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**Beyond the Green Revolution in Africa:
Exploring the Links between Property Rights, Land
Registration, and Development in Sub-Saharan Africa**

Diploma Thesis

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The Green Revolution, which was a triumph in many Asian and Latin American countries, served as a catalyst for subsequent industrialization. Regrettably, most African countries have deviated from this trajectory. The following thesis explores the paradigm of the agricultural revolution by focusing on the link between this transformative phenomenon, the property rights framework and the associated land registration. This article takes inspiration from the seminal ideas of the eminent economist Hernando de Soto, who argues that strong property rights are a powerful weapon against poverty, food crises and a key driver of economic progress in low-income countries. The work presents the hypothesis. It posits that in the absence of comprehensive information, efficient redistribution of basic resources among agricultural producers is implausible. At the same time, producers find themselves without access to critical state and market institutions such as banking facilities or judicial protection. Using a range of data and aggregate indicators, this paper examines the interplay of the above phenomena in the context of maize and rice crop production in sub-Saharan African countries over the past three decades.

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The Green Revolution was one of the most significant events of the 20th century, helping millions of people escape the trap of poverty and hunger. It was not only an agricultural achievement, but also a catalyst for comprehensive economic development and state-building. Africa, however, remains a continent where these achievements have not yet been realized. The main hypothesis of this paper argues that the difference between successful Asian states and African countries lies primarily in institutions, especially those related to land tenure. Formally held land and strong rights have been key to the prosperity of many states, examples of the Enclosure Movement in England or the thorough formalization of land among the Asian economic tigers can be mentioned. This approach led to agricultural overproduction, urbanization and the boom of new sectors. Despite the difficult situation in Africa, many African leaders have recognized the importance of formalizing land and establishing modern rights. However, examples in Africa vary, from the highly problematic situation in Nigeria and Burundi to the miraculous case of Rwanda, which is on par with Western countries in many aspects of the quality of land management. This thesis will explore land tenure in tropical Africa and its potential for a new Green Revolution and associated comprehensive development.

Keywords: Green Revolution, Land Registration, Property Rights, Land Tenure, Economic Development, State-Building, Africa

Anotace

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Zelená revoluce byla jednou z nejvýznamnějších událostí 20. století, která pomohla milionům lidí uniknout z pasti chudoby a hladu. Nebyla pouze zemědělským úspěchem, ale také katalyzátorem komplexního hospodářského rozvoje a budování státu. Afrika však zůstává kontinentem, kde tyto úspěchy dosud neobjevují. Hlavní hypotéza tohoto článku tvrdí, že rozdíl mezi úspěšnými asijskými státy a africkými zeměmi spočívá především v institucích, zejména těch, které se týkají vlastnictví půdy. Formálně držená půda a silná práva byla klíčem k prosperitě mnoha států, jako příklad lze uvést proces oplocování v Anglii nebo důkladnou formalizaci půdy u asijských ekonomických tygrů. To vedlo k zemědělské nadprodukci, urbanizaci a rozmachu nových odvětví. Navzdory obtížné situaci v Africe si mnozí afričtí představitelé uvědomují důležitost formalizace půdy a zavedení moderních práv. Příklady v Africe jsou však různé, od velmi problematické situace v Nigérii a Burundi až po zázračný případ Rwandy, která se v mnoha aspektech kvality správy půdy vyrovná západním zemím. Tato práce se bude zabývat vlastnictvím půdy v tropické Africe a jeho potenciálem pro novou zelenou revoluci a související komplexní rozvoj.

Klíčová slova: Zelená revoluce, Registrace půdy, Vlastnická práva, Držba půdy, Ekonomický rozvoj, Budování státu, Afrika

Declaration

I declare that I have carried out the diploma thesis on my own under the supervision of Mgr. Jan Prouza, PhD. and have presented all the sources and literature utilized.

In Hradec Králové, June 19, 2024

Miroslav Látal

List of Abbreviation

BTI	Bettelsmann Stiftung Transformation Index
GDP	Gross Domestic Product
HDI	Human Development Index
IEP	Institute for Economics & Peace
IIAG	Ibrahim Index of African Governance
ODA	Official Development Assistance
UN FAO	Food and Agriculture Organization of the United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
V-DEM	Varieties of Democracy Institute
WBG	World Bank Group
WJP	World Justice Project

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Introduction

“The small landholders are the most precious part of a state.”

Thomas Jefferson, 1786

“He who has no hope that he shall reap, will not take the trouble to sow.”

Jeremy Bentham, 1830

The Green Revolution was one of the most important events of the 20th century. Millions of people escaped the grip of starvation and poverty. Thanks to the application of new varieties and the spread of fertilizers. However, the Green Revolution is not just an agricultural phenomenon, referring only to increased productivity in the fields. In fact, it is a complex phenomenon that has contributed significantly to the comprehensive development and economic expansion of many countries. The Green Revolution in Africa is not considered successful compared to other regions of the world. It was not until the new millennium that Africa experienced its first successes in increasing agricultural production. However, despite steadily increasing agricultural production, most African states are still dependent on food imports and comprehensive economic development remains in sight. The question arises as to why the Green Revolution in Asia led to comprehensive development associated with the expansion of state capacity, poverty reduction and later the initiation of industrialization, but in Africa, despite some agricultural successes, states still struggle with food self-sufficiency, poverty indicators remain rather stagnant and industrialization still seems a far-off dream (Frankema 2012; 2014; 2015; Henley 2015; Juma 2012).

This thesis is based on the hypothesis that this difference is not so much due to differences in geographical conditions as to institutional differences. Specifically, in institutions related to land tenure. The theoretical basis is based on the so-called Dead Capital Theory of the renowned economist Hernando de Soto (2000), who argues that the main difference between the prosperous developed world and the moribund developing world lies in the formalization of property. The developing

world has very inefficient institutions that are unable to guarantee people's property rights. De Soto uses the example of slum dwellers, which are widespread in the developing world. Here, people live in dwellings that do not formally belong to them and their land is not registered with any cadastral authority. People suddenly have no rights to their property. If a foreigner claims their dwelling as their own, the original owners cannot appeal to the courts because the property does not formally belong to them. Similarly, they cannot take loans from the bank as they have no formal security. Many of them cannot engage in other activities as they have to guard their house, which can be taken away by anyone else. These residents have no protection from possible expropriation by the state. The traders in the marketplaces operate in a similar way. Since their shop does not formally belong to them, they cannot expand further. There is an incredible amount of capital lying around in the developing world that cannot be exploited, and there it can be considered dead (De Soto 1990; 2000; 2001).

In fact, for the wide majority of developed countries with high living standards, the basis of their success can be traced to the formalization of assets. It all began with agriculture and the formalization of land. Formally owned land facilitated the development of property rights and allowed farmers to integrate into the wide market. Farmers could experiment with new technologies and focus on cash crops. The result would be a dramatic increase in agricultural production, a consequent shift of rural populations to the cities and the development of new crafts. This, in a nutshell, is the story not only of the so-called Asian economic tigers, but also of England, the United States, Australia and France (Deininger & Feder 2009; Henley 2015; De Soto 2000).

However, Africa has historically had weak formal institutions. Customary land tenure still prevails, where traditional authorities, rather than the state or the market, decide (Herbst 2000, pp. 173–180). To successfully implement the green revolution, it is necessary to have effective institutions that gather information on land issues, including tenure. This makes it possible to better distribute new agricultural technologies and the necessary knowledge. For the subsequent comprehensive development witnessed in Asia, farmers need to be provided with clarity and certainty in the ownership of their land, which integrates them into the wider market and provides them with the necessary legal protection. Clearly

demarcated land will make it easier to build the necessary infrastructure. The research in this thesis focuses on the land tenure situation and the factors that lead to a possible green revolution in a comprehensive sense, not just an agricultural one.

The breadth of this thesis corresponds to the complexity of the topic it explores. It is a comparative case study that examines 21 countries ¹ in tropical zone of Africa. The research itself is divided into three parts. The first part seeks to categorize land tenure and then place the states into the designated categories. The categorization takes inspiration from the typology of John Bruce (1998) and Jeffrey Herbst (2000). They categorize states according to the stance their legislatures take towards state, private and customary tenure. This will be followed by an interpretive analysis of the land tenure of all examined states according to the structure used by J. Bruce (1998). For each state, the situation with current legislation that affects land tenure and the political and historical context will be mentioned.

The second part of the research will be the most comprehensive part of the whole work. The performance of land tenure will be investigated. Land tenure is an incredibly complex topic that encompasses many interacting factors. Using 53 indicators, four main dimensions of land tenure will be created. The first dimension will examine land tenure legislation itself. The data comes mainly from the World Bank and examines the quality of the cadastral infrastructure, the cost and time of the land registration process, the ability of the legislation to resolve disputes, expropriation and its transparency. Another dimension is the so-called Pro-Agrarian State Capacity. That is, the strength of state capacity, including macroeconomic stability or banking infrastructure, confronted with how strongly the state is oriented towards rural areas and agriculture. ² The third dimension seeks to quantify the performance of customary land tenure and thus traditional authorities. ³ The last

¹ These are the West African countries of The Gambia, Sierra Leone, Liberia, Guyana, Côte d'Ivoire, Ghana, Togo and Nigeria. The Central African States of Cameroon, Gabon, Congo-Brazzaville and Angola. And from East Africa, Zambia, Malawi, Mozambique, Madagascar, Tanzania, Kenya, Uganda, Rwanda and Burundi. Other countries from the tropical belt of Africa could not be included due to lack of data. Small island states were also not included due to their unique character. The order of the countries will not be alphabetical but from west to east.

² The data here come from the Bettelmann Stiftung Transformation Index (BTI), the Ibrahim Index of African Governance (IIAG), and the United Nations Food and Agriculture Organization (UN FAO)

³ For this, data from Afrobarometer (Round 7 and 8) was used.

dimension refers to the identification of the inclusiveness of institutions themselves. That is, whether farmers have the freedom to form associations or whether the institutions are impartial and not corrupt. Each dimension is then aggregated to produce a final comprehensive index of land tenure. This index cannot be evaluated by a single number, as the different dimensions are of different natures. It will therefore be evaluated in the form of two letters on a scale of A to F. These will indicate the final land tenure performance.

The final part of the research will try to answer the main hypothesis. That is, the influence of land tenure institutions on the factors associated with the Green Revolution. Since the research is limited by the lower number of observations ⁴, regression analysis will not be chosen, but correlation analysis. Specifically, a more advanced type of so-called partial correlation, which is able to include confounding variables ⁵ in the analysis and control for the relationship between the independent and dependent variables. Since the research follows a linear relationship, Pearson correlation coefficient was chosen. However, it is more complicated in nature with a low number of observations than the Spearman Correlation Coefficient or Kendall Tau Coefficient, so tests for normal distribution of the data must be performed and the data must be normalized before the actual analysis. The Shapiro-Wilks Test will be chosen for this purpose.

The first chapter will focus on introducing the phenomenon of the Green Revolution not only in Africa and understanding the importance of the role of institutions. To make the issue clearer, there is a section devoted to the case of Indonesia, a country whose starting conditions were not much better than those in Africa. The second chapter focuses on understanding the importance of the process of formalizing land and land rights. This chapter is not very African in nature. It offers the major historical milestones in the registration of land and land rights that have been the foundations of economically successful states. Specifically, it will chart the so-called Enclosure Movement in England, the introduction of the Torrens system in Australia, and the characteristics of Japanese colonization, which over

⁴ The number of observations (N) is 21, i.e., the number of countries examined.

⁵ However, in the correlation analysis table they are referred to as Control Variables (Control_x)

time became the Asian economic tigers. All these milestones have left a distinct mark on the process and will give us a better understanding of the development goals that Africa needs to achieve. This is followed by the theoretical and methodological section, where the research models are described in detail, the variables and the methods of computation are described. The following are the three main chapters that make up the research of the thesis. First, it will be an introduction to the specifics of African land tenure, its categorization and justification of the countries under study. The next chapter focuses on the quantification of land tenure performance. After calculating all four categories, it moves on to a comprehensive evaluation of land tenure. This is followed by the last research chapter which aims to find out the relationship between land tenure and factors influencing the green revolution. The thesis ends with a conclusion that does not simply provide a summary of the results of the thesis, but also reflections and considerations from it.

1. Green Revolution

The Green Revolution is undoubtedly one of the most important events of the 20th century, leading to the feeding of hundreds of millions of people who were suffering from hunger. Norman Borlaug, an American agronomist, can be considered the father of the Green Revolution in the developing world. Borlaug worked in central Mexico in the 1940s as part of a program to improve crop yields. He made some remarkable improvements, particularly in wheat. He successfully bred new varieties that were more resistant to parasites and weather fluctuations and produced higher yields. He spread these ideas to Mexican farmers, where they became very popular (Hesser & Carter 2006).

However, many of these innovations cannot be explicitly called innovations. A similar green revolution had been underway in the United States since the 1870s, with significant increases in agricultural productivity every year. Borlaug's contribution was to refine these ideas and to help spread them to the developing world. As a result, he was awarded the Nobel Peace Prize in 1970 (Ibid, 2006)

In the 1960s, famine threatened several South Asian countries, and the threat of the spread of communism was very evident. The Western powers were willing to help Borlaug himself spread new varieties. The basis for the spread of new varieties was a dwarf variety of wheat, the Mexican variety, and a new and equally dwarf variety of rice, the Philippine's IR8. The results were not long in coming (Frankema 2014, pp. 21–24)

Mexico was forced to import half of its total wheat supply in 1945, became self-sufficient in 1956, and has been a stable exporter since 1964. In the early 1960s, attention shifted to the countries of South Asia. As late as the late 1950s, Malthusian scenarios were still being predicted for many developing countries. Production at that time could not meet the demands of a growing population. In the early 1960s, Borlaug turned his attention to South Asia. In 1961, famine threatened India. Although the government there practiced what was known as the "License Raj" at the time, the gravity of the situation forced it to relax many bureaucratic restrictions to give Borlaug a free hand. The state of Punjab was chosen as the first test area because of its favorable conditions for wheat cultivation and better water supply

due to a decent infrastructure. Within a few years, the improved rice variety IR8 was also introduced here. It was a huge success, and by the 1970s, India had become one of the world's leading rice exporters. Famine, which was considered inevitable in the 1950s, has not occurred in India since the introduction of the Green Revolution. The revolution spread to the Philippines, Indonesia, Malaysia, Thailand, Pakistan, Sri Lanka, and later to China, Vietnam, and other countries. By 1985, cereal production in the developing world had tripled, with similar results for rice. Beginning in the 1970s, the UN and especially the World Bank took over the programs (Cotter 2003; Evenson et al. 1999)

As indicated above, the Green Revolution was not just an agrarian issue; it could be seen as a tool of the Western world's struggle against the spread of communism. The politics of the developing world has always been heavily influenced by the politics of land. Poor levels of food security played into the hands of Marxist movements, which addressed the situation by advocating socialist land reform and the disenfranchisement of the more privileged sections of the population. The non-socialist alternative was to be the Green Revolution. To reduce the pressure for land reform, food production had to be greatly increased. This was supposed to make food more affordable and support the further development of the state. A good example is Indonesia, which was on the brink of famine in the 1950s. The Green Revolution not only averted this threat, but also had a significant impact on socioeconomic development and state capacity building (Frankema 2014, pp. 18–19; Perkins 1998)

It would seem that the Green Revolution is the obvious answer to the problems of the African continent and the basis for nation-building and comprehensive economic development. But this has never happened. The Green Revolution has not been very successful here. It is still unable to replicate its Asian counterparts. African countries are still food insecure and can only dream of the economic progress of Asian countries.

There is an influential view that the Green Revolution was more difficult to implement in Africa because of the diversity of daily diets. In Asian countries, rice was overwhelmingly dominant, accounting for about 50 % of the diet at the start of the Green Revolution. In sub-Saharan Africa, there is no such dominant diet. At present, maize has the highest share, at only 16 %. Cassava, starchy roots and others

are also consumed. However, the Green Revolution brought new varieties and fertilizers mainly to rice, maize and wheat, not to cassava (Otsuka et al. 2017: 92–94). Others speak of the pitfalls of African geography, which brings unfavorable soil types, irregular stages, problematic water sources, high slope diversity, or the strong presence of tropical diseases (Frankema 2015; Alsan 2015; Bloom and Sachs 1998; Frison 2008; Gourou 1953).

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However, the increase in food production itself does not seem to be such a big problem. After 2000, we have seen a number of successes. For example, President Olusegun Obasanjo wanted to make agriculture "the new oil" in Nigeria, and productivity has indeed increased. Economist Akinwumi Adesina, who served as Nigeria's minister of agriculture and won the World Food Prize in 2017, was a major contributor to this success. Other notable achievements have been credited to Malawi's President Bingu wa Mutharika, for example, who has managed to revive the agricultural sector and significantly increase maize production. The increase between 2005 and 2007 was so significant that, for a time, Malawi became an exporter to neighboring countries. Similar successes have been celebrated by the New Rice for Africa (NERICA) initiative in Guinea or Madagascar, with increased rice production (Juma 2015, pp. 51–61; BBC 2013; AfricaNews 2019; Chibwana & Fisher 2006; 2011; Otsuka et al. 2017). A number of organizations, such as the Alliance for Green Revolution in Africa, funded by the Rockefeller Foundation and the Bill and Melinda Gates Foundation, are trying to increase food production.

Moreover, data show that agricultural production in sub-Saharan Africa is steadily increasing (UN FAO 2024).⁶

Rather, the obstacles must lie at the systemic structural level. This is where Africa is lagging far behind its Asian counterparts. In many Asian countries, infrastructure development, centralization of state power, or rapid poverty reduction have gone hand in hand with increased food production. The question is why, despite undeniable successes in food production, Africa has not followed a similar path. Among the most common explanations are the corrupt environment and pervasive neopatrimonialism (Frison 2008; De Grassi 2008; Young 2012). A weak state, unable to effectively redistribute needed capital such as new varieties, fertilizers, and knowledge, is also an obstacle. In his famous book *States and Power in Africa: Comparative Lessons in Authority and Control* (2014), Jeffrey Herbst discusses in chapter *National Design and the Broadcasting of Power* the complex geography of many African states. Populations are not evenly distributed, making it difficult to project state power. Goran Hydén (1980) elaborated on a similar theme, working with the notion of "Uncaptured Countryside". He used the example of Tanzania to show that African governments do not really control the countryside. This is due to the constant migration of farmers who practice extensive agriculture. Other observers, such as Robert Bates (1980; 1983; 2001), see as problematic the lack of emphasis on agricultural development by African governments, the promotion of so-called neo-mercantilism, which had a negative impact on local farmers, and, in the context of the Cold War, the dependence on international donors, while these financial flows did not motivate African leaders to build effective domestic institutions. The Green Revolution failed for many reasons. To better understand the issue, let us look at the case of Indonesia, which shared many initial obstacles with Africa.⁷

⁶ The UN FAO reports that agricultural output in Sub-Saharan Africa has been on a consistent upward trajectory. Between 1960 and 1990, the increase was 92 %. Between 1990 and 2020, the growth rate was almost 190 %.

⁷ It is not uncommon for tropical Asian countries to be used as a point of comparison with Sub-Saharan Africa. For instance, in *The Rise and Decline of the Zairian State* (1985), the Africanist Crawford Young and Thomas Turner selected Indonesia as a point of comparison with Zaire in terms of political and state-building matters. In his 2006 book, *How South Africa Works And Must Do Better*, Jeffrey Herbst selected Malaysia as an exemplar of successful political and economic development, which he then compared to South Africa. In his book *David Henley Asia-Africa Development Divergence*, economist David Henley offers an analysis of

1.1 The Importance of the Role of Institutions as a Foundation for the Green Revolution: Comparing the Indonesian Experience with Africa

At its core, Indonesia was not much different from sub-Saharan Africa. Like many African states, Indonesia is a multi-ethnic colonial construct with a complex geography, with 275 million people and some 1,300 ethnic groups spread across 17,000 islands, some of which have incredible population densities. Like many African states, Indonesia is a heavily tropical state that could never have been colonized by European settlers due to its harsh conditions.⁸ Historically, Indonesia also experienced an exploitative Dutch colonization based on the export of crops. After independence, the country suffered political upheaval and became an authoritarian and one of the most corrupt states in the world following Suharto's rise to power. According to Transparency International, Suharto himself embezzled between \$15 billion and \$35 billion during his reign and was considered one of the richest men in the world. Democratization came even later than in many other African states. Nevertheless, the Green Revolution period in Indonesia did not simply mean an increase in agricultural yields, as in Africa, but massive state-building, infrastructure development, and poverty alleviation. Thanks to the achievements in agriculture, a rapid process of industrialization has taken place since the 1980s (Encyclopedia Britannica 2024; Henley 2012, pp. 2–3; Transparency International 2004).

As recently as 1960, about 74 % of people in Indonesia lived on less than \$5 a day, more than in many African countries. In Ghana, for example, the figure was only 60 %, and in Côte d'Ivoire it was about 66 % (Van Zanden et al. 2014). The average political corruption index from 1960 to 1990 was comparable to that of

the divergent development paths of Asia and Africa. *Asia-Africa Development Divergence: A Question of Intent* (2015), the countries of Nigeria were compared to Indonesia, Kenya to Malaysia, and Tanzania to Vietnam. A number of parallels can be identified in their respective historical trajectories.

⁸ Diamond (1997, p. 210) argued: “*In the tropical parts of Africa, South Asia, Southeast Asia, Indonesia, New Guinea, and the tropical Americas, Europeans were unable to establish their own settlements, because they died in droves from malaria and other tropical diseases.*” Which sums up the complex situation in the tropics. Likewise, Sachs & Bloom (1998) argued that economic development in the tropics was also very problematic for the local population. This was due to tropical diseases, infertile soils with the absence of winter season, and the occurrence of extreme weather conditions that do damage to infrastructure to property.

Nigeria and well above that of Africa as a whole (VDEM 2020). But how is it possible that Indonesia, despite its initial limitations, has become such a success story, in contrast to many other African states, many of which had a decent start conditions in the immediate post-independence period.

In pre-colonial Indonesia, as in Africa, there were early states based on the mandala model.⁹ While Africa had kingdoms such as Shongay, Mali, and Ghana, Indonesia had the Majaphit kingdom. The Dutch and Portuguese began penetrating the region in the late 16th century for the spice trade. The Dutch Vereenigde Oostindische Compagnie (VOC) gained the upper hand, making treaties with local kingdoms and effectively controlling them through indirect rule. A growing emphasis on plantations of export crops led to territorial expansion and more imperial wars, but the VOC collapsed in 1799 (Booth 2016, pp. 1–12).

After the defeat of Napoleon, the Netherlands needed new revenue and introduced the Cultuurstelsel system¹⁰, which registered and taxed land, especially in Java, using chiefs as middlemen. The system was so successful that by the mid-19th century it was providing 50 % of all revenues for the government. However, centralization was not uniform; Java had a strong institutional organization while other islands did not. The Dutch established the organization named Stichting het Voedingsmiddelenfonds, whose succession structures played a crucial role in independent Indonesia (Ibid, pp. 12–34).

Indonesia became independent in 1949 under the Marxist Sukarno. Overpopulation and famine threatened because the traditional authorities still owned much of the land. Sukarno tried to address the situation with a land reform that weakened the power of the chiefs and redistributed land to small farmers. The

⁹ The "Mandala" term is mentioned by historian Oliver Williams Wolter (1999), who uses the term to refer to the system of functioning of pre-colonial states in Southeast Asia. That is, power is greatest at the centre and ties up as distance advances. Centralization of power is highest at the center, weakens further, and the ruler projects his power according to the *dodod* with the vassal state units. Pre-colonial Africa worked on a very similar principle (see Herbst 2000, Young 2012, Bates 1982).

¹⁰ The Cultuurstelsel (*Cultivation system* in English) took place mainly in Java, where the fertile soil is of volcanic origin. The system arose from the need to solve the financial problems of the Netherlands in the early 19th century. It included land registration. It was abolished in 1870, when the Netherlands began to promote liberalization and encourage private ownership. The system brought wealth to the Netherlands, but in Java it interfered heavily in local affairs and helped create several famines. There were no similar systems in the European colonization of Africa (Booth 2016).

Basic Land Law was passed in 1960. Social unrest led to a coup when the pro-Western Suharto took over the government in 1965 (Lucas & Warren 2013, pp. 11–29).

In the mid-1960s, Suharto introduced the New Order system of authoritarian government and decided to distribute new varieties and fertilizers to farmers on a large scale. The green revolution spread first to Java, where the infrastructure was strong. Suharto used the distribution of fertilizers to spread state power throughout the country. Even with oil revenues, he invested in rural areas and land, leading to poverty reduction and economic growth. By the mid-1980s, the country had industrialized and people were able to engage in industries other than agriculture. Since the 1990s, massive land registration has taken place. The Green Revolution became a major legitimizing element of Suharto's government and greatly increased agricultural production, which helped address socioeconomic problems (Sutiyo & Maharjan 2017).¹¹

Indonesia had no better development conditions than many African states, which faced similar geographic constraints, colonial histories, and corrupt leaders after independence. The key difference was that Dutch rulers in the 19th century needed to collect taxes for wars and reconstruction, which led to stronger state capacity and better land management. To do this, they created institutions to manage supply, maintain commodity stocks, and set prices, which required accurate information on land and yields. Suharto later used these institutions to successfully carry out the Green Revolution (Frankema 2015, pp. 272–276).

In contrast, African colonial states had smaller budgets and less investment. The absence of war and the focus on prestige projects such as cocoa and mineral extraction meant less development of state capacity. European metropolises found trade with Asia, Australia, and the Americas more attractive. The shorter colonial period in Africa also reduced the motivation for land registration and administration (Herbst 2014; Frankema 2015; Schumpeter 1989 [1951]).

¹¹ It is, however, important to note that Suharto's system was marked by numerous atrocities and human rights violations. Among the most egregious crimes was the suppression of the struggle for independence in East Timor, during which up to 15 % of the population of the now independent state was slaughtered (Encyclopedia Britannica 2024).

This thesis studies land registration and rights in Africa, hypothesizing that the establishment of consistent rules between the state and farmers is key to building strong institutions.

2. The Power of Land Registration and its Rights

Control over land is critical to economic development and the centralization of state power. Formal land registration and private ownership play an important role from the perspective of both the state and the farmer.

For the government, land registration is beneficial because it provides a reliable source of tax revenue. Taxing immovable property such as land is easier and more efficient than taxing movable property, which can be hidden. This system of taxation centralizes power and normalizes economic instruments such as currency (Yoo & Steckel 2016, p. 636; Bensley & Persson, 2009). As Gorän Hydén (1980, p. 9) has noted, economic history is about bringing peasants under the control of another social class. Effective taxation of land became a key driving force for the centralization of state power and the financing of activities such as wars.

The effects of land registration from the farmer perspective are described by Robert Bates in his book *Prosperity and Violence: The Political Economy of Development* (2001, pp. 30–38), which posits that agrarian pre-capitalist societies relied on kinship economic relations. Families served as an alternative to non-existent state institutions, as an instrument of territorial expansion, investment, or crisis insurance. Agrarian societies faced many natural hazards such as drought, disease, and floods. Farmers tend to grow less profitable but more reliable crops and diversify their production to minimize these risks. In times of crisis, they rely on the support of the extended family, which includes an obligation to help other members and to follow community rules.

In contrast, modern farmers are integrated into state and market structures. Their land is officially registered and privately owned. They can focus on high-yield crops and large-scale farming. In the event of natural disasters, they can use insurance, bank loans, or government subsidies to minimize risk. If their land is attacked, the police and courts take care of the problem, allowing them to focus on more productive activities (Ibid, pp. 38–50).

In traditional agrarian societies, farmers must protect their land themselves, which reduces economic productivity. Land is not only an economic asset, but part of a community's identity. Losing land means losing identity and family reputation, making land transactions difficult.

In most parts of the world, traditional systems have become obsolete. However, sub-Saharan Africa remains unique, with many farmers still living in traditional societies that are relatively autonomous from state control. Addressing new challenges such as overpopulation requires a strong centralized state and a unified land tenure system (Hydén 2006, pp. 162–183).

The importance of land registration is illustrated by three important historical milestones from different world regions. Almost all developed states first had to effectively control land, and then to make land rights inclusive. Here are the biggest historical milestones from different regions of the world that demonstrate the power of land formalization and land rights.

2.1. Enclosure Movement in England

The Industrial Revolution was a pivotal event in the history of the British Empire, enabling the empire to exert control over a significant portion of the globe. However, the basis for the Industrial Revolution was the preceding Agricultural Revolution.

In England, traditional land tenure persisted in kinship groups. There was an attempt at state control of land as early as the time of William the Conqueror ¹², when it was divided among nearly 200 barons who were to lease the land to the population. However, the traditional tenure system was maintained. Significant portion English land was designated as common land. This is land that does not really belong to anyone and is farmed by communities as they see fit. Another part of the land belonged to the nobility, who, however, only really owned it during the growing season. Among the nobility, there were only vague rights for trading or the question of inheritance. The situation began to change in the 12th century when the kings of the Plantagenet dynasty encountered financial difficulties and required assistance from the nobility. In exchange for their support of the king, local lords were promised absolute power over the land. This began the process of land

¹² It was William the Conqueror who created the so-called *Doomsday Book* (1081), which contains a wealth of information about almost every village and land in England. It was intended to make it easier to collect taxes (Encyclopedia Britannica 2024).

enclosure whereby poor peasants were driven off the common land. This system proved to be more effective in collecting taxes. The process would last until the early 19th century. Almost all land in England became fenced, which encouraged absolute power over land for the gentry and landlords and the development of private ownership rights. Although this process was met with considerable opposition and resulted in numerous peasant uprisings, it also led to increased agricultural production.¹³ Landowners were able to fully experiment with their land, introducing new varieties, fertilizers, and machinery. The establishment of clear property rights enabled landowners to prosper alongside the development of new financial institutions. Subsequently, this authority over land was vested in a powerful parliament, which prevailed over the king in the Glorious Revolution of 1689, inaugurating the era of the development of democratic institutions^{14,15} (Moore 1966, pp. 4–39).

2.2. Power of Property Rights: A Miracle from South Australia

Despite the development of the enclosure system in England, property rights remained vague for a long time. The British colonies in Australia faced similar problems. After losing the American Revolutionary War, Britain transported convicts to Australia and viewed it as a colony for social outcasts. The economy relied on forced convict labor for minimal pay, and Britain had little incentive to establish strong property rights for them, making their rights even weaker than in England (Acemoglu, Robinson 2001, pp. 1374–1387; 2012, pp. 318–326).

¹³ For many peasants it was a disaster, they lost their land. They had no choice but to go to the cities, where they became vagrants and thieves (Moore 1965).

¹⁴ However, the Glorious Revolution had its downside. During the turbulent 17th century, kings had to face the growing influence of landlords, especially as represented by parliament. The Stuart monarchs began to support the peasants affected by the enclosure movement. With the intention of weakening the influence of Parliament, the return of land was promised to many London vagrants. However, the defeat of royal power meant the victory of landlord power. The process of enclosure movement was accelerated (Moore 1965).

¹⁵ Similar processes took place in the France, Germany, United States etc. Within Africa, the enclosure movement was first applied in Kenya, but due to rapid decolonization, many difficulties arose. Botswana is an interesting case of the enclosure movement. Since the Botswana Democratic Party was mainly made up of medium and large cattle owners, it was in their interest to enclose and create strong property rights. Botswana thus became an African leader in property rights (Acemoglu et al. 2001, pp. 4–19).

Resistance from settlers eventually led to more inclusive institutions, but property rights were weak until the mid-19th century, complicating land transactions. At the time, Australia used a version of British Common Law, requiring landowners to keep extensive records ¹⁶ of all rights and transactions, known as "deeds". This system was costly and hindered farm development, leading to lengthy court disputes and widespread corruption. The cadastral office only recorded land ownership and boundaries. This system created cyclical crises as the land market reached its limits. In the early 19th century, for example, this system led to a boom in land speculation in the colony of South Australia and the loss of a staggering 75 % of the land grants (Esposito 2003).

Sir Robert Richard Torrens, an Irish customs official in South Australia, saw the inefficiency of this system. Drawing on his experience in maritime trade and in places like the hanseatic city of Hamburg, he simplified the system and reformed the cadastral offices. All rights and past transactions for land were recorded in one place, guaranteed by the state, and kept up to date, with registrars held personally liable for errors. Torrens lobbied the Real Property Act of 1858, which was passed despite opposition from the elite. This reduced legal disputes and stimulated the land market, making ownership clear and secure. The successful Torrens system quickly spread to other Australian colonies, New Zealand, and later to the United States, Canada, Great Britain, and several other countries (Whalan 1982).

Initially, Australia's economic and social foundations were poor, comparable to those of Latin American countries. However, the Torrens system has created some of the most inclusive property law institutions in the world. They have helped Australia become one of the richest countries in the world. In contrast, Latin American elites have historically opposed strong property rights. It is unfortunate that modern Kenya, for example, still resembles pre-1858 Australia in terms of its

¹⁶ In order to prove ownership, it was necessary to trace the chain of all previous transfers of ownership (chain of title) from the original Crown grant to the current owner. Farmers and other landowners had to keep all documents carefully at home or in banks. Missing documents could cause loss of land rights or lengthy legal disputes. Due to the complexity of the system and the lack of documents, disputes over land ownership were frequent. Farmers often faced uncertainty about their land rights (see Esposito 2003).

complex registration system, which hinders farmers' ability to assert their rights and expropriation of common land (Acemoglu & Robinson 2005; 2012).

2.3. Asian Economic Tigers and the Legacy of Japanese Colonial Institutions

For a long time, Japan remained largely untouched by European influences. In the 19th century, it was ruled by the rigid Tokugawa shogunate, characterized by isolationism, decentralization, and non-market agriculture. Increasing external pressure from European powers led to the Meiji Restoration in 1868, which restored imperial power and initiated the extensive modernization of the state that seemed necessary to maintain independence

Some problems remained, however. By the 1870s, Japan faced problems of high population density and food security. To address these challenges, the 1873 land reforms, inspired by the Australian Torrens system, introduced modern land tenure and improved tax collection and land transactions. Despite its economic success, Japan was in need of more productive land and had a necessity for colonization. The Japanese invested heavily in their colonies to ensure food security and to create a buffer zone for geopolitical reasons. In contrast, the European colonization of Africa was more for prestige than for vital reasons. Taiwan became a Japanese colony in 1895, Korea in 1905, and was fully annexed in 1910 (Yoo & Steckel 2010, pp. 4–5; Ibid 2016, pp. 623–629).

Both Korea and Taiwan were traditional agrarian societies with ineffective land registration systems. In Korea, about half of the land was registered under individual ownership, while in Taiwan less than 30 % of the land was registered, often unofficially. Japanese colonizers introduced Western property rights, focusing on land registration and benefiting smaller farmers through successful reforms. Surveys collected land data and created a sophisticated tax system. The authoritarian colonial government suppressed potential resistance, but the reforms were economically successful. By 1938, Taiwan's agricultural productivity had

more than doubled, education improved, and urban migration increased. A similar story unfolded in Korea (Ye 2015, pp. 205–241).

Crawford Young (2012, pp. 363–364) noted that some African leaders sought to replicate the postwar success of South Korea, which transformed itself into one of the wealthiest countries in a generation. However, although devastated by the Korean War, South Korea had well-documented land, functioning institutions, and an educated population, a legacy of effective Japanese colonization that focused on food security and geopolitical stability rather than prestige reasons.

An illustrative case of Japanese colonialism is the acquisition of Micronesia following the conclusion of World War I. In Palau, traditional tribal land ownership was subsequently replaced with a modern private ownership system, which led to economic prosperity despite the presence of an authoritarian government. Following the conclusion of World War II, Palau seceded from Micronesia, resulting in the emergence of two distinct systems. Currently, Palau, with its modern land ownership system, exhibits a significantly higher economic performance than Micronesia (Yoo & Steckel 2010, pp. 7–18).¹⁷

¹⁷ Yoo & Steckel (2010; 2016) observe another interesting case within Micronesia. In the state of Ngardmau, land registry were lost and never recovered. This state has large bauxite reserves, and due to confusion over property rights, there are a number of disputes that prevent people from building infrastructure and actually mining here.

3. Theoretical Perspective

This diploma thesis integrates two distinct yet complementary theoretical perspectives. The first is the dead capital theory of Hernando de Soto. He argues that the formalization of property is necessary for successful economic development. The second theory comes from David Henley, who argues that development always lies in a focus on agriculture. The Green Revolution is a complex concept and both theories must be combined to understand it. While de Soto refers to quality legislation, Henley refers to building strong pro-agrarian state capacity. In order to understand this phenomenon, this paper will look at both theories and derive subsequent variables from them.

3.1. Dead Capital Theory in the Context of Development Economics

The field of development economics emerged in the wake of the Second World War, in tandem with a rethinking of the strategy of the colonial powers in the developing world, including Africa. The exploitative form of colonialism was no longer acceptable, and different views of how development should take place in the Third World were formed. Pioneering names include Paul Rodan-Rosenstein or Ragnar Nurske. They represented a strand of so-called classical development economics, which focused on how to invest in developing countries and specific sectors. However, both considered the Big Push, i.e. massive state investment, as an important part of economic take-off. In 1956, the Hungarian-born economist Peter Bauer entered the debate with his book *"West African Trade: A Study of Competition, Oligopoly and Monopoly in a Changing Economy"* (1956). He was the first to challenge the common de facto consensus among economists and policymakers that massive state investment is necessary to stimulate economic growth. He strongly criticized foreign aid, arguing that the market should be the primary driver of economic recovery. However, the market's ability to thrive is contingent upon the existence of property rights and robust economic institutions. These conditions are often lacking in developing countries. These ideas were subsequently developed by Peruvian economist Hernando de Soto approximately 30 years later. De Soto's ideas have had a significant impact on the development

strategies of numerous countries. Within Africa, Rwanda is a particularly illustrative example.¹⁸

3.2. The Theory of Dead Capital: Hernando de Soto

De Soto's main point was that the main difference between the rich developed world and the poor developing world is the formalization of wealth. In his view, individuals in developing countries are not inherently lazy; rather, they are highly innovative and hardworking. The problem is that they do not have property rights to their assets and therefore cannot operate and develop them. The developing world has an incredible amount of capital, but it cannot be exploited and is therefore effectively dead. The secret of development, he argued, was the efficient use of capital. He summarized his ideas in his most famous book, "*The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*" (2000).

The book advocates for the formalization of capital, the development of property rights, and the establishment of related institutions. The formalization of property has six important effects.

1. Formalization will result in the property acquiring economic value.

Rights give property the ability to be transformed into active capital. Once formalized, it can be utilized for a multitude of functions, including serving as collateral for bank loans and as investment capital, among other applications. In the developed world, property can be used in many ways to increase its value, but not in the developing world. Here, for example, people find it difficult to get a loan because their house or business is not formally registered with the land registry and, therefore they do not have the necessary rights over the property (De Soto 2000, pp. 29–30).

¹⁸ Related issues are also addressed by Douglass North, Daron Acemoglu and James Robinson, William Easterly, and others. In contrast, James C. Scott, in his book *Seeing Like A State* (1999), sees the formalization of land as a negative phenomenon. It was meant to be a tool of the state to control the peasants. Formalization brought a series of simplifications that did not reflect the reality on the farms, and many peasants suffered as a result. On the contrary, he considers communal land tenure to be the freest form of land tenure.

2. **The formalization of assets facilitates the aggregation of information about them into a unified system.** It is possible to quickly find all necessary information about assets in one place. In developing countries, information is often scattered, making searches costly and incomplete, leading to questionable property titles. Many developing countries are like Western countries in the 19th century; for instance, mid-19th century California had about 800 property jurisdictions. (Ibid, pp. 30–31)
3. **The formalization of assets serves to hold people accountable.** In a well-functioning property rights system, individuals are aware of the precise ownership of assets and who has committed a particular crime. When people break the rules of the system, they are punished accordingly. Because of this system, people enter into contracts with each other in transactions that define the exact terms. If a problem arises, the judicial authorities have enough information to know exactly who to punish and how to punish them. In developing countries, dispute resolution becomes very costly and unclear. This creates more opportunities for fraudulent activities (Ibid, pp. 31–32).
4. **The formalization of assets brings functionality.** The value of formalized assets is quickly assessed. Developed countries have integrated systems with standardized categories for comparing assets, making them easily divisible, combinable, mobile, and suitable for business. De Soto gives the example of an inherited farm. In developed countries, one son can buy out his siblings' shares to maintain the farm's integrity. In developing countries, siblings must share the farm, leading to unprofitable fragmentation over generations (Ibid, pp. 33–34).¹⁹
5. **The formalization of wealth facilitates the networking of people.** As De Soto previously outlined in his third point, formalization encourages accountability, which in turn enhances communication. A well-developed property system in developed countries acts as a hub that connects citizens

¹⁹ Before 1994, land fragmentation in Rwanda was a significant issue (Diamond 2006).

with government and the private sector, facilitating the provision of various services. Moreover, through their formalized property, people are fully integrated into the legal system and interested in engaging with and changing government institutions. This serves as an incentive for active citizens and the formation of various interest groups. In developing countries, this network is imperfect and prone to abuse (Ibid, pp. 34–35).

6. **Formalized property creates effective protection for transactions.** It is precisely because information on assets is collected in unified systems that the state can effectively monitor and protect them, for example through the courts (Ibid, pp. 34–35).

De Soto (2000, pp. 41–42) also discusses the role of agriculture. It is precisely the lack of property rights that limits the modernization of agriculture. For example, without clear maps it is difficult to build the necessary infrastructure without violating the interests of the farmers, and without clear property rights it is problematic to carry out land reform. These processes have often led to social tensions and violence, as everyone has interpreted their land rights differently. Rampant modernization meant that many states could no longer cope with overpopulation, and a strong migration of rural people to the cities began. Here, however, they had no opportunities and resorted to crime. He also notes that property rights systems in many developing countries were designed to reflect urban areas, but the rural areas were overlooked.

Hernando de Soto's other major works include "*The Other Path: The Invisible Revolution in the Third World*" (1989) and "*The Other Way: The Economic Response to Terrorism*" (2002). While he has published few scholarly articles, he has been very active in putting his ideas into practice, especially in Peru. Beginning in 1995, Peru undertook a massive effort to survey and register urban land, formalizing the status of some 1.3 million families and 300,000 businesses by 2004. This reduced the need for individuals to protect homes without legal rights and increased the supply of labor, although banks remained reluctant to lend (Mitchell 2005). Globally, de Soto's property formalization initiatives have been influential. In particular, Rwanda adopted his ideas after the 1994 genocide and has been formalizing property on a large scale since 2003 (Payne 2011).

3.3. Successful economic development relies on agriculture: David Henley

The second part of the theory presented in this thesis will be based on the field of agriculture and the state capacity. For a considerable period, the prevailing view was that industrialization and export-oriented economies were the basis for the economic take-off of developing countries. This was the argument of Paul Collier, for example, who argued that the African economy had to industrialize. Economist David Henley, however, argues that the basis of long-term economic growth is always agriculture and rural areas, only then can industrialization come. Consequently, developing countries need to invest heavily in agriculture. He presents his ideas in his book, "*Asia-Africa Development Divergence: A Question of Intent*" (2015).

In the book, he explains that successful Asian countries always invested in agriculture first. Once, there was enough agricultural production and people moved to the cities, the process of industrialization began. He applies the theory to three Asian countries (Vietnam, Malaysia, and Indonesia) and three African countries (Tanzania, Kenya, and Nigeria). The default conditions were not so different, yet the Asian group of states experienced remarkable long-term economic growth. The difference, he said, is the focus on agriculture. In his view, governments needed to ensure three basic factors at the outset.

- 1. The necessity for subsidies directed towards farmers, particularly those of modest means, is a pressing concern.** It is recommended that the state prioritize agriculture by constructing infrastructure, redistributing fertilizer, and providing credit to these farmers. In Africa, governments have frequently favored urban projects and neglected agricultural investment, or directed resources to wealthy farmers, as evidenced by the case of Kenya. In contrast, Asian countries have consistently supported small rural farmers, enabling them to access loans and fertilizer, thus driving significant state-building efforts, such as Indonesia's Green Revolution (Henley 2015, pp. 8–15).

- 2. Economic freedom for farmers and small business owners.** Henley focuses on Tanzania. Nyerere, he argues, invested heavily in agricultural development, but farmers had very limited freedom and could not make full use of their know-how. In Ujamaa villages, land management was decided by government-appointed bureaucrats. In addition, there was little respect for the market, and agricultural production did not meet actual demand. Although all the Asian counterparts studied had authoritarian governments at the time of economic takeoff, farmers were guaranteed economic freedom (Ibid, pp. 8–15).
- 3. Macroeconomic stability.** The government must maintain macroeconomic stability to ensure the competitiveness of local farmers. This includes low inflation and low currency overvaluation. African countries have not made their fiscal policies pro-agrarian (Ibid, pp. 8–15).

In his book, Henley posits that another underdeveloped Asian states, such as Myanmar and Cambodia, have adopted a similar strategy to African states. From the outset, they have largely ignored the countryside and small farmers, focusing instead on industrialization. He further asserts that strong state support for the primary sector of the economy is often successful, but that other sectors, such as manufacturing or services, already have such sophisticated structures that state intervention becomes counterproductive. A significant degree of freedom and market management is required for these more advanced sectors to flourish (Ibid, pp. 42–49).

4. Methodology

The issue of land tenure in Africa is marked by extreme tendencies. It stands as one of the most crucial subjects for the continent's economic development, however it remains methodologically intricate and challenging to address. In economic discourse, land tenure is commonly categorized into two primary types: authoritative (state-controlled) and market-based (privately controlled) (Boone 2014, p. 21). However, the majority of land in Africa is subject to customary tenure, which is overseen by traditional chiefs. This is further complicated by the difficulty many African states face in projecting their authority across their territories. This form of tenure, which does not reflect the economic properties of modern tenure, presents a methodological challenge in its study. Even modern forms of land tenure are complicated by the weakness of African administrations and the lack of clarity in legislation.

The objective of this thesis is to describe the various types of land tenure and assess their performance. This will provide a foundation for understanding the potential success of the Green Revolution in Africa and subsequent economic development.²⁰

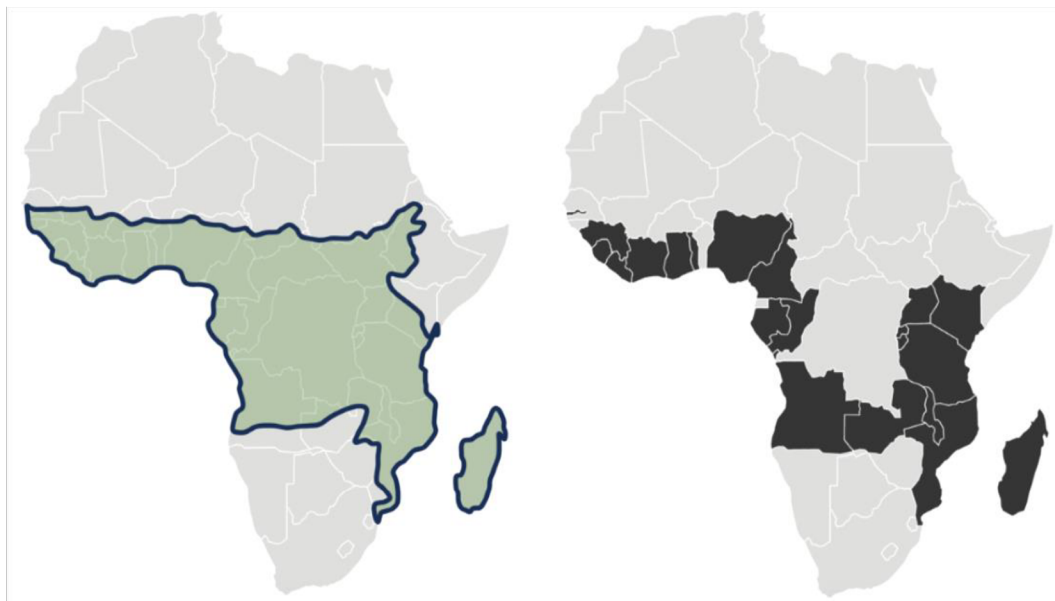
The research is focused on states in the tropical zone of Africa, which are classified according to Wladimir Köppen's climate classification as "Af", "Am", "Aw", or "As" (Peel et al. 2007).²¹ This classification facilitates the comparison of states, as each climate type necessitates distinct agricultural practices. A crucial factor is that the number of farmers significantly outnumbers that of pastoralists. The study encompasses 21 countries within this zone, representing approximately three-quarters of all tropical states in Africa and approximately 70 % of the total area. Some states were excluded from the study due to a lack of data or their unique

²⁰ As previously stated, this paper does not examine the Green Revolution solely in terms of increasing crop yields. Instead, it considers the Revolution in the context of comprehensive development. This is to say that the form of the Green Revolution that has taken place in Asia is the one that is being examined here.

²¹ Köppen designations are used to identify specific subcategories of tropical climate. In particular, the letters "Af" indicate a tropical forest, "Am" denotes a tropical monsoon, "Aw" signifies a savanna with dry winters in the tropics, and "As" represents a savanna with dry summers in the tropics (Peel et al. 2007).

characteristics.²² Borderline cases include Senegal, which is only partially tropical, and Gambia, which is recognized as tropical. Angola and Zambia, where the tropics cover slightly over 50 % of their areas, were included in the analysis. Inclusion was also extended to states with significant high-altitude regions, such as Burundi, Rwanda, Kenya, Madagascar, and Tanzania. This was done despite the differing climatic conditions that prevail in these areas.

Figure 1 - African Tropical Zone (left map), Surveyed Countries in this Thesis (right map)



Created by author, Source: Peel et al. (2007)

4.1. Comparative Case Study

This thesis presents a comparative case study of a synchronic nature, examining 21 cases. The work combines elements of both qualitative and quantitative analysis.

²² The countries under study were divided into three main geographical regions. The countries are presented in a west-to-east sequence, rather than in alphabetical order. The countries of the West Africa region that were examined in this study are The Gambia, Sierra Leone, Liberia, Guinea, Côte d'Ivoire, Ghana, Togo, and Nigeria. In the Central Africa region, Cameroon, Gabon, Congo-Brazzaville, and Angola are examined. In the East Africa region, the following countries were examined: Zambia, Malawi, Mozambique, Madagascar, Tanzania, Kenya, Uganda, Rwanda, and Burundi.

The following countries were excluded from the survey due to a lack of available data: Guinea-Bissau, Benin, Equatorial Guinea, the Democratic Republic of Congo, the Central African Republic, and South Sudan.

The following countries were excluded from the research due to their distinctive characteristics as small islands: São Tomé and Príncipe, Comoros, Seychelles, and Mauritius.

The first part of the research employs cluster analysis, which develops a typology that places the states under study into appropriate groups according to their land tenure regime. This is determined mainly by the local legislation. This is followed by an interpretative analysis of all states, which includes a justification of why each state belongs to that specific category and a context containing history and political relations. The conduct of the interpretive analysis is inspired by the voluminous work by John W. Bruce "*Country Profiles of Land Tenure: Africa*" (1998).²³ The second part performs a quantification of land tenure performance. A total of 53 indicators are sorted into four dimensions of land tenure. From these, an aggregate index and a final comprehensive index summarizing land tenure performance are calculated. Due to the large number of indicators and their different nature, it is not possible to compare the work over time. The data sources are as up-to-date as possible and range from 2018 to 2023, but the vast majority are after 2020. The thesis concludes with a partial correlation analysis using the Pearson correlation coefficient.

4.2. Description of the Various Forms of Land Tenure and their Typology

The first part of the research will be a description of the form of land tenure.²⁴ The description of land tenure is inspired by Jeffrey Herbst (2000, pp. 186–187) and John Bruce (1998) who want to express how state governments legislate land tenure. Despite the difficulties and imperfections in their proposed model, one can at least understand how the state is able to distort traditional land arrangements and how the land market works in the country. Different markets are able to redistribute necessary fertilizers or new varieties in different ways. The authors examine how legislation relates to (1) Private tenure, (2) State tenure/State leasehold, and (3) Traditional/Customary tenure. Each category is labeled according to whether it is

²³ This is arguably one of the most comprehensive and insightful works on the subject. In approximately 300 pages, a comprehensive profile of each African country is presented. The work has been utilized by Jeffrey Herbst (2000) and Catherine Boone (2014). Nevertheless, no such comprehensive work has been produced since.

²⁴ Although the term "description" is used in this thesis, it is intended to signify interpretive analysis. The structure of the description of states is derived from Bruce (1998).

formally recognized, and its intensity according to how much of a government priority it is.

This study goes further, however. It does not limit itself to mere legislation, but tries to map the actual situation on the ground. Thus, it examines not only the legislation, but also the comprehensive analyses published by organizations such as USAID, LandPortal, and a number of related studies, in order to confront the legislation with reality in describing land tenure. The categorization is as follows.

Table 1 - Form of Land Tenure According to the Legislative Framework

Form of Land Tenure	Expressed Intensity of Legal Recognition
Freehold	Significant; Exist; Vague; No
State Leasehold	
Customary/Traditional	

Source: Herbst (2000); Bruce (1998)

As can be observed, there are three distinct types of land tenure. The first is the Private Freehold type. Here it is necessary to emphasize the word "freehold". Herbst (2000, pp. 186–187) only uses the term "private ownership". However, this is somewhat vague and legally inaccurate, as in many of the countries surveyed it is referred to as private ownership, as a form of lease from the state. Freehold is a term that clearly states that it is private property without government control. The owner holds the land in perpetuity and is not subject to various conditions imposed by the state. Second type is State Leasehold. This includes either direct government ownership or government leasehold. It is a very common type of tenure. The state exercises formal control over the land, which brings with it aspects such as the easy possibility of expropriation. The state tries to prevent this by creating conditions under which land can be leased in exchange for its development. The final category is Customary Tenure, which is the most common in Africa. The emphasis here is on whether the state recognizes it or not. I see this recognition as a strong indicator of the relationship between the state and traditional authorities. This may be crucial to the success or failure of the Green Revolution and the associated formalization of land tenure.

The categorization of land tenure is determined by the intensity of its recognition in the legislation of the state and the treatment it receives in state actions. The designation "Significant" indicates broad recognition or even a stated national goal. The designation "Exist" indicates that land tenure is formally recognized and practiced. The designation "Vague" indicates that land tenure is formally

recognized, but in reality, is routinely violated.²⁵ The restrictions can reach such a high level that it is almost impossible to register this type of land. The designation "None" indicates that the state does not recognize this type of tenure. Based on these categories, types of land tenure systems can be created. These are described in the table below.

Table 2 - Land Tenure Regimes

Combination of land tenure variations	Land Tenure Regime
State Leasehold	Etatist Land Tenure Regime
State Leasehold + Freehold	Modernist Land Tenure Regime
State Leasehold + Customary	Etatist-Traditional Land Tenure Regime
State Leasehold + Freehold + Customary	Mixed Land Tenure Regime
Special Case of Rwanda	

Created by author

The surveyed countries are divided into four land tenure categories, with one additional category representing a unique feature of Rwanda. Freehold, customary tenure or combinations of these are not observed within the countries studied. The difference is that while all the countries studied have characteristics typical of the African continent, the vast majority of land is not formally registered. There are also dysfunctional formal land institutions, and most land is under the control of traditional authorities and subsistence farmers.²⁶ The institutional infrastructure related to land tenure in Rwanda is already so modern and developed that it is more comparable to countries like Mauritius, South Africa or Botswana. Due to methodological difficulties in comparing Rwanda with other countries in tropical Africa, Rwanda has to be treated as a special case.²⁷

Once the countries have been classified according to their type of land tenure regime, a detailed description of each category will be provided. This description will include an account of the historical evolution of land tenure, an analysis of the

²⁵ A typical example is that a particular type of land tenure is recognized in the constitution, but lower legislation creates a number of restrictions on it. This phenomenon can be observed with considerable frequency in Mozambique, Cameroon, and Nigeria, for example.

²⁶ In fact, there is a widespread phenomenon of what Gorän Hydén has called the "Uncaptured Countryside" (Hydén 1980).

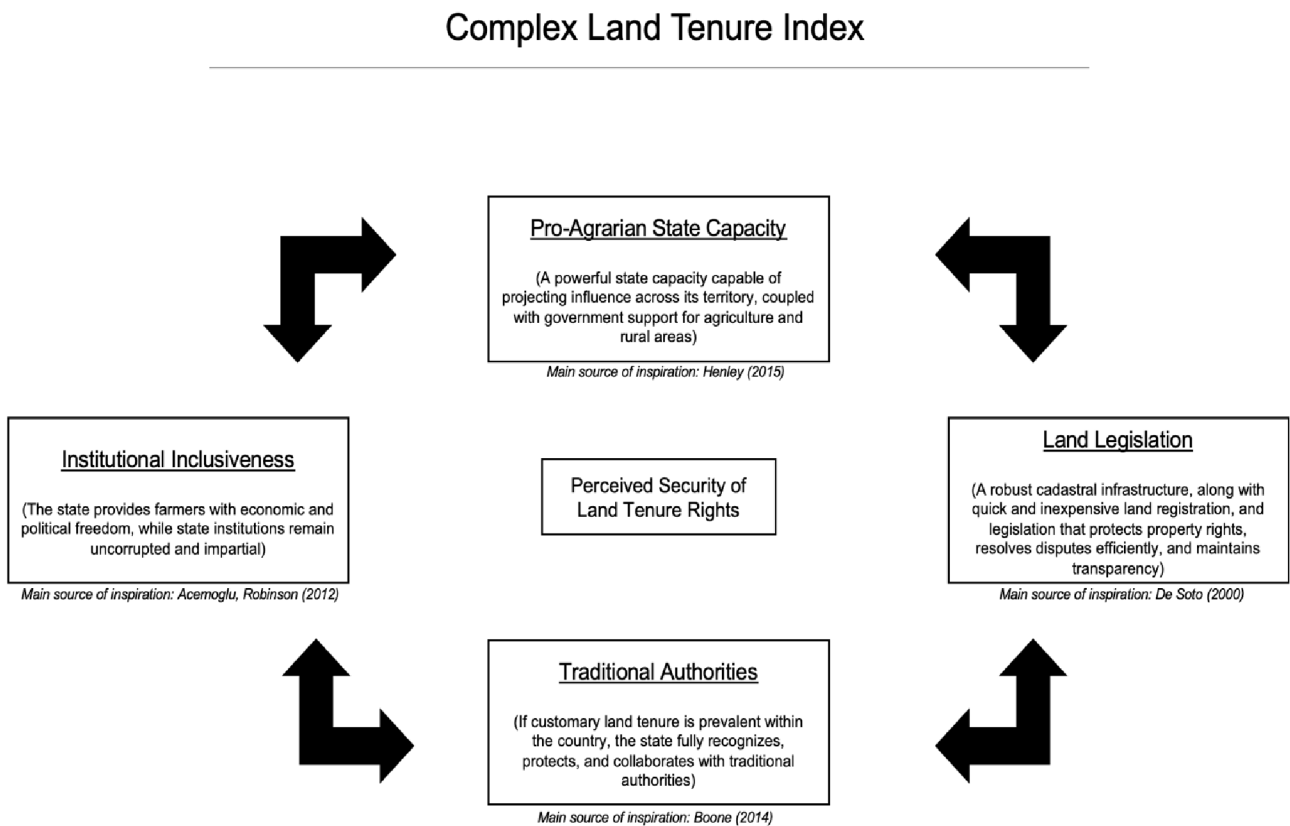
²⁷ The primary distinctions between developed tenure, as observed in Mauritius, Botswana, South Africa, and Rwanda, and undeveloped tenure, which represents the majority of sub-Saharan Africa, are as follows: (1) Cadastral authorities have been able to map 99 percent or more of the land, and the majority of farmers possess valid certificates; (2) customary tenure is not legally recognized in many cases because it is no longer necessary. The majority of farmers are fully integrated into state and formal market structures. Although Rwanda is situated on the border between these two categories, I have chosen to categorize it as a developed tenure system.

current tenure system, and a justification for the inclusion of each country in a particular category.

4.3. Performance of Land Tenure

Once the form of land tenure has been described, it is necessary to determine the performance of land tenure. The output must be quantified. Consequently, an attempt will be made to quantify the institutions related to land. In addition to legislation, a number of other factors influence land tenure. Consequently, it is essential to construct a comprehensive index that encompasses as many extraneous factors as possible.

Figure 2 - Land Tenure Performance Model whose Final Output is the Complex Land Tenure Index



Created and designed by the author

The performance of land tenure operates in four main dimensions. The first is the land legislative dimension, the second is the actual power of the state, the third is the power of traditional institutions, and the fourth is the inclusiveness of state institutions. All of these factors are complementary and overlapping. After all, the best legislation is worthless without a powerful state that cannot enforce it

throughout its territory. In the African context, research would be equally worthless if we did not take into account traditional institutions and their real power over the land. What is crucial for African states is the relationship they have with the traditional authorities who control most of the land. This thesis examines a total of three main dimensions and one secondary dimension, which it divides into 20 thematic subcategories and a total of 53 indicators. Each of the three main dimensions relates to a specific land tenure system. While the quality of land legislation dimension is constructed mainly for farmers under private ownership. The dimension of strong and effective state capacity, refers to farmers in the state sector, and the dimension of strength of traditional institutions refers to customary land tenure. The final dimension, which assesses the inclusivity of institutions, is not directly associated with any of the preceding dimensions, yet it interacts with them all.

4.3.1. Dimension of Land Legislation Quality

The first dimension assessed is the quality of land legislation. This dimension looks at what options farmers have to expropriate property, how difficult it is to register land, or how transparent land ownership is. But it also assesses the surrounding infrastructure, such as the state of the country's cadastral authorities. It uses data from the World Bank, which has its own set of laws that it examines. For the purpose of this thesis, 25 items are selected and answered either positively or negatively. Points are awarded for each positive rating. From the many items selected, the World Bank compiles an index as the Quality of Land Administration Index. However, some of the items focus only on urban areas, which does not meet the objectives of this thesis, which focuses on rural areas. Therefore, only some of the items that best fit the objectives of this paper were carefully selected. The data is from 2018 to 2019.²⁸

Firstly, the quality of the cadastral offices and the complexity of immovable property. The maximum number of acquired points is 12.

Table 3 - Cadastral Infrastructure (Land Legislation Dimension)

Evaluated Items	Justification for the evaluation	Quantified Evaluation
Existence of land registers in digital form	<i>Yes; Yes, but with caveats; No</i>	0 to 2 pts.
Existence of a comprehensive and functional database containing various legal encumbrances (e.g., mortgage, liens, various restrictions, etc.) in digital form		0 to 1 pt.
Existence of cadastral plans within mapping offices in digital form		0 to 2 pts.
Existence of land boundary records, control of plans and provision of cadastral information in digital form		0 to 1 pt.
The existence of a unified database system where information on immovable property is collected		0 to 1 pt.
Use of the Unique Identification Number System to identify immovable property		0 to 1 pt.
All privately owned land registered in the Land Registry		0 to 2 pts.
All privately owned land is mapped (e.g., clear delineation of boundaries on a map, etc.)		0 to 2 pts.
Average time for registration of immovable property (includes: (1) initial search of the land in the Land Registry, (2) purchase	<i>Average time in days and number of procedures required</i>	

²⁸ Detailed results are available in the Appendix (Chapter 1)

contract notarized, (3) receipt of the certificate)	
Average cost of registering immovable property (includes official fees to the Land Registry)	<i>Average cost in US Dollars (USD)</i>

Source: World Bank (2020)

Secondly, the legislation is evaluated to address potential disputes. The maximum score is 8.

Table 4 - Land Dispute Legislation (Land Legislation Dimension)

Evaluated Items	Justification for the evaluation	Quantified Evaluation
The existence of a law that requires all transactions regarding immovable property to be registered in the Land Registry	<i>Yes; Yes, but with caveats; No</i>	0 to 1.5 pt.
Existence of a public or private guarantee for the property registration system		0 to 0.5 pt.
Existence of a special out-of-court compensation mechanism for the provision of erroneous information by the cadastral authority		0 to 0.5 pt.
The need to control the legality of the documents required for a property transaction within the local legal system	<i>If yes, who is responsible; No</i>	0 to 0.5 pt.
The need to verify the identity of all parties to a property transaction under the local legal system		0 to 0.5 pt.
Existence of a national database for the verification of state-issued identity documents	<i>Yes; Yes, but with caveats; No</i>	0 to 1 pt.
When a land dispute arises, what is the average length of time before the court of first instance issues a decision on the matter (without appeal)	<i>Duration of processing by the competent court</i>	0 to 3 pts.
Existence of publicly available statistics on the number of land disputes at the economy level in the court of first instance	<i>Yes; Yes, but with caveats; No</i>	0 to 0.5 pt.

Source: World Bank (2020)

Thirdly, the transparency of the legislation is evaluated. The maximum score is 3.5.

Table 5 - Transparency of Land Legislation (Land Legislation Dimension)

Evaluated Items	Justification for the evaluation	Quantified Evaluation
Existence of a public list of documents that are required for any type of transaction	<i>Yes; Yes, but with caveats; No</i>	0 to 0.5 pt.
Existence of a formal commitment by the authority for the registration of immovable property to issue a legally binding document that clearly for each property ownership		0 to 0.5 pt.
Existence of an independent and specific mechanism for lodging complaints about a problem that has occurred at the responsible property registration office		0 to 1 pt.
Existence of public statistics tracking the number of transactions at the property registration office		0 to 0.5 pt.
Existence of a public schedule of fees for parcel maps		0 to 0.5 pt.
Is the cadastral office able to provide a timeframe for delivery of the updated cadastral plan		0 to 0.5 pt.

Source: World Bank (2020)

In addition to the above, there is an index that evaluates the lawful process of expropriation of property. The index is not directly produced by the World Bank, but rather compiled by the World Justice Project (WJP). In their index, they assess whether the individuals affected receive adequate compensation, the independence of the courts, and the time required for administrative proceedings. The lowest possible value is 0, while the highest is 10.

For a complete picture, the land registration system is displayed. Whether it is a system of deeds, titles or a dual system that combines both. The deed system works by issuing a deed to the owner to prove the transaction or various rights in the land. This system was popular in the 19th century and the owner had to hold a number of deeds to prove all transactions and rights to the land. In contrast, the title system works in that the owner does not hold the document that proves his ownership, but the ownership is recorded in the land registry along with all his transactions. This process forces the owner to constantly prove himself to the state, which can be costly, but it is a much more secure system than deeds. Many Western states use a combination of both systems, with an emphasis on the title system.

Conversely, some African states still use only the deeds system. The land registration system is not evaluated by the World Bank and is only used to provide a better insight into the formal land tenure situation in different countries. It is also not quantified here.

Similarly, a division by registration systems will continue to be used. These systems differ in that they combine the use of deeds, titles, or dual systems in different ways. The Torrens system, originally from Australia, the English, French, and German systems are examples of such systems. Even the countries of origin themselves no longer use these systems completely today. In fact, the Torrens system has been so successful that it is used almost everywhere in the world. Outside of the Torrens system, the German system was arguably the most effective. The system places an emphasis on title registration and centralization. In contrast, the French and English systems are much more decentralized and rely more heavily on registration of deeds. No system can be purely categorized; rather, they are a combination of numerous factors. This is why apparent contradictions arise, such as the fact that Angola still has a legal basis in the French system but does not recognize the deeds system. This division is employed in the exercise of ownership for the purpose of providing an overview and is not scored in any way. Data and methods are from Stig Enerman (2005).

4.3.2. Dimension of Pro-Agrarian State Capacity Quality

It is imperative that a state possesses robust capacity in order to effectively project its power throughout its territory. It is necessary to implement some form of enforcement for legislation. Nevertheless, a significant proportion of African states are characterized by a lack of strength and a constant threat from structural problems. For this dimension, aggregated data was selected and brought together by the Bertelsmann Stiftung, the Mo Ibrahim Foundation, and the UN FAO.

The term "state capacity" is broad in scope, and thus, the carefully chosen design of the overall output will be constructed to reflect a pro-rural, pro-agricultural, and pro-farm state capacity rather than overall capacity.

Selected data from the Bertelsmann Stiftung's Transformation Index (BTI), which examines the strength of state capacity in a general sense, will be used. Specifically, the Stateness Index will be used to determine the strength of the

Weberian monopoly on the use of coercive power, the functioning of the basic administration, and the strength of the population's identification with the state.²⁹ In addition, the Steering Capacity Index examines the ability of states to prioritize, coordinate, and implement planned policies. At the urging of D. Henley (2015), macroeconomic stability must be expressed, which the BTI determines through the state of fiscal and monetary policy, the efficient use of assets, as well as the quality of the banking infrastructure. At the insistence of J. Herbst (2000), the category of infrastructure strength is added. This is derived from the Ibrahim Index of African Governance and focuses on the transportation network, access to energy, mobile communities, Internet, shipping, and postal networks. Each individual index is adjusted so that the rating scale ranges from 0 to 10. A higher value indicates greater strength or effectiveness of a particular index. Data cover the period from 2019 to 2023.

The second half of the dimension is examined in terms of the quality of the rural economy. The Ibrahim Index of African Governance (IIAG), specifically the Rural Economy section, is used for this purpose. This examines access to the rural market, support for the rural economy, political representation of rural areas, and access to land and water. However, it lacks an explicit focus on agricultural support, so it adds data from the United Nations Food and Agriculture Organization (UN FAO) that examines the direction of government spending on agriculture. While the IIAG ranges from 0 to 100, the index of government expenditure on agriculture ranges from 0 to 10. A value below 1 indicates that the agricultural sector receives a lower share of government spending relative to its economic value. While the IIAF data is from 2021, there is more variability in the data, and to capture the trend of recent years, the final value is the average from 2018 to 2023. The two indicators are then combined.

²⁹ In this instance, BTI is understood to refer to the Weberian concept of the state. In order to fulfill the aforementioned criteria, it is necessary to establish a monopoly of legitimate violence, an authority that is able to implement a specific style of governance, and a bureaucratic apparatus. This definition is derived from the renowned 1922 publication "*Wirtschaft und Gesellschaft*".

$$\text{Combined ProAgrarian Index}_{i,n=20} = \alpha_i \times \left(\frac{\sum_{t=2018}^{2023} \beta_{i,t}}{6} \right)$$

Here, α denotes the rural economy indicator from IIAG, β denotes the average of the government expenditure ratio on agriculture from 2018 to 2023 from UN FAO. The i itself denotes the number of countries studied, t denotes the years studied. The number of countries studied is not 21, but one less. This is due to the lack of data for Gabon, which is not included in the IIAG.

4.3.1. Dimension of Traditional Institutions Strength

One of the most challenging aspects of the research was quantifying traditional institutions and their control over land. Despite the constraints, the possibility of using Afrobarometer data was offered. Questionnaire data from Afrobarometer is one of the most reliable sources, offering sufficient objectivity and a large sample size. In this thesis, data from Round 8, conducted between 2020 and 2021, will be utilized. The following questions were identified as being of particular relevance to the objectives of this paper. In particular, the fourth question draws upon the work of Boone (2014), who posits that traditional institutions are linked to their ethnic identity.

Table 6 - Questionnaire Under the Power of Traditional Authorities (Traditional Institutions Dimension)

Ino. of Question	Wording of the Question
Q87B	How much influence do traditional leaders currently have in each of the following areas: Land allocating
Q87D	How much influence do traditional leaders currently have in each of the following areas: Solving local disputes
Q87A	How much influence do traditional leaders currently have in each of the following areas: Governing your local community
Q82B	Let us suppose that you had to choose between being a [Your national identity] or [Your ethnic identity]

Source: Afrobarometer, Round 8 (2022)

In our case, we select only responses from rural areas. While the first three questions, labelled Q87, can be answered with the options "None", "A small amount", "Some", and "A lot", the fourth question in Q82 records the strength or weakness of ethnicity with three possible answers. These are the options "I feel only [my ethnic identity] ", "I feel more [my ethnic identity] ", "I feel equally [my ethnic identity] and [my national identity]". However, in order to create a single index from the responses, it is necessary to assign a weight to each response. The following weights are applied:

Table 7 - Coefficient within Responses - Questions Q87 (Traditional Institutions Dimension)

Options of Response	Response Coefficient
None	-2.0
A small amount	1.0
Some	1.5
A lot	2.0

Created by author, Source: Afrobarometer, Round 8 (2022)

Table 8 - Coefficient within Responses - Questions Q82 (Traditional Institutions Dimension)

Options of Response	Response Coefficient
I feel only [my ethnic identity]	2.0
I feel more [my ethnic identity]	1.5
I feel equally [my ethnic identity] and [my national identity]	1.0

Created by author, Source: Afrobarometer, Round 8 (2022)

The formulas for the subsequent calculations are as follows: to calculate the strength of traditional institutions from the Q87 group of questions, the variable r would denote response, with rN denoting response "None", rSA denoting response "A small amount", rS denoting response "Some", and rL denoting response "A lot". It should be noted that there are not 21 but only 19 states under the i label. Unfortunately, data are not available for Rwanda, Burundi, and the Republic of Congo. Conversely, the data for Madagascar are likely drawn from the previous Round 7 of 2018.

$$Traditional\ Institutions_{i,n=19} = \frac{(rN_i \times (-2)) + (rSA_i \times 1) + (rS_i \times 1.5) + (rL_i \times 2)}{2}$$

The formula for question Q82B, which refers to the strength of ethnic identity, would be as follows. The variable rOE denotes the response "I feel only [my ethnic identity]", rME denotes the response "I feel more [my ethnic identity]", and rEN denotes "I feel equally [my ethnic group] and [my national identity]".

$$Ethnic\ Identity_{i,n=19} = \frac{(rOE_i \times 1) + (rME_i \times 1.5) + (rEN_i \times 2)}{2}$$

For the first three questions in Q87, the resulting value is on a scale of -1 to 1, with higher values indicating greater influence of traditional institutions at the expense of other actors. The situation is different for the fourth question in the Q82 group, where there is no possibility of a negative result and the resulting value only indicates the strength of ethnic sentiment.

Having established the strength of traditional institutions, it is still necessary to express the overall satisfaction of the population with their traditional authorities. This is derived from the aggregated results of the Round 8 questionnaire published

in "*Afrobarometer Dispatch No. 548*". The values will be expressed as percentages, but for the sake of clarity in the final table summarizing this dimension, the results will be converted to a scale of 0 to 1. The final result will be in a format with two decimal places.

4.3.2. Dimension of Inclusion of State Institutions

Henley (2015) has already argued that successful development requires economic freedom for farmers. Similarly, Acemoglu and Johnson (2012) point out that long-term economic growth can be sustained by states with inclusive institutions that ensure openness and participation opportunities for broad segments of the population. The final dimension, which cuts across all the others, seeks to identify the openness of institutions to farmers. These will not be general indices that track the degree of democracy, but will be variables that specifically target farmers. In total, there will be six indicators from Varieties of Democracy (VDEM), which assesses the situation from the perspective of institutions, and from Afrobarometer, which assesses the situation from the perspective of ordinary people.

We have a total of four indicators from VDEM. The first is the political corruption index, which refers to the highest levels of politics. It captures the extent to which the legislative, executive, and judicial branches of government are involved in bribery, theft, and the creation of corruption-prone laws. The index ranges from 0 to 1, with higher values indicating a more corrupt environment. The second index is the Index of Rigorous and Impartial Public Administration, which refers more to local politics and administration. It measures the extent to which public officials respect the law and administer without bias. A higher score implies greater rigor and impartiality. The third indicator is the Freedom of Expression and Alternative Sources of Information Index. This focuses on the media. The higher the score, the greater the freedom. This index ranges from -4 to 4. The last index is very important for farmers. This is the Freedom of Association Index. It refers to the freedom to form various social organizations. It is thanks to these interest groups that farmers can better articulate their demands to the government. The higher the score, the greater the freedom. The last two indices range from 0 to 1.

There are two indicators from Afrobarometer. These are from round 7 of 2018. The questions and the assigned coefficients for their subsequent quantification are as follows.

Table 9 - Questionnaire on Transparency of Land Registration (Inclusiveness of State Institutions Dimension)

Ino. of Question	Wording of the Question
Q18B	How likely is it that you could get the following information from government or other public institutions, or haven't you heard enough to say?
Q18C	In this country, how likely do you think it is that an ordinary person could pay a bribe or use personal connections to get away with: Registering land that does not belong to them?

Source: Afrobarometer, Round 7 (2019)

Table 10 - Coefficient within Responses - Questions Q18 (Inclusiveness of State Institutions Dimension)

Options of Response	Response Coefficient
Not at all likely	-2.0
Not very likely	0.5
Somewhat likely	1.0
Very likely	2.0

Created by author, Sources: Afrobarometer, Round 7 (2019)

The final calculation will be identical to the previous Afrobarometer data. For both questions, the variable rN denotes the response "Not at all likely" rNL denotes the response "Not very likely", rSL denotes the response "Somewhat likely", and rVL denotes the response "Very likely". As can be seen for variable i , the database contains only 16 states. Data are not available for Rwanda, Burundi, Congo-Brazzaville, Angola, and Sierra Leone.

$$Access\ to\ Information_{i,n=16} = \frac{(rN_i \times (-2)) + (rNL_i \times 0.5) + (rS_i \times 1) + (rVL_i \times 2)}{2}$$

$$Bribery\ from\ Ordinary\ People_{i,n=16} = \frac{(rN_i \times (-2)) + (rNL_i \times 0.5) + (rS_i \times 1) + (rVL_i \times 2)}{2}$$

4.3.3. Complex Land Tenure Indicator

Once all four dimensions are completed, a large complex index of the overall performance of land tenure in tropical Africa remains to be developed. This index is by far the most complex to calculate, as it requires normalizing all previously calculated data and then applying the calculations to calculate the comprehensive index.

4.3.3.1. Aggregate Indexes of the Dimensions

Prior to proceeding to the final evaluation, it is first necessary to create an aggregate index that summarizes each dimension in a unified numerical index. Only then can we proceed to the final evaluation. We begin by constructing an aggregate index of land legislation that summarizes the first dimension. The four categories, i.e. quality of cadastral infrastructure, land disputes, transparency and legal process of expropriation, retain their original range of values and are included. However, the time, number of procedures and cost of land registration need to be normalized as they are expressed in different units. They will be expressed as a percentage of the best possible value achieved across the World Bank database. All three types within land registration are summed to give a maximum score of 5. To assess the first dimension, the final formula will be as follows.

$$Ag.I. Land Legislation_{i,n=21} = \frac{\alpha_i + \beta_i + \gamma_i + \delta_i + \left\{ \varepsilon_i = \left\{ S_{j=3} = \left(\frac{x_j}{x_{MaxValue,j}} \right) \times 5 \right\} \right\}}{37.5}$$

In this case, variable α denotes the category quality of cadastral infrastructure, variable β the category legislation on land disputes, variable γ the category transparency of legislation, and variable δ the index legal process of expropriation. The variable ε indicates all three registration values. This is calculated by taking the original value of x and dividing it by the maximum possible value obtained. Next, we have to convert this resulting ratio into a scale from 0 to 5, denoted by S . The j denotes the categories to be normalized. There are three categories: price, cost, and number of procedures. Everything is divided by the maximum possible score, which is 37.5, and adjusted to fit the normalized scale into a comprehensive index of 0 to 1.

The aggregate index in the next dimension, which denotes the pro-agrarian state capacity, will be more straightforward to calculate. Without the necessity for any normalization, the first part, which comes from the transformation index, will add up the values. Finally, this sum will be multiplied by the one already calculated from the IIAG and UN FAO data, which indicates the pro-rural and pro-agricultural orientation. The formula will be as follows.

$$Ag.I. State Capacity_{i=20} = \frac{(\alpha_i + \beta_i + \gamma_i + \delta_i) \times (Combined ProAgrarian Index_i)}{400}$$

The variable α denotes the category Basic State Functions, the variable β denotes the category Quality of State Capacity Steering, the variable γ denotes the category Effective financial control and δ denotes Infrastructure capacity. The sum of these values is multiplied by the Combined Pro-Agrarian Index, which is already calculated. The total is divided by the highest possible score and adjusted on a scale of 0 to 1.

The third dimension examines traditional institutions from Afrobarometer data. This dimension contains a total of five categories. However, I do not consider all categories to be equivalent. Some are very relevant to the aim of the thesis, others are more general. In the following table, the coefficient for each category can be seen.

Table 11- Coefficient within Categories of Traditional Institutions Dimension

Category	Coefficient
Allocation of Land by Traditional Leaders (Q87B)	1.00
Degree of Governance by Traditional Authorities (Q87A)	0.85
Resolution of Disputes by Traditional Authorities (Q87D)	0.75
Intensity of Ethnic/Tribal Identity (Q82B)	0.30
Trust in Traditional Institutions (Afrobarometer Dispatch No. 548, Aggregated Index)	0.50

Created by author, Source: Afrobarometer, Round 7 (2019); Round 8 (2022)

A further challenge arises with the fact that while the first three categories of the Q87 group of questions can take on both positive and negative numbers due to their positive and negative numbers, the last two categories are only in the positive range. In order to normalize, the first three categories need to be converted from the original -1 to 1 scale to a 0 to 1 scale.

$$Ag. I. Traditional Institutions_{i=19} = \frac{\left\{ \left(\frac{\alpha_i + 1}{2} \right) \times 1 \right\} + \left\{ \left(\frac{\beta_i + 1}{2} \right) \times 0.85 \right\} + \left\{ \left(\frac{\gamma_i + 1}{2} \right) \times 0.75 \right\} + (\delta_i \times 0.3) + (\epsilon_i \times 0.5)}{3.4}$$

The variable α denotes the category Allocation of Land by Traditional Leaders, the variable β denotes the category Degree of Governance by Traditional Authorities, the variable γ denotes the category Resolution of Disputes by Traditional Authorities, the variable δ denotes the category Intensity of Ethnic/Tribal Identity, and the last variable ϵ denotes the category Trust in Traditional Institutions. Each variable is associated with a corresponding coefficient. To obtain the final scale, the sum is divided by the maximum possible score, which is 3.4.

And the last dimension, called Inclusion of State Institutions, which includes all the others, is calculated similarly. Normalization is necessary for the category called Rigorous and Impartial Public Administration, which ranges from -4 to 4. Then

everything is added up. The Afrobarometer data, the last two categories, are not included in this aggregate. This is due to the lack of data for five states, which is too serious a shortcoming. The final formula is as follows.

$$Ag.I. Inclusion Institutions_{i=21} = \frac{\alpha_i + \beta_i + \gamma_i + \left(\frac{\delta_i + 4}{8}\right)}{4}$$

The variable α denotes the category of political corruption, the variable β denotes the category of freedom of expression in public administration, the variable γ denotes the category of freedom of association, and the variable δ denotes the category of strict and impartial public administration. For the last variable, normalization is also included. All are divided by the maximum possible score.

4.3.3.1. Complex Index of Land Tenure

We have now reached a point where all the dimensions have been evaluated and the final step is to create a comprehensive index that assesses overall land tenure. In addition to the four main dimensions, an indicator of overall security with regard to one's land tenure has been included. This index is relatively universal and does not fit into any of the dimensions mentioned. The data originates from Prindex.³⁰

For all four dimensions, the value scale will not be uniform for the Complex index. While there is no possibility of a negative value for the land legislation and pro-agrarian state capacity dimensions, there is for the traditional institutions and inclusive institutions dimensions. If the state refuses to recognize traditional tenure, the value summarizing the strength of traditional institutions will be given a negative value. This will give rise to the so-called contradiction factor. The contradiction factor is an indicator of the extent to which the state is at odds with traditional authorities in terms of land tenure.³¹ Also in the case of the dimension of inclusive institutions, I have opted for the possibility of assigning both positive

³⁰ Prindex is an organization that, in collaboration with the Global Land Alliance, assesses satisfaction with land ownership at both the plot and aggregate levels. Nevertheless, I do not consider their data and related issues to be of the same quality as, for example, Afrobarometer. However, in the absence of an alternative, we accept a reduction in the coefficient for these data, which reduces their statistical significance in aggregate indicators.

³¹ Contradiction Factor: If the traditional institutions are demonstrably strong but the state in question decides to deny their legitimacy, the contradiction factor will be just as pronounced. This will have an adverse impact on the overall result as expressed in the Complex Land Tenure Index.

and negative values. Even with regard to the dimension of inclusive institutions. I have opted for the possibility of assigning both positive and negative values. The resulting value in this dimension will be converted into a scale of -1 to 1. If the institutions are non-inclusive or non-democratic and farmers do not receive the requisite economic and political freedom, this will have a negative effect on the final comprehensive index.

The final step is to determine the final complex index. However, the nature of aggregate indexes is different and they cannot be added or multiplied. For example, an aggregate index of legislation evaluates its quality. The higher the number, the better the level of legislation. A second aggregate index works on the same principle, assessing better and worse levels of pro-agricultural state capacity. However, the aggregate index of traditional institutions is different. It does not assess the better or worse quality of traditional institutions. That would not be possible. Traditional institutions are highly pluralistic and flexible. There are thousands of types of customary systems on small lands, and they also tend to change according to current conditions. We only assess the strength of traditional institutions. A comprehensive index must take this contradiction into account. We need to divide the aggregate indices into their groups. The first group will focus on modern forms of ownership. The second group will focus on traditional institutions. The calculation methods will be as follows.

The first group of modern form holdings will include all aggregate indexes except the traditional institutions index. The Pridex perceived security indicator is included in the modern land tenure group. However, the latter is a mere supplement and, moreover, does not provide as good data as, for example, the Afrobarometer. For this reason, it is given a lower weight of 30 % compared to the main aggregate indexes. The aggregated index of institutional inclusion also receives a lower coefficient. This index does not have the same relevance as the two main aggregated indices and contains relatively general information. It will have a ratio of 50 % to the main aggregated indexes. The established coefficients and formulas will be as follows.

Table 12 Coefficient within Aggregate Indexes of Modern Land Tenure

Indicator	Coefficient
Aggregate Index of Land Legislation	1.0
Aggregate Index of Pro-Agrarian State Capacity	1.0
Aggregate Index of State Capacity Inclusiveness	0.5
Overall Security of Land Tenure	0.3

Created by author, Source: World Bank (2020); WJP (2022); BTI (2024); IIAG (2023); UN FAO (2023); VDEM (2023); Prindex (2018)

$$Complex\ Index\ ModernLT_{i,n=21} = \frac{(iSLT_i \times 0,3) + (aiL_i + aiSC_i) + (aiI_i \times 0,5)}{2.8}$$

The variables in the comprehensive index of modern land tenure are *iSLT*, which denotes the security of land tenure indicator, *aiL* the aggregate index of land legislation, *aiSC* the aggregate index of pro-agricultural state capacity, and *aiI* the aggregate index of inclusiveness of state institutions. A coefficient of 0.3 was assigned to the land tenure security indicator. The aggregate indices of land legislation, pro-agricultural state capacity and inclusiveness of state institutions are summed. A coefficient of 0.5 is assigned to the aggregate index of state inclusiveness. All are divided by the maximum possible score, which is 2.8, to arrive at the 0 to 1 scale.

The final complex land tenure index will present a ranking of countries according to their scores, which are on a scale of 0 to 1, in six categories labeled A to F. The following is the proposed order of the categories in the final index.

Table 13 - Identification and Assessment of Complex Land Tenure Index – Modern Land Tenure

Identification of the Relevant Category	Scale of Performance of Conditions
A	1.000 to 0.833
B	0.832 to 0.667
C	0.666 to 0.500
D	0.499 to 0.333
E	0.332 to 0.167
F	0.166 to 0.000

Created by author

The second group of traditional land tenure will comprise an aggregate index of traditional institutions, which is a distinct entity. The role of state recognition and the intrinsic strength of the institutions themselves will be of significant importance. The identification of categories will be analogous to the previous example.

Table 14 - Identification and Assessment of Complex Land Tenure Index - Customary Land Tenure

Identification of the Relevant Category	Scale of Performance or Conditions
A+	Customary tenure is recognized, and traditional institutions are characterized by significantly strong powers ($aiT > 0.65$)
A-	Customary tenure is recognized, but they do not have significantly strong powers ($aiT < 0.65$)
A	Customary tenure is not recognized, but the powers of traditional institutions are very weak and therefore insignificant ($aiT < 0.35$)
C	Customary land tenure is not recognized, but the powers of traditional institutions are weak ($aiT < 0.50$)
F+	Customary land tenure is not recognized, but the powers of traditional institutions strong ($aiT < 0.65$)
F-	Customary land tenure is not recognized, but the powers of traditional institutions strong ($aiT > 0.65$)

Created by author

Firstly, it can be observed that for certain letters (namely B, D, E), there are no categories. This has been designed in this way to maintain the A to F scale, as was the case in the previous instance. The variable aiT denotes the value resulting from the aggregated index of traditional institutions. The customary tenure that is formally recognized is automatically denoted by the first letters of the alphabet that symbolize the better result. The symbols (+) and (-) are used to differentiate between the strength of traditional institutions. In one case, unrecognized land tenure is denoted by category A, which symbolizes good results. It is necessary to take into account states that do not recognize traditional tenure, but whose importance is so low that it does not affect the performance of land tenure. The letter C is intended to symbolize a kind of average between the two extremes. It represents customary tenure, which is not recognized, but the prerogatives of traditional authorities are not very significant.

Since the four aggregated indexes are different in nature, the final complex index is not evaluated by simple summation, but by assignment to categories. The resulting value will always consist of two letters on a scale from A to F. The first letter will indicate the first group, which refers to the quality of modern tenure (i.e. private or public ownership), and the second letter will refer to the next group, which indicates the formal recognition of traditional institutions and their relevance. For example, a final score of AA+ indicates that the country has high-quality modern tenure institutions, but also strong traditional institutions that are formally recognized by law. In this case, the overall land tenure performance can be

described as high quality. Conversely, a country with a score of EF- indicates poor quality modern tenure institutions and traditional institutions that are not formally recognized but are very strong and therefore relevant to local farmers.

4.4. Correlation Analysis on the Effect of the Land Tenure on the Green Revolution

Once the types of land tenure regimes have been identified and their performance quantified, the thesis will proceed to establish the relationship between land tenure and the feasibility of a green revolution. A regression analysis could be offered, but it would be quite problematic. The paper is characterized by a high number of variables and a low number of observations.³² The limited number of observations is further compounded by the fact that the research, while employing a multitude of indicators, is inherently limited in its ability to make comparisons over time. Consequently, it is characterized by its synchronic nature.³³ Therefore, correlation analysis is chosen. Pearson's coefficient is chosen as the correlation coefficient since the purpose of the paper is to observe the linear relationship between the variables.³⁴ However, the coefficient is sensitive to outliers, so it is necessary to determine the normality of the data distribution. The Shapiro-Wilk test is performed.

The Shapiro-Wilk test was developed by Samuel Sanford Shapiro and Martin Wilk in 1965 and first published in the article "*An analysis of variance test for*

³² In our case, the number of observations (N) is 21. According to the recommendation of Tabachnick, Fidell (2012, pp. 119–121), a regression model with one variable should have at least 58 observations.

³³ Many basic indicators are very difficult to compare over time. This is also considering that the impacts of land registration and related infrastructure is a complex process and the effects take a long time to be seen. For example, in the case of the Japanese colonies, industrialization did not occur until about 30 years after land registration began (see Chapter 2). The problem in Africa is that systematic forms of land registration usually start only after 2000 (among the best-known cases are Rwanda, which has been registering land since 2003, and Madagascar, which has been registering land since 2005 and 2015, respectively). Even the indicators tracking these processes themselves are relatively young. For example, the World Bank has been compiling its DoingBusiness Index since 2012, and specific items for land registration have only been included in the index since 2016. Similarly, the Afrobarometer was only created in 1999, and each new round of surveys includes relatively different questions for respondents. This makes it very difficult to compare certain indicators over time.

³⁴ Alternatives could be Spearman's coefficient or Kendall's Tau coefficient, which are perhaps even more appropriate for a small sample of cases, as they are non-parametric measures and do not require normality of data distribution. However, they measure only a monotonic relationship, do not provide as precise a measure of the strength and direction of the relationship, and are more difficult to interpret. For the purposes of this paper, the Pearson coefficient is more appropriate.

normality (complete samples)" in the journal *Biometrika*. The test tests the null hypothesis under normally distributed samples. The formula for the calculation is as follows:

$$W = \frac{(\sum_{i=1}^n a_i X_{(i)})^2}{(\sum_{i=1}^n (X_i - \bar{X})^2)}$$

Where \bar{X} is the average of the dataset. It is the mean of all numbers in the dataset. It is calculated by adding all the values and then dividing the result by the number of values. This value tells us where the middle of our data is. The a_i labels are coefficients, special weights that are used to determine how well the data used fits a normal distribution. These coefficients are pre-calculated values that depend on the sample size in the test. The W value is a test statistic that is compared to critical values or used to calculate a p-value. A low W value (and therefore a low p-value) indicates that the data are unlikely to come from a normal distribution. Conversely, a high W -value (and thus a high p-value) indicates that the data may be considered normally distributed (Zar 2010, p. 95; Shapiro, Wilk 1965).

The test will be followed by a correlation analysis. However, the actual correlation between the independent and dependent variable is highly questionable. A number of processes may interfere with the relationship, which we call the confounding variable. Therefore, a more advanced partial correlation will be chosen for the analysis. Although partial correlation is more complicated to calculate, it allows us to operate with confounding variables. It does so in such a way that it establishes the relationship between the independent and dependent variables and cleans it from the influence of the confounding variable. Let's explain this in more depth using the variables X, Y and Z.³⁵

Thus, the final value of the correlation of XY with the Z control may take on a smaller value than the isolated relationship between X and Y if the Z value invalidates it. However, it may take on a higher value. This occurs, for example, when the Z control removes some of the bias that was present in the original correlation between X and Y regardless of Z. There may also be a confounding

³⁵ In partial correlation, the independent variable is often referred to as X, the dependent variable as Y and the confounding variable as Z. This designation is also used in this paper.

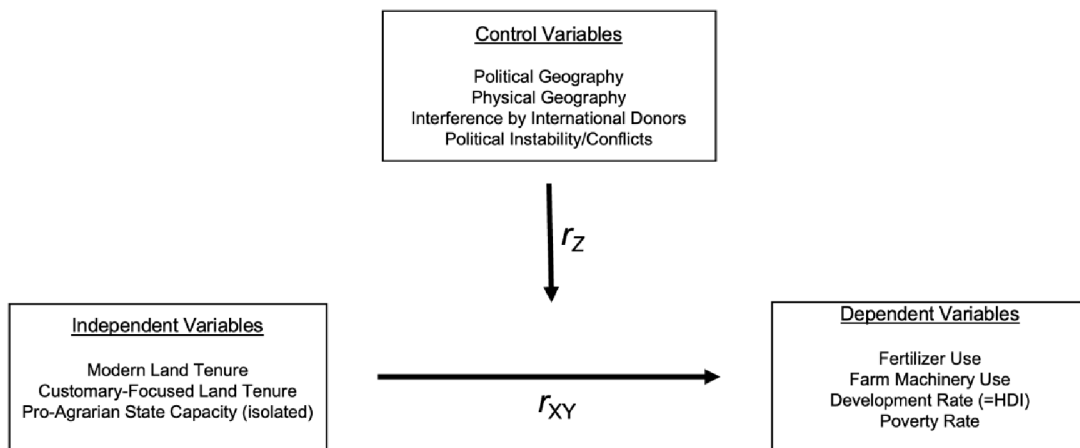
effect where Z has a significant effect on both variables X and Y and this effect was not accounted for in the original simple correlation. The calculation is done in several steps. First, the normal correlations between all pairs of variables are calculated.³⁶ The following is the calculation of the partial correlation using this formula (Salkind 2016: 146–158).

$$r_{XY|Z} = \frac{r_{XY} - r_{XZ}r_{YZ}}{\sqrt{(1 - r_{XZ}^2)(1 - r_{YZ}^2)}}$$

4.4.1. Used Variables

Two correlation analyses will be conducted within the chapter. The first analysis will be synchronic in nature, using 13 variables, and will seek to establish what relationship exists between land tenure and the Green Revolution phenomenon, or its typical characteristics. A simplified model of the correlation is as follows.

Figure 3 - Partial Correlation Model



Created and designed by the author

In total, we have three independent variables. The first independent variable, called Modern Land Tenure, refers to the value of the resulting comprehensive index of modern land tenure (i.e., excluding customary land tenure indicators). The second, called customary land tenure, is the value of the comprehensive land tenure

³⁶ In our case we have variables X,Y and Z. So, the correlations would be XY, XZ and YZ.

index. This is denoted by two letters on a scale from A to F.³⁷ The following scoring is used to evaluate it.

Figure 4 - Quantification of the Complex Land Tenure Index Assessment (Modern Land Tenure Section)

Assessment Category	Scoring for Correlation Purposes
A	5.5
B	4.0
C	3.5
D	2.0
E	1.0
F	0.0

Created by author

Figure 5 - Quantification of the Complex Land Tenure Index Assessment (Customary Land Ten. Section)

Assessment Category	Scoring for Correlation Purposes
A+	5.5
A-	5.0
C+	3.5
C-	3.0
F+	0.5
F-	0.0

Created by author

As noted above, the overall land tenure rating is expressed in two letters. The first letter indicates modern tenure and the second letter indicates customary tenure. The distribution is evenly split at 50 percent each³⁸. The maximum score is 11 (for the AA+ case) and the minimum score is 0 (for the (FF-) case). The final independent variable is Pro-Agrarian State Capacity, which is the value of the aggregate index of pro-agricultural state capacity. The reason for choosing this variable is to isolate state capacity and pro-agricultural orientation from land legislation and recognition of customary rights. This will show us the net power of the state.

The first two are directly related to the Green Revolution, not to the associated development. The first one measures the use of fertilizers. Specifically, total fertilizer use is the sum of synthetic inputs of nitrogen, potassium and phosphorus and organic inputs of nitrogen. The data come from the UN FAO. The second dependent variable tracks how much agricultural equipment is in African fields.

³⁷ The assessment of total land tenure is explained in detail in the previous subsection 4.3.2.1 Complex Land Tenure Index.

³⁸ Thus, the value of modern possession is identical to the value of customary possession. Customary tenure has been given such a high proportion that its strength and formal recognition in a particular state has been emphasized. As a result, the variable is called "Customary-Focused Land Tenure".

Agricultural machinery is measured in units of horsepower. This value is divided by the total agricultural land to obtain the average use of machinery per 1,000 hectares of agricultural land. The data come from the United States Department of Agriculture (USDA). The third dependent variable no longer focuses specifically on increases in agricultural production, but on overall development as expressed in the Human Development Index, which is compiled by the United Nations Development Programme (UNDP) and includes the Life Expectancy Index, the Education Index and the Gross National Income Index. This variable takes its inspiration from the experience of the Green Revolution in Asia, where in many cases it was not simply a matter of increasing agricultural production, but of complex development. The last dependent variable is the poverty rate. Specifically, it is the proportion of people living below US\$3.65 per day. Rates are in 2017 US dollars. The data are from the World Bank.

This leads us to the group of variables that are presumed to control the relationship between the independent and dependent variables. A total of six variables are divided into four groups that could potentially confound the original relationship.

The first control variable called Political Geography³⁹ comes from J. Herbst (2000). Aspects such as population density and distribution, state size, or ethnic diversity have not been otherwise used in the context of this paper. Yet these factors can strongly influence the quality of land tenure and the strength of the institutions associated with it. J. Herbst (2000), in the chapter "*National Design and the Broadcasting of Power*", creatively combines these factors into a single typology. Specifically, he focuses on the distribution of population density, shape and size of the state. According to these factors, he divides African states into three categories. Specifically, states with favorable geography, neutral geography and difficult geography. According to him, by combining these factors a number of other things can be understood. States with difficult geography are characterized by high levels of ethnic and cultural fractionalization and disbelief in a central state. Similarly,

³⁹ Herbst (2014) refers to this as political geography, although socio-economic geography is a more accurate term, however this paper will follow Herbst's terminology.

there is great difficulty in projecting state power throughout its territory ⁴⁰. Herbst (2000, p. 191) even mentions that states with more difficult geography have not been able to effectively disrupt customary land tenure, and chiefs here still have dominant power over most land. It is the distribution and density of the population, the size and shape of the state. And related values, such as ethnic and cultural fragmentation or the density of transportation infrastructure, can strongly affect the relationship between the independent and dependent variables.

Table 15 - Quantification of Herbst's Categories of Political Geography

Category	Scoring for Correlation Purposes
Countries with favorable geography	1.0
Countries with neutral geography	0.5
Countries with difficult geography	0.0

Created by author, Source: Herbst (2000)

This is followed by the so-called Physical Geography, which includes two variables. The first control variable is the composition of the daily diet and the second is soil types. Although it was suggested at the beginning of this paper that the success or failure of the African Green Revolution is more influenced by institutions than by geography itself. This was based on the premise of comparison with tropical Asia. However, there are some differences. Otsuka et al. (2017) refer to the first important difference. The latter argues that diet composition in Asia, Africa or Latin America has always been different. In countries like Indonesia, Malaysia, Thailand or Vietnam, rice has always been absolutely dominant. In Mexico it was maize and in India it was a combination of the two. In Africa, on the other hand, the diet is much more varied. Africans also eat a lot of cassava, taro, yam, pulses, various fruits and more. The fundamental problem is that the success of the Green Revolution was mainly focused on rice, maize and other grains. Indeed, the Green Revolution in Asia or Latin America was accompanied by a huge demand for crops for which there were very effective fertilizers and new varieties. As much as two-thirds of the daily diet of Africans contains items hardly covered by the Green Revolution. Another problem is that many African countries are still too focused on export crops. In Asia, by contrast, the 1960s were characterized by a significant government orientation towards food crops and meeting domestic

⁴⁰ Herbst (2014, p. 168) even shows that worse geography is related to road and railway infrastructure.

demand as a priority. Although the situation in Africa is slowly changing and items such as rice or maize continue to grow in share, the situation is still characterized by a high diversity of diets and less demand for the crops with which the Green Revolution phenomenon is directly linked. The data measure the proportion of energy supplied by food in an average individual's diet. This is measured in kilocalories per person per day. The data comes from the UN FAO. The second variable refers to soil. The tropical belt of Africa was chosen mainly because of similar characteristics such as rainfall frequency or sunshine. However, there are differences in soil types. Different soils have different characteristics and these are key to the cost-effectiveness of growing crops. In this paper, the typology used is from the USDA.⁴¹ Rice needs heavier clay soils with a high water retention capacity, moderate acidity (pH between 5.5 and 7.0), and the soil should also have sufficient macro- and micronutrients.⁴² For maize, deep and well-drained soils are best suited. It prefers higher altitudes. The optimum pH is between 5.8 and 7.0. Based on these conditions, the most suitable soil types have been selected. Specifically, alfisol, andisol, histosol, ultisol, inceptisol, and mollisol (USDA 1999; 2024; Macauley 2015).⁴³ Their contribution to the total land area of the states surveyed will be measured. There would be another important variable. This is the impact of climate change, which is currently a highly debated topic. However, unlike the other variables, it is very complex and not clearly bounded. Finally, it was not included in the control variables.

Another control variable examines political instability and conflict. It is based on the assumption that, even with the best soil legislation, the spread of fertilizer is very limited if there is tension and associated violence in politics and society. The data will come from the Global Peace Index. This very comprehensive index measures not only conflict, but also the level of crime in society or political instability. The Index is produced by the Institute for Economics & Peace (IEP).

⁴¹ These are 15 soil types. Namely Alfisol, Andisol, Aridisol, Entisol, Gelisol, Histosol, Inceptisol, Mollisol, Oxisol, Spodosol, Ultisol, Vertisol, Rocky Lands, Shifting Lands and Ice/Glacier.

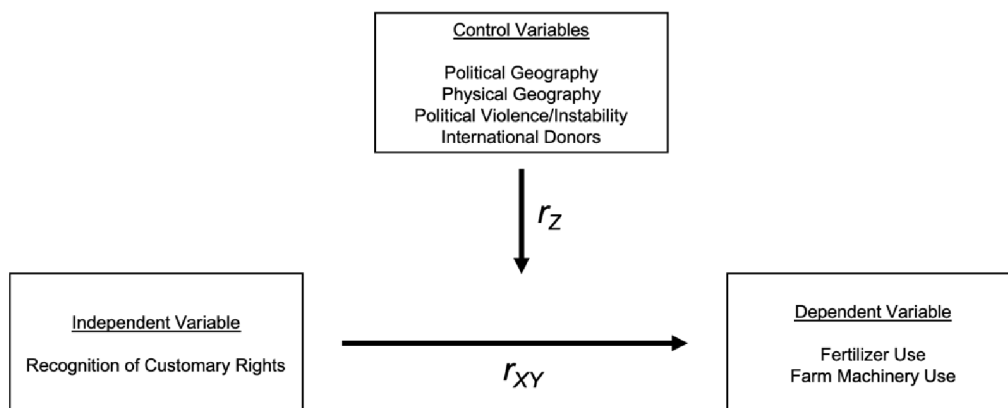
⁴² The micronutrients are mainly iron and zinc and the macronutrients nitrogen, phosphorus and potassium

⁴³ Of course, there are more soils that are suitable for maize or rice. These may include, for example, vertisol. However, these types are almost non-existent in the study area.

The final control variable is the role of foreign donors. Within Africa, foreign donors have always been very influential. Many foreign organizations, such as AGRA and the Rockefeller Foundation, have directly sought to support the African Green Revolution. This raises the question of the role of land tenure and the role of donors themselves in the distribution of fertilizers or agricultural machinery. Aid is measured as net Official Development Assistance (ODA). It includes concessional loans and grants disbursed by ODA members. Data are from the World Bank.

The second correlation analysis will focus on the role of customary ownership. Although this question is already addressed in the previous correlation, it does not compare data over time. This is, among other things, a major handicap of this thesis. This correlation will attempt to compensate for this, at least in part. However, it will operate with fewer dependent and control variables, as obtaining much historical data appears to be a problem.

Figure 6 - Partial Correlation Model (Recognition of Customary Tenure)



Created and designed by the author

Within this correlation, five states are selected where the transition from a purely statist regime to the recognition of customary rights can be clearly identified. These states are Ghana, Angola, Zambia, Mozambique and Uganda.

Table 16 - Recognition of Customary Land Tenure within Selected Countries

Selected Countries	Recognition of Customary Rights (Partial Recog.)	Revocation of Recognition of Customary Rights (Partial Revoc.)
Ghana	1992	
Angola	2010 (2004)	
Zambia	2000 (1995)	
Mozambique	2000	2018 (2010)
Uganda	1995	

Created by author, Source: LandPortal (2023); USAID (2023)

The table shows the years in which customary rights were recognized, and in brackets the years in which they were partially recognized. There is also an entry to indicate the States where these rights have ceased to apply. This is the case of Mozambique, which has gone through an interesting trajectory. Since its creation, in 1975, only state ownership has been set there. The government has actively sought to abolish customary tenure by forcibly moving the rural population into newly created villages. Dissatisfaction with this system grew into a civil war. Following this, the government reintroduced it in 2000 due to pressure from the international donor community. However, from 2010 onwards, laws began to be passed to restrict this type of tenure and by 2018, when systematic land registration began, these rights are already being ignored completely.

The independent variable will measure the time from the initial introduction of state ownership only until 2021. All other variables are identical to the previous correlation analysis. The only difference is the control variable that measures the incidence of political violence. This already comes from the Center for Systematic Peace (CSP), which also collects historical data on conflict and violence.

In both correlation analyses, the data will be normalized to a 0 to 1 scale and ranked according to the objectives of the thesis.

5. Land Tenure in Tropical Africa

5.1. Context of the Research: History and Peculiarities of Land Registration in Africa

5.1.1. The Origins of Land Tenure in Tropical Africa: Topographic Constraints

The pre-colonial African context differed from the European context in terms of its power base. In Europe, fertile soils, a favorable climate for growing protein-rich crops, animals suitable for domestication and rapid population growth led to land becoming highly valuable. In contrast, Africa had very different conditions. Despite the abundance of game, the land was largely empty and not very fertile. In addition, numerous diseases contributed to a sparse and migratory population that subsisted on extensive agriculture. Investment in the land was minimal, as the people, or rather the slaves, were of higher value. (Herbst 2000, pp. 11–31; Frankema 2014, pp. 19–21; Diamond 1997, Fenske 2012). As a result, Africa did not develop feudal systems in which the ruler had absolute power over his subjects and their land (Goody 1971). If Africans disagreed with their ruler, they often simply moved. Pre-colonial wars were not fought over territory, but over slaves as potential labor in the fields (Herbst 2000, p. 22). The spread of domesticated animals from other regions was virtually impossible due to diseases, especially those associated with the tsetse fly (Alsan 2015). This led to the fact that pre-colonial Africa never developed strong state institutions like Europe to effectively control its population and territory. Consequently, the state leadership had no reason to map and record their lands for tax collection or building strong central institutions. Although several strong empires were established in West Africa, for example, their centralization was based on long-distance trade rather than land ownership. There were few cases where the centralization of state institutions was based on land control. Such cases included the kingdoms of Imerina and Ethiopia (Herbst 2000, pp. 42–46; Bates 1982, pp. 21–58).

5.1.2. The Efforts to Formalize African Land

Land registration and mapping in tropical Africa only began with the advent of European/Western influences. Due to its hostile, disease-ridden environment, Africa was not of interest to Europe for a long time, and colonialism only began in the late 19th century. Control of land was problematic, however, as the European metropolises themselves lacked the capacity to effectively control entire vast areas. These attempts were often unsuccessful and economically unprofitable. In addition, the spheres of influence of the metropolises were pre-determined, so there was no incentive to go to war. In the vast majority of cases, land was registered only for European settlers. All unregistered land was declared crown or state land. This legalized any expropriation of land for colonial purposes (Herbst 2000, pp. 64–75; Dickerman et al. 1989, p. 7).

The first land registration institutions were established in West Africa in the mid-19th century, particularly in Liberia, Sierra Leone, and around Lagos in present-day Nigeria. These systems were relatively imperfect, based on a deed system and designed for the newly arrived free population. At the beginning of the 20th century, the more advanced Torrens system began to spread throughout Africa. This system was adopted surprisingly quickly by the French colonizers, first in the settler colonies of North Africa, and later in some colonies such as Madagascar and Guinea (Enermark 2005, pp. 3–7; Dickerman et al. 1989, pp. 7–8). Modern land tenure itself, which would have given them some legal protection, was banned outright for the African population in several colonies. These were the Belgian colonies, for example. Elsewhere, the cost of registration was so high that African peasants would not have been able to afford it. There were, however, notable exceptions where systematic land registration was introduced for the indigenous population at government expense. In tropical Africa, these were the kingdom of Buganda and Madagascar. However, the reasons for land registration were political rather than economic. It was about securing strategic alliances and strengthening the power of the ruling indigenous authority. However, the Buganda system of private indigenous ownership, called "Mailo", was later characterized by a vibrant cotton trade and greater investment in land than in the rest of the country. After World War II, colonizers began to invest heavily in their colonies. In East Africa in particular, massive land registration projects for the indigenous population were to

be undertaken, creating an African class of commercial farmers. In the early 1950s, the so-called Royal Commission for East Africa was set up in Britain to launch agricultural and industrial revolutions in colonies such as Kenya, Uganda and Tanganyika. Growing disobedience by the indigenous population, such as the Mau Mau rebellion, thwarted these plans.⁴⁴ After independence, many African governments moved toward state control over land and, in the 1970s, massive nationalization. Only a few states continued to emphasize private ownership and land registration. Seychelles and Malawi, for example, remained among them (Dickerman et al. 1989: 6–12).

Only since the late 1980s, thanks to structural adjustment programs supported by international donors, has there been a renewed focus on the need for private land titling or registration projects. Perhaps the most notable case is Rwanda, which emerged from the chaos of the 1994 genocide to become the country with the strongest property rights on the continent and highly successful land registration projects. Large-scale systematic land registration projects are being considered by many countries after 2000, but are already underway in Rwanda, Madagascar and Mozambique (Bates 2001, pp. 84–101; LandPortal 2023).

5.1.3. The Critical Role of Chiefs and The Specificity of Customary Land Tenure Systems

It is first necessary to define what is meant by customary tenure in Africa. The African Development Bank defines it as follows:

Customary land law is all the unwritten rules that make up the customs of the people (as opposed to statutory law). Customary land law governs rights to land. It is a way of managing land and land-related rights in accordance with indigenous custom. It varies from region to region and ethnic group to ethnic group, and also over time due to economic, social and political changes. (ADB 2009)

⁴⁴ Swynnerton Plan from 1954 for Kenya envisioned the emergence of a strong crop of African commercial farmers. The customary system was considered backward, and private ownership of land was seen by the British as the best option. The plan called for the redistribution of some land in the fertile central highlands to over 600,000 families. Those who accepted modern tenure would receive government assistance, such as loans at a favorable interest rate. At the same time, farmers would be encouraged to invest less in export crops and more in market crops. The process would take about 20 years (Ogot 1995)

The complicated topography of tropical Africa and the weakness of state institutions have resulted in the prevalence of informal institutions that have significant influence. Despite many state's attempts to reduce the power of these traditional structures, traditional authorities still hold a great deal of power over critical resources. According to many authors (e.g., Honig 2019; Baldwin 2020; Hydén 2006; 1980; Mamdani 1996), it is the traditional authorities who could be an important vehicle for development in African states. They may be also the solution to the weakness of African states, as they tend to be the mediators between the state and the rural population.

However, it is questionable whether chieftaincy institutions can be considered truly traditional or, on the contrary, a modern invention of the colonial powers. As mentioned above, the practice of extensive agriculture based on migration and the low population density in Africa in pre-colonial times meant that the system of feudalism could not take hold. The peasants simply expressed their disagreement with the authorities by leaving. This meant that the power of the authorities was relatively weak compared to their European counterparts and based on mutual consensus. Many pre-colonial societies did not even have institutions of chieftaincy. Lacking the means to effectively occupy the entire vast continent, the colonizers resorted to pragmatic solutions in the form of alliances with traditional authorities. Their goal was to create a kind of feudal system in which chiefs would gain near-absolute power over their subjects. The way in which control over the chiefs was gained varied. The British gave the chiefs broad powers, such as budgets or control over the appointment of various posts. They did not interfere with their institution unless it was necessary for colonial administration. On the contrary, the French selected authorities who were fluent in French, respected by both their tribe and the French themselves, and willing to adopt European traditions. The Germans drastically reduced the number of chiefs, leaving a small number of very influential authorities. The chiefs' control over the land and the peasants also increased significantly. The Europeans demarcated for the chiefs the territory in which their authority would be exercised, essentially creating rigid boundaries between ethnic groups that had previously been very flexible to non-existent. Each peasant was assigned to a particular tribe, and a particular customary law applied to him accordingly (Ubink 2008, pp. 13–38).

Catherine Boone (2014, pp.: 28–38) has referred to this land tenure system as neo-customary. It is the designation 'neo' that is meant to emphasize that the power of authority over land was a European invention not an ongoing historical continuity from pre-colonial times. The chief administered the common land and was in charge of its redistribution. Whoever belonged to the chief's tribe was entitled to the land. Newly arrived outsiders already had a rather menial role as tenants for temporary use. They were excluded from key land decisions. As competition for land increased, their status continued to deteriorate. This system of power strengthened not only the institution of the chief, but also members of certain ethnic groups, which fostered greater cohesion with colonial power. However, to maintain this cohesion, the colonial administration prevented the emergence of a land market. Land claims were based on tribal identity. Thus, with few exceptions, the maintenance of colonial power and legitimacy over the indigenous population prevented the emergence of a market system of commercialization of agriculture. This is not to say, of course, that the pre-colonial land tenure system supported a market in land and was not based on identity.

There was, of course, continuity between precolonial and colonial societies, but the colonialists greatly reinforced the system and created firm boundaries that were difficult to cross. It was only after World War II that the emergence of commercial agriculture was strongly encouraged for broad sections of Africans, but this phase was too brief to make any difference. After independence, many presidents got rid of the chiefs, but this land tenure system was maintained. Since the 1990s, the institution of chiefdoms has been restored in many countries, and chiefs have come to be seen as a symbol of democratization. Many states have restored their institutions in their constitutions.⁴⁵ It is questionable, however, whether the institution of chieftaincy is truly equitable. Its origins lie in the colonial rather than the precolonial period (Baldwin 2015, pp. 53–65; Ubink 2008, p. 12)

Thus, neo-costumary land tenure, which emerged as a tool of colonial powers to maintain power and legitimacy, is still dominant in most of Africa. It also

⁴⁵ In Ghana, for example, a parliamentary chamber for chiefs was created in 1992 and they were given great powers.

reinforces the belief that land is not an economic commodity but part of identity (Chimhowu a Woodhouse 2006, p. 346; Boone 2014, pp. 319–320). In terms of economic development, this creates a complicated position for Africa in relation to other parts of the world. Although countries like Taiwan and Palau were in a similar position to Africa in the 19th century, Japanese colonizers built the foundations for a successful market economy there; the Dutch in Indonesia built a similar, though less perfect. Africa remains trapped in a vicious circle of an agrarian society that inherently blocks economic development and cannot effectively address the problems of food security, increasing competition for land, and overpopulation. This land tenure system is typical of West Africa. In contrast, the East Africa has a tradition of settlers and large land projects that undermine this tenure.⁴⁶ While this passage may have sounded very critical of traditional institutions, they still have critical control over land, and working with them is extremely important, despite their shortcomings. They are the main channels through which the state can effectively project its power over its territory.

⁴⁶ Interesting examples are Tanzania, where the influence of traditional institutions is weak due to the legacy of the Julius Nyere government, or Rwanda, which has experienced remarkable development since 1995 and where land tenure is now almost entirely modern.

5.2. Research of Land Tenure: Description of the Various Forms and their Typology

In the first part of the research, a cluster analysis will be conducted to classify the states under study into land regimes. Loosely inspired by the typology of Jeffrey Herbst (2000) and John Bruce (1998), it will be based on the legislation of each country. However, it will not only examine the legislation per se, but will also focus on analyzing the country's situation, which will influence its classification into each category.⁴⁷ Countries are divided into five categories. These are etatist regimes where only the state has formal authority over land and traditional institutions are not recognized or are consistently ignored. Often, due to the demands of the international donor community, traditional tenure is recognized in the constitution, but weakened and made less transparent by subordinate legislation. Then there are Modernist regimes.⁴⁸ These states only recognize state and private land ownership. The third category is State-traditional land tenure, which does not recognize private tenure. The fourth category is Mixed systems, which recognize both state, private and customary/traditional land tenure. For private tenure, the term freehold is used to avoid possible confusion with private tenure under a long-term government lease. Freehold means absolute private ownership with no government conditions such as time limits or the need to develop the land. The fifth special category relates to Rwanda, which is in many ways a special case and quite difficult to compare with the other countries studied. Private property does indeed exist in the vast majority of countries, but the difference is that in many countries it is limited to urban areas. In our case, we focus only on rural areas. Within the assigned categories, we always see the designation (F), (C), (L), or (?) in parentheses. For clarity, in systems with multiple forms of tenure, (F) is the designation for Freehold, (L) is the designation

⁴⁷ A number of articles on individual states will provide context for the legislative analysis. Primary sources will include LandPortal, USAID, BTI, and Bruce (1998).

⁴⁸ The word "Modernist" is used deliberately because the word modern would imply the dominance of modern tenure. In our case, it is more a legislative attempt to have a modern form of land tenure, which often does not correspond to reality.

for State Leasehold, (C) is the designation for Customary, and (?) is the designation for Unclear situation.

Table 17 - Typology of Land Tenure Regimes

Country	Private Ownership of Freehold Type	State/ State Leasehold	Customary/Tradition Tenure	Relevant Category
Gambia	Vague	Exist	Exist	Etat.-Traditional (?)
Sierra Leone	Significant	Exist	Significant	Mixed (F, C)
Liberia	Significant	Exist	Significant	Mixed (F, C)
Guinea	Exist	Exist	No	Modernist (F)
Côte d'Ivoire	Exist	Exist	Exist	Mixed (F)
Ghana	Vague	Significant	Significant	Etat.-Traditional (L)
Togo	Vague	Significant	Exist	Etat.-Traditional (?)
Nigeria	Vague	Significant	Vague	Etatist
Cameroon	Exist	Significant	Vague	Modernist (L)
Gabon	Vague	Exist	No/Vague	Etatist
Congo-Braz.	No	Significant	No	Etatist
Angola	No	Significant	Exist	Etat.-Traditional (L)
Zambia	No	Significant	Exist	Etat.-Traditional (L)
Malawi	Significant	Exist	Exist	Mixed (F)
Mozambique	No	Significant	Vague	Etatist
Madagascar	Significant	Exist	Vague	Modernist (F)
Tanzania	No	Significant	Exist	Etat.-Traditional (L)
Kenya	Significant	Exist	Exist	Mixed (F)
Uganda	Significant	Exist	Significant	Mixed (F)
Rwanda	Significant	Exist	No/Vague	Specific Case
Burundi	Exist	Exist	Vague	Modernist (L)

Created by author, Inspired by Bruce (1998) and Herbst (2000)

The largest portion of the countries have a mixed land tenure system, with the remaining countries categorized as Etatist-Traditional, Modernist, or pure Etatist. This section will provide a detailed description of the situation in each state, including an analysis of its historical context and the justification for its categorization.

5.2.1. Etatist Land Tenure Regimes

5.2.1.1. Nigeria

Land tenure in Nigeria is typically etatist. Outdated land legislation, inherited from military governments, vests all major powers in the federal or state governments. This country of two hundred million people faces enormous challenges that the current legislation does not address. Overpopulation, drought, and conflicts between farmers and herders are causing increasing problems. Despite some success in increasing agricultural production in this millennium, there is still a need for constitutional reform and investment in rural areas and land. Part of the reason for the slow pace of reform is that oil provides most of the country's revenue

and the federal government neglects rural areas and agriculture (FAO 2021; Herbst 2014, pp. 191–193).

The Nigerian Constitution still relies on the 1978 Act to regulate land use (Ifeka 1996, pp. 138–141; Laws of Federation of Nigeria 1978; UNIZIK 2023).⁴⁹ The 1970s was the era of strong states in Africa and their attempt to dominate all sectors.⁵⁰ It is not difficult to surmise that the Act essentially ignores traditional institutions. The law makes it clear that the state has rights to land; individuals only have the right to use the land. However, use is regulated by administrative authorities. The power of expropriation in the public interest is exercised by state authorities within the federation. A reform of the dysfunctional legislation was attempted in 2011 by President Goodluck Johathan, who sought to systematize land registration or make the oversight of administrative bodies more transparent. This forced a constitutional reform that has not yet taken place (Juma 2015, pp. 21–31; Butler 2012).

Since customary tenure is prevalent in the vast majority of the country, it is formally recognized by law. However, the registration process for customary usufruct rights is very costly and lengthy. Moreover, the vagueness of the definition of the registration process gives power to national administrations, which is a breeding ground for corruption. The option of registration is rarely used; it would cost more than the annual income of smallholder farmers and then expose them to high taxes (Ikejiofor 2006, pp. 448–450).

The reality of land tenure in Nigeria differs significantly from official legislation. The vast majority of land is controlled by traditional authorities such as chiefs and emirs. It is to them that the overwhelming rural population turns for various needs. Customary rights are highly pluralistic and flexible. Land is considered the property of the deity and is managed by the chief for the benefit of the community. However, due to population growth, there are more and more

⁴⁹ Land Use Act of 1978, Chapter 202; Land Tenure in the Nigerian Constitution Section 315 (5) (d) This section of the Constitution contains provisions that incorporate the Land Use Act as part of the Constitution, which means that any amendment to this Act requires a constitutional amendment.

⁵⁰ In his book *The Postcolonial State in Africa: Fifty Years of Independence, 1960-2010* (2012), Crawford Young refers to the 1970s as a statist era when the goal of many military governments was to gain dominance over all sectors, including land.

conflicts, which are not well addressed by the state. State encroachment also causes many conflicts, which are greatly facilitated by legislation and which customary authorities are unable to counter. Terrorist organizations are active in the country, and land reform or investment in agricultural production is becoming increasingly necessary (LandPortal 2022).

5.2.1.2. Gabon

Heavily forested Gabon has long benefited from oil, and the government has not been overly concerned about land. Although legislation still does not recognize customary rights, the new millennium has seen the introduction of a number of laws aimed at formalizing and simplifying land tenure. The country has one of the highest HDIs in Africa. This is a result of investment in the population and rural areas in the new millennium as the economy seeks to move away from dependence on oil (World Bank 2021; LandPortal 2021, UNDP 2023). Gabon also benefits from good political geography, with the vast majority of its very small population living along transportation arteries such as rivers. This is a consequence of the systematic resettlement of the population dating back to French colonial rule (Bruce 1998, pp. 58–59)

Gabonese legislation is etatist and does not recognize other rights, or recognizes them only in a limited and vague way. It is thus largely based on the colonial doctrine practiced by the French (République gabonaise 2012a).⁵¹ As in the case of Nigeria, there are possibilities for the state to grant usufruct rights to individuals for a limited period of time. Although the freehold option is formally possible, the registration process is so lengthy and costly that it is virtually non-existent in the country. Interestingly, however, forestry legislation is fairly well developed and attempts to protect resources. Since 1996, there have been new laws on the sustainable use of forest resources. It should be added that international donors, such as Norway, have had a significant influence on the favorable legislation and

⁵¹ The current main instrument for land tenure is Code Foncier de 2012 (2012 Land Law). Land tenure is defined in No. 5/2012 and in the land registration No. 3/2012. However, like many other African countries, here I refer to rural land. It is common practice in urban areas for private elastic rights to be recognized.

have expressed an interest in promoting sustainability (République gabonaise 2001).⁵²

For a long time, oil contributed to the state budget and there was little interest in sophisticated land legislation. In addition, Omar Bongo introduced a one-party system in 1967, leaving no room for democratic debate. But in the new millennium, the government is wiser and recognizes the need to reduce its dependence on oil. Since 2008, laws have been passed to simplify and speed up the land registration system. This is all under the auspices of the "Plan stratégique Gabon émergent" (PSGE). The 2012 laws better define tenure (though only for state land), and since 2017 a Land Allocation Commission has been in place to inform the local population about tenure options and increase security. Of course, the situation is far from perfect. Many recommendations from international observers and experts on land governance have still not been implemented. Tenure security remains poor for many residents, and illegal logging continues to flourish (Tan 2001; République gabonaise 2012b).

5.2.1.3. Congo-Brazzaville

Congolese land legislation has obvious roots in the French colonial system and the Afro-Marxist regime. And it still retains its etatist character. Like neighboring Gabon, it is part of the Guinea Forest and has a very small population. As in Gabon, the French colonial government undertook massive projects, including the resettlement of the population. At the same time, the French refused to recognize customary rights and insisted on systematic registration. However, only a tiny fraction of the population - either European settlers or assimilated Africans - were able to acquire real property. After independence, the state adopted an Afro-Marxist regime that abolished all private property and created agricultural cooperatives with vast tracts of land. These, however, went bankrupt and eventually became vacant (Bruce 1998, pp. 53–55).

⁵² The main current instrument of forest land tenure is Code No. 016-01 of 2001

Although legislation is heavily etatist, laws have been gradually changing since the wave of democratization in the 1990s.⁵³ However, as in many African countries, there is legal chaos. Many land rights overlap and conflict. Although freehold land ownership formally exists, it is so vague as to be meaningless. Rather, much of the private land ownership is state leasehold, where the state leases land to farmers for a limited period of time and subject to conditions for development. Formally, there is even recognition of communal tenure to recognize customary rights. In practice, however, only a small proportion of those interested in these rights are protected. Rural people have to go through a long and costly registration process that must be approved by several authorities, including the Ministry of Land Affairs. This creates an environment ripe for corruption. Overall, less than one percent of the country's land is registered. Problems include illegal logging and oil exploration, which devastate local ecosystems (République du Congo 2000 [1991]; LandPortal 2023).

One problem is the small and scattered population, which depends on extensive rain-fed agriculture. At any one time, about 2 % of the total land area is cultivated⁵⁴. Since the 1990s, the state has tried to promote development through concessions to large international companies or through the settlement of new settlers. An interesting example is the settlement of South African white farmers since the 1990s, who have acquired large tracts of land. However, most of the new settlers gave up after a while. The development of the land had to be communicated to the relevant authorities because the land was acquired in the form of a leasehold, i.e., a lease from the state for a certain period of time under certain conditions. However, communication with these authorities was at a very low level. Other reasons for failure included unclear and chaotic rights, almost non-existent infrastructure or poor cooperation with the local population, with many apartheid-raised farmers refusing to socialize and communicate more intensively with local people (The Guardian 2011; Reuters 2009).

⁵³ This was La loi fondamentale du 4 juin 1991 (Fundamental Law of June 4, 1991), which definitively abolished the strict state possession of the Afro-Marxist regime. However, state ownership is still recognized as the only one, but with wide possibilities of state leasehold. However, the legislation was very vague. So, clarifying laws are emerging, such as Loi No. 17-2000 of 30 December 2000, which specifies land tenure and confirms the State as the priority landowner, but with leasehold options.

⁵⁴ With reference to G. Hydén (1980), this is a typical problem of the uncultivated countryside.

5.2.1.4. *Mozambique*

Mozambique completes the group of etatist land regimes. Mozambique's history is littered with large-scale state projects. From the *Prazeiros* system, to the settlement of Portuguese settlers in the *Estado Novo* era, to the Marxist projects of the FRELIMO party with the villagization process and the forced resettlement of several million inhabitants (Newitt 1969; King 2007).⁵⁵ The country also experienced a rapid exodus of Portuguese settlers and a devastating civil war, both of which had a devastating impact on economic development. While international pressure has forced the still-ruling FRELIMO to accept the recognition of community and customary rights, these have been gradually undermined by the impact of massive projects such as the current land registry. Under current law, the state remains the sole owner of land (Lorgen 2000: 15–17).⁵⁶

A major issue is the formalization and recognition of traditional rights, which the majority of the population still follows. The power of traditional authorities should be a sure sign of democratization. The National Land Policy was introduced in 1995⁵⁷. Its purpose was to protect the land of the rural population from encroachment by the state or foreign investors. Access to land and the protection of communities are regulated by the "Direito de Uso e Aproveitamento da Terra" (DUAT). For example, land can be acquired through a formal application for

⁵⁵ Newitt (1969) summarized Mozambique's remarkable historical phase in an article entitled *The Portuguese in Zambizi: A Historical Interpretation of the Prazo System*. As early as the 16th century, the Portuguese were planning to colonize Mozambique. They gave land to deserving and upper class citizens in order to spread feudalism. But the system was not successful. The small number of Africans and the infertile tropical soil prevented the application of the feudal system. Over time, Portuguese families stopped communicating with their homeland and specialized in alliances with African kings and chiefs. This was much more strategic in this context than focusing on the demands of Portugal, which did not understand the African realities of land tenure. The land was called *Prazo* and the owners *Prazeiros*. Over time, they intermarried with the African population. After the Berlin Conference, Portugal found itself in the paradoxical situation of having to gain effective control of Mozambique by waging war against these *Prazeiros*. That is, the settlers it had sent here 300 years earlier. In the end, all the influential families were closed down and slaughtered.

⁵⁶ In Mozambique, after Tanzania and Ethiopia, the most massive villagization took place under the tactics of the Marxist FRELIMO, affecting about 1.8 million inhabitants (about 15 % of the then population). Government-created villages ignored customary land tenure and traditions. This led to a rebellion and the formation of the RENAMO party, supported by the neighbouring Republic of Rhodesia and South Africa, among others (Lorgen 2000)

⁵⁷ The New Land Policy, which definitively broke with the previous Marxist orientation, has been in place since 1995, but the law was officially adopted in 1997. This is the *Lei de Terras de 1997* (Lei n° 19/97). Decree 15/2000 formally recognised customary tenure rights. The legislation was adopted mainly under pressure from the UN FAO and the World Bank.

registration based on long-term historical occupation by individuals or communities and bona fide use, and land rights must be unchallenged by anyone else for at least ten years. Since 2000, traditional institutions have been re-recognized. The Land Use Planning Act of 2007 was intended to involve communities in the prioritization of district land use plans (Constitution of the Republic of Mozambique 2007; Tanner 2011).⁵⁸

From 2000 until recently, the land system could be described as etatist traditional. However, rights were vague and increasingly trampled by state power. The government favored the interests of foreign investors, and many land grabs took place despite violations of the law. In addition, formal land registration was very slow, with only one percent of all land registered in 2010 and one-third of cases not fully processed. These processes are being accelerated by the government without regard for the rights of local communities. The 2014 revision of the National Interest Law has made it possible to speed up the process of land acquisition for other purposes. The 2017 DUAT reform gives officials even more power in registration. The last straw for classifying Mozambique as a purely etatist regime is the massive land registration that has been underway since 2018. This is a nationwide land control campaign, covering up to eight million hectares of land. Farmers who do not farm efficiently and practice extensive agriculture are not eligible for registration. In this way, FRELIMO is continuing the great state projects carried out by the Portuguese colonizers or party leaders in the years immediately following independence (USAID 2018; LandPortal 2022).

5.2.2. Modernist Land Tenure Systems

5.2.2.1. Guinea

The West African representative of the modernist regime is Guinea. Private property was formalized by the French in 1901, and all unregistered land became state property. The French were aware of the influence of the chiefs over critical

⁵⁸ In particular, the 2007 revision of the Constitution restricted previously acquired customary rights. Subsequent revisions to land legislation in 2014 and the commencement of massive systematic registration from 2018 no longer have any respect for customary rights.

resources, so they abolished it. It was not until 1956 that the possibility of land registration was opened to the general population, but the Africans, ignorant of the law, did not take advantage of this opportunity, leaving the owners to be European settlers or mestizo Africans. The authoritarian government of Sekou Touré expropriated the land of many large landowners and initiated collectivization, whereby all land became the property of the state. Agricultural hardship caused many young people to emigrate from the country. French attempts to destabilize the country also contributed to the poor economic situation. It was not until 1985 that Colonel Lansala Conté came to power and implemented a policy of structural change. As part of the liberalization process, freehold and, to a lesser extent, state leases were promoted, but the recognition of traditional land tenure is still neglected. The current land tenure system thus has its roots in French direct rule, the authoritarianism of Sekou Touré, and pressure from the Bretton Woods institutions (Benkalha et al. 2016).

As part of the liberalization process, the Land and Property Act was passed in 1992 and remains the main instrument of land administration.⁵⁹ Individual property rights were restored. Land commissions were established in each prefecture to redistribute land. In the 1990s, many Guineans returned from exile and were expected to acquire land in the form of freehold property, which was a declared national objective. The reality, however, is that the Land Tenure Act is well drafted to address urban or peri-urban specifics, but only very vaguely rural. Amendments to the Act in 2001 and 2012 did not significantly improve the situation (République de Guinée 2012). Moreover, due to poor land mapping, sales take place spontaneously and unofficially. In fact, less than 3 % of landowners have official title deeds. The legacy of colonialism and the Touré government also plays a strong role, and state ownership is still strong. All unregistered land is state land, the state owns the infrastructure, and the constitution gives it broad powers of expropriation in the interest of the public good. Customary land tenure is informal and

⁵⁹ This is the Land Tenure and Property Code of 1992, where only Article 92 talks about rural land. However, the law is vague and a process of revision has been underway since 2012, so far without success.

unprotected; legally it is state land. Extractive industries owned or leased by the state are increasingly important (Diallo et al. 2021; LandPortal 2021).

Guinea is thus divided into a coastal area, where private ownership is significant, and an eastern inland area, where formal state ownership predominates.

5.2.2.2. Cameroon

Another example of modernist land tenure with disregard for customary rights is Cameroon. The country has a complex history of French and English colonial administration. Cameroon's current land legislation reflects this tumultuous situation. The British part was governed by a form of indirect rule with great power to traditional authorities and tolerance of customary rights. The French part was characterized by strong interference with traditional authority and the granting of large concessions to companies (Njoh 2013). In the 1970s, as in many African countries, all customary property was abolished and declared state property. Since the 1990s, private ownership has been encouraged, as in Guinea, but it represents only a fraction of the total land area. Current legislation is full of inconsistencies and chaos (Bruce 1998, pp. 31–36).

The instrument of land policy is the 1996 Constitution, which is based on previous constitutions from the 1970s.⁶⁰ It divides land into private, public, and national. It is national land, which occupies the vast majority of the country, and formally gives power to the chiefs as the main intermediaries between the state and the population on this type of land. However, from a legal point of view, their power is too much influenced by the state, so that it is not possible to classify this land regime as a mixed or other regime with the recognized influence of traditional institutions. The state is supposed to protect the farmers, decide on land expropriation and administer their rights. In legal terms, the chiefs are therefore only spectators. Moreover, customary land tenure is considered backward and is not officially recognized by the state. The state also tries to impose freehold tenure on farmers, but this form undermines community cohesion, as chiefs and other

⁶⁰ Specifically, these are Law No. 74-1 of 1974 and Law No. 74-2 of 1974. In addition, the 1996 Constitution restored private property. However, Law 85-09 of 1985 still applies, which allows for the expropriation of land by the State if it is in the national interest.

knowledgeable individuals in particular gain too much power and enrich themselves at the expense of other community members. In addition, the state grants large concessions to foreign companies, often without the knowledge of local farmers. Tensions are also rising as a result of deforestation, drought in the north, and conflicts between herders and farmers (Constitution of Republic of Cameroon 2008; LandPortal 2022).

5.2.2.3. *Burundi*

Burundi is one of the most populous countries on the continent. Its history is closely linked to that of neighboring Rwanda, with which it shares a tradition as a highly centralized pre-colonial state. The history is one of constant conflict, not only along ethnic lines, but also over land. Fertile volcanic soil is a critical resource, where uniform and formal land rights are becoming a vital necessity. To make matters worse, Burundi is one of the poorest countries in the world, with about 80 % of the population directly dependent on it. Historically, the king, or "Mwami", was the lord of all land and granted it. While the Hutu tended to be farmers, the Tutsi owned cattle. Although the Tutsis were always considered the elite, the social boundaries between the two ethnic groups were flexible and the system had elements of checks and balances. This was ended by the Belgian colonizers, who clearly separated these ethnic groups and favored the Tutsi. This was a breeding ground for perpetual conflict. Since independence, Burundi has experienced several massacres (Mamdani 2020, pp. 41–51; Eggers 1997) The critical situation came after the genocide in neighboring Rwanda meant too many ethnic Hutu refugees demanding land and civil war broke out. The conflict ended in 2000 with the Arusha Agreement, which sought to establish a consensual model of political power-sharing based on ethnic quotas. In accordance with the agreement, a National Commission on Land and Property was established in 2006 to address property issues. However, the Commission's work has been disrupted by ongoing crises and other events, such as President Nkuruziza's seizure of power in 2015 (BTI 2023).

Since 2005, land issues have been addressed by the aforementioned Commission on Land and Other Property.⁶¹ The aim was to recover the property of persons displaced by the various massacres. The Commission has established courts in all provinces to adjudicate disputes. However, this institution has been accused of bias and of favoring certain groups of the population over others. Since 2008, private ownership of land has been favored. The Constitution considers private property inviolable, but allows for expropriation in the public interest. However, compensation is paid only after several years and is often not commensurate with the damage to the property. Since 2011, the Land Code has been in force, creating the conditions for formal land registration and the issuance of certificates. The code essentially recognizes customary land tenure by transforming it into private, formalized communal property. The problem with issuing land certificates is the overlapping responsibilities of different authorities, which creates chaos and inefficiency in the process.⁶² Since 2020, the state has enacted new laws to unify and centralize the land titling system. Due to persistent inefficiencies, traditional authorities still have power, but are forced by law to transfer to private ownership. While the apparent national objective is to promote private land ownership, the state still retains formal control over unregistered or quasi-registered land. I have therefore decided that after 2006 the state cannot be part of land tenure systems with an element of recognized traditional rights, and this is the modernist land tenure system. Given its characteristics, such as overpopulation, Burundi is in dire need of better land administration, which is still inadequate (Constitution of the Republic of Burundi 2005; LandPortal 2022).

5.2.2.4. Madagascar

The East African island is neglected by many Africanists due to its exclusivity from the rest of the continent. This is due to the specificity of the local population and culture, which combines both Asian and African elements. People of South

⁶¹ The 2005 Constitution, following the example of neighbouring Rwanda, makes private ownership of land a top national priority. The current legislation is based on the Code Foncier de 2011.

Asian descent⁶³ have a dominant economic position, occupying the fertile central highlands. Although the island has been inhabited for about 2,000 years, the Merina ethnic group arrived from present-day Indonesia in the 13th to 15th centuries. In the central highlands, they created the highly centralized state of Imerina (Mitchell 2020, Southall 1971: 144–157). They created many sophisticated institutions to better collect taxes from the peasants. Agriculture was intensified in the highlands, irrigation systems were created, and crafts were developed. The land was formally owned by the ruler and administered by chiefs. By the beginning of the 19th century, the Merinos ruled the entire island. As part of the centralization of the state, a "Fokonolon" or Village Council was created in each village, delegated directly by the monarch and used to maintain state power over traditional authorities. Remarkably, as a result, a relatively uniform form of land tenure, known as "petits papiers", persists throughout the island to this day.⁶⁴ Thanks to a well-organized defense, the island was not completely annexed until 1897. Due to the favorable climatic conditions of the central highlands, the arrival of French colonists began, who owned about a quarter of the total cultivated land. Despite resistance, the French needed a strategic alliance with some Merino elites (Hošek 2011: 32–39).

Within the continent, Madagascar thus became one of the unique cases of granting formally registered land to an indigenous population. In the 1920s, the Torrens registration system was even introduced, albeit rather imperfectly. Independence in 1960 was followed by a quiet decade that culminated in a military coup in 1972 (Bruce 1998: 223–224). A period of Soviet-style Marxist rule followed. All land was nationalized and communal agricultural cooperatives were established. Due to economic hardship and the inability of the Eastern Bloc to provide aid, privatization took place, but the elites close to the president benefited. 2002 was also a milestone, as Madagascar's preference for France was no longer a priority and was replaced by the United States and South Africa. Since then, there have been a number of American organizations that support formal land registration and tend to support freehold-type private property. Madagascar has also

⁶³ Especially the Merina ethnic group.

⁶⁴ Under this system, the owner prepares a document describing the land and the rights claimed over it. This system is registered and recognized by the local community (Hošek 2011, pp: 32–39, Landportal 2022)

experienced many massive and systematic land registrations due to its history (Tucker et al. 2011: 291–305; Hošek 2011: 252–261).

Current land policy has two milestones. Liberal reforms since the late 1980s and 2005, since when large-scale systematic land registration projects have been underway. Since the late 1980s, there have been proposals for formal registration of all land to replace customary ownership. However, this proved too costly. The foreign policy shift to the United States at the beginning of the millennium marked a change, and in 2005 a contract was signed with the U.S. Millennium Challenge Corporation to secure formal land titles for the rural population. In the same year, a series of land laws were passed with clear support for private ownership. Since 2006, cadastral offices have been established for each community with the authority to issue individual property titles. Thus, by 2009, systematic land registration was underway, which led to an immediate increase in land investment. However, many individuals benefited from the reform more than others, and the reform was halted by the 2009 popular uprising and coup. It was also a backlash against multinational corporations, which were usurping land disproportionately. Since 2015, a new systematic land registration process has been underway, which attempts to learn from past mistakes. Legislation, still heavily influenced by US organizations, is constantly simplifying the land registration process. However, nothing is without complications; there are obvious differences in land registration between the fertile central highlands and the rest of the island. Madagascar remains one of the poorest countries in the world, and only the future will tell if these efforts to formalize land ownership will be successful (USAID 2020; LandPortal 2021).

Current legislation recognizes private ownership of the freehold type. Also common is state leasehold, where the government sets conditions for the need to develop the land in exchange for a lease. The last category is concessions, which are mainly used by international companies (République de Madagascar 2006). With the exception of the Central Highlands, customary tenure is prevalent on the island and

is not explicitly recognized by legislation that seeks to formalize and convert it into private property (USAID 2020).⁶⁵

5.2.3. Etatist-Traditional Land Tenure Regimes

5.2.3.1. *Gambia*

One of the smallest states in Africa, located under the Gambia River in West Africa. The country has a complex and integrated system of formal and customary land rights. At the same time, the country has no unified national land policy and the legal system is considered inadequate. In particular, there is a problem with land use planning around cities. The diverse legal system is a remnant of English indirect rule, Islamic law and customary law.

The major problem with the current 1997 Constitution is that it does not contain specific provisions on land issues. This could have been changed by the new constitution of 2020, but this has not been pushed through. However, as in Burundi, there are land commissions that administer land. The legislation on land administration has not changed much since 1945.⁶⁶ Customary rights are explicitly recognized, and private law operates only under state leases. The Ministry of Lands can also designate any area as state land and lease it for up to 99 years. However, since 2018, the Land Commission has been empowered and is a statutory advisory body to the government. Most land in the country is held in customary tenure, with land being administered by a village headman called an "Alkalo". Land under state leasehold accounts for about 10 % of all land. However, The Gambia does not impose as many conditions on leases as other African states and allows temporary tenants a relatively large degree of freedom. As elsewhere, there are conflicts over land due to overlapping rights where it is not clear what is state and what is customary (BTI 2023; Freudenberger 2000; Republic of Gambia 2008).

⁶⁵ Specifically, Law No. 2005-019 and Law No. 2006-031, which have become the main legal instruments to trigger systematic land registration and consider private ownership as a national priority.

⁶⁶ This is the Land Act of 1945. It was supposed to be replaced by the State Land Act of 1991, but was never fully implemented. The companion legal instrument for customary land tenure is the Local Government Act of 2003.

5.2.3.2. *Ghana*

There have been several major state formations in the past in what is now Ghana. For example, the kingdoms of Dagomba, Mamprusi, and Gonja in the 14th to 16th centuries. Institutional centralization in these cases was not due to land, but rather to long-distance trade. From the late 17th century, however, there was a well-centralized Ashanti kingdom centered in the city of Kumasi, which successfully projected state power through the road system (Herbst 2000, pp. 41–42; Bates 1982). From the late 19th century, the territory became the property of the British. The British exercised different forms of rule over different parts of the country, which were divided into the Crown Colony of the Gold Coast on the coast, the Protectorate of Ashantiland, and the Northern Territories (Davidson 1978). In the Gold Coast, English law applied and Africans had some influence over political events. In the Ashantiland Protectorate, there was less recognition of popular sovereignty and more attempts to undermine local traditions. The northern territories were of least interest to the colonial powers (Bates 1982, pp. 21–57; Herbst 2014, pp. 40–41). In 1946, the so-called Burns Constitution came into force, which provided for an indigenous majority in the Legislative Council. However, this system further strengthened the power of the chiefs, who would elect their representatives to the Council, and the Northern Territories were not represented at all. This created tensions between the people and the colonial power. It was this unrest that created a new leader, Kwame Nkrumah, who opposed the power of the chiefs and the colonial power (Rooney 1988, pp. 252–280).

Local crops such as cocoa and coffee were very promising, leading to the emergence of a local indigenous bourgeoisie. The Ghanaian bourgeoisie was uniquely powerful in Africa. This was helped by indirect rule, but also by English law in the Crown Colony of the Gold Coast, which guaranteed them a significant voice. The bourgeoisie established significant controlling positions in production and in entire regions. This bourgeoisie was mostly of Akan ethnicity and associated with traditional authorities. The post-war period was one of prosperity for Ghana. Roads and railroads were built and, compared to other colonies, not a few people were educated. However, the nationalists led by Nkrumah saw this emerging bourgeoisie as a symbol of colonialism and set out to eliminate it. Similarly,

Nkrumah advocated intense interventionism in the countryside, where the state must replace traditional authorities. All land was to be declared state land. The tensions between the chiefs, the bourgeoisie and Nkrumah were so great that the Nkrumah regime fell in 1966, crippling one of Africa's most prosperous economies (Boone 2003, pp. 144–156). What followed was a period of military rule, a period of debt and continued economic hardship. It was not until 1979 that Jerry Rawlings took power and, under the pressure of circumstances, adopted the measures imposed by the World Bank and the International Monetary Fund. Despite the obvious difficulties, the country has become one of the most prosperous on the continent (Herbst 1993).

The current Constitution of 1992 places all land in the hands of the president.⁶⁷ However, customary tenure is also recognized and practiced in more than 80 % of the country. Customary tenure is diverse and the legislation recognizes a number of forms. One interesting category is the freehold customary tenure, which is intended to facilitate the trading of land and its transfer into private hands.⁶⁸ While some form of private ownership is possible, the state cannot be included in the mixed land tenure system given the clear predominance of state and customary ownership. Land administration has improved over time (Azumah & Noah 2023; Ubink & Quan 2008). In 2003, Ghana launched a land reform project aimed at improving land registration and building institutional capacity. Since 2008, the Land Commission Act has been in place to centralize and merge land offices. The problem is still a series of overlapping laws that create an ill-defined boundary between state and customary ownership. The new law seeks to address this by consolidating the plethora of land laws. The law was passed in July 2020 (LandPortal 2022, Prindex 2022).

⁶⁷ Under the 1992 Constitution, these are Articles 257, 267. They confirm customary ownership. Within the official classification of customary tenure, Ghana has one of the most sophisticated constitutions within the countries studied.

⁶⁸ These are so-called allodial rights. Allodial ownership is usually vested in the head of the family (Janine, Qual 2008)

5.2.3.3. *Togo*

Another representative of etatist-traditionalist regimes in West Africa is Togo. In the coastal areas, private property developed before colonization. This was due to the migration of freed slaves of African origin, especially from Brazil. In 1884, the German colony of Togoland was established. It was called a model colony and was to serve as a model for the development of other colonies. The infrastructure was greatly improved, agricultural schools were established, and the financial balance was balanced by efficient tax collection. All this came at the cost of oppressive government and the depletion of natural resources. In the early 20th century, the Germans decreed that all land here had to be registered under the land title system. But only the land in the south was registered, the north went on with its life (Bruce 1998, pp. 126–127; Sebald 1988). After World War I, the land fell into the hands of the French, who restored the German land system in 1922. A special feature is the respect for customary rights. The Germans had too little time to expand into the central and northern parts, and the League of Nations required the French to respect customary rights. Although Togo was under the authoritarian rule of Gnassingbé Eyadéma for a long time, customary rights continued to be respected. In the south, however, national estates and planned agricultural development zones were established in 1974. These state-owned zones were intended for productive agricultural development with the necessary infrastructure (LandPortal 2022).

The wave of democratization has not affected Togo very much, and the land legislation corresponds to this. The basic legal instrument is still the 1974 legislation.⁶⁹ It recognizes state land, customary land and so-called abandoned land. These are fallow lands claimed by the state. Since the turn of the millennium, the state has been renewing and expanding the planned agricultural development zones. Since 2018, the state has been collecting and harmonizing all land data. It is also seeking to formally recognize customary rights and register them in the land registry. In 2019, a unified cadastral system will be created to collect all data.

⁶⁹ This is Article 1 of Decree No 12 of February 6, 1974.

Currently, 99 % of the country's land is registered in the electronic system, but land certificates are still not being issued to people.⁷⁰ The process is very slow. The "dibi-madibi" contract system, which governs the relationship between owners and peasants, prevails in customary tenure. However, it is often the subject of disputes (LandPortal 2022).

5.2.3.4. Angola

A remarkable example is Angola, which, like Mozambique today, went through Portuguese colonization, a Marxist regime, and a devastating civil war. Although J. Herbst (2000, pp. 186–187) describes it as a state that recognizes only state ownership of land, the situation for rural communities has improved to the point that it can now be described as an etatist system. Land was taken throughout the colonial period. However, the intensity of dispossession increased dramatically after the Second World War, when hundreds of thousands of Portuguese settlers arrived in the country. A colonial cadastral system was also established. Land grabs led to the displacement of up to a million Africans. This sparked a war of liberation that lasted until 1974, when Angola gained independence. However, this meant the departure of some 350,000 Portuguese settlers, which led to the collapse of the rural trading system. By 1977, the country's GDP had fallen by nearly 80 %. In response, land was nationalized and agricultural cooperatives were established. Another civil war followed, which lasted until 2002. The war displaced four million people and left the country heavily mined. As a result, only one-tenth of the land in the central highlands is cultivated (LandPortal 2022).

The 2004 post-war legislation designates the state as the ultimate owner of land, but allows wide latitude for leasing.⁷¹ However, communal land under customary tenure enjoys special protection. This was reinforced by the 2010 constitutional revision. Recognized rural communities are entitled to time-limited rights and

⁷⁰ The current land registration is regulated by Law n°2018-005 of June 14, 2018 (portant Code foncier et domanial).

⁷¹ The most recent version of the 2010 Constitution in Article 10 and 98 (3) establishes state ownership as superior and regulates the possibilities of state leasing. The basic law on land is the Basic Law of 2004.

protection from third parties (Constitution of the Republic of Angola 2010). In 2018, a commission was created to formally register land for rural communities. The program, called "Minha Terra", aims to strengthen communities' rights to land and improve tax collection. However, the problem is that unrecognized rural communities, of which there are still many, often become victims of land expropriation. The government rarely compensates these communities. The question, however, is to what extent the government has an incentive to invest in land. Most of the revenue for the national budget comes from oil (LandPortal 2022; Filipe 2014).

5.2.3.5. *Zambia*

Zambia is a typical example of an etatist-traditionalist regime. The country was colonized by the British when the British South Africa Company leased the present country for 25 years in 1889. It was not until 1924 that the British colonial authorities took control of the country. All land was declared Crown Land and allotted to British settlers. However, most of the land set aside for whites remained fallow. The dissolution of the Federation of Rhodesia in 1964 created Zambia. Unlike other states, it was a peaceful transition. After Kenneth Kaunda took power, the establishment became increasingly authoritarian. State control over the land became more evident. Immediately after independence, land owned by settlers was nationalized, but they lived in Europe and the land lay fallow. In 1969 the mines were nationalized, and after the introduction of the revised constitution of 1972, all land began to be nationalized with the possibility of temporary leases. By the 1980s, however, Zambia was one of the most indebted countries in the world and had to adopt structural adjustment reforms (Bruce 1998, pp. 270–272; Encyclopedia Britannica 2024).

The current land legislation was created in the 1990s when a new political group, the Movement for Multi-Party Democracy, sought to create a land market and accelerate privatization. However, private land ownership was never restored in the country. The changes consisted of expanding the possibilities for state land leasing. However, the legislation recognized customary land tenure. However, this system required coordination with the state, which greatly increased the power of the chiefs and fostered an environment of corruption. In 2000, a revised land policy

was drafted that included greater community participation.⁷² It will not come into force until 2021. Customary land cannot be traded, but must be transferred to the state. The problem seems to be that the state does not keep a cadastre of customary land. The information is completely inadequate. This leads to cases of expropriation. Another problem, not only in Zambia, is that with the support of Western powers, nature reserves are being expanded, which tend to violate the rights of the rural population (LandPortal 2023).

5.2.3.6. Tanzania

If we examine land issues in Africa, Tanzania is one of the most remarkable cases that defies conventional African realities to this day. Thanks to the specific rule of Julius Nyerere, today's Tanzania is characterized by a weak ethnic identity of the population, low power of the chiefs and, paradoxically, the strong role of a not so strong state.

At the Berlin Conference, it was decided that the present territory of Tanzania would go to Germany. The conquest of the territory was made easier by the fact that it was plagued by drought, rinderpest, and smallpox. However, the Germans could only establish a fragile authority in this vast territory, controlled by an alliance with the chiefs. This contributed to the alienation of land and the recruitment of labor for the plantations. However, the colony was loss-making and German technology did not suit the specific soil conditions of present-day Tanzania, except perhaps in the mountainous areas. The Germans sought to abolish traditional subsistence food production in favor of capitalist large-scale production. This was accompanied by overpopulation, the need to pay taxes, and so on. This attempt, however, ended in a major failure and sparked the Maji Maji uprising with several hundred thousand dead. The result was the admirable liberal reforms of the colonial administration under Bernhard Dernburg. Visions of strict direct rule were seen as ineffective, and the economy focused on developing small-scale agriculture and tolerating customary land ownership. The German administration was to support small-scale agriculture by building infrastructure. As in Togoland, the

⁷² This is the Land Act of 1995 as revised in 2000.

Germans invested heavily in education, which developed in a way that was unprecedented in tropical Africa. The effects of the reforms, however, did not last long. After World War I, the colony fell to the British, who paid less attention to it. For the Germans it was a very important colony, for the British it was just another colony among many others (East 1987, pp. 179–181). Although the British later continued the German course, they were never able to manage it as efficiently as the Germans. Attempts to intensify the land and bring in European settlers came after the Second World War, when there was a shortage of crops in Britain, but this only caused further discontent among the local population (Hydén 1980, pp. 45–49).

Tanzania declared independence in 1961 and Julius Nyerere took power. He was an opponent of capitalism and especially of the multinational corporations that still held great economic power in much of Africa. He created his own concept of African democracy, Ujamaa. The system was based on the traditional communal life of Africans hand in hand with technical modernization and food self-sufficiency. In January 1967, these ideas were confirmed in the Arusha Declaration and the so-called "Ujamaa period" began. All land was declared state property, villages were built with social facilities where people were to farm together. Each village had up to 250 houses, which were planned to promote community life in the village. The ruling party, the Tanganyika African National Union (TANU), was to play a central role in the lives of the farmers; although it was the only permitted political party, internal processes were relatively democratic. As part of the construction of a unified Tanzanian identity, the power of the chiefs was abolished and replaced by government officials deliberately placed in regions with ethnic groups other than their own. The Ujamaa project, unprecedented in Africa, relocated about 60 % of the total population. Many social indicators, such as infant mortality, improved significantly, but economically it was a failure (Hydén 1980, pp. 129–153, Boone 2014, pp. 41–42).

The government became increasingly authoritarian as people refused to go to the Ujamaa villages and were forced to do so by force. Another problem was that the ruling party, TANU, tried to talk too much to the farmers. Farmers had limited autonomy and could not fully utilize skills that had been passed down through generations. The officials who ran the villages were often corrupt and did not

understand farming. The system collapsed in the 1980s when Tanzania was forced to adopt structural adjustment policies. Although Ujamaa was a failure, it still has a major impact on Tanzania today. The influence of government officials on farmers, low social trust in traditional authorities, and low ethnic identification are legacies of this system (Jennings 2008, pp. 162–173).

Current land legislation is based on the Rural Land Act of 1999. All land is under the administration of the President. Land is divided into village customary land, protected land and general land. The legislation recognizes customary use rights, which are equal to state rights. However, the village council regulates the latter. Common land is essentially state land administered by decentralized authorities. Protected land creates territory for wildlife. This type of land occupies more than one-third of the total land area and results in a shortage of available land for villagers. Land administration, such as disputes between farmers, is decided by village councils. Land registers for each village have existed since 1982, but registration is voluntary and not widely used. Insecure land tenure is a problem, as government-controlled village council members are often not sufficiently qualified to manage land. Land titles are often contested (LandPortal 2022).

5.2.4. Mixed Land Tenure Regimes

5.2.4.1. Côte d'Ivoire

Land has always played a critical role in Côte d'Ivoire, affecting not only agricultural development but also the legitimacy of political institutions and social peace. The country experienced a period of prosperity, but one in which modern property rights were neglected, leaving the state highly vulnerable to subsequent crises that led to a devastating civil war. Classifying the country as a mixed system may not be entirely accurate. However, the situation is very complex and constantly changing depending on who is in power and which group is favored.

Since early colonial times, the potential of the export crops of cocoa and coffee has been exploited. Since the 1920s, the colonialists invited immigrants from the north. The first president of the independent country was Félix Houphouët-Boigny. He recognized the great potential of cocoa and coffee, which required little labor and yielded high profits. He was also aware of the benefits of close cooperation

with France and turned the country into the opposite of what anti-French Guinea was. Until the late 1970s, the country was considered an "African miracle". The economy grew at a rate of up to 10 % per year during this period, and the country's GDP increased twelve-fold between 1960 and 1978. Boigny invested in the primary sector, modernized infrastructure, attracted foreign investors, and encouraged labor migration from the north. However, as it turned out, this prosperity was not very sustainable. Later, this development was referred to as "growth without development". Thanks to the promising harvests, there was an African capitalist class, born before independence, with the capital necessary for development. Boigny chose to ignore or even undermine this class in favor of the small farmers. There was no investment in modern land tenure. It was the systematic registration of land and the promotion of private freehold-type property that would favor the emerging large bourgeoisie, whose power would presumably threaten the position of the authoritarian president. Instead, Boigny supported the continuation of customary tenure, which favored small farmers and traditional authorities. Because of the low population density, economic growth was based on the constant expansion of arable land, which remained relatively unproductive. The country also received large numbers of immigrants from the north, who were integrated into pluralistic customary tenure systems in which indigenous people were landlords and immigrants were workers (Boone 2003, pp. 157–176; Nandjui 1995).

Things began to fall apart in 1978 when cocoa prices plummeted, followed by drought. Boigny initially thought the crisis would be short-lived, so he pumped large amounts of finance into the economy. This turned out to be a fatal mistake. Long-standing ignorance of land capitalization and modern property rights took its toll. It created tensions between immigrants and original population. Until then, Boigny had embraced a "productionist philosophy" with the central idea that whoever cultivated the land owned it. The problem was that there was no official regulation of their relationship, so everyone interpreted their rights to the land a little differently. Freely available land was almost non-existent, and the additional income needed could not be generated. There was no investment in technology or more sophisticated markets, and the potential bourgeoisie was excluded or corrupted. In 1993, Henri Konan Bédié became president and began an economic policy of austerity. At the same time, it was necessary to create a solid framework

for land tenure. Like many other African countries, Côte d'Ivoire was hit by a wave of democratization that proved disastrous for the country. Land policy became a major electoral issue, and a strong immigrant electorate would support a fundamental change in the country's circumstances. Bédié had a clear plan. First, to formalize and privatize the customary property of the nature settlers as quickly as possible, and second, to introduce an Ivorité identity policy. Ivorité citizenship was to be granted only to the original population. Only those who had citizenship could have their land formally registered. At the same time, non-citizen immigrants were to be excluded from the electoral process, which would have meant their ultimate exclusion from political power. This land law was passed in 1998. It triggered the expulsion of non-citizens from the country and created enormous tensions that led to the overthrow of the Bédié government a year later. This was followed by the government of Laurent Gbagbo, a long-time opponent of Boigny. The situation did not calm down, and civil war broke out in 2002. Since 2010, the country has been ruled by a Muslim president, Alassane Outarra, who tends to side with the immigrants but faces strong opposition (Boone 2014, pp. 129–138; Bruce 1998, pp. 78–82).

The current legislation is still based on the 1998 law, but the real direction is changing.⁷³ The law encourages private ownership and formalizes customary ownership. Those who are not citizens of the country have no formal right to land. However, the law could not be implemented until 2011 because the country was in chaos. However, during his rule, Outarra increased state power over land and weakened private ownership. State ownership is more acceptable to the immigrant population. Nevertheless, the country was in chaos, with different rights overlapping. The registration process is slow and expensive. Interest in formalization has gradually waned, and most of the country is still under customary ownership. Land transactions are routinely conducted outside the legal framework. The formal situation has not improved for migrants, for whom it is almost impossible to acquire land. Moreover, the law only reflects the interests of the south

⁷³ It is Law No. 98-750 of December 23, 1998.

and completely ignores pastoralists in the north of the country (République de Côte d'Ivoire 1998; BTI 2023).

5.2.4.2. Malawi

Another mixed land regime is Malawi. This densely populated landlocked country has a tradition of private property ownership that is firmly entrenched, unlike many other countries.

In pre-colonial times, many of the people of today's Malawi were victims of slave traders. The British received extensive land concessions in exchange for protecting the population from slave raiders. In 1891, the area was declared the British Protectorate of Nyasaland. The British refused to recognize customary ownership and all land was declared Crown land. However, protectorate status meant less influence from settlers and British companies, so the local population had more freedom than, for example, in Southern Rhodesia and other colonies. Nevertheless, forced labor was routinely used and tensions arose, culminating in independence in 1964 (LandPortal 2021).

Hastings Banda became president for many years. But he was different from many other African leaders. He never abolished private property; on the contrary, he supported it. He was strongly anti-communist.⁷⁴ Banda considered customary land rights outdated and unproductive. He saw land as a commodity subject to market forces. With the support of the World Bank, he introduced reforms in the 1960s to register land and convert it into private land with individual rights. But this land reform was not successful. The individualization of ownership essentially excluded women, and the new owners abused their rights to the detriment of the community. Other segments of the population did not know how to use their newly acquired rights and resisted the reform. The result was social tension and many local conflicts. The government began to encourage the establishment of large estates, which displaced the unfashionable small peasants. Although private property was

⁷⁴ Hastings Banda was one of the unique leaders. For example, he maintained warm diplomatic relations with apartheid South Africa, Rhodesia and the Portuguese colonies in southern Africa. Malawi and the Seychelles were the only countries that supported continuity intervention from the British East Africa Royal Commission of 1953, which favored private property (Encyclopedia Britannica; Hulec, Olša 2008).

strongly encouraged, the state maintained a large role in regulating trade. It also made little effort to ensure food security. By the 1980s, the country was in economic distress, and economic liberalization and democratization followed (Ibid 2021; Hulec & Olša 2008).

By the 1990s, population pressures were already significant and calls for land reform were growing. In 1994, a new constitution was passed that kept private property in the hands of those who had previously owned it. At the same time, it limited the possibility of arbitrary expropriation. Two years later, a presidential commission on land reform was established, leading to the new land policy introduced in 2002. This new legislation fully recognized customary land and sought to formalize it. However, this led to conflicts with traditional authorities, and a significant part of the land laws only came into force in 2016. These laws require land registration, but there is still a lack of institutional capacity to implement them in practice. Land disputes are particularly common in the south, where population densities can reach 400 people per square kilometer. The government has been forced to resettle farmers, which has been met with incomprehension. Despite relatively good and diverse legislation, Malawi is still one of the poorest countries in the world, with too many people living in rural areas. It remains to be seen whether the new 2016 legislation will be the basis for a new green revolution with inclusive development.⁷⁵ In the meantime, the country faces many challenges (USAID 2020; Constitution of the Republic of Malawi 1994).

5.2.4.3. Kenya

Kenya is unique in tropical Africa because it has gone very far in individualism. Thanks to the favorable climate, tens of thousands of British settlers came here and laid the foundation for a strong institutional infrastructure. However, constant ethnic conflict and land expropriation are the biggest problems facing independent Kenya.

⁷⁵ Currently, land matters are governed by The Land Act (2016), The Registered Land Amendment Act (2016) and The Customary Land Act (2016). The 1994 Constitution specifically addresses land matters in Sections 28 and 44. Where it favours private ownership, but expropriation by the state is possible if it is for public purposes. However, the state gives clear rules for compensation unlike others examined.

Before the colonial period, there were no highly centralized states, except perhaps the city-states on the coast that grew rich from trade. The territory that is now Kenya was appropriated by the British East Africa Company in 1888, and a protectorate was established seven years later. Indians came to build railroads. In the early 20th century, British settlers arrived for the fertile volcanic soil and relatively mild climate. Although nearly a million Kikuyu people lived in the highlands at the time, their land was alienated from them. The white settlers focused less on export crops and more on food crops, especially cereals. The settlers built infrastructure, influenced market prices and had a strong political position. After World War II, the British government wanted to implement land reforms that would create a strong indigenous class of pro-British bourgeoisie. This failed, however, and a Mau Mau rebellion broke out and was suppressed. The subsequent land reform, known as the Swynnerton Plan, was carried out in such a way that land was allocated to loyal sections of the population. The most powerful ethnic group, the Kikuyu, was more or less excluded from the process (Anderson 2005; Ogot 1995).

In 1964, Jomo Kenyatta of the Kikuyu ethnic group became the long-serving president. Although he initially sided with the rebels, his policies were relatively conciliatory. At the same time, the strongly ethnic politics begun during the colonial era continued. Many white farmers returned to Britain, and the government faced the challenge of redistributing large amounts of land. Between 1967 and 1970, the "Million Acre Settlement Scheme" was implemented, affecting about half a million Kenyans. Members of the Kikuyu ethnic group in particular benefited from the land reform. However, Kenya had great development potential due to its good infrastructure and the knowledge of local farmers. Many Kenyan farmers adopted know-how from the Europeans, such as the use of modern machinery, land management techniques, and others. The economic system called African capitalism spread here quite rapidly. It was able to combine elements of capitalism with traditional African communitarianism (Hydén 1980, pp. 183–204). Kenyatta even blamed other African leaders for not reaping the benefits of capitalism as he had. The problem, compared to his successful Asian counterparts, was that from the Swynnerton Plan onward, the policy aimed to support only modern and wealthy farmers who belonged to the right ethnic groups. Aid and land were allocated to farmers who were already wealthy, but the poor, who needed support the most, were

rather neglected by the government. In most cases, only the top three percent of farmers were eligible for agricultural loans, financial subsidies, or fertilizer. In Asian countries such as Indonesia and Malaysia, the opposite was true, with the smallest and poorest farmers benefiting most. Inequalities in society have become more pronounced (Henley 2015, pp. 52–56; Boone 2012). After Kenyatta's death, Daniel arap Moi took power. Under him came new waves of expropriation and redistribution of land to his allies. There was also an emphasis on non-agricultural megalomaniac projects ⁷⁶. Elections in Kenya are an extremely sensitive issue because they are closely linked to land distribution. The last major land-related ethnic riots took place in 2007, when up to 700,000 people lost their homes (Boone 2014, pp. 261–268).

The current land legislation is relatively new and comes after these riots. The main instrument is the Constitution of 2010. It recognizes both private property and state and customary property. The land law is a response to the cyclical violence and is intended to protect marginalized groups. A unified system of cadastral authorities has been established and mapping of the entire country is underway. The 2012 Land Registration Act aims to protect smallholder farmers from dispossession and address the issue of insecure land tenure, which has been one of the biggest problems since the colonial reforms. However, Kenya remains plagued by high levels of inequality and an elitist view of land tenure. Some 7 million landless people still languish without any claim to land. While Kenya has improved land tenure security since 2010, a new land reform that distributes land more equitably is still needed (LandPortal 2022).

5.2.4.4. Uganda

Uganda sits on fertile but densely populated land. Land is a critical resource for the vast majority of the population, making its management extremely important. After a series of political and social upheavals, the Ugandan legislature today recognizes the diversity of land tenure and is keen to modernize it.

⁷⁶ An example would be Nyayo Cars factory.

In what is current territory of Uganda, states with sophisticated centralized organization emerged. For many centuries, there were two rival kingdoms - Buganda and Bunyoro. Uganda was originally planned as an African colony, not a settler colony like neighboring Kenya. To gain influence, the British decided to ally with the Buganda kingdom. This created a unique case where all land was not declared crown land, but private indigenous land ownership developed. Through the so-called "Buganda Agreement of 1900", a new system of private land tenure called "Mailo" was established in the kingdom. Customary land was systematically registered and distributed among the Buganda aristocracy in a form similar to freehold. The main idea behind the registration of private land tenure was not so much economic as political. It was to further consolidate the power of the Buganda's aristocracy. Rather than being a conventional African colony, Buganda thus resembled the early development of land ownership in England, where private property was born out of the enclosure movement, which was also originally political and reinforced the influence of the aristocracy. The rest of the land in the protectorate was administered by the administrative arms of the colonial government. However, the Mailo system was itself a source of conflict, increasing inequality between the Buganda elite and the tenant farmers. In the 1920s, the British had to regulate rents that were too high. Thousands of indentured laborers from India, who later became successful merchants and plantation owners, also arrived in the late 19th century (Reid 2017, pp. 56–61; Mamdani 1976, pp. 25–60; Van Soest 2020).

Uganda gained independence in 1962, at that time it was a relatively prosperous economy. However, the power of the Bugandan elite generated further conflict and the situation resulted in the ousting of the Bugandan king. President Milton Obote subsequently confiscated land in Buganda and put it in the charge of the so-called Uganda Land Commission. After the 1971 coup, a despotic dictator, Idi Amin, came to power and devastated the successfully developing capitalism and drove the Indian minority out of the country.⁷⁷ All land was declared state land. The government meant economic disruption for the country and, thanks to the 1979

⁷⁷ At the time, this minority controlled up to 80 % of the country's economy.

invasion of Tanzania, its final overthrow. Thus, the present Uganda begins only in 1986, when Yoweri Museveni came to power. In 1993 the historic kingdoms and their institutions were restored and in 1995 the Mailo land tenure system. Stability has continued to be threatened by conflicts with the north, where the war has displaced nearly 900,000 people and major land conflicts have arisen (Ingram 1994; Kasozi 1994; The Guardian 2003).

The basis of current land legislation is the 1995 Constitution⁷⁸. Four types of land tenure are recognized. Customary, State Leasehold, Freehold and the specific Mailo system. The 1998 Land Act continues to establish procedures for the management of customary land and encourages its formalization as a safeguard against expropriation. Expropriation itself is possible for reasons of national defense or public use. As in Madagascar, U.S. organizations that influence land legislation are working in Uganda to have all land formally registered. A Land Fund was also established in 1998 to compensate expropriated persons. In practice, however, the fund is underfunded and the affected farmers are not fairly compensated. The formalization of land tenure itself has not been very successful, and in 2013 it was recognized that the mistakes of the 1990s had not been effectively addressed. A number of policies have emerged to make overlapping tenure more concrete, including within individual tenure systems such as Mailo. In 2019, the Land Survey Commission recommended to the president that all land in the country be registered as soon as possible, due to increasing tensions over land as a result of overpopulation. It also recommended the best form of land tenure. It even considered abolishing the Mailo system, which is considered to be quite outdated and does not reflect the evolution of society. However, this did not happen (Foreign Policy 2021; Stickler 2012; USAID 2021).

It is therefore only a matter of time before the country succeeds in formalizing and modernizing land tenure and ending the ever-increasing tensions. The country

⁷⁸ The 1995 Constitution of Uganda deals with land issues in Chapter 15. Article 237 deals with the legal regime of land tenure and recognises the four types of tenure mentioned. Articles 238 and 239 establish the Land Commission and give it relevant functions. Article 240 defines the role of Parliament in land matters. Article 241 defines the role of local authority and 242 deals with the conservation and sustainable use of land (Constitution of the Republic of Uganda 1995).

has a strong presence of institutions such as the World Bank, which influences legislation and funding of various programs to promote formalized private tenure.

5.2.4.5. Liberia and Sierra Leone

Both countries have a unique character within the African continent. They were essentially founded by freed slaves. In 1822, U.S. President James Monroe freed several thousand African-American slaves to subsequently acquire land in West Africa. A similar story occurred in Sierra Leone, which became a haven for freed slaves from Britain and later the American colonies.⁷⁹ The freed population established a modern land tenure system operating on a system of Deeds. There had long been a dual system of land tenure. Modern private tenure was widespread near the coastal areas and customary tenure in the interior. However, there emerged a form of apartheid system based on the dominance of the freed population over the indigenous population. The violation of the rights and expropriation of the land of the indigenous population was a feature of this system. In the late 1970s and 1980s, the indigenous population came to power and a vicious civil war broke out, with devastating consequences for both countries (USAID 2012).⁸⁰

Post-war reconstruction in both countries is crucial for contemporary land management. Both countries are still characterized by private land ownership on the coast and customary land ownership in the hinterland. Legislation in both countries recognizes both private, state and customary tenure. Tensions have remained in both countries even after the end of the devastating conflict, and the government has an eminent interest in resolving land issues, as the least number of people here of all the African countries surveyed consider their land tenure secure. Liberia has been systematically reforming its land policy since 2013. This culminated in 2018, when the most progressive customary tenure laws on the continent were introduced.⁸¹ Until now, there has been verbal confirmation of customary tenure, but this is set to change. Laws related to customary tenure create

⁷⁹ Among these settlers who acquired lands from the British Crown were "Nova Scotians" (black loyalists who supported the British during the American Revolution) and Maroons (originally rebels from Jamaica).

⁸⁰ Tensions were also caused by the new Liberian constitution of 1985, which continued the non-recognition of customary rights. This justified the arbitrary expropriation of land.

⁸¹ Land Rights Act of 2018

good conditions for formal registration, protect farmers and traditional authorities, and address forest protection. However, implementation has been slow. For the near future, however, Liberia is becoming a very interesting laboratory for how the recognition and protection of customary tenure has a real impact on economic development (Unhur 2009: 426–430; Roush 2018).

Sierra Leone, on the other hand, focused on attracting investors after the war. Many of them are investing in large-scale agricultural projects. Although the country recognises private, state and customary law, a great deal of legislative chaos is causing tensions. The government is currently preparing a reform of land legislation to address these problems. It is the large multinational companies that are committing many controversial acts. The current legislation is based on the 2004 Local Government Act and the 2009 Customary Tenure Act. This law encourages chiefs to collect taxes for the state and makes them the main custodians of the land (LandPortal 2022).

5.2.5. Specific Case of Rwanda

Rwanda is a unique country in tropical Africa. It is the story of a state that has seen its economic day and a horrific genocide, but also incredible economic development accompanied by great land policies. Today's Rwanda is nicknamed the Singapore of Africa. The meaning of this name may be deeper than it seems, because the land story after 1994 is indeed similar to that of the Asian economic tigers. At present, it is difficult to compare Rwanda with the other countries studied. The system is so developed that it is more appropriate to compare it with countries like Botswana, Mauritius or South Africa. This is one of the reasons why I have decided to place contemporary Rwanda in a special category.

Rwanda's population has traditionally been above average compared to the rest of Africa. This was due to the higher altitude, where tsetse flies and malaria were not as prevalent, and the quality of the volcanic soil. Rwanda's state structure was established in the 17th century and was one of the most centralized on the continent. There were two types of land ownership. In the central and southern parts of the country, land was controlled and redistributed directly by the king. In the north, on the other hand, there was a land system based on lineage, with the chief as the main authority who granted usufruct rights. Strong population growth from the early 19th

century onward led to the practice of intensive agriculture and, more importantly, to new powers for traditional authorities, who focused not only on land allocation but also on disputes and other matters. The country was divided between the two most powerful ethnic groups, the Tutsis and the Hutus. As in the case of Burundi, the border between the two was very flexible. Everything changed with the arrival of the Belgian colonizers, who changed these inter-ethnic boundaries into clearly defined and impermeable ones, favoring the Tutsi ethnic group. Private property was introduced, but limited to commercial centers, religious institutions or colonial companies. Within customary property, Tutsis were favored, which later became a source of tension. In the 1930s, the Belgians even introduced identity cards, which definitively confirmed this ethnic division. Until the late 1950s, the land tenure system among the indigenous population functioned as a quasi-feudal system, with most Hutus in a subordinate role as tenants of sorts. In the late 1950s, however, the political situation relaxed and Hutu power was strengthened. The political relaxation led to the first conflicts, in the context of which the country became independent in 1962 (Mamdani 2020, pp. 20–75)

Immediately after independence, some of the land was redistributed to the Hutus, and up to 400,000 Tutsis were forced into exile. This led to armed incursions into the country. In 1973, a coup brought Juvénal Habyarimana, a member of the northern Hutu elite, to power. The economy initially flourished, and the country was a popular recipient of foreign aid. But the crises of the 1980s and 1990s ended a period of stability. Like Boigny in Côte d'Ivoire, Habyarimana did not invest in the modernization or sustainability of land tenure; a dual ownership system remained in place. Private land ownership was limited to urban areas and used by the elite. The vast majority of land was under customary tenure. The government did not do much to address overpopulation and pressure on land. Investment in modernizing agriculture and disseminating new varieties failed (Bruce 1998, pp. 181-186). As Jared Diamond (2006, pp. 312-328) has noted, by the 1980s all of Rwanda looked like one big garden and banana plantation, but there was no

investment in preventing environmental disasters. Soil erosion increased, streams dried up, and rainfall became increasingly erratic.⁸²

In addition, Rwanda was under constant external threat from ethnic massacres in Burundi and Tutsi exiles in Uganda and the Kivu region of Congo. In response, a state of emergency was declared and many Rwandan Tutsis were arrested. In this situation, the slightest detonation was enough to cause a catastrophe. The trigger was the assassination of President Habyarimana on April 6, 1994. A catastrophic genocide ensued, with some 800,000 people massacred in just one month. Although the conflict is commonly referred to as ethnic, Jared Diamond (2005, pp. 312–315) defends the version that ethnic strife was the real cause, rather than a struggle over land and the problem of overpopulation. He argues that in the northern regions, where only Hutus lived, the murder rate was similar to the rest of the country. The highest death rate was among older men, who controlled the most land. This is supported by the fact that after the genocide, women made up over 70 % of the population.⁸³

The Rwandan Patriotic Front (RPF), made up of exiled Tutsi fighters, then invaded the devastated country. Since then, Paul Kagame has become a major figure. Thus began the most remarkable period in the country's economic history. The country was in an impoverished state and traditional land tenure had failed. On the other hand, the genocide created good conditions for subsequent development to take off. Much land had been abandoned and there were hundreds of thousands of Tutsi refugees from neighboring countries. The government, recognizing the inefficiency of housing, initiated the Imidugudu villagization program. Landless refugees were placed in these newly created villages, where they were provided with the necessary infrastructure. Unlike in Tanzania or Mozambique, the program

⁸² It might be added that two Belgian economists, Catherine André and J. P. Platteau (1993), wrote about the situation in the country in the early 1990s. Inequality among farmers increased dramatically. There was little land left for young farmers. While older farmers (over 50 years old) owned an average of about two acres of land, younger farmers (20 to 29 years old) owned about 0.4 acres. Many small farmers had to give up their land because it could no longer support them. In this way, the rich got richer and the poor got poorer. Seasonal famines became more frequent. Crime was rampant. In the context of customary land tenure, traditional authorities were overwhelmed with complaints and disputes that they could no longer resolve. The custom of helping poor relatives was abandoned because of food shortages, and tensions within families grew.

⁸³ This is the chapter on "Malthus in Africa". Diamond sees the catastrophic state of land tenure and natural disasters as the primary cause of genocide. The ethical narrative followed and exacerbated the problem.

was successful. The government was able to effectively influence land use planning, and traditional authorities were slowly being sidelined. In 1997, with the help of the UN's FAO, the first land legislation began to take shape. Many land parcels were successfully consolidated and the conditions for their commercialization were gradually created. The first phase of post-conflict development, characterized by the construction of new villages, was successfully completed in 2003 (Hillhorst 1999; LandPortal 2023).

The next phase was characterized by the formalization of land tenure. The Rwandan government has embraced the ideas of economist Hernando de Soto, who argued that individual land ownership is the best key to poverty reduction (Payne 2011, pp. 29–31). On May 26, 2003, a new constitution was adopted that fully supports private property and considers customary property outdated and obsolete.⁸⁴ Massive land registration projects are underway. Unlike in other African countries, where registration is lengthy and problematic, here it has been a great success, with property formalized virtually throughout the country by 2013 (USAID 2022). Since then, a modernization phase has been underway, with the digitization of property rights and an emphasis on greater transparency and modernization of administrative offices. However, the land tenure system has not escaped criticism. After great successes, the government has been taking more and more control over farmers since 2013. The sophisticated land registry contributes to farmers losing their autonomy from the state and becoming increasingly subordinated to it. There are still many disputes over land. Critics see the regime as a market-driven authoritarianism that is growing stronger with the effective centralization of the state. The country's controversial re-education camps for untrustworthy or poor people are no exception. In addition, the government increasingly favors foreign investors over its own people and ignores social problems (Takeuchi, 2019, pp. 121–132; Samset 2011, pp. 265–282; Isaksson 2013, pp. 395–435).

⁸⁴ The Constitution of Rwanda was adopted on 26 May 2003. It deals with the issue of land tenure in Chapter 4, Articles 29 to 31. Every natural and legal person has the right to property. Ownership may not be withdrawn except in the public interest and in accordance with the conditions laid down by law. Article 30 enshrines private property, but with the possibility of expropriation for national reasons. Article 31 protects private property and every owner has a right to it (Constitution of the Republic of Rwanda 2018)

There is no doubt that Rwanda is a "small miracle" in Africa, with a sophisticated and digitized land tenure system and a successfully growing land market. On the other hand, the question is who will succeed Paul Kagame in the presidential chair and whether he will be able to maintain this miracle comparable to his Asian counterparts or, on the contrary, exploit the opportunities offered by a well-centralized state, which Rwanda is undoubtedly becoming.

5.3. Research of Land Tenure: Quantification of Land Tenure Performance

In the previous section, we classified the surveyed states into different categories of land tenure according to their legislation. In this section, we will focus on the measurement of land tenure performance. As explained in the methodology section, the measurement of land tenure performance will consist of four main dimensions, which are divided into 26 categories and 53 indicators. From these dimensions, aggregated indices will be created, which will ultimately become the basis for a final complex index to represent overall land tenure performance.

This section is divided into individual dimensions, which are summarized in tables. The initial dimension encompasses an evaluation of the quality of land legislation. This dimension is of particular relevance to the context of private ownership. The second dimension is concerned with the strength and effectiveness of pro-agrarian state capacity, which is a key factor in determining the viability of state ownership. The third dimension is concerned with traditional institutions and seeks to ascertain their strength and the degree of satisfaction among the population with regard to them. This dimension is of particular importance in the context of customary ownership, which is a prevalent phenomenon on the African continent. The final dimension of the framework examines the degree of inclusion of state institutions.

The final step is to create a complex land tenure indicator that summarizes all the previous dimensions. The manner in which states recognize or fail to recognize traditional institutions has a significant impact on this process. In the event that traditional institutions are not acknowledged or disregarded in the land tenure framework, the aggregate index of traditional institutions will be negatively valued. This can be referred to as the "Contradiction factor", which represents the conflict between customary tenure and the state. It is anticipated that etatist and modernist regimes will be particularly susceptible to the risk of a large contradiction factor. In addition, institutions that are not inclusive and that do not provide farmers with the necessary political and economic freedom also gain a negative value.

5.3.1. Dimension of Land Legislation

Table 18 - Dimension of Land Legislation

	Type of Registration System	Legal Basis of the Formal System	Formal Registration (Time + Procedures)	Formal Registration (Costs)	Cadastral Infrastructure	Land Dispute Legislative	Transparency of Information	Lawful Process of Expropriation
Min; Max value					0; 12	0; 8	0; 3.5	0; 10
Etatist Land Regimes			74.5 days (7.5 proc.)	USD 8.837	1.8	3.6	0.9	4.1
Nigeria	Deed	English System	115 days (12 proc.)	USD 2.200	5.0	2.5	1.0	4.6
Gabon	Title	French System	86 days (6 proc.)	USD 20.000	0	4.5	1.0	4.4
Congo-Brazzaville	Deed	French System	54 days (6 proc.)	USD 12.000	0	3.5	1.0	4.8
Mozambique	Title and Deed	Torrens System	43 days (8 proc.)	USD 1.150	2.0	4.0	0.5	3.5
Modernist Land Regimes			62.0 days (6.3 proc.)	USD 3.352	1.0	3.6	1.0	4.4
Guinea	Title	Torrens System	44 days (9 proc.)	USD 2.090	0	4.5	1.0	3.9
Cameroon	Deed	French/English	81 days (5 proc.)	USD 9.500	2.0	3.5	2.0	4.7
Burundi	Title	French System	23 days (5 proc.)	USD 270	1.0	3.5	0	4.0
Madagascar	Title	Torrens System	100 days (6 proc.)	USD 1.550	1.0	3.0	2.0	4.8
Etatist-Traditional Land Regimes			78.8 days (5.6 proc.)	USD 1.608	0.8	4.3	1.1	4.7
Gambia	Title and Deed	English System	73 days (6 proc.)	USD 1.900	3.0	2.5	0.5	4.4
Ghana	Title and Deed	English System	33 days (5 proc.)	USD 2.050	1.0	4.0	1.5	6.6
Togo	Title	German System	35 days (3 proc.)	USD 500	1.0	4.5	2.5	4.6
Angola	Title	French System	190 days (6 proc.)	USD 1.400	1.0	4.0	1.0	3.9
Zambia	Title	Torrens System	45 days (6 proc.)	USD 2.900	0	5.5	0	4.2
Tanzania	Title	English System	67 days (8 proc.)	USD 2.300	0	5.0	1.0	4.5
Mixed Land Regimes			45.3 days (7.1 proc.)	USD 2.491	2.2	4.3	1.2	4.8
Sierra Leone	Deed	Torrens System	56 days (7 proc.)	USD 950	0	3.5	0.5	3.9
Liberia	Title and Deed	Torrens System	44 days (10 proc.)	USD 3.900	0	2.5	1.0	3.7
Côte d'Ivoire	Title	French System	39 days (5 proc.)	USD 5.300	3.0	6.0	1.3	5.3
Malawi	Title and Deed	Torrens System	47 days (6 proc.)	USD 150	0	5.0	0.5	4.8
Kenya	Title and Deed	Torrens System	44 days (10 proc.)	USD 3.500	7.0	5.0	2.0	5.5
Uganda	Title	Torrens System	42 days (10 proc.)	USD 1.150	3.0	4.0	2.0	5.8
Rwanda	Title	Torrens System	7 days (3 proc.)	USD 23	12.0	8.0	3.5	7.1

Created and calculated by author, Source: World Bank (2020); WJP (2022)

The table summarizes the situation under the dimension of land legislation quality. As can be seen, the indicators included in this dimension tend to focus on private ownership. Countries whose legislation prioritizes private ownership are highlighted in yellow. The first two items deal with the type of registration system and the legal basis of the formal land tenure system. Most Western countries now have a combination of systems, but the Torrens system predominates, and dual systems with a greater emphasis on titles are also common. As discussed in the methodology, title systems tend to refer to a centralized system where rights are collected in a single official location, and deed systems refer to a decentralized system where deeds with rights are held by the owners. Deed systems were particularly prevalent in the 19th century, and only after that did the boom in cadastral offices, which collect these rights in one place, begin. In our research, only four states still use the deed system, indicating little reform since the end of colonialism. These tend to be states in West and Central Africa. At the same time, with the exception of Sierra Leone, all states are characterized by large mineral reserves and there is apparently no incentive to cultivate land. In contrast, in East Africa, which has a stronger tradition of state intervention in land, title systems are dominant. The Torrens system is the strongest legal basis for formal land tenure. However, it is important to add that this is only formalized tenure, which in practice covers a minority of the total national territory. The only state where a formal system actually operates on the vast majority of its territory is Rwanda. Since 2003, when a massive process of land formalization began, Rwanda has opted for a title system that comes closest to the Torrens system. The apparent contradictions and underdevelopment of legal systems can also be noted. For example, Angola has been using the title system since the new millennium, but it is still based on the French registration system. The French system has always been based on the deed system. The legal framework is therefore contradictory in this case.

We arrive at the registration stage, which is followed by two additional columns. Based on the ideas of Hernando de Soto, the World Bank tries to measure the quality of the registration process in terms of length, number of procedures, and cost. Of course, all three indicators can vary depending on who is registering the assets. A small farmer has different conditions than a large corporation. Let's consider the resulting values as rough estimates. Before moving on to the countries

under study, let us try to look at other parts of the world for comparison with tropical Africa. To formally register a piece of land in the Czech Republic, a person pays about US\$70, goes through four procedures, and waits about 26 days for the authorities and banks to sort everything out. In New Zealand, which is one of the best countries in the world in this respect, the person pays about US\$200, goes through only two procedures and everything is done in less than four days. It should be noted that many African countries charge astronomical sums for formal land registration. This is due to the lack of administrative, market infrastructure and rampant corruption that creates these incredible costs. In Gabon, for example, the amount paid is around US\$20,000. The average amount retained is around US\$1,500. Most countries require about six procedures to be completed. These include land registration, notarization, and bank confirmation. In addition, a few of the countries surveyed require confirmation directly from ministries or even the president, as is the case in Angola or Nigeria. Nigeria in particular requires the most procedures. The processing time itself is also very long. In Angola, for example, it takes almost 200 days to complete the six required procedures, and 115 days in Nigeria. This suggests that the vast majority of people remain in informal tenure because they are unable to meet these costs. Within the types of land tenure, etatist and etatist-traditionalist regimes are the worst off. Mixed and modernist systems, which have a warm relationship with private property, have somewhat more favorable scores, but are far from perfect. The African miracle here seems to be Rwanda, which is among the world's top performers. In 2018, registering a plot of land here took only seven days, with three procedures and a total cost of just US\$23. In this respect, it even significantly outperforms the Czech Republic.

Another part is examining the infrastructure of cadastral offices and its quality. Although there is a cadastral type office in every country, the availability of the land registry and the database varies. In fact, only a minority of countries in tropical Africa have a centralized land title database system. These are only Cameroon, Côte d'Ivoire, Uganda and Rwanda. Surprisingly, there are no countries like Kenya or Malawi, which have long considered private property a national

priority.⁸⁵ Nigeria, Mozambique, Angola, Togo, Côte d'Ivoire, Kenya, Uganda and Rwanda provide it. The World Bank also assesses whether all formally registered land is included in the central database. Only Rwanda and The Gambia meet this requirement, while in the other countries many parcels are only semi-formally registered. Land boundaries are also an important indicator. The question is therefore whether the cadastral authorities also use detailed maps with clear markings of private land boundaries. This condition is met in Nigeria, Kenya and Rwanda. The database itself should not only record owners, but also various legal encumbrances such as mortgages, liens and various restrictions. Nigeria, Côte d'Ivoire, Kenya and Rwanda are characterized by such comprehensive databases. In the final scoring, states could receive a maximum of 12 points. Since cadastral infrastructure is the absolute foundation, the vast majority of western states received full points. In our case, however, this was not the case. A total of 13 states surveyed have no points or one point, indicating that their cadastral infrastructure is in a deplorable state. Surprisingly, states such as Nigeria, Côte d'Ivoire and Gambia have a ratio of about 35 % to the Western countries. In the case of Nigeria, this has been an effort since the 2000s, when the government began to recognize the seriousness of land tenure and overpopulation in the country. In Côte d'Ivoire, the new cadastral infrastructure is being built for political rather than economic reasons. Private ownership is necessary to confirm indigenous control over land. Again, Rwanda is a unique case, scoring full points. This is the result of the government's massive land registration efforts since 2003.⁸⁶ Mixed land tenure systems perform best overall, with etatist systems in the second best group due to the efforts of the Nigerian government.

Another indicator is legislation that focuses on dispute resolution. In the previous analysis of land tenure, it is clear that many African farmers consider the main added value of formal land registration to be the ability to effectively resolve disputes with their neighbors. This problem is particularly acute in countries with

⁸⁵ If one were to look for a comparison, the vast majority of the countries surveyed are in a situation similar to that of Taiwan and Korea in 1920, when the Japanese colonial system was still in its infancy. The situation with the data available online is not very satisfactory either

⁸⁶ Here, too, it compares favorably with Western countries and is tied with Mauritius for the best score on the continent.

high population densities, where there is a demand for a strong centralized system to replace the highly pluralistic system of traditional authorities.⁸⁷ The focus here should therefore be on states such as Rwanda, Burundi, Malawi, Nigeria, Togo or Gambia, but also the central highlands of Kenya and Madagascar, or the southern part of Ghana and Côte d'Ivoire, where the population is high. There should be an independent mechanism in the form of a central database to verify the identity documents of all parties involved. This mechanism exists in Mozambique, Angola, Kenya, Sierra Leone and Rwanda. In addition, a public or private guarantee should be provided for land registered in the registration system, and compensation should be provided if the authorities make a mistake.⁸⁸ In tropical Africa, this guarantee is only provided in Gabon, Malawi and Rwanda, where adequate financial compensation is also provided for mistakes. In Mozambique, Madagascar, Angola, Gambia, Ghana, Togo, Zambia, Tanzania, Côte d'Ivoire, Kenya and Uganda, the state does not commit itself to paying compensation. Another indicator is the average length of court proceedings in the event of a dispute. In the Czech Republic and New Zealand, the average length is between one and two years. Many of the countries surveyed exceed three years. Only Guinea, Tanzania and Malawi meet the one to two year limit. However, there are also cases where court proceedings take less than a year. These are Zambia, Côte d'Ivoire and Rwanda. The scores achieved are generally better than for cadastral infrastructure and there are less obvious differences. Among the countries with high population density, only Kenya, Malawi, Côte d'Ivoire and Rwanda score well. Again, only Rwanda achieves the highest score. In contrast, overpopulated Nigeria scores only 2.5 out of 8 points.

The final categories are transparency of legislation and lawful procedures for expropriation. Transparency of legislation assesses aspects such as the existence of a public list of land transactions, the issuance of legally binding documents by the authority as part of the registration process, the existence of an independent complaints mechanism, a public schedule of fees, or whether the authority is able

⁸⁷ A typical example of the failure of traditional authorities was Rwanda in the 1980s, when enormous overpopulation demanded a centralized legal system.

⁸⁸ This aspect goes back to R. R. Torrens, who first used it in South Australia

to provide a timeframe for the delivery of an updated cadastral plan. Particular attention is paid to whether the authorities provide this through an online form or only in person. The expropriation process is an aggregate index that looks at the transparency of the process, the adequacy of financial compensation, the impartiality of the courts, or the length of the administrative process. Rwanda is the only country to achieve the maximum score in the transparency framework. Kenya, Uganda, Togo, Madagascar and Cameroon also achieve reasonable scores. In contrast, Zambia and Burundi are characterized by zero transparency. The vast majority of countries have a problem with the lack of an independent mechanism for complaining to the authorities. Only Rwanda and Togo have such mechanisms. Countries such as Mozambique, Gambia and Madagascar have only limited ones. The differences between land tenure systems are minimal. The category of legal expropriation does not come from the World Bank, but from the World Justice Project. The methodology is therefore different and the differences between countries are not as pronounced as in the World Bank data. This is because it includes general factors related to the quality of democracy, on which many countries score relatively well. The differences between land tenure systems are not as great. Rwanda is the best performer, comparable to the Czech Republic. Countries such as Kenya, Uganda and Côte d'Ivoire also score slightly above average. The worst performers are Mozambique, Liberia, Sierra Leone, Angola and Guinea.

Overall, Rwanda has a perfect track record in land legislation, which is comparable to the most developed countries in the world without major difficulties. The quality of its legislation guarantees strong property rights, which is best seen in its strong economic growth and its designation as the "Singapore of Africa". In fact, Rwanda is somewhat reminiscent of the early stages of rapid development in South Korea or Taiwan. The rest of tropical Africa is much worse off. Kenya, Uganda, and Côte d'Ivoire are in relatively good shape. Kenya has a legacy of strong colonial property rights. Uganda is in a similar situation, where a system of indigenous private rights called "Mailo" was recognized in colonial times. There is currently a problem of overpopulation, and there are a number of American organizations working in the country to help formalize land. In addition, the government there sees private property ownership as the best way to deal with

overpopulation and related disputes. The incentives in Côte d'Ivoire are twofold. The first is the high population problem in the southern part of the country, and the second is the political struggle between the indigenous population and the newly arrived population. Malawi, on the other hand, is a poor performer, even though the government considers private property a national priority. A very poor performer is overpopulated Burundi, whose government also considers private property a key priority. Liberia, Sierra Leone, Angola, Gabon and Congo-Brazzaville are the countries with the lowest quality of land legislation.

5.3.2. Dimension of Pro-Agrarian State Capacity

Table 19 - Pro-Agrarian State Capacity Dimension

	Basic State Functions	Quality of State Capacity Steering	Effective Financial Control	Infrastructure Capacity	Structural Constraints	Pro-Agrarian Bias
Min; Max value	0; 10	0; 10	0; 10	0; 10	0; 10	0; 10
Etatist Land Regimes	5.6	3.6	5.2	3.6	6.6	6.8
Nigeria	3.0	3.3	4.8	4.3	8.5	6.9
Gabon	8.2	5.1	5.5	5.1	5.2	No data
Congo-Brazzaville	5.6	3.0	6.0	2.7	6.3	5.6
Mozambique	5.5	3.1	4.5	2.4	6.5	7.9
Modernist Land Regimes	6.1	4.6	5.4	2.9	7.3	6.5
Guinea	7.2	5.9	5.8	2.9	7.0	7.0
Cameroon	5.2	3.8	5.5	3.8	6.8	6.5
Burundi	6.3	4.4	4.3	2.5	9.0	6.9
Madagascar	5.7	4.4	5.8	2.5	6.5	5.7
Etatist-Traditional Land Regimes	7.5	5.8	5.8	3.9	5.4	6.7
Gambia	8.2	5.6	6.5	3.6	6.0	6.1
Ghana	8.4	6.3	5.5	5.7	5.0	7.9
Togo	6.8	5.4	6.3	3.1	6.0	6.4
Angola	6.3	4.6	5.1	3.6	5.5	6.8
Zambia	8.0	5.3	5.5	4.0	5.0	5.5
Tanzania	7.3	5.5	6.1	3.5	5.0	7.9
Mixed Land Regimes	6.8	5.0	6.0	3.4	6.7	7.5
Sierra Leone	6.6	3.8	5.0	2.6	7.8	5.6
Liberia	7.0	4.8	5.5	2.1	7.3	7.2
Côte d'Ivoire	6.8	6.0	7.4	4.6	5.8	7.5
Malawi	7.6	4.8	5.5	2.3	6.5	8.5
Kenya	6.0	5.8	6.6	5.5	6.3	8.5
Uganda	6.8	4.6	5.8	3.4	6.5	7.8
Rwanda	8.0	6.0	7.3	4.0	7.0	7.8

Created and calculated by author, Source: BTI (2024); IIAG (2023); UN FAO (2023)

Another dimension is pro-agricultural state capacity. Here, states that fall under etatist and etatist-traditional regimes that do not recognize private ownership of rural land, or recognize it only vaguely, are expected to perform better. States that favor public or state land ownership as a national priority are highlighted in yellow. The first category covers basic state functions such as the monopoly of coercive power, the functioning of basic administration, and the identification of citizens with the state. Gabon, Gambia, Ghana, and Rwanda score highest in this category. Gabon takes advantage of a favorable political geography, with French colonial relocation of the population near water and communication routes facilitating efficient state power projection. Gabon has a high HDI, achieved through planned development and economic diversification under President Ali Bongo Ondimba (2009-2023). There are no insurgent groups or significant organized crime, and the French army helps maintain order. Approximately 91 % of the population has access to electricity, 85 % to water, and 50 % to sanitation. Ghana and Gambia are considered successful states. Gambia, despite President Jammeh's ouster by ECOWAS in 2016, is now stable and projecting power effectively with the help of troops from Senegal, Ghana, and Nigeria. Rwanda continues to build strong state capacity and is one of Africa's most successful states. In contrast, Nigeria struggles with ineffective state capacity due to terrorist groups in the south and Boko Haram in the north. Etatist regimes in Nigeria perform poorly despite not recognizing alternative land tenure systems, while etatist traditional regimes perform best (BTI 2023).

Quality of State Capacity Steering shows how well individual governments are able to prioritize, implement and coordinate new policies. The scores are not as high as in the previous category. Ghana is the best performer. The government has been pragmatic, thanks in part to good cooperation with the donor community, especially the International Monetary Fund. Policy implementation remains a challenge, although it is at a good level compared to the other countries surveyed. Another country with above-average performance in this area is Guinea. It scores particularly well on policy coordination. Policies are based solely on the ruling CNRD party, and ministers with their own agendas tend to be abruptly dismissed. It is worth noting that this dimension does not track democratic aspects, only the strength of state capacity, so in this case coordination is perceived positively. At the

same time, the ruling party of the CNRD follows the guidelines of the donor community. Policy implementation is not at a low level compared to other countries. Countries such as Gabon, Rwanda, Côte d'Ivoire, Kenya, Tanzania, Togo and Gambia are also doing well. On the other hand, Sierra Leone, Nigeria and Mozambique are the worst performers. Again, the worst results are achieved by etatist regimes, the best by etatist-traditionalist regimes.

Effective financial management indicates fiscal and monetary stability, efficient use of assets, and quality banking infrastructure. Côte d'Ivoire has the best performance. Côte d'Ivoire stands out for its membership in the CFA franc zone, pegging its currency to the euro and targeting low inflation. Despite pandemic and war-related increases in inflation, the country's credit rating has improved to historic highs. The banking system is well regulated, and further financial restructuring is a priority. Abidjan is home to the West African Regional Stock Exchange. Rwanda also performs well, maintaining a stable Rwandan franc and improving its banking system under IMF and World Bank supervision. The government is effectively using international aid to achieve its development goals, and is aiming for sustainable development by 2030. Nigeria and Burundi have the worst outcomes, with mixed regimes doing the best and etatist regimes doing the worst.

Infrastructure Capacity is not based on the BTI, but on the IIAG. Specifically, it focuses on transportation networks, mobile communications, internet and computers, shipping and postal networks, and access to energy. The scores are relatively weak compared to other categories. Kenya has the best score. Compared to other countries, the infrastructure here is at a good level. There are 3,900 km of railways and over 162,000 km of roads. Ghana and Gabon also score above average. Nigeria also does relatively well, with almost 65 % of the population connected to the Internet, one of the best results in Africa. Rwanda, which is otherwise successful, is average. The worst performers are Sierra Leone, Liberia and Madagascar (Ibid 2023).

Structural Constraints hinder effective state power projection and can cause future shocks, such as conflict, unstable environments, or unfavorable geography. Burundi and Nigeria face the worst constraints. Burundi suffers from ethnic tensions and high population density, exacerbated by controversial constitutional amendments. Nigeria is plagued by terrorist groups, high population density, and land disputes.

Rwanda also faces significant constraints. In contrast, Gabon, Zambia, Tanzania, and Ghana have the lowest risks. Modernist regimes show the highest constraints, while etatist-traditional regimes have the lowest.

The final category is pro-agricultural orientation. This category consists of the IIAG, specifically Rural Economy, which looks at rural market access, rural political representation, rural government support, and access to land and water. It also consists of government spending on agriculture, which is tracked by the UN FAO. Malawi and Kenya have the highest scores. Both countries invest above average in agriculture, and their rural areas have good levels of government support. The worst performers are Zambia, Madagascar, and Congo-Brazzaville. Interestingly, Zambia has the highest level of agricultural spending in contemporary sub-Saharan Africa, but rural spending is at a very low level, according to the IIAG, which greatly reduces the overall quality. However, the dispersion of data across countries is not as drastic as for other indicators. To the detriment of research on this dimension, Gabon has no data on the rural economy. Gabon performs very well in other categories, so its agricultural orientation would be a very interesting measure (Ibid 2023).

In summary, Ghana, Kenya, and Rwanda have the best pro-agricultural state capacity scores. Gabon also has significant state capacity strength. In this case, however, a key element is missing, namely data from the IIAG and UN FAO. The worst performers are Nigeria, Mozambique, Sierra Leone, Madagascar and Congo-Brazzaville. With the exception of Sierra Leone, all of these countries belong to etatist or modernist regimes, so one would expect them to have a stronger state capacity to regulate state land ownership well as compensation for ignoring customary rights. This is not the case. The regimes with the worst state capacity, and thus the inability to enforce legislation and project power, are the etatist and modernist land tenure regimes.

5.3.3. Dimension of Traditional Institutions

Table 20 - Traditional Institutions Dimension

	Comprehensive Recognition by the State	Allocation of Land by Traditional Authorities	Degree of Governance by Traditional Authorities	Resolution of Disputes by Traditional Authorities	Trust in Traditional Institutions	Intensity of Ethnic/Tribal Identity
Min; Max value		-1; 1	-1; 1	-1; 1	0; 1	0; 1
Etatist Land Regimes		0.380	0.493	0.625	0.70	0.45
Nigeria	No	0.586	0.756	0.802	0.60	0.52
Gabon	No	0.189	0.267	0.550	0.60	0.31
Congo-Brazzaville	No	No Data				
Mozambique	No	0.364	0.456	0.523	0.69	0.52
Modernist Land Regimes		0.242	0.278	0.395	0.69	0.30
Guinea	No	0.236	0.267	0.554	0.75	0.17
Cameroon	No	0.450	0.528	0.591	0.66	0.40
Burundi	No	No Data				
Madagascar ^a	No	0.040	0.040	0.040	0.65	0.33
Etatist-Traditional Land Regimes		0.466	0.338	0.540	0.65	0.32
Gambia	Yes	0.663	0.754	0.861	0.82	0.34
Ghana	Yes	0.719	0.673	0.756	0.64	0.30
Togo	Yes	0.471	0.590	0.568	0.70	0.36
Angola	Yes	0.336	0.463	0.331	0.55	0.32
Zambia	Yes	0.799	0.665	0.813	0.77	0.32
Tanzania	Yes	-0.192	-0.117	-0.098	0.43	0.26
Mixed Land Regimes		0.458	0.574	0.690	0.68	0.42
Sierra Leone	Yes	0.712	0.881	0.919	0.77	0.36
Liberia	Yes	0.662	0.714	0.772	0.57	0.45
Côte d'Ivoire	Yes	0.454	0.501	0.699	0.73	0.32
Malawi	Yes	0.322	0.536	0.711	0.69	0.42
Kenya	Yes	0.270	0.342	0.558	0.66	0.34
Uganda	Yes	0.326	0.472	0.482	0.71	0.51
Rwanda	No	No Data				

^a Afrobarometer for Round 8 did not include Madagascar. The data is therefore from the previous Round 7 (i.e., 2018). The questions were slightly different and so the result is more of an estimate by the author.

Created and calculated by author, Source: Afrobarometer, Round 8 (2022); Round 7 (2018)

The third dimension assesses the strength of traditional institutions and the rural population's satisfaction with them. Subsequent values were derived from Afrobarometer data from Round 8. Due to a lack of data, the measurement was taken for 19 countries, with Madagascar requiring a derivation from the previous Round 7. Countries that significantly emphasize customary rights are marked in yellow. The questionnaire targets only rural, not urban, inhabitants.

The initial three categories examine the robustness of traditional institutions. The most pivotal category is the strength of traditional authorities' land allocation powers. With regard to the strength of traditional institutions in the context of land allocation, the most notable examples can be observed in Zambia and Ghana. A survey of the Zambian population revealed that 76 % of respondents considered the powers of their chiefs to be very strong. In Ghana, the figure is 55 %. In general, the figures for overall governance and dispute resolution are even higher. In this category, Sierra Leone (76 %), the Gambia (56 %), and Nigeria (45 %) are the top-performing countries. With regard to disputes, Sierra Leone (87 %), the Gambia (76 %), and Zambia (75 %) exhibit particularly robust performance. In contrast, Tanzania is the only country surveyed to score negative values, indicating a lack of confidence in the powers of their chiefs. This indicates that the influence of traditional institutions is less significant than that of other sectors. This is a consequence of the 30-year rule of Julius Nyerere, who abolished these institutions and relocated the population to newly created villages. A mere 10 % of Tanzanians indicate that their chiefs possess substantial land allocation authority. With regard to Tanzania, it can be observed that ethnic sentiment is notably low in comparison to other countries. Tanzania is distinctive in that a greater proportion of the population identifies as Tanzanians, rather than as members of their ethnic group. In contrast to neighboring Kenya, where politics along ethnic lines has been widespread, Tanzania's political culture is characterized by a lack of such divisions. Madagascar is another state with very weak traditional institutions. Prior to colonization, Madagascar was ruled by a centralized Imerina kingdom, which gradually reduced the influence of chieftaincy systems in favor of a centralized authority. Since the 1970s, Madagascar has been ruled by an Afro-Marxist regime. The values of Gabon and Guinea also appear to be relatively weak. In particular, Guinea exhibits even weaker ethnic sentiments than Tanzania. Similarly, in Guinea,

traditional institutions have been constrained by direct French rule and by the dictator Sekou Touré, who has identified himself as the only legitimate chief because of his origins. Furthermore, the civil society of Guinea is distinctive in its African context and bears resemblance to European conditions. The majority of all labor is organized under trade unions. It is also noteworthy that the country is divided between the "modern" western region and the "traditional" eastern hinterland.

Already in the methodology of this thesis the so-called contradiction factor was mentioned. This refers to a situation where there are strong traditional institutions in a country with a high level of trust, but the state either does not recognize them or ignores them in its practical policies. Nigeria has the highest absolute score for the contradiction factor. The land tenure situation is deplorable. In the 1960s, Nigeria tried to modernize rural areas, but since the 1970s, when state revenues were dominated by mineral profits, the state has ignored the countryside. Despite minor successes after 2000, the state only vaguely recognizes customary tenure. A series of laws essentially nullify this recognition, and the legislation concentrates power in the hands of state officials and the federal government itself. This is compounded by high population density, the threat of climate change, and high levels of litigation and violence. There are also significant conflicts in Mozambique and Cameroon.

From the table, we can see that traditional institutions tend to be weaker in East Africa than in West Africa. We see the strongest traditional institutions in states that fall into the etatist traditional category and mixed regimes. The category of trust in traditional institutions is a conversion of the percentage results. Trust is relatively high. Among the highest scores are Gambia, Sierra Leone, and, paradoxically, Guinea, where it is very weak. The only country where the majority of the population does not trust its chiefs is Tanzania.

5.3.4. Dimension of Inclusiveness of State Institutions

Table 21- Inclusiveness of State Institutions Dimension

	Political Corruption	Rigorous and Impartial Public Administration	Freedom of Expression	Freedom of Association	Transparency of Information on Land Ownership	No Bribery from Ordinary People at Registration
Min; Max value	0; 1	-4; 4	0; 1	0; 1	-1; 1	-1; 1
Etatist Land Regimes	0.81	0.1	0.65	0.64	-0.122	0.094
Nigeria	0.92	-0.7	0.84	0.76	-0.232	0.073
Gabon	0.82	0.9	0.77	0.64	-0.257	0.159
Congo-Brazzaville	0.84	-0.3	0.34	0.45	No Data	
Mozambique	0.64	-0.6	0.63	0.71	0.123	0.050
Modernist Land Regimes	0.82	-1.4	0.53	0.49	-0.085	0.051
Guinea	0.72	-1.4	0.56	0.40	-0.178	0.074
Cameroon	0.95	-1.7	0.6	0.47	-0.048	0.076
Burundi	0.79	-0.9	0.23	0.22	No Data	
Madagascar	0.81	-0.6	0.73	0.86	-0.030	0.003
Etatist-Traditional Land Regimes	0.52	0.4	0.75	0.77	-0.005	0.286
Gambia	0.28	0.6	0.80	0.77	0.037	0.097
Ghana	0.64	-0.7	0.86	0.88	0.015	0.304
Togo	0.74	0.8	0.66	0.70	-0.171	0.114
Angola	0.70	-0.4	0.54	0.60	No Data	
Zambia	0.33	0.8	0.84	0.82	-0.064	0.387
Tanzania	0.20	1.3	0.72	0.71	0.158	0.529
Mixed Land Regimes	0.68	1.2	0.76	0.76	-0.097	0.191
Sierra Leone	0.50	1.2	0.81	0.82	No Data	
Liberia	0.88	0.1	0.85	0.88	0.045	0.161
Côte d'Ivoire	0.64	0.5	0.67	0.76	-0.179	0.092
Malawi	0.64	1.1	0.76	0.82	-0.125	0.239
Kenya	0.60	1.0	0.85	0.81	-0.146	0.238
Uganda	0.74	0.3	0.59	0.42	-0.079	0.223
Rwanda	0.44	0.1	0.18	0.20	No Data	

Created and calculated by author, Source: V-DEM (2022); Afrobarometer, Round 7 (2018)

The final dimension is the inclusiveness of institutions.⁸⁹ This refers to the case of Tanzania where during the Ujaama period, although there was investment in farmers, they did not have economic freedom and were authoritatively controlled by officials. Data for the first four categories come from V-DEM, the rest from Afrobarometer.

The first category is the level of political corruption. The most corrupt countries are Nigeria and Cameroon. They are followed by Liberia, Congo-Brazzaville, Gabon, and Madagascar. Countries with low levels of corruption include Tanzania, Gambia, Zambia, and Rwanda. The second category measures the extent to which public officials respect the law and administer it without arbitrariness or bias. The worst performers are Guinea, Cameroon, Burundi and Nigeria. In contrast, the countries with the most impartial institutions are Tanzania, Zambia and, surprisingly, Gabon. This is followed by the freedom of expression category. The least free state is Rwanda, followed by Burundi and Congo-Brazzaville. However, most states are considered free, with Ghana being the notional winner. The final category from the V-DEM data is Freedom of association. Rwanda, Burundi, and Congo-Brazzaville are the exceptions to an otherwise free cluster of states. Ghana, Liberia, and Madagascar are the freest environments for independent associations.

The following data from the Afrobarometer provide an overview of how ordinary people perceive the situation. The fifth category in the table measures the extent to which information on land ownership and, in particular, registration procedures are available to the population. Only five countries show positive values, meaning that a larger number of people responded positively. Information is most readily available in Tanzania and Mozambique. In Tanzania, about half of the population is relatively well informed about land tenure, and a similar proportion in Mozambique. Tenure transparency is lowest in Gabon and Nigeria. The last category tracks the extent to which ordinary people (not the rich or otherwise privileged) bribe officials to obtain a certificate for a particular piece of land. Ordinary people are more likely not to bribe, and we see this in the table. No country

⁸⁹ This dimension is inspired by economist D. Henley (2015) who argues that for successful economic development, farmers need to have economic freedom. Another source of inspiration is Acemoglu, Robinson (2012).

reaches negative values, which symbolize significant corruption. Corruption is highest in Madagascar and lowest in Ghana. However, the question is how relevant this category is. Most respondents answered "Don't know" because they find land registration unprofitable due to the huge costs and time delays. Overall, states with modernist regimes score the lowest, while states with mixed land tenure regimes score the highest.

5.3.5. Comprehensive Land Tenure Assessment

Table 22 - Comprehensive Land Tenure Assessment

	Overall Security of Land Tenure	Aggregate Index for Land Legislation	Aggregate Index of State Capacity with Pro-Agrarian Bias	Aggregate Index of Traditional Institutions	Aggregate Index of State Institutions Inclusiveness	Complex Results of Modern Land Tenure	Complex Results of Land Tenure (=Complex L.T. Index)
Min; Max value	0; 1	0; 1	0; 1	-1; 1	-1; 1	0; 1	FF; AA
Etatist Land Regimes	0.60	0.33	0.33	-0.70	-0.01	0.29	
Nigeria	0.68	0.38	0.27	-0.78	0.05	0.30	EF-
Gabon	0.57	0.31	0.50 ^a	-0.61	0.12	0.37	DF+
Congo-Brazzaville	0.56	0.29	0.24	No Data	-0.26	0.20	E
Mozambique	0.57	0.33	0.31	-0.70	0.06	0.30	EF-
Modernist Land Regimes	0.61	0.33	0.31	-0.62	-0.23	0.25	
Guinea	0.69	0.32	0.39	-0.64	-0.22	0.30	EF+
Cameroon	0.56	0.37	0.30	-0.71	-0.30	0.25	EF-
Burundi	0.53	0.30	0.30	No Data	-0.49	0.16	F
Madagascar	0.66	0.34	0.26	-0.52	0.11	0.30	EF+
Etatist-Traditional Land Regimes	0.65	0.36	0.38	0.69	0.28	0.39	
Gambia	0.65	0.34	0.38	0.82	0.43	0.40	DA+
Ghana	0.62	0.42	0.52	0.76	0.25	0.45	DA+
Togo	0.63	0.42	0.36	0.72	0.11	0.36	DA+
Angola	0.64	0.31	0.33	0.63	-0.05	0.29	EA-
Zambia	0.70	0.32	0.32	0.81	0.47	0.39	DA+
Tanzania	0.64	0.34	0.44	0.41	0.46	0.43	DA-
Mixed Land Regimes	0.61	0.38	0.40	0.74	0.21	0.39	
Sierra Leone	0.59	0.26	0.25	0.84	0.39	0.32	EA+
Liberia	0.51	0.23	0.34	0.77	0.18	0.29	EA+
Côte d'Ivoire	0.59	0.48	0.47	0.72	0.18	0.43	DA+
Malawi	0.71	0.35	0.43	0.71	0.29	0.41	DA+
Kenya	0.61	0.58	0.51	0.65	0.34	0.52	CA-
Uganda	0.62	0.45	0.40	0.68	-0.10	0.35	EA+
Rwanda	0.89	0.92	0.49	No Data	-0.27	0.55	CA^b

^a Due to the absence of IIAG data, the value for Gabon is estimated by the author, ^b Due to the absence of Afrobarometer data, the value was estimated by the author

Created and calculated by author, Sources: World Bank (2020); WJP (2022); BTI (2024); IIAG (2023); UN FAO (2023); VDEM (2023); Prindex (2018), Afrobarometer (2019; 2022)

The final step is to determine the aggregate indexes for all dimensions and to evaluate the final Complex Land Tenure Index. The Comprehensive Land Tenure Index cannot be expressed by a single number; because of the different nature of the aggregate indices, it is expressed by two letters on a scale from A to F. The first letter refers to modern land tenure, i.e., either private or state land ownership, while the second letter refers to traditional land tenure. Some countries are given only one letter due to lack of data.

Let's start with states that recognize only state property. Nigeria received a final score of EF-. This is a very poor score. The modern tenure system is very weak, which is particularly reflected in the weak capacity of the state, which does not invest much in agriculture and rural areas. Land legislation, which has a good cadastral infrastructure, scores slightly better. In terms of traditional institutions, Nigeria received the lowest possible score. This is due to legislative ignorance of traditional institutions, which are very strong. It has the highest disconnect factor between government and traditional institutions of all the cases studied, with a value of 0.78. This is an alarming result in the context of high population and increasing competition for land.

Gabon is rated DF+. It earned a D in modern tenure mainly because of its strong state capacity. For the latter, however, the agricultural orientation cannot be estimated due to a lack of data, so the value of 0.50 is rather indicative. However, the most recent data from 2012 from the UN FAO shows that the state had above-average agricultural spending within Africa. On the other hand, within the traditional institutions that are not recognized, the value obtained is F+. The sign (+) indicates that the strength of traditional institutions is moderate.

Congo-Brazzaville received only an E rating due to a lack of data on traditional institutions. The country is not very democratic, with weak state capacity and poor legislation.

The most recent representative of etatist land regimes is Mozambique in Southeast Africa. Here, thanks to pressure from the donor community, customary tenure rights have been recognized but curtailed since 2010 and completely ignored since 2018, when the country began systematic land registration. The final score is EF-, the lowest possible score among the countries assessed. The weak institutions of

modern land tenure are compounded by ignorance of traditional institutions, resulting in a high contradiction factor.

We are getting to modernist regimes that recognize only private and state ownership of land. West African Guinea has received an EF+ rating. The country favors private ownership, but the legislation is among the worst of the countries surveyed. The situation with state capacity is slightly better. The country does not recognize traditional institutions despite their moderate strength.

We are moving toward modernist regimes that recognize only private and state ownership of land. The West African country of Guinea received an EF+ rating. The country favors private ownership, but legislation is among the worst of the countries surveyed. State capacity is slightly better. The country does not recognize traditional institutions, despite their moderate strength.

Cameroon is rated EF-. A country with many legal contradictions, where both French and English legal bases for land tenure are combined, has a very weak level of modern land tenure. As the state prioritizes state ownership, state capacity is among the worst. Traditional institutions are ignored and yet very strong. This has created the biggest factor in the disconnect between the state and traditional institutions after Nigeria.

I consider Burundi to have one of the worst land tenure situations on the continent. The country is characterized by enormous population density and, thanks to recent constitutional changes, a weakening of the consensual political system. Due to a lack of data, the strength of traditional institutions could not be measured, but the state scores the worst ever on modern tenure measures and is the only one in the worst possible F category.

Madagascar is a unique country in Africa with a different historical context. It is one of the poorest countries in the world and its category reflects its deplorable state. It is in the EF+ category. Despite major registration projects underway since 2005 and the existence of relatively strong state institutions from pre-colonial times, the level of modern tenure is very weak. Although the state prioritizes private property, legislation is below average. The level of state capacity is tragic. The situation regarding the recognition of customary tenure is rather limited to the

coastal areas of the country, where the F+ value is very marginal. Here, as in Tanzania, the relevance of traditional authorities is insignificant.

The following etatist-traditional group includes regimes that do not recognize private property in rural areas or that are very vaguely described. The Gambia scores DA+. While the country does not score above average on aggregate land tenure indices, there is high satisfaction with land tenure security and the country allows farmers a high degree of freedom. The country's recognition of customary tenure rights and the fact that customary institutions are very strong and popular among rural Gambians earned it the highest possible score of A+ for traditional institutions.

Ghana is in the same category, DA+. Ghana has one of the highest quality land tenure systems among the countries surveyed. By African standards, strong state capacity goes hand in hand with recognition of strong customary tenure.

The next country is Togo, again in the DA+ category. Interestingly, the country is characterized by relatively good legislation. The cadastral infrastructure, for example, has already managed to map 99 % of the country's land. State capacity is complemented by the fact that, by African standards, the country has had very little support for agriculture since the turn of the millennium. Traditional institutions are very strong and duly recognized.

Angola is on the borderline between etatist-traditionalist and etatist-land regimes, but since 2010 the government has been moving more and more toward traditional institutions. Much of the population lives in cities due to the long civil war. In addition, parts of the rural areas are uninhabitable due to the presence of land mines. The country scores EA-. The country does not score very well on modern property rights, and it is the only etatist-traditional regime that has negative values for the inclusiveness of state institutions, which does not indicate much freedom for farmers. Traditional institutions are recognized, but not as strong as in West African states, for example, hence the A- grade.

Zambia is in the DA+ category. The country's capacity is mainly constrained by the poor state of its rural areas. However, as of 2017, the Zambian government is investing more in agriculture and rural areas than any other country on the continent. Perhaps this is why the country has earned a modern D tenure score.

Traditional institutions are among the strongest on the African continent and are duly recognized, hence the A+.

Tanzania belongs to the category DA-. The country is characterized by the irrelevance of traditional institutions and ethnic identity. Although the value is almost borderline, it gets an A- as customary land tenure is legally recognized. The country maintains a relatively good level of state capacity however with below average investment in agriculture.

Sierra Leone and Liberia are rated EA+. Both have weak state capacity, partly as a legacy of civil war. However, the states are introducing progressive legislation to protect customary rights. In both cases, traditional institutions are very strong, which is why they are in the A+ category.

Côte d'Ivoire has a relatively good DA+ rating. The quality of land legislation and cadastral infrastructure is a driver. However, the political struggle between the indigenous population and the immigrant population is more likely to be the reason for the promotion of private property. State capacity also scores well. The state invests more in the rural economy, including agriculture, than in the other states studied.

Malawi is a country that, unlike most of Africa, has never abolished private property, but has always considered it a priority. The rating is DA+. However, the quality of land legislation, which in our case is the biggest indicator of the quality of private property, is very poor. In fact, even countries like Nigeria and Cameroon do better. State capacity is the driving factor in the comprehensive modern tenure index. Malawi is a state that invests above average in agriculture compared to the other countries surveyed. The state also recognizes customary tenure.

Kenya's rating is CA-. Kenya is one of the countries with the best infrastructure on the continent when its history of settler colonies. Of all the states examined, it is one of only two that achieved a C grade in the modern tenure framework. Land legislation is among the most advanced. State capacity is also at a good level, but government orientation towards agriculture has been steadily declining since about 2005. Customary land tenure is mainly found in the north of the country and on the coast; the A- designation means that traditional institutions are only moderately strong.

Uganda was rated EA+. For modern tenure, an E seems like a poor rating, but this is mainly due to non-inclusive institutions. However, the score is borderline; a mere hundredth of a point more would put Uganda in the D rating. Uganda has fully recognized traditional institutions since the 1990s, and these are very relevant to the lives of the vast majority of rural people, hence the A+.

The last country is Rwanda, which received the best CA rating. It should be noted that we have no data on traditional institutions. We only know that since 2003 they are no longer provided for in the legislation because they are considered obsolete. However, based on the analysis of land tenure there and the incredible performance of the land legislation, I have decided to give it a grade of A. So customary tenure is no longer recognized, but it is also not relevant. But in terms of modern land tenure, Rwanda is one of the leaders on the continent. Land legislation scores an incredible 0.92 out of 1. The quality of cadastral infrastructure, land dispute legislation, length and cost of land registration are on par with Western countries. Even Prindex data shows that 89 % of the population consider the security of their land ownership to be good. However, other data puts the modern tenure situation in perspective. Rural land is still not at a good level, and the government has been steadily reducing spending on agricultural development since 2013. According to the UN FAO, the agricultural orientation itself was the second weakest of the countries surveyed in 2023, after Togo. Another factor that reduces the quality of modern land tenure is non-inclusive institutions. Rwanda is among the least democratic of the countries studied, and farmers here have little space to form independent interest groups and criticize the government. Thus, the final grade for modern type of land tenure is a C.

6. Land Tenure as the Catalyst for Comprehensive Green Revolution?

The final research chapter is concerned with establishing the relationship between land tenure and the factors that characterize the Green Revolution. The thesis employs a large number of indicators, although it is limited in its ability to make comparisons over time. Given the smaller number of cases, the subsequent correlation was analyzed using partial correlation, rather than regression analysis. The advantage of partial correlation is that it allows for the use of fewer cases and the inclusion of control variables. A total of two correlations will be performed. The first correlation is more comprehensive and encompasses the examination of land tenure in all 21 countries with Green Revolution characteristics. The second correlation attempts to compensate for the inability to make comparisons over time examines the relationship between the recognition of customary land tenure rights and Green Revolution features.

The first correlation analysis encompasses a total of 13 variables, six of which serve as controls. The independent variables total three and focus on modern land tenure, which encompasses all tenure dimensions that relate to either private or state land tenure.⁹⁰ The potential of this variable is only realized in the second independent variable, which contains data from a comprehensive land tenure index with a ratio of 50 % for modern tenure and 50 % for customary tenure. The last independent variable is designed to isolate state capacity from the other dimensions. This approach allows us to assess the role of state capacity in determining the success or failure of the Green Revolution, without the influence of other factors such as land legislation or the recognition of traditional authorities. This can be regarded as a test of the actual importance of legislation in this context.

We have a total of four dependent variables. The first two are directly related to the green revolution and target the spread of fertilizers and farm machinery. The rest of the variables, on the other hand, focus on the comprehensive development

⁹⁰ It should be noted, however, that customary land tenure is not included (see Subchapter 5.3.5.).

that the Green Revolution has triggered in, for example, Asia. The first variable will specialize on the level of development as expressed by the Human Development Index and the other on the level of poverty. As mentioned, a major limitation is comparisons over time and therefore the values of these indices do not include long-term growth or decline. However, in order not to be completely misleading, the values are calculated as an average over the years 2010 to 2021 to reduce outlier bias and to show a sort of trend over the last decade.

The following are the six control variables. The variable called Political Geography is a typology created by J. Herbst (2000).⁹¹ Within the part of Africa under study, states with complex geography include Angola, Mozambique, Nigeria and Tanzania. All are very large and have unevenly distributed populations.⁹² States with neutral geography include Cameroon, Côte d'Ivoire, Ghana, Kenya, Madagascar, Malawi, Uganda and Zambia. States are of medium size and ethnic or cultural fragmentation persists. The rest of the states have favorable geography. Most states are small in size, with Guinea, Gabon and Congo-Brazzaville among the exceptions.

The other two variables belong to the group of physical variables. The first one tracks the composition of the daily diet. In many countries where the Green Revolution was successful, rice, corn and other grains accounted for well over 60 % of all calories consumed per day. Africans, however, have a significantly more varied diet and these crops on average make up only a third of the daily diet. The exception is Madagascar, where rice dominates and, together with other key items associated with the Green Revolution, accounts for about 61 %. The Gambia, Sierra Leone, Liberia, Guinea and Togo also perform relatively well, with rice leading the way and the overall share of key crops being around 42 %. Furthermore, Zambia, Malawi and Kenya favour maize and the share of key items is also at a good level, exceeding 40 %. Conversely, countries such as Burundi, Congo-Brazzaville, Gabon

⁹¹ It categorizes states according to population density and distribution, size and shape of the state. These categories should predict a state's ability to project its power over its entire territory or ethnic and cultural fragmentation (see Subchapter 4.4.1.).

⁹² In all states except Tanzania, there is a high degree of ethnic and cultural fragmentation. Tanzania still carries the legacy of Julius Nyerere's rule and ethnic identity is very low, the same can be seen with traditional authorities (see Subchapter 5.3.3.).

and Ghana are typical representatives of very diverse diets, limiting the prospects for a successful green revolution (UN FAO 2023; Otsuka et al. 2017). There is also an interesting situation with soil types. This thesis uses a typology originating from the USDA and selects five types out of 15 that are suitable for growing maize or rice. It is worth noting that the proportion of these suitable soil types to the total land in the Asian countries where the revolution was successful is around 95 %. In tropical Africa, the situation is somewhat more complex. Very unsuitable soil types such as oxisol or entisol are quite common here. However, there are countries that have a good coverage of suitable soil types. These include, for example, The Gambia, Côte d'Ivoire, Ghana, Togo and Nigeria, where the proportion of suitable soil types is around 75 %. Malawi, Tanzania, Madagascar and Kenya have average results. For the other countries, these are rather small parts of their large areas. Interestingly, Uganda, Rwanda and Burundi are considered to have very fertile soils. However, it is not very suitable for growing these key crops. This is confirmed, among other things, by the daily diet (USDA 2024).⁹³

Other control variables are political instability and foreign donor interference. The most unstable state is clearly Nigeria, where terrorist groups operate. Other states where tensions are high including Côte d'Ivoire, Cameroon, Burundi and Kenya. Conversely, the most stable states include Madagascar, Zambia and Rwanda (IEP 2023). Another important variable is the influence of foreign donors, who are significantly involved in projects ranging from land registration to fertilizer distribution. Among the countries where they have had the greatest influence over the past decade are Rwanda and Liberia. Rwanda in particular is known to be a popular target for development aid. Conversely, the countries receiving the least development aid are Nigeria, Tanzania and Cameroon (World Bank 2023).

The correlation itself first goes through the pre-calculations of inter-correlations that are necessary for partial correlation and then a final correlation controlling for all six variables that potentially bias the underlying relationship between the independent and dependent variables. However, it must be emphasized that due to the limitations of

⁹³ It may also explain the fact that although Rwanda has a very powerful state capacity by African standards, government investment in agriculture is weak. This may be because growing key crops for the green revolution could be too costly (see Subchapters 5.3.3. and 5.3.5.)

the data used, caution must be exercised in the actual interpretation of the correlation results. This is a synchronic analysis that does not compare data over time.⁹⁴

⁹⁴ For example, the resulting correlation in this case tells us that, for example, states with powerful land tenure have higher HDI rates. It does not examine the increase in HDI, only the current trend over the last decade.

Table 23 Pre-Calculations: Intercorrelations

	Modern Land Tenure (IV ₁)	Customary-Focused Land Tenure (IV ₂)	Pro-Ag. State Cap.(IV ₃)	Fertilizer Use (DV ₁)	Machinery Use (DV ₂)	HDI (DV ₃)	No-Poverty (DV ₄)	Political Geography (Control ₁)	PG: Dietary Composition (Control ₂)	PG: Soil Type (Control ₃)	Physical Geography (Control ₄)	Instability/Conflicts (Control ₅)	International Development Aid (Control ₆)
Modern Land Tenure (IV ₁)				0.443	0.091	0.249	0.004	-0.084	0.259	0.482	0.536	-0.216	0.176
Customary-Focused Land Tenure (IV ₂)				0.402	-0.055	0.110	-0.081	0.032	0.242	0.452	0.502	-0.438	0.351
Pro-Agrarian State Capacity (IV ₃)				0.343	0.334	0.430	0.210	-0.030	-0.116	0.289	0.169	-0.028	0.070
Fertilizer Use (DV ₁)	0.443	0.402	0.343					-0.152	0.394	-0.086	0.160	-0.215	0.065
Machinery Use (DV ₂)	0.091	-0.055	0.334					-0.052	-0.027	-0.431	-0.359	0.011	-0.214
HDI (DV ₃)	0.249	0.110	0.430					-0.066	-0.289	-0.139	-0.280	0.146	-0.269
No-Poverty (DV ₄)	0.004	-0.081	0.210					0.178	-0.261	0.134	-0.045	0.152	-0.196

Values in bold represent all values of $p < 0.1$. The number of observations (N) is 21. The control variable, Physical Geography, is the average of the variables Soil Types and Dietary Composition. Variables IV denote Independent variables, DV are Dependent variables, and Control are control variables. The Pearson correlation coefficient was used for the calculation, with previous checks for normal dispersion of the data and normalization of all data to a 0 to 1 scale.

Table 24 Final Calculations: Partial Correlation

	Fertilizer Use (DV ₁)	Machinery Use (DV ₂)	HDI (DV ₃)	No-Poverty (DV ₄)
Modern Land Tenure (IV ₁)	0.459* (.074) $t = 1.931$	0.497** (.049) $t = 2.145$	0.662*** (.005) $t = 3.302$	0.126 (.473) $t = 0.643$
Customary-Focused Land Tenure (IV ₂)	0.416 (.113) $t = 1.690$	0.401 (.123) $t = 1.641$	0.695*** (.003) $t = 3.619$	0.087 (.748) $t = 0.328$
Pro-Agrarian State Capacity (IV ₃)	0.481* (.059) $t = 2.056$	0.567** (.022) $t = 2.573$	0.541** (.031) $t = 2.405$	0.192 (.477) $t = 0.731$

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The value in parentheses below the resulting correlation value is the p value indicating significance. The value underneath marked t denotes the t -statistic, again for the purpose of establishing significance. The control variables do not include the Physical Geography variable. Thus, the partial correlation shows IV and DV with Control₁, Control₂, Control₃, Control₅, Control₆.

Created and calculated by author. Data sources: World Bank (2019; 2020); WJP (2022); BTI (2024); IIAG (2023); UN FAO (2023); VDEM (2023); Prindex (2018); Afrobarometer (2019; 2022); UNDP (2022); Herbst (2000); USDA (2024); IEP (2023)

First of all, we focus on the results of the independent variable of modern land tenure. In terms of statistical significance, the results show a moderate relationship with fertilizer use (0.46). As mentioned, partial correlations can strengthen or weaken the relationship when controlling for other variables⁹⁵. In this case, the relationship is slightly strengthened compared to the original simple correlation in the pre-calculations. The only control variable that may have biased the correlation was Dietary Composition. Populations in the study states where dietary composition shows a higher proportion of calories from rice, corn, and other grains coincide with states where modern land tenure is better. In other words, the question arises whether fertilizer use is really influenced by legislation or rather by demand for specific crops – and thus farmers have a strong incentive to obtain fertilizer despite poor land legislation. An even stronger correlation was found for the introduction of farm machinery in the fields (0.50). The original relationship without the inclusion of control variables was almost non-existent (0.09). However, after including the control variables, the relationship changed to moderate. In the first place, there is no significant positive relationship between farm machinery use and control variables, which should have disturbed the main correlation. What is more, there are strong negative relationships that strengthen the final partial correlation. The dependent variable HDI shows the strongest relationship (0.66). The latter was relatively insignificant in the original simple correlation (0.25). However, it subsequently turned out that no control variable disturbs this relationship and, what is more, even strengthens it. A non-significant relationship figures with the poverty rate. Here, perhaps the main handicap of the correlation is that poverty is not compared over time, as its change over time would show more about the relationship.

Another independent variable is Customary-Focused Land Tenure. This is data from the Comprehensive Land Tenure Index, but customary tenure has the same weight as other forms of land tenure. There is only one statically significant relationship with the dependent variable depicting HDI (0.7). However, this is the strongest of the entire analysis. We might tentatively suggest that the recognition

⁹⁵ See Subchapter 4.4.

of traditional authorities together with powerful land tenure institutions has a significant effect not on one-off fertilizer use or machinery, but on longer-term development. However, it should be added that here too the relationship should be verified not by the current value of the HDI but by its growth since the rights were recognized (mostly during the 1990s). The absence of other statistically significant values indicates that the recognition of customary tenure does not have as significant an impact on the early aspects of the Green Revolution as the spread of fertilizers and farm machinery. This might suggest that, although it is debatable whether traditional authorities are indeed an effective mediator between rural populations hence farmers and the state apparatus. However, another possible explanation is that although many states recognize customary tenure, they are probably not exploiting its potential to disseminate new technologies. It is worth adding that many states that formally recognize customary tenure still have unsatisfactory records of treatment of these communities. Arbitrary land expropriation outside the legal framework is common even in etatist-traditional land tenure regimes.⁹⁶

The last independent variable is Pro-Agrarian State Capacity, which examines only state capacity and state orientation towards rural economy and agriculture in particular. The independent variable aims to isolate state capacity from the quality of land legislation, recognition of traditional institutions, and inclusiveness of state institutions. We are only concerned with the raw power of the state projecting its power and its orientation towards agriculture. The results are quite strong compared to the other variables. The independent variable shows the strongest relationship with fertilizer diffusion (0.56) and farm machinery diffusion (0.57), but lags behind the other independent variables in the HDI (0.54). An interesting explanation offered here is that we observe a trend whereby the brute force of the state is more effective in agricultural objectives such as fertilizer and machinery dissemination, but good land legislation and recognition of traditional institutions are necessary for long-term comprehensive development, which in our case is captured by the HDI. Of course, given the limitations of this thesis

⁹⁶ See Subchapter 5.2.

mentioned several times, one just needs to be particularly cautious in these somewhat ambitious conclusions.

A second correlation analysis follows, which aims to at least partially compensate for the pitfalls of synchronic analysis and attempts to incorporate a time perspective. Specifically, it will address the much-discussed topic of the importance of traditional authorities and the recognition of customary land tenure. The correlation will include five states with clearly defined years when customary rights were frequently and fully recognized. These states are Ghana, Angola, Zambia, Mozambique and Uganda. Thanks to comparing over time, we have 258 cases of observations. All variables are identical to those in the previous correlation except for the observation of political violence. In this case, the data comes from the Center for Systematic Peace, which also offers historical data.

However, as shown in the following table, the resulting partial correlation did not confirm any relationship between the recognition of customary rights and increased use of fertilizers or machinery. It is noteworthy that the original simple relationship between the independent and dependent variable is moderately strong (0.39 and 0.34 respectively). However, after controlling for other variables, it is essentially non-existent (-0.03 and -0.05). The inter-partial correlation revealed the confounding nature of the control variables. For example, within Angola and Mozambique, customary rights were only recognized after the end of the devastating conflict. This evokes the question of whether a change in legislation or rather simple peace has an impact on fertilizer diffusion. This is linked to development aid. At the very least, this has proven insufficient to demonstrate the impact of the recognition of customary rights on development, or in our case, the prospects for a green revolution.

Table 25 - Pre-Calculations: Intercorrelations (2)

	Customary Rights Recognition (IV)	Fertilizer Use (DV)	Machinery Use (DV)	Political Geography (Control ₁)	Dietary Composition (Control ₂)	Soil Type (Control ₃)	Political Violence Non-Occurrence (Control ₄)	International Development Aid (Control ₆)
Customary Rights Recognition (IV)		0.392	0.338	0.183	-0.164	-0.010	0.449	0.426
Fertilizer Use (DV)	0.392			0.263	-0.158	-0.142	0.388	0.378
Machinery Use (DV)	0.338			-0.278	-0.078	0.673	0.306	0.256

Values in bold represent all values of $p < 0.1$. The number of observations (N) is 258. Variables IV denote independent variables, DV are dependent variables, and Control are control variables. The Pearson correlation coefficient was used for the calculation, with previous checks for normal dispersion of the data and normalization of all data to a 0 to 1 scale.

Table 26 - Final Calculation – Partial Correlation (2)

	Fertilizer Use (DV)	Machinery Use (DV)
Customary Rights Recognition (IV)	-0.028 (.635) $t = -0.486$	-0.048 (.861) $t = 0.861$

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The value in parentheses below the resulting correlation value is the p value indicating significance. The value underneath marked t denotes the t -statistic, again for the purpose of establishing significance. The control variables do not include the Physical Geography variable. Thus, the partial correlation shows IV and DV with Control₁, Control₂, Control₃, Control₅, Control₆.

Created and calculated by author, Data sources: World Bank (2019; 2020); UN FAO (2023); UNDP (2022); Herbst (2000); USDA (2024); CSP (2023); LandPortal (2023); USAID (2023)

7. Concluding Reflections

The Green Revolution in many Asian countries represented not only an increase in agricultural production but also a significant means of expanding state capacity and economic development. This thesis examines a similar phenomenon on the African continent, specifically in its tropical zone. It explores the prospects of the Green Revolution through the formalization of land ownership and rights. The research is structured into three main parts. The first part focuses on the categorization of different land tenure regimes from a legislative perspective. The second part analyzes land tenure performance, concluding in the creation of the so-called Complex Land Tenure Index. The third part of the research attempts to demonstrate the relationship between land tenure regimes and characteristics associated with the Green Revolution by means of partial correlation. The breadth of this work reflects the complexity of the examined topic and was essential for achieving the original objectives.

Historically, land formalization has been an inherent part of state-building. By registering land, the government was better able to collect taxes and finance other projects. Formal land tenure gradually ceased to be a profitable asset not only for the rulers but also for the farmers themselves. With land, they could begin to focus on cash crops, trade land better, settle disputes efficiently, and borrow money from banks. These and many other privileges led to a dramatic increase in agricultural productivity. The surplus of agricultural products meant that fewer people could work in the fields and take up new crafts. Virtually all economically advanced countries have fully formalized land and can exploit its full potential. According to the eminent economist Hernando de Soto (2000), it is the formalization of property that is the main difference between the economically underdeveloped developing world and the prosperous developed world.⁹⁷

The Green Revolution became a widely discussed topic, especially in the 20th century when, in the context of the Cold War, Western countries spread new varieties of rice, maize and related fertilizers to developing countries to mitigate the

⁹⁷ See Chapter 2

land reforms pushed mainly by Marxist organizations. This required state capacity and a certain level of land registration so that fertilizers could be efficiently distributed where they were needed. The Green Revolution was an undeniable success and many states transformed it into comprehensive economic development that created the conditions for successful industrialization. An illustrative example was Suharto's Indonesia, which became an economic tiger despite its unkind geography. But Africa had long lagged behind other world regions, and the first partial successes came only in the new millennium. However, these were successes in the agricultural sense, not the comprehensive development successes of other regions. The main hypothesis of the thesis was that the main difference between Asia and Africa was not so much geography as institutions.⁹⁸

The foundation of modern land institutions was established during the colonial period. Many Asian states experienced a different type of colonization compared to Africa, primarily driven by the colonizers' motivations. In Asia, colonization was often driven by practical necessities. For example, densely populated Japan at the end of the 19th century needed to ensure food security and maintain a buffer zone of colonies for geopolitical reasons. Japanese officials in colonies like Korea and Taiwan focused on formalizing land, creating surpluses, and developing the colonies. Similarly, the Netherlands held Indochina to generate revenue, with profits accounting for half of the Dutch state treasury in the mid-19th century, laying the groundwork for strong institutions. In contrast, Africa was colonized later due to its harsh environment and diseases, rather for prestige. Land formalization largely existed only for European settlers. Colonial powers lacked the capacity to govern the vast continent effectively, leading to alliances with traditional authorities whose power grew significantly. The challenging African environment necessitated that these authorities maintain unity based on shared identity, which influenced land tenure. Attempts at massive land formalization and commercialization occurred post-World War II during decolonization, but this period was brief, limiting colonial powers' intentions. Newly independent African states, unlike their Asian counterparts, inherited weak institutions and predominantly customary land tenure,

⁹⁸ See Chapter 1

hampering land commercialization and formalization. And this legacy persists to the present day, still generating difficult initial conditions for successful land registration, powerful state institutions and the prospect of an African Green Revolution coupled with comprehensive economic development.⁹⁹

Since the research was primarily based on the ideas of Hernando de Soto, it focused on exploring the links between land tenure in Africa and the prospects of the Green Revolution associated with comprehensive development.¹⁰⁰

It was necessary to establish a framework for land tenure to assign it a numerical evaluation, which could then be used for subsequent correlation analyses. First, land tenure was categorized according to how the legislation treats private, state and customary tenure. As a result, five categories were identified into which the states under study could be placed. Among the categories were states with statist land tenure regimes that recognize only state ownership of land. Then there are the statist-traditional land tenure regimes, i.e., states that formally recognize only state and customary land tenure. These are followed by Modernist land tenure regimes, which recognize only state and private land ownership, and Mixed land tenure regimes, which recognize state, private and customary land tenure. The fifth category is called the Specific Case of Rwanda. Rwanda is the state with the most remarkable historical trajectory regarding land tenure. The country's legislation is by far the most sophisticated and is becoming an African leader in property rights. In many ways, it is more akin to land tenure in the most developed African countries such as Mauritius, South Africa or Botswana. For these reasons, too, it has been very difficult to compare Rwanda with other countries in tropical Africa.¹⁰¹

This was followed by a justification within each country examined as to why it belonged to a particular category. The historical and political context of their land tenure was also outlined. A number of interesting insights into African land tenure can be gleaned from this comprehensive section of Chapter Four. Although the thesis sees land registration as an important basis for further development, in many

⁹⁹ See Chapter 1, 2 and Subchapter 5.1.

¹⁰⁰ See Chapter 3

¹⁰¹ See Subchapter 3.2. and 4.1.

African societies, registration is limited by the complex environment of customary tenure. Rural people themselves do not have much understanding of the benefits of land registration. They themselves do not have the necessary knowledge to realize the full potential of formal land tenure. In Malawi, for example, land registration has caused a number of conflicts and in Madagascar it was one of the important factors in the 2009 coup d'état. Demand for registration occurs in areas of high population density where traditional authorities are failing to settle disputes. Land registration can itself be a catalyst for conflict, as private property is often written to one person in a community who suddenly becomes the absolute owner of the land and often abuses his or her power. Likewise, land formalization is not only an economic but also a political tool. A typical example is Côte d'Ivoire, where laws were passed in the 1990s that vehemently promoted private ownership. The rationale was to legally confirm that as much land as possible would come under the absolute control of the original population and that immigrants would lose their positions. Positive shifts can also be observed. In countries that have experienced disasters such as civil war or genocide, post-conflict development is incredible. For example, Rwanda's post-conflict trajectory has been incredible; even many Asian states have not accomplished what Paul Kagame did in the first 20 years after the genocide. In Liberia, the most progressive laws are being created to protect traditional authorities and to encourage cooperation between the state and them.¹⁰²

This was followed by quantification of land tenure performance. This consisted of 53 indicators classified into four interacting main dimensions. The first dimension focused on assessing land legislation, the second dimension on state capacity and the pro-agrarian orientation of the government, the third dimension on quantifying the strength of traditional institutions, and the last dimension on assessing the inclusiveness of state institutions. Aggregate indices were created from all dimensions and a final comprehensive land tenure index was created. The comprehensive index could not be expressed as a single number that would summarize everything. Because of the different nature of some of the dimensions, the evaluation of the comprehensive land tenure index takes the form of two letters

¹⁰² See Subchapter 4.2.

on a scale of A to F. The first letter indicates the performance of modern tenure, i.e., private and state tenure, and the second letter the situation of traditional authorities. Rwanda scored the best. The land legislation of this small country is a minor miracle compared to other countries in tropical Africa. The land registration process is even cheaper and faster than many European countries, including the Czech Republic. Rwanda also has a very good cadastral infrastructure, where all relevant data is available online. It has the best legislative mechanisms for land disputes, expropriation and transparency. The country has also managed to build a strong state capacity since 1994, which is one of the most efficient on the continent. However, there are downsides. The first is that the government has increasingly abused its achievements since about 2013. Laws are being passed where the government can expropriate land more easily, and powerful state capacity is being used to over-control unreliable citizens. Rwandan farmers have the worst level of freedom among the countries surveyed in terms of freedom of expression or the establishment of interest groups. Kenya and Ghana also scored very well. A form of disappointment was Malawi, which has been unique in its strong support for private property since independence. However, there has been no effort to build institutions to legally support such ownership. The country has a very poor cadastral infrastructure. For example, there is no interconnected land registration database system, so there is a lot of confusion and disputes. Nor does the country have an executive state capacity to effectively enforce legislation throughout its territory. Nigeria and Burundi are among the worst land tenure countries ever. Traditional authorities have influence over a significant majority of the rural population, yet the state fails to recognize and ignore them. State institutions are weak and land legislation inadequate. People here have to pay exorbitant sums and go through many procedures to formally register their land. Add to this the enormous population pressure and the increasing intensity of land disputes, and the situation could become serious in the future. In general, the situation in tropical Africa is poor compared to other regions. States are certainly not investing as much in agriculture as many Asian countries did at the start of the Green Revolution, and reforms are proceeding very slowly. An interesting demonstration of this situation is the resettlement of some white South African farmers in the 1990s and 1990s to Congo-Brazzaville. Although they acquired huge amounts of land, the vast majority did not last and left. They were unsure of their ownership, as Congo does not

recognize private property, and had to settle for living on a mere state lease. So the state could simply expropriate the land. Furthermore, the almost non-existent infrastructure made the crops grown dramatically more expensive and prevented the spread of fertilizers and new varieties. Last but not least, they came into conflict with the local population who farmed their land without knowing what land belonged to whom. Vague legislation, poor cadastral infrastructure and a corrupt environment would make it very difficult to take a dispute to court. This is a typical example of how land institutions work in most countries in tropical Africa.¹⁰³

The last part of the research was correlation analysis. This examined the relationship between land tenure and factors related to the Green Revolution. Due to the smaller number of cases, regression analysis was not chosen, but a more advanced form of correlation analysis, i.e., partial correlation. The latter has the advantage of including confounding variables that control for the main relationship between the independent and dependent variables. Of course, correlation had its limitations, and the author interpreted the results with particular caution. As it turns out, state capacity alone has a moderate effect on the primary factors associated with the Green Revolution. That is, as the strength of state capacity increases, the number of fertilizers used and farm machinery on the fields increases. Conversely, quality land tenure, even with the recognition of traditional authorities, does not have as much of an impact on the primary factors mentioned above as it does on longer-term comprehensive development as expressed in Human Development Index units. This would mean that the quality of land tenure matters as a trigger not for the Green Revolution as an agricultural phenomenon, but as a phenomenon with a complex character accompanied by long-term economic development.¹⁰⁴

In conclusion, this highly extensive thesis explored an equally comprehensive topic. A topic that linked land tenure to the prospects of an African Green Revolution, not in a purely agricultural sense, but in a complex sense linked to economic development. That is, the kind of green revolution that has taken place in many Asian countries. I believe the potential of this perspective is very relevant and

¹⁰³ See Subchapter 4.3.

¹⁰⁴ See Chapter 5

the topic certainly deserves further and more detailed research to better demonstrate the relationship between these factors.

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