSLA dispossess smallholders off their land



	Food Insecurity	Assign if the LSLA resulted in causing food insecurity to smallholders
	Restricted Access to Commons	Assign if the LSLA resulted in restricted or limited access to commons such as water sources, grazing lands, forests etc.
	Water Pollution	Assign if the LSLA resulted in polluting water sources through waste and pesticides/fertilisers
<b>Theoretical Framework</b>		
Legal Frameworks	Formal Land Rights	Assign if land rights are formalised through a land tenure law
	Customary Land Rights	Assign if customary law for land exists where authority of local chief is recognised, and land is bestowed by the chief
	Formal Water Governance Law	Assign if water rights are formalised and monitored under a water law
	Legal Pluralism	Assign if any two or more of the following co-exist: formal land rights, customary land rights, water rights
	Interaction between Legal Frameworks	Code if "Plural Legalism" has been assigned to the case. Code whether the frameworks are complementary or contradictory.
Power Relations	Actors Involved	Code by the type of major actors involved in the case i.e., State, Smallholder, Chiefs, Investors, Non-profits (include all that apply).
	Land Ownership	Code by who has the ultimate authority over the land (State, Chiefs or Smallholder) and mention whether the land has been leased or purchased outright.
	Resource Control	Code by who controls the natural resources on land (including water) i.e., whether investors have exclusive rights or are the resources shared.

	Smallholder Participation	Assign if the smallholder participated in the decision-making of land use change or management during or after acquisition of land.
Water Security	Water for livelihood	Assign if the available water resources for irrigation of the smallholder farms are affected by the LSLA. Assign "Increased access", "Decreased access", "No effect", "N/A" (in case it is not covered in the study)".
	Water for health and hygiene	Assign if the available water resources for drinking and sanitation purposes of the smallholder are affected by the LSLA. Assign "Increased access", "Decreased access", "No effect", "N/A" (in case it is not covered in the study)".
	Water for ecosystem	Assign if the available water resources i.e., surface water and groundwater are affected by the LSLA. Assign "Increased abstraction", "Decreased abstraction", "No effect", "N/A" (in case it is not covered in the study)".
	Water for natural hazard resilience	Assign if the available water resources i.e., surface water and groundwater are affected by the LSLA. Assign "Increased water quality", "Decreased water quality", "No effect", "N/A" (in case it is not covered in the study)".
Response of Smallholder	Resistance or Contention for Land/Water	Assign if smallholders resisted and/or protested dispossession of land and/or water sources.
	Non-agricultural Livelihood	Assign if smallholders started to pursue non-agricultural livelihood due to dispossession from farmland.
	Shift to Cash Crop Agriculture	Assign if smallholders shifted to cash crop cultivation same as LSLA to cope with market incentives.

## **4.6. Limitations**

### **4.6.1. Limitations of the data**

The data lacks validation of the search protocol through external reviewers as directed by PRISMA (Moher *et al.*, 2016). This might result in some personal bias even though the protocol was strictly followed. Another limitation is the restriction to English language, articles in other languages such as French (official language of some countries in Sub-Saharan Africa) were excluded. Lastly it cannot be said that all relevant documents fulfilling the eligibility and quality criteria were obtained via the search strings. This is a limitation of the search string and how the author has identified and used keywords within the string. Due to multiple terminologies being used for LSLAs in existing literature, not all evidence-based case studies were found and included.

### **4.6.2. Limitations of the research method**

QTA was utilised with a deductive approach while coding the documents, hence the bias might be reproducible due to the positionality of the author. Furthermore, the results are derived from secondary data and no verification was performed on the field level. Some missing or unavailable information from LSLA characteristics was augmented through the Land Matrix (LM) database, while a few cases could not be traced within the LM.

## **4.7. Positionality and reflexivity**

As an author from a lower middle-income country, I am acutely aware of the potential for bias and perspective in any research project, especially when it comes to topics that involve issues of power and inequality.

Firstly, it is important to acknowledge my positionality and reflexivity as a researcher (Silverman, 2013; Patton, 2014). Belonging to a lower middle-income country, my insights may differ from those of researchers from more privileged backgrounds. My inclination towards rationalism and constructivist ontological beliefs also shapes my worldview and approach to research. I am aware of how my personal biases may affect the research process and have taken steps to mitigate their impact on the findings.

One approach I have taken to address potential issues of bias and perspective is to engage with multiple sources of information. The systematic literature review aspect of my research involved a rigorous search for relevant studies from various academic databases and sources. By engaging with a diverse range of studies and perspectives, I was able to gain a more comprehensive understanding of the topic and reduce the potential for bias from any single study.

Furthermore, I made a conscious effort to use inclusive and non-biased language in the research to avoid any potential misunderstanding or misinterpretation. I also made an effort to be transparent about my methods and assumptions by explaining my research design and approach explicitly.

## **5. Results and Discussion**

In pursuit of answering the research questions regarding the impacts of LSLAs on the water security of smallholders, data was collected by means of systematic literature review and analysed using qualitative thematic analysis in context of political ecology with a hydrosocial lens.

### **5.1. LSLA Characteristics**

To obtain a broad view of the characteristics of LSLA case studies and acquire general insights, the extracted data was analysed qualitatively and statistically. The sample of 31 case studies covered 12 countries from sub-Saharan Africa. Detailed analysis revealed that LSLA investors belonged mainly to first world countries with the resources to invest internationally. United Kingdom had the highest participation with 5 LSLAs, followed by USA with 3 cases and Canada, France, and Netherlands with 2 cases each. In a similar context, the largest LSLA was the AgriSol Maize Farms sponsored by the United States of America with a contracted size of 325,000 ha. This is an outlier within the data and if excluded, the mean LSLA size of the other 30 deals comes out to be roughly 27,000 ha.

In terms of current state (active / closed), 13 LSLA projects (58%) have been either abandoned or cancelled, including 8 of the largest deals in sample. This can be accredited to multiple factors including exhaustion of water resources, lack of sustainable practices, incomplete knowledge of crops, and smallholder resistance, discussed in detail ahead. 10 cases are still in production, while 8 are unknown since the information was not available within the case studies nor on the Land Matrix Database.

Further, data indicated that the LSLAs were mostly biofuel driven since Jatropha, Oil Palm and Sugar cane were the highest cultivated crops in the sample. Acquisition dates from the sample also corroborate the “food price crisis” of 2008, leading to the sudden increase in global land deals to ensure food security by the MENA countries (Anseeuw and Bending, 2012). The contract dates of LSLAs lie between 1991 to 2013, with approximately half of the deals signed between 2007-09, right after the food price crisis.

Discussing the water dimensions of LSLAs, only 14 out of the 31 deals (~45%) had some details relevant to water abstraction mentioned in their contracts, although vague and mostly miscalculated, while the rest completely bypassed these aspects. In addition, 29 LSLAs (~94%) utilised the existing irrigation structures for their crops adding to the demand on the existing freshwater sources leading to water insecurity, while only 2 (~6%) of all LSLAs developed new irrigation structures to cultivate their farms.

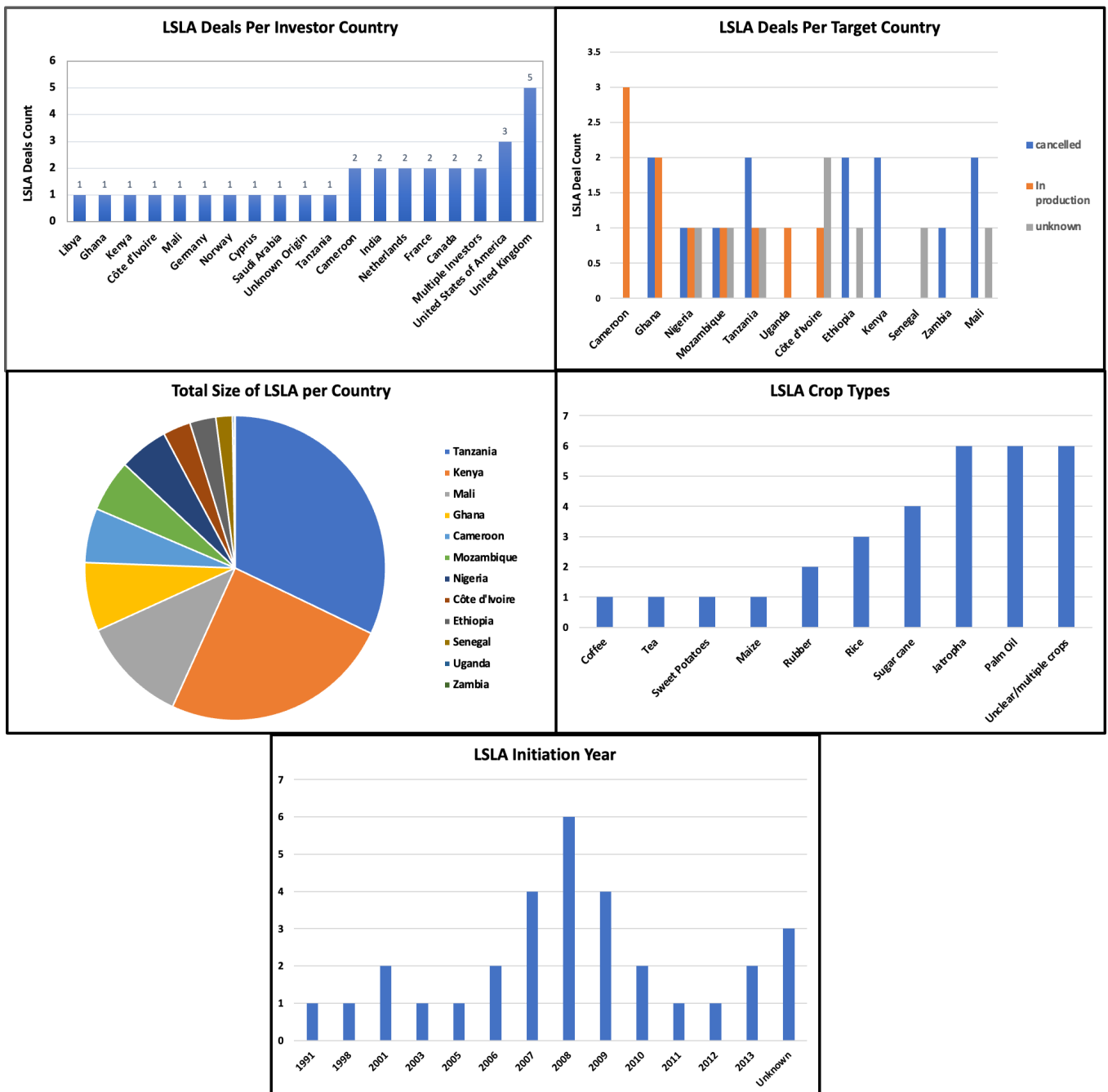


Figure 5-1 Case Studies' Characteristics

## **5.2. Coverage of Water Impacts amongst Case Studies**

Consistent with the scope of this study, those LSLA cases were selected which covered the details of land deals and followed through to their quantified impacts on land, water, and smallholders. Hypothetical probabilities and predictive impacts were excluded. Out of a total 583 peer reviewed articles, narrowed down from the aforementioned databases [Detailed in Chapter 4:Methodology], only ~4.4% of studies successfully passed the screening process and provided reliable impacts of LSLA cases, with minimal abstractions. Amongst them, about half the studies (~2.4%) mentioned water impacts to some extent, without hypothetical abstractions. This extremely low occurrence and quantification of water impacts of LSLA, in published papers or cases, is indicative of the vast coverage gap in the discussions, planning and documentation of water use and its consequences in LSLA dealings. While some studies summarise the potential impacts LSLAs might have on the ecosystem and smallholders, a minimal number map the direct consequences, concretisations rather than abstractions, that have occurred with respect to such land grab cases.

Overtime, numerous studies have highlighted the importance of water bodies and their direct influence upon large scale land acquisition deals (Borras, Fig and Suárez, 2011) . While some even emphasizing the hidden narrative of water grabbing during large scale land grabbing deals, where detailed or documented accounts of water use are purposefully left out or discussed vaguely (Ibid.). These opinions stand solidified by the findings of this study. This lack of discussion and documentation not only provides adequate room for exploitation of water rights, but escapes quantification of water consequences and its legal repercussions, absolving the culprits of their responsibility towards sustainability (Detailed in Results: LSLAs and their impact on Water security and Results: Smallholder consequences).

This information void also raises serious concerns for the long occurring, as well as potential future impacts on the lives of smallholders and water security of Sub-Saharan African regions. 80% of the farmland in sub-Saharan Africa and Asia is managed by smallholders, while 75% of the world's food is generated from such smallholder systems who keep many rustic and climate-resilient varieties and breeds alive (FAO, 2012, 2021). Smallholders largely depend upon commons for water and grazing land, keeping their importance in mind, this study finds the direct/concrete consequences to their water security and livelihoods, have been minimally mentioned or remained

largely undocumented in peer reviewed communities, escaping reasonable quantification and compilation even with thorough research.

### **5.3. LSLA Impacts on Water Security**

Water security ensures a sustainable access to appropriate quantities of acceptable quality water, so that it may sustain the livelihoods and protect the health and well-being of people. It can be stated as protecting water rights of the people to ensure four essential elements; (i) Water for livelihoods: Adequate water economic activities and development, food and energy production, industry and tourism, (ii) Water for health and hygiene: Access to safe, sufficient and affordable water for drinking, sanitation and well-being, (iii) Water to preserve and sustain the Ecosystem, and (iv) Water to provide resilience against water related hazards such as floods, drought and pollution (UN-Water, 2013a; World Economic Forum, 2016).

Establishing the impact of LSLA induced water insecurity of smallholders, qualitatively or quantitatively, forms the focus of this study. Results indicate a direct relationship of Large-Scale Land Acquisitions' (LSLA) impacts on smallholders influencing the aforementioned four essential elements of water insecurity (Table 5-1). Amongst the cases cited, a clear trend emerges wherein cases reporting LSLA induced consequences to smallholders, also report increase in some form of water insecurity of smallholders. This is observed in all the cases (100%) and discussed in detail later. The interrelationship of LSLA consequences and water insecurity of smallholders can be easily mapped if spatial and temporal details of LSLAs are followed through. However, many studies focus upon the potential impacts of such deals, and do not map their real-world impacts with time. Some qualitative studies have been carried out to assess their consequences, however they cannot be linked to the particular LSLAs and thus form an abstraction. This study therefore focuses on cases where such details have been tracked with the LSLA in focus, to create a solid argument with respect to their water grabbing undertones and their impact on the water security of smallholders.

Further, even though there is evidence that water related infringements have occurred in many farming communities where land grabs are taking place impacting pastoralists and smallholders, the local conditions, institutional configurations, and power relations that underlie these conflicts are not well understood, and there is barely any scholarly



documentation of investor and farmer perceptions of water use and availability. Beyond the evidence that investors acquiring land for large-scale plantations are interested in water availability, there is limited knowledge about the forms water appropriations take, investor strategies for gaining access to water, conditions under which land and water appropriations occur together, and investor and local farmer perceptions about the role of water rights.

### 5.3.1. Hidden Narratives in Land Grabbing

The phenomenon of land grabbing with appropriation of water resources or inclinations towards land with the availability of natural water, has been highlighted numerous times in multiple studies (Makki, 2014; Antonelli *et al.*, 2015; Franco, Mehta and VeldWisch, 2016; Tufa, Amsalu and Zoomers, 2018; Maya Silva, 2019). Our study solidifies these findings and associates the narratives of LSLAs with consequences to water security of smallholders in the region.

(Borras, Fig and Suárez, 2011) reports that the premise of the LSLA in Mozambique was utilisation of marginal lands (wastelands, unused, under-utilised, or idle lands) or empty lands. In reality, it was purposefully situated very close to common water sources of the region; a local dam and river, therefore comprising prime agricultural land rather than semi-arid and waterless conditions.

A similar covert water grabbing in land grab deal is observed in the LSLAs around River Tana delta (Duvail *et al.*, 2012). A large-scale sugar plantation is allocated land between two river branches, and a jatropha plantation allocated deltaic floodplains by the Kenyan government. The area which possesses a high irrigation potential and socio-economic value due to its proximity to the river, and supports the livelihoods of local tribes, was instead designated as “empty dryland”, and handed off in LSLAs under the pretence of development.

The water grabbing aspect can be clearly identified in the land grab deal by a Canadian investor around the River Tana for Jatropha plantation (Duvail *et al.*, 2012). This crop was termed as “drought resistant” but the land acquired was unnecessarily close to the local river. Further, the water requirements and availability have been misquoted in its ESI assessment which realistically would require irrigation access to the over-utilised river.

(Tufa, Amsalu and Zoomers, 2018) registers another case where agropastoral lands are labelled as “underutilised” and are leased under the government’s development schemes. Aiming for the underutilised land in the LSLA by Emami biotech, it was conveniently concealed that the only stream that is used by the community for human consumption and their livestock traverses the company’s farm site along its eastern border and is near a local river. Both these water sources were later exploited for mass irrigation leading to water scarcity in the region.

Similar covert and exploitative water grabbing cases through LSLAs have been discussed by (Hertzog *et al.*, 2012; Fonjong, 2016; Ajala, 2018; Adams *et al.*, 2019; Effossou, Cho and Ramoelo, 2022) thereby establishing the argument that land grabs are inherently water grabs, where water rights are hidden in the land grab deals. Adams *et al.*, 2019 highlight that several hectares of the acquired land was home to settler communities predominantly farmers and fishermen, hence dependent on natural water resources acquired in the land deals. These included the Pru, White Volta, Onwam, and Afram Rivers, and the Volta Lake. (Ajala, 2018) brings forth case studies where investments by foreign entities are mainly monoculture agriculture which required high water availability. Hence, land acquisitions inevitably included wetlands and the massive capture of water sources for irrigation purposes.

(Damtew, 2019) highlights cases of land-grabbing in Ethiopia exacerbating the already existing hunger and desperation in vulnerable communities. Investors targeted land that is close to water, hindering access to water for livelihoods and consumption and threatening farms on sedentary plots along river lines.

(Hertzog *et al.*, 2012) shares documented cases of large-scale land deals in large areas carrying high irrigation potential for agriculture. Another scheme worth mentioning is in Mali, where the government opened access to land and promoted capitalised on land deals by openly highlighting smooth access to water resources from the Niger river basin.

One of the most controversial of the LSLAs in sub-Saharan Africa is the Southern Africa Growth Corridor of Tanzania (SAGCOT) project, initiated at the World Economic Forum Africa summit in May, 2010 (van Eeden, Mehta and van Koppen, 2017). SAGCOT planned to bring together the Tanzanian government and more than 20 multinational companies and organisations (e.g., Monsanto, YARA and the World

Bank) in a public-private partnership for commercial agriculture. SAGCOT was planned to span across a third of Tanzania's land, with assumed control over the water sources essential for commercial farming. Despite being critical to the successful implementation of these initiatives, the importance of water was almost negligible in the formulation and adoption of Kilimo Kwanza (the national policy aimed at aiding smallholders whilst maintaining agricultural investments)(van Eeden, Mehta and van Koppen, 2017; Bassi *et al.*, 2018). Even after the Water Resource Management Act of 2009 was introduced for the protection of water access, illegal water abstraction by investors that either exceeded their allocation, or abstract water without the necessary water permits, constituted a major concern continuing concern (Veldwisch, 2015).

#### **5.4. Impact on Access to Water for Livelihoods**

Out of the total case studies, 84% (26) report some form of an impact upon water security affecting livelihoods of smallholders. Amongst them, 88% (23) cases exhibit an increased insecurity (water essential to sustain livelihoods of smallholders), with the occurrence of LSLA induced consequences affecting smallholder land rights, detailed in Table 5-1. While 11% of the cases report no damage to water security and stand independent.

<b>Co-occurrence of Impact of LSLAs on Smallholders (SH) and their Water Security</b>			
<b>Case Study</b>	<b>LSLA Impact on SHs</b>	<b>Negative Impact on Water Security</b>	
		<b>Livelihood</b>	<b>Health, Ecosystem &amp; Hazard Resistance</b>
ProCana	✓	✓	
Tana Delta - Kenyan Private Company	✓	✓	✓
Tana Delta - Canadian Private Company	✓	✓	✓
D1 Oils	✗		
Tomanguié	✓	✓	
Ayenouan	✓	✓	✓
Soumié	✓	✓	✓
Volta-Red Farms	✓	✓	
SG-SOC	✓	✓	✓
Société des Plantations du Haut Penja	✓	✓	
CDC	✓	✓	✓
Saudi Star	✓	✓	✓
Senhuile-Senéthanol	✓	✓	✓
AgriSol	✓	✓	
Sun Biofuels	✓	✓	
Neumann Kaffee Gruppe	✓	✓	✓
Kimminic Corporation	✓	✗	✓
Intergrated Tamale Fruit Company (ITFC)	✓	✗	✓
ScanFarm	✓	✗	✓
Dominion Farms	✓		✓
PZ Wilmar	✓		✓
Michelin	✓		✓
Karuturi	✓	✓	✓
Malibya	✓	✓	✓
M.K.	✓	✓	✓
MCA	✓	✓	✓
Mtibwa Sugar Estate (MSE)	✓	✓	✓
EcoEnergy	✓	✓	✓
Moçfer Industrias Alimentares (MIA)	✓	✓	
Emami BioTech	✓	✓	✓
Niqel	✗		
<b>Case Studies with consequences on SHs</b>	<b>29</b>	<b>23</b>	<b>22</b>
<b>Total Case Studies with information</b>	<b>31</b>	<b>26</b>	<b>22</b>
<b>Co-occurrence (SH &amp; Water for Livelihoods)</b>		<b>88%</b>	
<b>Co-occurrence (SH &amp; Water for Health, Hygiene, Hazard Resistance and Ecosystem)</b>			<b>100%</b>

Empty cells indicate 'Information unavailable in respective case study'.

Table 5-1 Impact of LSLAs on Water Security of Smallholders

#### 5.4.1. Dispossession of Land / Restricted access to commons

As the smallholders are displaced to land further away, the water insecurity they struggled with increases many folds. Displacement led to dispossession of land close to or containing natural water bodies, which catered for their primary livelihood. LSLAs were promoted for occupying “land intensive” or “underutilised” locations, under the premise of implementing irrigation infrastructure in a land/country lacking. However, many such deals allocated prime agricultural land in LSLAs, some even possessing the advantage of government made infrastructure to aid in resolving water scarcity for the local population, such as dams and irrigation schemes (Makki, 2012, 2014; Tufa, Amsalu and Zoomers, 2018). This study validates the claims associating negative impacts of LSLAs on smallholders, as they are left to move away after land grab deals or assigned land in areas distant to natural water bodies and lacking infrastructure, creating a severe water scarcity. Additionally, smallholder households are extremely poor (FAO, 2012, 2021) and, as such, cannot invest in new infrastructure, thus relying heavily upon government schemes and access to commons. The land deals made upon these commons, restrict access, not only to the land but to the shared natural water sources as well. Additionally, in many cases it restricted access to government laid infrastructure, primarily created to increase water access amongst the local population. In about 87% of the LSLA case studies in this study, the investors hold exclusive rights to the lands leased (Detailed in Appendix B), whilst a mere ~13% provide shared rights to the commons to the smallholders (Detailed in Appendix B). However, even in the case of shared rights, the access to land and water bodies is restricted due to plantations and irrigation work, in effect creating an exclusivity.

The ProCana deal is a prime example of such an occurrence, where the LSLA was touted for being located on marginal lands (wastelands, unused, under-utilised, or idle lands) with a positive aspect of placing infrastructure in remote areas. However, ProCana land was adjacent to a newly built local dam, as well as to the Rio dos Elefantes River, both key sources of irrigation for smallholders in the region, effectively displacing them from prime agricultural land. Furthermore, ProCana was eligible to title deeds for infrastructure after 50 years, constituting long term control over the land (Borras, Fig and Suárez, 2011). Although, “marginal land” implied no harm to the local community, however, when the deal was finalised, it incorporated three essential economic activities of the locals; livestock raising, subsistence farming and charcoal

production thus creating direct market competition. Its consequences included reduced access to commons (land and water bodies) for herding and farming activities, which were the primary sources of livelihood for the locals. Further, any commercial reliance on outgrowers placed these small farmers under the company's regime without providing them with secure income, legal protection, or infrastructural support.

Similar scenario is reported by (Duvail *et al.*, 2012) regarding the Tana river. Being one of the largest rivers in Kenya, it constitutes a multifunctional area of high socio-economic value inhabited by many local communities whose livelihoods depend upon the river and surrounding plains. The cohabitation between various users or settler communities of the wetland is through informal rights of access to land and the river but officially it falls under the category of 'government land', under the direct authority of the central government, and was acquired or sub-leased by private companies. This resulted in exclusive rights for investors to prime floodplain grazing land, leading to dispossession of land with prime access to water, and restricted access to commons (the river, its flood plains and surrounding grazing land). Such changes effectively reallocated a multi-user shared territory to private interests, disrupting the livelihood and food sources of many communities dependent on the river and surrounding land, and creating water scarcity for many, such as Wataa tribe which maintained fisheries (hunter-gatherers), Pokomo tribe who practiced recession agriculture, and Orma tribe who were pastoralist cattle herders.

(Tufa, Amsalu and Zoomers, 2018) also presented the case of such agropastoral land being labelled as "underutilised" and leased off in LSLAs, restricting the water access to many local populations, creating water scarcity through mass irrigation, and ultimately resulting in disruption of their livelihoods, dispossession of land and generating large scale conflict over resources.

(Effossou, Cho and Ramoelo, 2022) reports through interviews with the locals that the land deals were unfairly conducted, without transparency and negotiations with the locals, and ultimately resulted in dispossession of their land, leading to disruption of livelihood, food and water security, and displacement of families from their homes. Similar scenarios have been highlighted by Fonjong (2016) and Adams *et al.*, (2019), where Large- scale land deals for irrigated agriculture undermined local water rights and local agrarian and pastoralist livelihoods. Several hectares of the acquired

land at Kobre were home to settler communities predominantly farmers and fishermen. According to a community member, they were informed that investors had acquired the area, but nothing was mentioned about relocating, although it would eventually lead to it (Adams *et al.*, 2019). Farmers had lost several acres to investors, and most of them (80 percent) did not receive any compensation. The farmers who lost land lamented that chiefs conspired with investors to deny them their due reparations (*ibid.*).

(Ajala, 2018) brings forth LSLAs in Nigeria of several thousand hectares, acquiring land that had for many years provided major ecological and hydrological functions for the local community situated along the shoreline; (i) Case 1: a population of over 40,000 of farmers and pastoralists depending upon it for livelihood) (ii) Case 2: Abutting rural communities with an estimated population of between 20,000 and 30,000. The land and water resources served the community for commodity agriculture, hunting and harvesting of other useful resources that served the survival needs of the locals, and (iii) Case 3: Dispossessing land from the local Iguobazuwa community of over 20,000 people who cultivated crops such as cassava, plantain, cocoa-yam, and beans which constituted their staple food.

(Damtew, 2019) highlights cases of land-grabbing in Ethiopia exacerbating the already existing hunger and desperation in vulnerable communities. In many regions there was little food security and prevailing water scarcity, local communities developed coping mechanisms such as shifting cultivation, farming in sedentary plots along riverbanks and relying on forest resources. Land-grabbing in these areas led to the clearing of forests and shifting of cultivation plots that are crucial buffers for the food security of smallholders. Since investors target land that is close to water, land-grabs hinder access to water for consumption as well as threaten farms on sedentary plots along river lines. Further, one of the investor companies constructed a roadblock restricting access to rivers and other water sources used by locals. In addition, a deep ditch dug alongside the commercial farm blocked access to the nearby Gibe River which previously was used by farmers to water livestock.

Through Southern Africa Growth Corridor of Tanzania (SAGCOT) project, commercial farming was planned to span across a third of Tanzania's land, with assumed control over the water sources essential for commercial farming, thereby affecting livelihoods, land and water resources of hundreds of communities (van Eeden, Mehta and van

Koppen, 2017). Communities' access to water has, in some instances, literally been cut off to demarcate land for commercial agricultural purposes. Despite being critical to the successful implementation of these initiatives, the importance of water was almost negligible in the formulation and adoption of Kilimo Kwanza (A national policy to aid smallholders whilst maintaining investments). One of the investors (Mkindo Sugar Estate) abstracted water for irrigation by constructing a weir upstream of a village and opening and closing the weir to meet their irrigation demand, often for months on end, creating severe water scarcity for downstream users (Ibid.). Another investor, EcoEnergy acquired village land and blocked multiple access ways to the shared Wami River. This forced pastoralists to seek alternative resources, often on village land. Villagers complained that the influx of pastoralist and their cattle on their land have placed immense pressure on the land resources and has left their water resources depleted.

### **5.5. Impact on Access to Water for Health and Hygiene, Ecosystem and Natural Hazard Resilience**

Out of the total case studies, 71% (22) (Detailed in Appendix C) report some form of an impact upon water security linked to the health of smallholders, ecosystem, or hazard resilience. All cases exhibit an increased insecurity of at least one of these water security elements. While all of the 22 cases exhibit a cooccurrence of these overlapping water insecurity elements, we find 3 anomalous into some extent (Kimminic Corporation case, Integrated Tamale Fruit Company (ITFC) and ScanFarm) and will be discussed in detail.

The large-scale land acquisition deals surprisingly focused minimally on the terms and conditions for access and utilisation of available water bodies, whilst being heavily influenced by them. A general lack of discussions and documentation for water access, utilisation and distribution of benefits and burdens is observed in all the cases profiled. The ones that made some mention of water utilisation, incorporated vague terminologies, unplanned promises to bring forth smallholder and public complacency, and exhibited a clear bias of priorities focusing mainly upon provisions for the investors. Many company managers made use of their state invitations and relationship with higher officials as leverage not to follow any of the normative land



acquisition procedures, bypassing socioeconomic, environmental, and technical assessments, which are prerequisites for large-scale agricultural investments.

While land and water are interconnected, a focus on the grabbing of water resources is essential to highlight a distinct set of underdiscussed issues linked to the materiality of water. The savanna ecosystems of Sub-Saharan Africa whilst characterised by water insecurity, remain attractive to large-scale plantation investors. Investors increasingly look for ways to increase agricultural productivity through irrigation, and excessive water abstraction for irrigation accompanying direct investment in biofuel and food production could lead to significant changes in hydrological fluxes and affect both ecosystems and livelihoods. Hence, intensive water use from large-scale land acquisitions could potentially damage the quality and quantity of groundwater resources (Kizito *et al.*, 2012; Woodhouse, 2012a). For instance, water availability fluctuates across time and space and often has pronounced dislocated (downstream) effects, in terms of quantity and qualities, thus compounding the remaining elements of water insecurity (water required for human health maintenance, sanitation and resilience in natural hazards). In this study, ~71% (Detailed in Appendix C) of the cases report an increase in water insecurity due to restricted water access for the health, sanitation, and ecosystem maintenance, while ~58% (Detailed in Appendix C) alone report the downstream impact of water pollution / decreased water quality. Further, this study strengthens the argument placed forth by (Franco, Mehta and Veldwisch, 2016), that such global level ambiguities are aiding a land grab regulatory setting which is highly permissive to water grabbing, where political contestation from a social justice perspective is either weak or absent.

In the case of Borras, Fig and Suárez (2011), essential factors affecting water security remained undecided, undocumented and even contested such as (i) water volume to be used, (ii) priorities in case of natural hazards such as droughts and electricity production for industries, and (iii) access to the land harbouring common water bodies. Rather unsustainable state guarantees of constant water supply to the investor plantation were made and documented, unsustainable in the light of the variability of rainfall in the area and the insecurity of water flow into the dam involved, thus undermining the autonomy and capacity of local communities to produce their own food for their consumption.

(Duvail *et al.*, 2012) reports the water balance of the LSLA project, acquiring land around Tana River depended largely on water availability and flows, but these aspects were misrepresented, inappropriately treated, and minimally discussed in its respective EIA document. Only two mentions were made with respect to water allocation without a mention of sources from which water volumes were calculated. A recalculation of water flows with data from gauging stations clearly indicated miscalculated water abstractions. Further, impact on water quality was brazenly dismissed as the decided Matomba channel for drainage opens into a lake, home to a biodiverse ecosystem of water animals and birds. Toxic insecticides and pesticides were drained into the lake, impacting species of fish, and contaminating surface waters and floodplains, leading to water insecurity through ecosystem damage, land, and water pollution.

Tufa, Amsalu and Zoomers (2018) follow an LSLA where the company managers made use of their invitation and relationship with higher officials as leverage not to follow any of the normative land acquisition procedures, bypassing socioeconomic, environmental, and technical assessments for large-scale agricultural investments. Even the very basic soil, water and climatic assessments were not undertaken, although documentation shows that groundwater and labour availability were the two major conditions in consideration to allocate the land. All these contingencies contributed to exploitation of natural water bodies leading to severe water scarcity, and massive competition and conflict over land and water resources, resulting in a crippled investment.

Effossou, Cho and Ramoelo (2022) report through interviews with the locals that the land deals were unfairly conducted, without transparency and negotiations with the locals, and ultimately resulted in dispossession of their land, leading to disruption of livelihood, food and water security, and deterioration of living conditions and displacement of families from their homes.

Further, we argue that lack of local concern about water grabs is reinforcing land-water grabs as investors show no concern for potential long-term consequences of water abstraction and pollution. Fonjong (2016), Ajala (2018), Adams *et al.* (2019) highlight similar scenarios where large-scale land acquisitions have directly impacted their water security in terms of deteriorations of water source affecting living conditions, health and sanitation and the ecosystem. Adams *et al.* (2019) report that the major

water resources available to smallholder farmers and acquired in LSLAs were the Pru, White Volta, Onwam, and Afram Rivers, and the Volta Lake. The uses of the water resources by the locals were numerous, including for tie-dye businesses, car washing, and livestock, most respondents ranked agriculture (69.2 percent) and drinking (57.6 percent) as the most important uses. They mention that the farmers drink water directly from the Owam River because water from boreholes and wells provided by NGOs were too salty. Most of the farmers informed that investors intentionally acquired land near major water resources for unrestricted access to irrigation, many fearing water pollution as its major consequence. Further, Large-scale investors generally operated without formal certificates to abstract water even though their Environmental Impact Assessment (EIA) reports explicitly mentioned water requirements needed for their operations. No documentation was available on the water rights granted as the local leaders and chiefs, while instrumental in land and water grab deals, were often ignorant about the land and water nexus (Ibid.). The investors merely informed community leaders of their intention to appropriate surface water for irrigation. There were no discussions on the impacts of water appropriation on smallholders.

Ajala (2018) brings forth case studies where investments by foreign entities were mainly monoculture agriculture which required high water availability and therefore the massive capture of water sources for irrigation purposes. Also, the cultivation of these crops on a large-scale was far more than the natural capacity of land, it required the application of fertilisers, pesticides and herbicides altering soil structure, polluting water bodies, destroying biodiversity as well as the ecosystem. Additionally, no environmental impact assessments were carried out during the planning and execution stages of all the agricultural projects. In the absence of an environmental impact assessment report, the environmental impact of the projects was not determined with a view to mitigating potential adverse environmental effects.

Similar cases of land-grabbing in Ethiopia are reportedly exacerbating the already existing hunger and desperation in vulnerable communities of smallholders (Damte, 2019). Land-grabbing along riverbanks where smallholders have established farming and cultivation to combat water scarcity, led to the clearing of forests and shifting of cultivation plots that are crucial buffers for the food security of smallholders. Furthermore, since investors target land that is close to water, land-grabs hinder access to water for consumption and family use (Ibid.).

In Tanzania, the increasing focus on commercial agriculture has had far-reaching implications for the governance of water, as well as for communities' access to water. Communities' access to water has in some instances literally been cut off to demarcate land for commercial agricultural purposes (van Eeden, Mehta and van Koppen, 2017). Despite being critical to the successful implementation of these initiatives, the importance of water was almost negligible in the formulation and adoption of Kilimo Kwanza (A national policy to aid smallholders whilst maintaining foreign investments). Similarly, not much importance was given to the water governance framework and the institutions which were meant to strengthen water resources governance and management, such as the water basin offices, the introduction of volumetric pricing as well as water permits, all critical to evaluate and maintain water security of the regions. These were instead altered and shaped to fit into the national agenda of the various investment policy initiatives (Ibid.).

## **5.6. Smallholder Impact and Response**

### ***5.6.1. Framing LSLAs as Intervention with 'Net Positive Gains'***

One of the most persistent challenges investors faced in attempting to exercise exclusive rights in land deals was the presence of local residents who depended on the land, forests, and water for their livelihoods. While force may be used to affect land clearance and dispossession, this was an unpopular choice by investors concerned about their reputation as "responsible" companies, as mass public opposition can compromise their social license to operate and delay project implementations (Chung and Gagné, 2021). Hence LSLAs were framed to offer benefits outweighing the consequences. Some of the selling points of LSLAs in the global South is that they would spur and promote livelihoods and employment among the rural poor in host communities. This was achieved by enacting schemes such as contract farming and utilisation of local population in farming, generating employment (Edelman, Oya and Borrás, 2016; Chung and Gagné, 2021). Hence, in remote rural communities where there were no significant commercial economic activities, these were a welcome development. It is precisely in this context that many LSLAs included in this study, were framed and publicised. Such promises not only quieted resistance amongst the locals, but many welcomed the deals to improve living standards and generate opportunities. According to this study, ~74% of the LSLAs were framed to offer benefits to the smallholders in the form of contract farming / employment on the new

plantations, monetary benefits, or new land deals. However, a critical examination with time revealed the truth behind the attractive pictures publicised and proved mostly to be capitalist ventures focused on profit rather than the people or environment. Additionally, a dispossession by accumulation trend was shown where the labour dispossessed couldn't be absorbed into the industrial models of farming. In this study, ~94% of the LSLAs ultimately lead to negative consequences to the smallholders in the form of land dispossession, food insecurity, restricted access to commons, and increased water pollution, thus affecting water security.

(Borras, Fig and Suárez, 2011) reports that the premise of the LSLA was firstly, the utilisation of remote lands lacking vital infrastructure, with a positive aspect of building new infrastructure and a focus on introducing drip irrigation in remote and underutilised areas. Secondly, it was framed to promote livelihoods and employment by committing itself to hiring the local population. The project was designed to help increase the income of local people by up to five times more than the national poverty line income. Based upon interviews with ProCana representative and locals, it was observed that only a few of the young and skilled were employed by choice, while the rest were pressurised to change their source of livelihood to one favouring the large-scale plantation.

A similar promise of 20,000 jobs was made in the Tana Delta case (Duvail *et al.*, 2012), but the details were purposefully vague and lacked proper project implementation plans, job descriptions and time-frame details, hence no solid foundation was provided to promised benefits.

Duvenage, Taplin and Stringer (2012) describe scenarios in which benefits to the locals were promised in LSLAs and endorsed by the state and chief. However, interviews with the local populations presented a bleak picture of their reality. Societal sustainability criteria were barely met and poorly executed including local employment measures, agronomic training and provision of facilities, transparency or participation in plantation plans or price negotiations. Risk assessment, avoidance and response strategies were lacking and economic sustainability measures to sustain investor business or aid local development was sparse (*ibid.*).

Tufa, Amsalu and Zoomers (2018) also report such promises being made but never being kept while the smallholders suffered from increased competition and conflict

over water resources. To make matters worse, the investor encroached upon other sources of livelihoods of the locals as well, such as selling of spices and local crops.

Hertzog *et al.* (2012), Fonjong (2016), and Effossou, Cho and Ramoelo (2022) report similar findings where the promised benefits were used for short term peace with smallholders but proved to be either unfavourable in the long term or worse, left unfulfilled by the investor(s). Many company officials even cited the absence of initial upheavals and protests as evidence of transparency in discussions and local community engagement (Adams *et al.*, 2019). Using such initial complacency to solidify the grounding of large agricultural projects, forms another tactic of exploitation in large scale land deals. Damtew (2019) highlights similar cases in Ethiopia where land-grabbing exploited the open-door agricultural investment policy, by making open-ended claims about positive future impacts and unsupported justifications, lacking implementation strategies or documentation that can be used for accountability. The government claimed that apart from ameliorating food security, the investments would facilitate technology transfer, create employment, and develop infrastructure. However, there was no sign of technology transfer as most smallholders continued to use low-technology farming techniques (Ibid.). Promises to dig water wells and construct schools and clinics for the community never materialised. The only benefit extended to the community was that a few persons were employed as guards and others were employed seasonally as skilled laborers, but with meagre salaries (Ibid.).

(Hertzog *et al.*, 2012) quotes a government scheme in Mali which required thousands of new settlers to develop and cultivate the reclaimed lands, in return for a title of permanent occupation, to be granted after ten years of 'good behaviour'. The farmer settlers had to follow strict instructions regarding plot maintenance, cropping calendars, and cultivation techniques, and pay a water fee for each cropping season. Though the majority cultivated their land in accordance with the requirements of the administration for more than ten years, the granting of land titles remained sparse, and in a few years only 15% of farmers had received a land ownership title (Ibid.).

#### 5.6.2. Success Stories

Although in majority cases within the sample, the negative impacts were dominant, however, we do sparingly observe fulfilment of promises from some investors. For example, after failing to implement any societal and economic sustainability measure

initially, D1 Oils (Biofuel oriented LSLA in Zambia) improved their social governance by forming discussion groups where information on agronomy and suitable production processes were openly debated. This developed more trustworthy relations between the investors and locals, and the sharing of knowledge helps to reduce exploitation across different levels and groups and opening up opportunities to produce *Jatropha* in a manner more supportive to social and environmental sustainability (Duvenage, Taplin and Stringer, 2012).

### 5.6.3. Investor/State Power relation

“Smallholders are small-scale farmers, pastoralists, forest keepers, fishers who manage areas varying from less than one hectare to 10 hectares, using mainly family labour for production and using part of the produce for family consumption...” (FAO, 2012). Many of those households are extremely poor: overall, the highest incidence of workers living with their families below the poverty line is associated with employment in agriculture (Fanadzo *et al.*, 2021). They are usually considered part of the informal economy and are often vulnerable due to the lack of funds, literacy and political power and a low societal status, making them exploitable in land and water deals (Hall *et al.*, 2015; Hilson and Maconachie, 2020). Duvenage, Taplin and Stringer (2012) find that unequal representation, a lack of participation and unequal cost and benefit distributions for local actors in large scale agro-developments have negatively affected the sub-Saharan local population. The multiplicity of actors involved in these LSLAs necessitates a better understanding of motivations and power relations that underlie land and water grabs as one socio-natural process, whereby society and nature become co-constitutive by shaping one another (Swyngedouw, 2007)

Additionally, this study places forth evidence of political power exploitations, where the investor, state and chief can bypass the less literate, uninformed, politically underrepresented, and unconnected smallholder populations, and enforce control through local or state powers. It also brings into focus the conflicting customary and statutory tenure systems across sub-Saharan Africa. The ambiguities in legal pluralism (customary and modern tenure systems) have in certain areas resulted in conflicts between communal land users that own customary rights and the agribusiness developers that claim it.

Interviews with the locals in our case studies clearly highlight the satisfaction of many smallholders with their familial livelihood source, such as small subsistence farming and charcoal production, without the intention of switching. However, pressure from local power figures enforced changes favouring the investor's plantations.

Duvail *et al.* (2012) report that the Tana delta river landscape is a complex mosaic of forests, woodlands, floodplain grasslands and various wetland types, accommodating exceptional biodiversity. Thereby constituting a multifunctional area of high socio-economic value inhabited by many local communities whose livelihoods depended upon the river and surrounding plains. The cohabitation between various users or settler communities of the wetland was through informal rights of access, hence there was a disconnection between the complexity of these customary rights and the official point of view, according to which the central floodplain falls under the category of 'government land', under the direct authority of the central government. While some LSLAs use the investor-state power relation together with a benefits-outweighing-consequences outlook, the land allocation of the Tana delta has been brazenly direct without any regard to collateral damage to the local populations. Entire villages were not represented on the EIA maps though included in the project areas. In the EIA document these villages were described as "squatter villages", and the land surrounding the river as "free land". Additionally, when the public hearings were held, these were conducted far away from these villages, enabling easy land allocation to LSLAs, and its exploitation for development purposes. In another LSLA for *Jatropha*, Duvail *et al.* (2012) quote that the investors had a negative opinion of the traditional mobile pastoralism and livestock management practices, and used state power to introduce commercial changes in their favour. However, this favoured the local elite ranch owners and dismissed the local river tribes completely.

This study highlights the brazen utilisation of state and investor power with a clear bias towards investors. For the smallholders, who have listened to the government's rhetoric of protecting the poor from land and water grabbers, but who have been dispossessed of their land and displaced from their livelihood by the same government, the existing system of land governance fails to deliver its promises. Further, it supports the argument that by controlling land, the successive African regimes have retained for themselves a monopoly of water resource access, political



power, and the legal provisions, towards remaining the main players in the massive land enclosures and land grab-related dispossessions and displacements.

Many investors made use of their state invitations for investment and development, and power relationship with higher officials as leverage to bypass large scale land acquisition procedures and prerequisites, such as socioeconomic, environmental, and technical assessments. In some cases, political connections were utilised for coercive procedures in large scale scheme land acquisition and agricultural development. Implementation of the large scale agricultural plan in the study by Tufa, Amsalu and Zoomers (2018) exemplifies this notion perfectly. By labelling pastoral lowlands as empty or underutilised, the state and development actors can then claim possession because there is no legally entitled group/person to pose claims upon land declared empty. The sparsely populated areas in Ethiopia covered by green bush were used to support the official rhetoric of the government that label the lowland agropastoral areas as “idle” or “underutilised” land waiting for “capitalist redemption”. These areas allocated in LSLAs, and local people have been dispossessed and displaced without claim to any kind of compensation because they are not accepted as legitimate owners of the land, and the land they occupy is considered unutilised and therefore can be violently appropriated. Exploitation of the local water resources created water scarcity and led to massive resistance by the community (Ibid.). Higher officials intervened and put pressure on the local officials and the community to accept the company’s increasingly exploitative demands. The community’s resistance to the demand even led to a coercive intervention from the federal army based in the nearby military camp. Where reports indicate several people were beaten up and many were taken to jail. The lower administration officials complained about the pressure exerted on them by higher officials “to support the investment at all costs” (interview with a district official) (Ibid.).

In Ethiopia extending to Kenya, small communities living along the Omo Valley have faced numerous human rights violations through the establishment of 100,000 hectares of private commercial farming and large developmental projects (Damtew, 2019). The Ethiopian government exercises control over land as the custodian on behalf of the public. Thus, large-scale land deals are concluded between the government and investors. Communities of the Omo Valley relied mainly on the Omo River for growing crops and replenishing grazing land were subjected to a forced

villagisation programme accompanied by arbitrary detention, beatings, and intimidation towards enforcing restricted access to land handed to investors by the state. Indigenous communities have been displaced from their ancestral lands, forced to reduce the number of their cattle, abandon the Omo River and shift to a sedentary lifestyle (Ibid.).

van Eeden, Mehta and van Koppen (2017) report that with Southern Africa Growth Corridor of Tanzania (SAGCOT) project, commercial farming was planned to span across a third of Tanzania's land, with assumed control over the water sources essential for commercial farming. A massive project endorsed and supported by the government, while communities' access to water has in some instances was completely cut off to demarcate land for commercial agricultural purposes. Despite being critical to the successful implementation of these initiatives, the importance of water was almost negligible in the formulation and adoption of Kilimo Kwanza (A national policy to aid smallholders whilst maintaining investments) (Ibid.). One of the investors in Tanzania (Mkindo Sugar Estate) abstracted water for irrigation in a particularly contentious manner, ignored by the government. Upstream of a village, MSE constructed a weir and an irrigation canal in the region's river and had been opening and closing the weir to meet their irrigation demand, often for months on end, regardless of the needs of downstream users. Another investor EcoEnergy also gained access to land and water resources through various acts of dispossession, as well as through the creation of new alliances with government officials and key figures in communities (Ibid.). Hertzog *et al.* (2012), Fonjong (2016), Adams *et al.* (2019) discuss many similar scenarios in which smallholders are exploited by the state and dispossessed of their family land, often under the pretence of better land assignment or other benefits.

Ajala (2018) note three LSLA cases where the land deals were brokered only by the States' government officials. Under the Nigerian Land Use Act 1978, title to land within the territory of a State is vested in the Governor of the State but held in trust for Nigerian citizens. The government can appropriate any land for purposes that serve the public interest, so the allocations in these three cases were purportedly made under the guise of public interest (Ibid.). The negotiations leading to the allocations were undertaken without public knowledge and the affected local communities were not informed. Additionally, investors used influence to bypass the environmental

impact assessments during the planning and execution stages of all the agricultural projects, hence the environmental impact of the projects was not determined with a view to mitigating potential adverse effects on land use or water scarcity (Ibid.).

Hertzog *et al.* (2012) quote a scheme in Mali, the government implemented a large-scale irrigation project, which required thousands of new settlers to develop and cultivate the reclaimed lands, and two ordinances from the government (in 1937 and 1955) guaranteed settlers access to the land through a title of permanent occupation, to be granted after ten years of 'good behaviour'. The farmer settlers had to follow strict instructions regarding plot maintenance, cropping calendars, and cultivation techniques, and pay a water fee for each cropping season. Though most farmers cultivated their land in accordance with the requirements of the administration for more than ten years but were not granted land titles as it was perceived by the colonial state as a threat to its power over land management and farmers' supervision (Ibid.). By 1958, only 15% of farmers had received a land ownership title. Hence another example of investor-state-smallholder power politics benefiting only the former two.

#### 5.6.4. Investor/Chief Power relation

Across SSA, land legislation poses a problem with regards to its proper implementation because the land is controlled by lineage families or clans under the authority of traditional chiefs. Investors deflect dissent by co-opting project opponents and securing consent from smaller groups of powerful actors, including those who may not directly reside within the project areas but may have influence over local politics. As German, Schoneveld and Gumbo (2011), Duvenage, Taplin and Stringer (2012) and, Effossou, Cho and Ramoelo (2022) disclose, in SSA, countries such as Zambia and Ghana, where customary rights are recognised by law and chiefs may decline or concede land leases, or transfer permanent land ownership, irregularities are common. In practice, chiefs lack political know-how and skills to negotiate favourable terms when swayed by promises of "development" and although powerful relative to the people in their chieftom, chiefs remain weak players in the LSLA chain of power. This study reports such power relations where a state-investor-chief dynamic is used in 13% of the cases, and smallholders are bypassed, land deals involving agribusiness are conducted behind closed doors and the locals are informed after securing deals and forced to cooperate through the power practiced by local chiefs. Effective smallholder participation in such mediations is minimal to none.

Duvenage, Taplin and Stringer (2012) report from interviews with the local populations that LSLA negotiations and deals had taken place with chiefs and governing officials, namely, those actors with more power than average citizens. Through imbalances in political power and knowledge, locals were largely excluded from the project design and implementation process and were led to believe that joining the large-scale project would benefit the whole community (Ibid.).

Similarly, Effossou, Cho and Ramoelo (2022) highlight through local interviews that the land deals were conducted unfairly and in a hidden manner, lacking transparency, where the stakeholders were the local chiefs or heads. Exclusion of the locals from these deals lead to conflicts within the community and ultimately resulted in dispossession of their land, leading to disruption of livelihood, food and water security, and deterioration of living conditions and displacement of families from their homes. Some officials state plainly the exploitative nature of investor-chief-smallholder power relations:

*“Some of the agribusiness corporates are attracted by land acquisition because of the absence of clear land legislation and land acquisition systems”.*

Adams *et al.* (2019) highlight similar cases in which land deals were done behind closed doors in cooperation with the local chief or head. The locals were not aware of the monetary compensations decided, the land size finalised or any other officially transcribed benefits. Some even went further to state that the locals were forbidden from participating in any such discussions with investors, making the chief or head one of the primary stakeholders reaping benefits (Ibid.). A deal between the investor (ScanFarm Ltd) and traditional council led to the payment of the necessary customary drink money and an agreed fee on annual land rent. However, local people were not aware of any compensations, and the chiefs neither declared nor accounted for how the money was used (Ibid.). Additionally, chiefs could take financial compensation meant for farmers but instead provided new available lands to the farmers. However, when investors asked the chiefs to provide the names of farmers to be compensated with employment, ideally farmers who lost lands, the chiefs often submitted only the names of direct family members (Ibid.).

## 5.7. Smallholder Resistance/Contention

I further argue that resistance matters for understanding the divergent and unexpected ways in which land deals with water grabbing undertones, unfold. In ~65% of the cases, some form of smallholder resistance or contention is reported (Detailed in Appendix D), but it lacks the social organisation and political grounding to bring about any effect. It is important to recognise that the boundaries between resistance, acquiescence, and incorporation are blurry (Hall *et al.*, 2015). Debating environmental conflicts, local communities often express disparate economic discourses. However, the dominant discourse is that of the privileged elites in power, and alternative forms of values tend to be suppressed. This trend plays out in the LSLAs context too, as sustainability frameworks are often developed by those with an interest in pursuing large scale cultivation, without necessarily involving those with alternative perceived values and livelihoods who are affected by shifts in land use (Martinez-Alier, 2009; Duvenage, Taplin and Stringer, 2012).

While the case studies indicate that many smallholders were satisfied with their running source of income, and registered this opinion to the local political figures, but were pressurised or forced to change their ways, either by leaving their land or changing their source of livelihood to one favouring large-scale plantations. The voice of smallholders lacked organisation and publicity, and was easily suppressed by those in power. Borras, Fig and Suárez (2011) report smallholders clearly disagreeing with the investors and the state, and actively struggling to gather other local villages in raising their voice to form an organised resistance. They feared their access to water hindered as the new land they will be moved to lacked essential irrigation infrastructure, and under conditions of water insecurity their livelihoods will be affected. A clear struggle to hold onto land with better water access was observed (Ibid.).

In the case of Duvail *et al.* (2012), whilst multiple local populations and tribes dependent on River Tana were effected, they could not bring about any change in state decisions and land dispossession, thus validating our claims about the lack of power in smallholder resistance. One of the LSLAs was taken to court later by NEMA, local and national NGOs, which was a stronger, although unsuccessful, contestation for land allotment, as compared to the response shown by the river tribes.

We see several examples of dispersed ineffective forms of smallholder resistance presented by Duvenage, Taplin and Stringer (2012). Once conflict arose over water use, confrontation between the local community and the investor company was met with coercive response from the government actors, including the army, which ended up in several people being physically harmed. The local community continued staging resistance but in different forms, resorting to hidden tactics to expel the investor without attracting much attention from the government authorities. Bearing in mind the authoritarian and repressive nature of the Ethiopian political regime, the resistance was not well coordinated or systematically organised (Ibid.). Rather, it was measures taken by individuals and micro groups such as the investor company's employees, herders, the company's guards, and other members of the community who were disappointed by the company's actions or inactions. These scattered resistance measures included (i) damaging the company's crop (ii) driving their cattle into the plantation (iii) the locally hired guards collaborated with the people against the company while several resigned from their positions and (iv) exercising indigenous practices of prayer and sacrifice to drive investors away (Ibid.).

van Eeden, Mehta and van Koppen (2017) report major conflicts in Tanzania over blatant water abstractions by foreign investors. Some of these conflicts took place within the community. Some community members, who were also employees of the investors, were forced to stay away from work or strike against the employer in order to put pressure on the company. Many employees were also outgrowers, they were forced to go on strike with fellow outgrowers because they had not received payments from investors. More volatile reactions to water scarcity manifested as smallholders started walking with their machetes while protesting. While it resolved the problem temporarily, they were ineffective as long-term solutions.

## **5.8. Positive Impact of Smallholder Participation**

As previously discussed, Large-scale land acquisitions in African countries by foreign investors who use such lands for agricultural purposes have negative socio-economic and environmental impacts in host countries. In the context of environment, the type of crops and monoculture practices undertaken by the foreign investors led to changes in land use, deforestation, exposure of land to soil erosion, depletion of water sources, pollution of surface water and contamination of ground water. Collectively, these have had a deleterious environmental impact leading to food and water insecurity in host

countries. We argue that suitable legal and environmental laws must contain the concept of Community Participation in the environmental impact assessment process of land based foreign investments, and Environmental Justice for victims of environmental degradation in such investments. Additionally, sharing of practice-based knowledge of crop characteristics, land, and water use by the locals in many cases, may even aid the investors' commercial farming, rather than standalone knowledge.

This is also highlighted in the case study by Tufa, Amsalu and Zoomers (2018). Besides the competition and conflict over natural resources such as water and land, the investor company instead of incorporating the locals, began to encroach on the livelihoods of the locals through its engagement in petty businesses. Among these were participation in the small-scale production and sale of pepper, tomatoes, and maize from parts of the land the company acquired for *Jatropha*. While some locals; laborers and guards tried to advise the investor on the selection of maize variety that suit the area, they however disregarded local knowledge and went ahead with inappropriate varieties instead that take longer to mature: the variety that suits the highland climate where rainfall is longer and sufficient. This put pressure on water resources because the production of maize and vegetables required intensive use of water. Their maize farm suffered from shortage of rainfall and the water from the stream, which was the source of conflict between the company and the local community, was not sufficient to sustain them. The company's grand promises for modern infrastructure, technological and innovative agricultural capacities, followed by their inability to grow even maize came as a shock for the local community.

In another study, Hertzog *et al.* (2012) quotes a scheme in Mali where the government implemented a large-scale irrigation project, which required thousands of new settlers to develop and cultivate the reclaimed lands. An effort to utilise practical smallholder knowledge and skills upon new lands for large scale benefits. In return, the government (in 1937 and 1955) guaranteed settlers access to the land through a title of permanent occupation, to be granted after ten years of 'good behaviour'. Though most farmers cultivated their land in accordance with the requirements of the administration for more than ten years, the granting of land titles remained rare, as it was perceived by the colonial state as a threat to its power. Although the government failed to deliver in its promise to smallholders, the crops and farming practices were

stable and successful. Had it been beneficial to the smallholders/settlers, long term commitments could be made, in parallel with continued profit.

Ajala (2018) quotes multiple LSLAs where foreign investors fail to comply with the extant environmental law in Nigeria or communicate with the local communities who may suffer the environmental consequences. As a result, there is no sustainability measure for environmental pollution or degradation that results from large-scale land-based investments by foreign entities. An environmental law regime with the concept of environmental justice can ensure that local communities and investors alike do not bear the environmental consequences of foreign investments alone without compensatory, restorative, or rehabilitative remedy from the violators. Damage to the ecosystem and exploitation of land and water resources will render the lands unfavourable and negatively impact commercial as well as local farming.



## 6. Conclusion

This study aimed to bridge the disconnect between large scale land acquisitions and their consequences to the water security of smallholders in sub-Saharan Africa using political ecology to understand the interconnection of relationships in land-water appropriations.

Large-scale land acquisitions (LSLAs) have been a contentious issue in Africa for decades with significant impacts on water security, shaping agrarian and pastoral livelihoods in the region (De Schutter, 2009; Deininger *et al.*, 2011). Our goal was to address land and water grabs as an intertwined process through a hydro-social perspective. In addition, the study aimed to highlight not only how LSLAs enables water appropriations for smallholders, but also how power figures navigate their negotiations for land and water deals and the consequent ineffective response from smallholders following these changes.

This study brings forth evidence of the nexus of political and hydrological relationships leading to dispossession of land and water appropriations for smallholders, impacting multiple aspects of water security. Land acquisitions for large-scale agriculture mainly targeted areas in proximity to or with easy access to natural water bodies or state-built irrigation systems. The state, traditional leaders and other powerful actors wielded significant influence on land and water grabs. Clever strategies were employed by investors to grab land and local water resources, including providing monetary and social benefits, and sharing modern agricultural technology and practices. However, most of these promises remained unfulfilled and smallholders did not receive their due compensation, leading to displacement of their livelihoods. Additionally, the study establishes that this exploitation was enabled by a lack of accountability from the state and local politics by traditional leaders who prioritised relatives and close subjects for compensation instead of a fair distribution.

We further argue that these appropriations were legitimised by lack of coherence in land tenure and water regulations, and outdated institutional regulations. Sample data reveals that LSLAs have focused minimally on the terms and conditions for access and utilisation of available water bodies. A general lack of discussions and documentation for water access, utilisation, and distribution of benefits and burdens is mainly observed, along with the incorporation of vague terminologies and unplanned

promises to bring forth smallholder and public complacency. The priorities in such agreements exhibit a clear bias, focusing upon provisions for the investors. Traditional leaders were incapable of political negotiations and mostly oblivious to the national legislations and institutional arrangements on water access and rights. While in many cases, institutional requirements for access to water, including appropriate assessments and documentation were bypassed through political power plays involving investors, state, and local chiefs. Further, investors' notion of abundant water resources motivated their use of water for irrigation and expansion of irrigation for out grower schemes. Additionally, many cases reported detrimental impacts on the natural ecosystems through water toxicity and pollution, hence land-water grab studies must focus not only on physical abstractions of water or blue water footprints but equally on grey water implications such as chemical pollution and other land use processes.

Additionally, we argue that lack of local concern about water grabs and smallholder rights is reinforcing land-water grabs as no evidence was found pertaining to concern shown by investors or local leaders for potential long-term consequences of water abstraction and pollution, or land dispossession on local populations. Findings indicate that this lack of accountability is compounded by the ineffective response shown by smallholders, lacking the social organisation and political grounding to bring about any effect. It is important to recognise that the boundaries between resistance, acquiescence, and incorporation remain blurry with empty promises and lack of approach. Local communities often express disparate economic discourses but the dominant discourse is that of the privileged elites in power.

The lack of attention to the terms and conditions for access and utilisation of available water bodies suggests that LSLAs are not being implemented in a sustainable manner that considers the needs of smallholders and the environment. Finally, this study establishes the importance of adopting a more inclusive and participatory approach to land acquisition that considers the needs and rights of smallholders whilst the investors benefit from complacency from locals, their improved incorporation into the large-scale schemes and shared knowledge. This approach should be based on a transparent and accountable process that includes consultations with smallholders, communities, and other stakeholders. The terms and conditions for access and utilisation of available water bodies should be negotiated and documented to ensure that the interests of all parties are considered.

There is also a need for increased attention to water resource management in LSLAs. This should include the development of sustainable water management practices that consider the needs of smallholders and the environment. Such practices should prioritise water conservation and the equitable distribution of water resources. Water management strategies should also consider the impacts of climate change on water availability and incorporate adaptation measures that enhance resilience.

Finally, there is a need for greater regulation and oversight of LSLAs. Addressing land and water grabs effectively requires better integration of land and water governance, including streamlining land and water sector agencies. This includes the development of legal frameworks that protect the rights of smallholders and promote sustainable land use practices. Governments should ensure that LSLAs are subject to rigorous environmental and social impact assessments that consider their potential impacts on water resources, as well as smallholder livelihoods, towards adding long-term sustainability to large scale agricultural ventures.

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## **APPENDICES**

## Appendix A

Case name	Source	Theoretical Framework\Legal Frameworks\Formal land rights [1=yes; 0=no]	Theoretical Framework\Legal Frameworks\Customary land rights [1=yes; 0=no]	Theoretical Framework\Legal Frameworks\Formal water governance law [1=yes; 0=no]	Theoretical Framework\Legal Frameworks\plural legalism [1=yes; 0=no]	Theoretical Framework\Legal Frameworks\Interaction between frameworks	Theoretical Framework\Power Relations\Actors Involved	Theoretical Framework\Power Relations\Land ownership	Theoretical Framework\Power Relations\Resource Control	Theoretical Framework\Power Relations\Smallholder participation [1=yes; 0=no]
ProCana	Borras, S.M.; Fig, D.; Suárez, S.M. (2011)	1	0	1	0	-	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Tana Delta - Kenyan Private Company	Duvail, S.; Médard, C.; Hamerlynck, O.; Nyingi, D.W. (2012)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Tana Delta - Canadian Private Company	Duvail, S.; Médard, C.; Hamerlynck, O.; Nyingi, D.W. (2012)	0	1	1	0	-	State/Investor/Smallholder/Chiefs	Lease\Chief Power	Shared	1
D1 Oils	Duvenage, I.; Taplin, R.; Stringer, L. (2012)	1	0	0	0	-	State/Investor/Smallholder	Lease\State Power	Exclusive	1
Tomanguié	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	1	1	0	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Ayenouan	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	1	1	0	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Soumié	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	1	1	0	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Volta-Red Farms	Fonjong, L.N.; Gyapong, A.Y. (2021)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
SG-SOC	Fonjong, L.N.; Gyapong, A.Y. (2021)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Société des Plantations du Haut Penja	Fonjong, L.N.; Gyapong, A.Y. (2021)	1	0	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
CDC	Fonjong, L.N.; Gyapong, A.Y. (2021)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0

Saudi Star	Sama, S. (2017)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Senhuile-Senéthanol	Sama, S. (2017)	1	0	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
AgriSol	Sama, S. (2017)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Sun Biofuels	Sama, S. (2017)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Neumann Kaffee Gruppe	Sama, S. (2017)	1	0	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Kimminic Corporation	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	1	1	1	1	Contradictory	State/Investor/Smallholder/Chiefs	Lease\Chief Power	Exclusive	0
Intergrated Tamale Fruit Company (ITFC)	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	1	1	1	1	Contradictory	State/Investor/Smallholder/Chiefs	Lease\Chief Power	Exclusive	0
ScanFarm	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	1	1	1	1	Contradictory	State/Investor/Smallholder/Chiefs	Lease\Chief Power	Exclusive	0
Dominion Farms	Ajala T. (2018)	1	0	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
PZ Wilmar	Ajala T. (2018)	1	0	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Michelin	Ajala T. (2018)	1	0	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Karuturi	Damtew S.G. (2019)	1	1	0	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
Malibya	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	1	0	1	1	Contradictory	State/Investor/Smallholder/Non-profits	Lease\State Power	Exclusive	0
M.K.	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	1	0	1	1	Contradictory	State/Investor/Smallholder/Non-profits	Lease\State Power	Exclusive	0
MCA	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	1	0	1	1	Contradictory	State/Investor/Smallholder/Non-profits	Lease\State Power	Exclusive	0
Mtibwa Sugar Estate (MSE)	van Eeden A.; Mehta L.; van Koppen B. (2016)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	0
EcoEnergy	van Eeden A.; Mehta L.; van Koppen B. (2016)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Shared	0



Moçfer Industrias Alimentares (MIA)	Veldwisch G.J. (2015)	1	1	1	1	Contradictory	State/Investor/Smallholder	Lease\State Power	Exclusive	1
Emami BioTech	Tufa F.A.; Amsalu A.; Zoomers E.B. (2018)	1	0	0	0	-	State/Investor/Smallholder	Lease\State Power	Shared	0
Niqel	von Maltitz G.P.; Gasparatos A.; Fabricius C.; Morris A.; Willis K.J. (2016)	1	1	0	1	Complementary	State/Investor/Smallholder	Lease\State Power	Shared	1
						<b>31</b>	<b>31</b>		<b>31</b>	<b>31</b>
						<b>26</b>	<b>24</b>		<b>27</b>	<b>4</b>
						<b>83.9%</b>	<b>77.4%</b>		<b>87.1%</b>	<b>12.9%</b>
							<b>4</b>		<b>4</b>	<b>3</b>
							<b>12.9%</b>		<b>12.9%</b>	<b>9.7%</b>
							<b>3</b>			
							<b>9.7%</b>			

## Appendix B

Case name	Source	LSLA characteristics\ Investor name	LSLA characteristics\ Investor origin	LSLA characteristics\ Year of land acquisition	LSLA characteristics\ Size of LSLA	LSLA characteristics\ State	LSLA characteristics\ Crop	LSLA characteristics\ Country
ProCana	Borras, S.M.; Fig, D.; Suárez, S.M. (2011)	Central African Mining and Exploration Company (CAMEC) / Procana	United Kingdom	2008	30000	unknown	Sugar cane	Mozambique
Tana Delta - Kenyan Private Company	Duvail, S.; Médard, C.; Hamerlynck, O.; Nyingi, D.W. (2012)	Kenyan Private Company	Kenya	2007	120000	cancelled	Sugar cane	Kenya
Tana Delta - Canadian Private Company	Duvail, S.; Médard, C.; Hamerlynck, O.; Nyingi, D.W. (2012)	Canadian Private Company	Canada	2009	160000	cancelled	Jatropha	Kenya
D1 Oils	Duvenage, I.; Taplin, R.; Stringer, L. (2012)	D1 Oils	United Kingdom	2006	860	cancelled	Jatropha	Zambia
Tomanguié	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	Unknown Investor	Côte d'Ivoire	Unknown	28000	unknown	Palm Oil	Côte d'Ivoire
Ayenouan	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	DekelOil CI	Cyprus	2009	5000	In production	Palm Oil	Côte d'Ivoire
Soumié	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	Unknown Investor	Unknown Origin	Unknown	650	unknown	Palm Oil	Côte d'Ivoire
Volta-Red Farms	Fonjong, L.N.; Gyapong, A.Y. (2021)	Sithe Global Sustainable Oil Ghana	Ghana	2008	3750	In production	Palm Oil	Ghana

SG-SOC	Fonjong, L.N.; Gyapong, A.Y. (2021)	Sithe Global Sustainable Oil Cameroon	Cameroon	2013	19843	In production	Palm Oil	Cameroon
Société des Plantations du Haut Penja	Fonjong, L.N.; Gyapong, A.Y. (2021)	Société des Plantations du Haut Penja	France	1991	4500	In production	Rubber	Cameroon
CDC	Fonjong, L.N.; Gyapong, A.Y. (2021)	Cameroon Development Corporation (CDC)	Cameroon	2009	41000	In production	Tea	Cameroon
Saudi Star	Sama, S. (2017)	Saudi Star	Saudi Arabia	2003	10000	unknown	Rice	Ethiopia
Senhuile-Senéthanol	Sama, S. (2017)	Senhuile-Senéthanol	Multiple Investors	2012	20000	unknown	Sweet Potatoes	Senegal
AgriSol	Sama, S. (2017)	AgriSol Energy	United States of America	2013	325000	cancelled	Maize	Tanzania
Sun Biofuels	Sama, S. (2017)	Sun Biofuels	United Kingdom	2008	8211	cancelled	Jatropha	Tanzania
Neumann Kaffee Gruppe	Sama, S. (2017)	Kaweri Coffee Plantation Ltd.	Germany	2001	2524	In production	Coffee	Uganda
Kimminic Corporation	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	Kimminic Corporation	Canada	2008	65000	cancelled	Jatropha	Ghana
Intergrated Tamale Fruit Company (ITFC)	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	Integrated Tamale Fruit Company (ITFC)	Netherlands	2001	552	cancelled	Unclear/ multiple crops	Ghana
ScanFarm	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	ScanFarm (Gh.) Ltd.	Norway	2009	13058	In production	Unclear/ multiple crops	Ghana
Dominion Farms	Ajala T. (2018)	Dominion Farms	United States of America	2010	30000	cancelled	Rice	Nigeria
PZ Wilmar	Ajala T. (2018)	PZ Wilmar	United Kingdom	2011	26000	In production	Palm Oil	Nigeria

Michelin	Ajala T. (2018)	Michelin	France	2007	3500	unknown	Rubber	Nigeria
Karuturi	Damtew S.G. (2019)	Karuturi Agro PLC	India	2007	10700	cancelled	Unclear/ multiple crops	Ethiopia
Malibya	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	La Grande Jamahiriya Arabe Libyenne Populaire et Socialiste	Libya	2008	100000	cancelled	Unclear/ multiple crops	Mali
M.K.	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	M.K.	Mali	Unknown	7400	unknown	Unclear/ multiple crops	Mali
MCA	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	Millenium Challenge Account (MCA)	United States of America	2006	22000	cancelled	Unclear/ multiple crops	Mali
Mtibwa Sugar Estate (MSE)	van Eeden A.; Mehta L.; van Koppen B. (2016)	Mtibwa Sugar Estate	Tanzania	1998	7000	In production	Sugar cane	Tanzania
EcoEnergy	van Eeden A.; Mehta L.; van Koppen B. (2016)	Agro EcoEnergy Ltd.	Multiple Investors	2008	22000	unknown	Sugar cane	Tanzania
Moçfer Industrias Alimentares (MIA)	Veldwisch G.J. (2015)	Moçfer Industrias Alimentares (MIA)	United Kingdom	2005	26000	cancelled	Rice	Mozambique
Emami BioTech	Tufa F.A.; Amsalu A.; Zoomers E.B. (2018)	Emami BioTech	India	2010	11000	cancelled	Jatropha	Ethiopia
Niqel	von Maltitz G.P.; Gasparatos A.; Fabricius C.; Morris A.; Willis K.J. (2016)	Niqel	Netherlands	2007	6500	In production	Jatropha	Mozambique

## Appendix C

Case name	Source	Theoretical Framework\Water security\Water for livelihood	Theoretical Framework\Water security\Water for health and hygiene	Theoretical Framework\Water security\Water for ecosystem	Theoretical Framework\Water security\Water for natural hazard resilience
ProCana	Borras, S.M.; Fig, D.; Suárez, S.M. (2011)	Decreased access	N/A	N/A	N/A
Tana Delta - Kenyan Private Company	Duvail, S.; Médard, C.; Hamerlynck, O.; Nyingi, D.W. (2012)	Decreased access	N/A	Increased abstraction	N/A
Tana Delta - Canadian Private Company	Duvail, S.; Médard, C.; Hamerlynck, O.; Nyingi, D.W. (2012)	Decreased access	N/A	N/A	Decreased water quality
D1 Oils	Duvenage, I.; Taplin, R.; Stringer, L. (2012)	No effect	No effect	No effect	No effect
Tomanguié	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	Decreased access	N/A	N/A	N/A
Ayenouan	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	Decreased access	N/A	N/A	N/A
Soumié	Effossou, A.K.; Cho, M.A.; Ramoelo, A. (2022)	Decreased access	N/A	N/A	N/A
Volta-Red Farms	Fonjong, L.N.; Gyapong, A.Y. (2021)	Decreased access	N/A	N/A	N/A
SG-SOC	Fonjong, L.N.; Gyapong, A.Y. (2021)	Decreased access	N/A	Increased abstraction	N/A
Société des Plantations du Haut Penja	Fonjong, L.N.; Gyapong, A.Y. (2021)	Decreased access	N/A	N/A	N/A
CDC	Fonjong, L.N.; Gyapong, A.Y. (2021)	Decreased access	N/A	Increased abstraction	N/A
Saudi Star	Sama, S. (2017)	Decreased access	N/A	Increased abstraction	Decreased water quality
Senhuile-Senéthanol	Sama, S. (2017)	Decreased access	N/A	Increased abstraction	N/A

AgriSol	Sama, S. (2017)	Decreased access	N/A	N/A	N/A
Sun Biofuels	Sama, S. (2017)	Decreased access	N/A	N/A	N/A
Neumann Kaffee Gruppe	Sama, S. (2017)	Decreased access	Decreased access	N/A	Decreased water quality
Kimminic Corporation	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	No effect	No effect	No effect	Decreased water quality
Intergrated Tamale Fruit Company (ITFC)	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	No effect	Increased access	No effect	Decreased water quality
ScanFarm	Adams E.A.; Kuusaana E.D.; Ahmed A.; Campion B.B. (2019)	No effect	Increased access	No effect	Decreased water quality
Dominion Farms	Ajala T. (2018)	N/A	N/A	N/A	Decreased water quality
PZ Wilmar	Ajala T. (2018)	N/A	N/A	N/A	Decreased water quality
Michelin	Ajala T. (2018)	N/A	N/A	N/A	Decreased water quality
Karuturi	Damtew S.G. (2019)	Decreased access	Decreased access	N/A	Decreased water quality
Malibya	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	Decreased access	Decreased access	Increased abstraction	Decreased water quality
M.K.	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	Decreased access	Decreased access	Increased abstraction	Decreased water quality
MCA	Hertzog T.; Adamczewski A.; Molle F.; Poussin J.C.; Jamin J.Y. (2012)	Decreased access	Decreased access	Increased abstraction	Decreased water quality
Mtibwa Sugar Estate (MSE)	van Eeden A.; Mehta L.; van Koppen B. (2016)	Decreased access	Decreased access	Increased abstraction	Decreased water quality
EcoEnergy	van Eeden A.; Mehta L.; van Koppen B. (2016)	Decreased access	Decreased access	Increased abstraction	Decreased water quality
Moçfer Industrias Alimentares (MIA)	Veldwisch G.J. (2015)	Decreased access	N/A	N/A	N/A
Emami BioTech	Tufa F.A.; Amsalu A.; Zoomers E.B. (2018)	Decreased access	Decreased access	Increased abstraction	N/A
Niqel	von Maltitz G.P.; Gasparatos A.; Fabricius C.; Morris A.; Willis K.J. (2016)	No effect	No effect	No effect	No effect