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Colonial Crop, Maize: Land Appetite and Economic Subsidies in Colonial Kenya: 1895 - 1965.

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Colonial Crop, Maize: Land Appetite and Economic Subsidies in Colonial Kenya: 1895 - 1965

A thesis submitted in partial satisfaction of the requirements for the degree Master of Arts In African Studies

by

Alex Oloo

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ABSTRACT OF THE THESIS

Colonial Crop, Maize: Land Appetite and

Economic Subsidies in Colonial Kenya:

1895 - 1965

by

Alex Oloo

Master of Arts in African Studies

University of California, Los Angeles, 2020

Professor Michael Lofchie, Chair

Kenya depends on agriculture for food production. It is an industry that is currently occupied by smallholder farmers, unlike the colonial era. The smallholder farmers averagely cultivate less than one hectare of land. For the smallholder farmers, farming is a household activity implemented at the subsistence level. However, because the Kenyan economy depends mostly on agriculture, national food security is pegged on the availability of adequate maize supply to meet the food demand.

This primarily historical study aims at examining the successful introduction of the food staple maize crop in Kenya, drawing selectively from an extensive published scholarly literature about crop changes and related policies that were put in place to boost maize productivity. The

thesis focuses on land acquisition by European settlers in the early 1900s, the development of White Highlands, Kitale, and other significant areas where maize production made an essential impact on the food economy. The thesis concentrated on the development of the maize crop between 1895 to 1965, the period when maize became the dominant food crop in Kenya, the use of technology, and other public investments like seed company that led to the legacy of maize growing in the post-independent Kenya.

The period of 1985 – 1965 is significant in understanding the introduction of white maize and transition from traditional crops like sorghum and millet to maize. It is essential for understanding why white maize is preferred in Kenya, how maize farming changed Kenya's economy to an agriculture economy and the evolution of maize politics in Kenya.

This thesis of Alex Oloo is approved.

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2020

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1. Background

Maize consumption in large parts of Africa has increased tremendously since the introduction of the crop from the Americas in the 1600s[1] . In Kenya, maize has become the most important crop, contributes over 20 percent of total agricultural production, and provides over 25 percent of total agricultural employment. Maize constitutes a consumption of 125 kg per capita per year in Kenya (Byerlee and Eicher, 1997), and the national food security is pegged to the availability of adequate supply of maize to meet domestic demand. In both small-scale and large-scale maize farmers, the crop is grown in almost all agro-ecological zones (CIMMYT, 1990, 1992). However, in Kenya up to 1960s, large-scale farming which was mostly done by the white settlers catered for the marketed maize. The settlers' maize was destined for the export market and local markets. For instance, the government stock reserve was supplied by the settler farmers. Native Kenyans who were mostly small-scale farmers, their produce served mainly for local consumption. The policies that controlled the market worked against the native farmers such that they could not sell their produce. However, in the post-independence, Kenyan farmers revolt and changed from large-scale farming to smallholder farming. The revolution happened because the smallholder farmers believed that with the majority rule, the same benefits of controls for the settler farmers during the colonial period could also promote the welfare of the millions of smallholder farmers if it were simply expanded (Jenkins 1999).

Maize in Kenya was introduced by the turn of the 20th century, and by 1903, it occupied 20 percent of the total agricultural area (Karanja, 1996). By 1990, maize occupied 79 percent of

[1] maize was introduced to Africans in the 16th century through along the western and eastern coasts and gradually moved inwards as a ration with the slave trade (Miracle 1966).

cereal crops produced in the country. The tremendous increase of maize production is attributed to several reasons; 1) the ease in cultivation compared to traditional cereals like millet and sorghum, 2) its easy storage which involves traditional granaries unlike small grains that required the use of special containers like traditional pots or baskets before storage in the traditional granaries, maize are dried on the cobs and stored in the granaries without special containers, 3) limited diseases and pest; many seed-eating bids easily eat traditional crops because of their tiny grains unlike maize which has larger grains that makes it harder for the birds to feed on the crop and 4) utilization of maize in various forms; maize can be boiled, roasted or grounded and the flour used for making different types of traditional bread. However, the success of maize production in Kenya is the availability and adoption of modern maize technologies, especially the use of fertilizer and hybrid seeds that was supported by public funds (Karanja, 1996). According to Karanja, the Kenya Seed Company (KSC) produced hybrid seeds as one of the major success stories in agricultural research in Kenya, as Kenya being the first country in the African continent to venture into the improved seeds that ended up improving the maize production.

The presence of the European settlers in Kenya in the early 1900s jumpstarted large-scale farming in many parts of the country. Unlike Southern Rhodesia (later to be known as Rhodesia then Zimbabwe) which was referred by then as a ‘sergeant's mess,' which reflected its hands-on, rough and ready attitude, Leo (1984) argues that Kenya provided the European settlers with a suitable environment for officers and gentleman. The suitable climate encouraged many white settlers to move to East Africa. With this influx of the Europeans into Kenya after a series of marketing Kenya abroad, many of the Europeans ventured into farming. The marketing and exposure of Kenya opened up large-scale farming, including mixed farming (dairy and crops) in some semi-arid areas. It also changed the land ownership system for the native Kenyans and created the White Highlands (Scheduled Areas). The White Highland became mostly occupied by European settlers while native Kenyans were relocated to the 'native reserves' which later became the source of cheap labor for settlers' farms.

Marketing Kenya in South Africa and England became a success to the colonial government in Kenya. The response of people who wanted to move in and the farm became promising. However, as the colonial government continued to market Kenya as a place with the best land for agriculture, the alienation of the native Kenyans from their ancestral land also intensified. The demand for land continued to rise, and land control policies and several measures to accommodate the influx of the settlers were being put in place. The determination to make Kenya a 'white man' country was in the offing as many South Africans of European descent responded and moved to the Kenyan highlands, (Sorrenson 1968, Okoth-Ogendo 1991, Leo 1984).

The occupation of Kenya's white highlands and eventual farming of maize can be defined into three historical phases. From 1900 through 1965 period, when maize became the dominant food crop. This phase involved the introduction and transformation from the traditional crops like sorghum and millet to white maize, policy changes, land acquisition, and marketing control. The second phase involves the expansion of smallholder maize production. This period is the post-independent phase of the 1965 – 1990 period when most colonial policies were extended to the smallholder farmers to increase maize production. And phase three starts from 1990. This phase is characterized by a combination of unfavorable weather conditions, declining public investment in agriculture research, subsidy reductions, and erratic policies, which have precipitated a decline in maize productivity in Kenya. This thesis focuses on phase one of the maize production in Kenya that forms the White Highlands basis.

The White Highlands (Scheduled Areas) became the cornerstone for agricultural produce that supported local and international markets (Leo 1984). The eagerness to farm led to the colonial administration developing an industry based on the notion of large-scale farming carried out to benefit white farmers, thus seeing native Kenyans only as farm laborers. This farming model had all kinds of issues relating to the establishment of large-scale capitalist farming, which would be the legacy of maize farming in post-colonial Kenya. It also impacted the development of race and class relations, and the emphasis on land tenure and changes in the traditional land system carried over into the post-colonial era—for example, the freehold system as opposed to communal tenure.

What are the primary factors that explain the emergence of maize production in the colonial and post-colonial era? One of the leading factors was the economic subsidies and protections that the colonial government made available for the European farmers to improve on the maize production. And last, what implications did this have on the colonial and post-colonial economy of Kenya? Answering these questions is essential because they help us in understanding the effect of maize production in Kenya. Understand the policy changes that have led to the heated maize politics in Kenya today, to plan well and advice on future agricultural investments as Kenya's economy still depends heavily on agriculture.

By using library research, archival research, and one-on-one interviews, the thesis will answer these questions by describing in detail the evolution of maize production in Kenya focusing on phase one (1985 – 1965) of the maize production period. This phase is essential in understanding how maize farming took over from the traditional crops and how maize production turned Kenya into an agricultural economy. It is also crucial for understanding the maize politics, which is one of the thorny issues in Kenyan politics today.

The thesis critically analyzes land adjudication and acquisition practices describing the formation of the White Highlands, 'Scheduled Areas,' and mixed farming in the semi-arid areas. The thesis concludes with a discussion of the economic subsidies offered to the settler farmers that effectively contributed to the maize production. Economic subsidies to look into are 1) ready market for maize, 2) cheap labor, 3) crop monopoly, and 4) transportation. All this will lead to the understanding of the establishment of large-scale capitalism farming, which would be the legacy of maize farming in post-colonial Kenya (phases two and three in the historical study of maize production in Kenya).

2. European Land Acquisition and Policies

At the beginning of the colonial era, individual land ownership in Kenya was seen as a safe bet for white settlers and a form of economic security. Esther Mwangi (2005) in *Transformation of Property Rights in Kenya's Maasailand: Triggers and Motivation*, argues that socio-economic conditions such as the increase in land value and demographic pressure have triggered individuals or community groups to resort to privatizing or individualizing their property rights. That argument is in contrast to how Kenyans owned and used their land in the pre-colonial era. Mwangi's views reflect the changes that started in Kenya during the colonial period and continued to occur even in the post-colonial era. In the post-independent age, land ownership has changed hands as a result, and it has not been easy to trace the original owners. Many policies have been put in place to control land use. Some of these policies can be traced back to pre-colonial times, but their effects are still being felt in Kenya today. For instance, the Native Lands Registration Ordinance and the Land Control (Native Lands) Ordinance (Okoth-

Ogendo, 1991). The former introduced a system of registration of the land title in the English model to be applied on land after establishing the procedures of adjudicating the land titles.

At the beginning of the millennium, due to land consolidation by the European settlers, several policies were introduced that altered land ownership. Historically, native Kenyans lived and worked on the land, and the land-tenure arrangements have always been governed by customary law until recently in the 1950s. As the Europeans traversed the country in the late 1800s, they were impressed with the vast land, and many of the explorers viewed Kenya as having the land potential for agriculture. This view was later followed by farming tests that led to the discovery of the country to be more valuable than previously known.

East African countries that include Kenya, Uganda, Tanzania, Rwanda, Burundi, and South Sudan (former part of lager Sudan) are known to have almost a similar weather pattern. However, when it comes to European settlement in the 1800s, the European settlement in Kenya did well than in other East African countries. Okoth-Ogendo (1991), a Public law professor at the School of Law, University of Nairobi compared other East Africa nations (Uganda and Tanganyika 'now mainland Tanzania') with Kenya as to why it was viable for the white farmers to settle and farm in Kenya than those other East African countries. Okoth-Ogendo noted that in the case of Uganda, the eco-climatic conditions which were deemed to be 'unattractive' to the Europeans were a factor in their settlement. He also noted that the presence of the missionary alliances with indigenous people did not allow a large number of European settlers to move into Uganda. Their settlement in Uganda was seen as a competition between the missionaries and settlers.

In the case of Tanganyika, he noted that the enforcement of the League of Nations Mandate[2], which was assumed in 1923, contained the British land policy. The other was a political factor. He noted that the political structure of the indigenous societies in Kenya compared to Tanzania and even to other British protectorate made it easier for the settlers to colonize and explore Kenya without using any force. There was less resistance by Kenyan societies as the British explored the country compared to other territories where they experienced resistance that led to some of the major wars. For instance, in Southern Rhodesia (now Zimbabwe) and South Africa where force was used, for example, the Second Boer War[3]of 1899 to 1902 between the British Empire and the two Boer states; the South African Republic (Republic of Transvaal) and the Orange Free State. It got rid of the customary law, the laws which Europeans viewed as a hindrance to farming, and introduced freehold or individual land ownership with titles.

As the number of European settlers increased, a series of land policy changes were accompanied by the relocation of indigenous communities in the years to follow. The *Crown Lands Ordinance* (Sorrenson, 1968), which Sorrenson termed as "vague" because it did not elaborate what Crown Lands stands for but was understood within the context of the 1901 Order was seen as a breakthrough to control land in Kenya. This breakthrough marked the beginning of the major land acquisition by Europeans. The acquisition happened after many deliberations between the colonial office at the local level and His Majesty. The colonial government

[2] A League of Nations mandate was a legal status for certain territories transferred from the control of one country to another following World War I, or the legal instruments that contained the internationally agreed-upon terms for administering the territory on behalf of the League. https://resources.saylor.org/wwwresources/archived/site/wp-content/uploads/2011/06/League-of-Nations-Mandate.pdf

[3] Some of the factors that led to the war were the conflicting political ideologies of imperialism and republicanism, the discovery of gold on the Witwatersrand and tension between political leaders.

desperately needed some authoritative order to control the land. The Ordinance gave the Commissioner more powers over land. And by authoritatively applying the Crown Lands Ordinance of 1902, the colonial government acquired large tracts of land. Later notices were issued in South Africa and Britain that land for agriculture was available for purchase or lease in Kenya. The colonial government then started the sale and leased agreements to settlers by issuing a certificate of occupation for 21 years, which was later extended to 99 years. The use of sale and leased agreement marked the beginning of the organized settlement within the jurisdiction. And with the completion of the Uganda railway from Mombasa through Kenya's highlands to Port Florence (Lake Victoria) in 1903, the Indian traders and European settlers in Kenya's highlands surged (Okoth- Ogendo 1991, Sorrenson 1968).

After vigorous marketing of Kenya's agricultural land in South African and Britain, the settlement in Kenya attracted mixed people consisting of three main groups, as noted by Okoth-Ogendo and Sorrenson. First, the small group they classify as "upper-middle-class plantation-type elite," which mostly came from Britain. This group was regarded as 'men of means' as they were able to come to East Africa and work on land without government subsidy (Lord Delamere[4] was one of the people of means that moved to Kenya), (Okoth-Ogendo, 1991 and Sorrenson, 1968). Their wealth and social standings enabled them to influence politics, and that helped them to accumulate a large amount of land compared to their small proportion.

The second group who responded to the advertisement of land happened to be white South Africans with British decent, but later they were joined by the Boers[5]. The movement from

[4] Lord Delamere was the son of Hugh Cholmondeley born in April 1870 and died in Kenya in 1931. He moved to Kenya in 1901with the second wife, Emily Seymour, daughter of Sir George Hamilton Seymour, and acquired vast land holdings from British Crown.

[5] Boers are members of the Dutch and Huguenot population that settled in southern Africa in the late 17th century.

South Africa, Sorrenson argued, was also influenced by the Anglo-Boer war. South Africa was too hostile even though the British were victorious in the Second Boer War. The third group to move to Kenya was the large syndicate controlled by multinational companies based in Britain (Sorrenson, 1968).

As the number of immigrants from both South African and British to Kenya increased, it became a challenge for the colonial government to accommodate them all. The group became unruly, and it forced the Commissioner and the land surveyor had to work tirelessly to accommodate their land appetite and demands. The work involved, among other ways, changing the leasing terms and the size of the land the settlers could acquire. In the process, African land rights continued to be ignored and violated. After 1915, Africans were said to be mere 'tenants-at-will' of the state, and after that, the beneficiaries of a trust established by the state to administer the land they occupied and this continued throughout the colonial period (Sorrenson 1967, Okoth-Ogendo, 1991, 45)

3. The Establishment of the White Highlands

For the Europeans to gain control over the Kenyan communities, they had to explore Kenya's inland. The exploration was made possible by several means. The most noticeable one was constructing the railway line from Mombasa through the Kenyan highlands to Western Kenya (Lake Victoria) and later continued to Jinja in Uganda. Thus, the railway was later named Uganda Railway. The railway line opened up many parts of the country for the Europeans in the early 1900s, and many of them were amazed by the variation of unexplored Kenyan highlands. The Kenyan highlands were deemed more suitable for agriculture as the area received a higher amount of rainfall than most of the regions along the railway line from Mombasa to Nairobi. Sorrenson noted that as early as 1896, the European explorers started settling on the southern district of Kikuyu country that sits on the highlands. By 1899 when the Uganda railway line reached Nairobi, the number of Europeans increased, and many of them started looking for land for commercial agriculture.

However, the quest for land at this time caused much confusion amongst the Europeans. Many of them were coming across the Kikuyu's for the first time, and they did not understand the kind of land tenure system the Kikuyus had in place. Hans Ruthenberg (1966), Sorrenson, and Okoth-Ogendo (1991) argued that the settlers did not want to settle in the land Africans did not settle in because the unoccupied land had less water and was infested by ticks. Europeans argued that the African occupation of land was a sign of good soil. However, with other nomadic communities like Maasai, this did not apply, but the Europeans did not understand their lifestyle either.

The misunderstanding of Kikuyu's land tenure system forced the first Europeans to acquire land in Kikuyu country for commercial or agriculture to 'buy' it from Kikuyus. The transaction was reported to be worth five cows, three bales of 'Mericani,' four loads of beads, and four loads of brass wire. This kind of transaction was later used by many settlers who wanted to settle within the Kikuyu country and other parts of the country. However, the 1915 land Ordinance (Okoth-Ogendo, 1991) that stripped all of Africans the right to their land and aided the establishment of the White Highlands was in the full course. Colin Leys (1974:29) quoting Sorrenson, gave the figure of European settlers in Kenya's highlands between 1903 to 1953 (Table 1.1) to be increasing as the number of lands acquired to create White Highlands also increase.

White settlement in the Kenyan Highland

	1903	1915	1920	1934	1942	1953
Settlers' (approx.)	100	1,000	1,200	2,000	3,000	4,000
Occupied' acreage	?	4.5m.	3.1m.	5.1m.	6.3m.	7.3m.

acreage is in millions Table 1.1

4. The White Highlands

The White Highlands, also known as the Scheduled Areas in Kenya, covered over three million hectares of land (Leo, 1984:4), which was divided into 3600 farms and ranches. Leo notes that the land owned by whites was averaging 400 hectares and upwards to 12,000 hectares. The European area covered about one-fifth of Kenya's highlands, and it was sold intact (Leo, 1984). One thing that made the 'White Highlands unique was that the railway line connected all the major cities/towns. The connection made it possible for farmers to transport their farm produce to the local market as well as the international market through the port of Mombasa.

However, one thing that Sorrenson et al. agreed upon is that what made the White Highlands unique and helped form a tightknit within the Europeans was the lack of other means of communication and transport apart from the railway line. Unsurprisingly, apart from the railway line, moving in and out of the highland, was impossible for many settlers. The seasoned weather in the highland made the rocky, muddy murram roads impassable at times. Incidentally, the impassable roads locked-in European settlers on the highland. Many who needed the well-paved roads to move around and move their agricultural product as well were locked within the highland. Antagonized by this immobility, Leo (1984) notes that it led to the Europeans forming an exclusive social club within the highland. That exclusivity made the White Highlands a European paradise.

As the White Highlands was thriving in many ways and the number of Europeans increasing, the Africans who were still found within highland were mostly house servants or the farm laborers who lived in the native reserves. As the alienation continued, so did the imposed taxes (hut tax and other taxes). Leys (1974:31) noted that by the 1920s, more than half of the able-bodied men in two large communities (Luo and Kikuyu) in Kenya were working in the European farms in the Scheduled Areas. The systemic process was able to transform the self-reliant Kenyan peasants who were capable of producing their cash crops to become dependent peasants within a short time. In addition to being dependent, their wages were also too low compared to the settlers who were making large profits and also getting government subsidies.

What are the reasons for establishing the ‘White Highlands,' also known as ‘Scheduled Areas’? As we try to answer the question, it is essential to note that not all the Scheduled Areas were on the highlands; a significant number of the scheduled areas were also in Western Kenya, where crops like sugarcane were also planted. But for the White Highlands, Hans (1966; 3) argued that there were five reasons behind the establishment. First, the empty land in a healthy climate. The Maasai community and their cattle occupied the area, but because of their nomadic nature, the settlers thought they could make better use of the land. Second, Hans argued that by establishing the White Highlands, the colonists believed there was a chance to create a buffer zone between the feuding communities and that it could make the administration easier.

Third, pests and diseases control. As the Europeans moved to Africa, they encountered illnesses that they were not familiar with. The conditions affected early explorers, including the settlers. Hans argued that establishing the White Highlands was to group large farms close together to make it easier to control plant diseases, animal diseases, and theft. But it was also making it easier for the access of markets, creameries, and social events. Fourth, the establishment was to make the railway economically profitable by exporting farm produce from the large European farms even though the railway line was initially built for non-economic reasons.

Broadly, the White Highlands produced significant economic growth for the colonial government in Kenya for many years. For instance, in 1946, the Labor Government in Britain proposed a Ten Year Plan, which had many changes targeted towards the large farms. The large farm sector continued to be considered the mainstay of the economy, even in post-independent Kenya. The other reason that is not mentioned much was the proximity of Nairobi (headquarters) from the farms that gave many of the settler's double lives. Double life in that many of them could double as farmers and government administrators. Thus, allowing the immigrants to influence policies that favored them and their farming practices.

5. Maize Farming

Even though maize is a new crop in Africa, its rapid expansion has made it the most dominant crop and the most staple food throughout eastern and southern Africa. Its importance can be equated to that of rice in Asia.

In Kenya, the major transition from traditional crops like millet and sorghum to maize occurred during World War I (Byerlee and Eicher, 1977: 9). Maize was seen as a war crop, and the colonial government encouraged people to plant it. Also, during the war, Kenya experienced epidemic diseases that destroyed millet and sorghum, which led to famine. The famine forced Kenyan communities to consume stocks of millet rather than saving for planting. However, consumption of all the millet provided an opportunity for the colonial government to provide the maize seeds for farmers to plant as an alternative. The maize seeds provided were late-maturing white maize. The issuance of maize seed helped pushed for the transition from traditional crops to a maize-based food economy. By the end of the war, the production of maize had increased due to the development of the export market. Byerlee and Eicher note that by the 1930s, white maize became the dominant cash crop in Kenya, Tanzania, and southern Africa.

In many years to follow, maize continued to be the most important cash crop in Kenya and other African countries. After the 1930s, within two generations, maize consumption in Africa had reached 80%. The farming was done by both smallholders and large-scale farmers, where smallholders were mostly for subsistence and cash crop, while large-scale farming was for export.

Initially, in Kenya and other parts of Africa, maize was primarily produced in areas with large human populations, a high amount of rainfall and accessibility to transport. But as the consumption increased tremendously in many parts of Africa, the ignored semi-arid areas were opened up for maize production. Byerlee and Eicher quoting the International Maize and Wheat Improvement Center (CIMMYT) give three essential criteria that were/are used to classify the range of production environments in which maize is grown as altitude, maturity, and grain color and texture.

6. Early Maize Research in Kenya

As early as the 1930s, the colonial governments in Kenya and Rhodesia had embarked on maize research. The research was believed to be the beginning of the transformation in the maize production within the two African countries. Harrison (1970:28) argued that the research in Kenya and Zimbabwe was encouraged after the news of hybrid breeding success in the United States emerged. In 1949, Zimbabwe became the first country outside the United States to produce double-cross hybrids for commercial use, releasing Southern Rhodesia-1 (SR-l) from a breeding program started by H.C. Arnold in 1932.

In Kenya, the first scientific maize research program began in 1955 in Western Kenya (Kitale), the center for maize production in the White Highlands. The first modern maize type released from the center was Kitale Synthetic II, an improved open-pollinated maize variety (IOPV) released in 1960. It was based on inbred developed from the Kenya Flat White complex of farmers' selections. M.N. Harrison, the chief Kenyan maize breeder, felt "the need to widen the genetic base of the Kitale program," and while "nothing of value" had come from earlier testing of U.S. Corn Belt, European, South Africa, Rhodesian, and Australian materials, "the great diversity of center-of-origin material from similar ecological conditions to those of East Africa, close to the Equator with a wide range of altitude, had never been tried" (Harrison 1970: 38). Harrison continued to do more research, including taking trips to Columbia and Mexico in search of exotic breeding materials to crossbreed with Kitale Synthetic II. The breakthrough came in 1964 after doing over 124 top screenings. The result was a crossbreed between unimproved Ecuadorian landrace (Ecuador 573) and Kitale Synthetic II that gave rise to Hybrid 611. The yield advantage for this unique varietal hybrid over Kitale Synthetic II was 40 percent (Gerhart 1975: p.5). Varietal hybrids have lower seed costs than conventional hybrids, with lesser loss of yield advantage when recycled. Released on the eve of Independence, H611 diffused among large-scale and small-scale farmers in the high potential areas of western Kenya "at rates as fast or faster than among farmers in the U.S. Corn Belt during the 1930s- 1940s" (Gerhart 1975:51).

The success in maize research in Kenya (Kitale, Embu, Katumani, and Mtwapa) was contributed to the capacity and the continuity of the Kenya maize program staff, which was "probably unmatched in any national research in Africa" (Gerhart 1975). The maize breeding program had only two directors, F. Ogada and M.N Harrison, since its inception in 1955 to 1973. But in the earlier years, Rockefeller Foundation and USAID also helped in facilitating the exchange of germplasm between continents and also sharing new research experiences concerning hybrid genetics. The support connected the institution with other organizations outside the country, which boosted the research. These public investments in maize research involving institutions and international organizations and the consistency in the management of the research organization in Kenya paid off, unlike in phase three of Kenya's maize farming, where Kenya experience the decline in maize production due to lack of investments and support from the government. They boosted the quality of hybrid seeds leading to an increase in maize production (Kapfuma1994; Karanja 1996; Smale and Heisey 1994).

7. Settler Lobbies and Market Control

As the production and demand for maize increased in the 1930s, so did the government influence. The threat of competition from African farmers led the colonial administration to design and implement controlled marketing systems from the 1930s. The colonial government got involved heavily to control production, prices, imports, and export. A Maize marketing board was established and was given the sole power to export and import maize in Kenya and even other parts of Africa. Evidence from Kenya and other southern African countries like Zambia and Zimbabwe indicates that African farmers were capable of generating maize surpluses at a price lower than the production costs for most settler farms. Because of that, settlers' farmers successfully lobbied the colonial legislature for protection (Jayne at al. 1995). Surprisingly, in the beginning, in both Kenya and Rhodesia, settler consumer interest groups such as animal feeders and plantation farmers strongly opposed protection for settler maize farmers because the cost of maize will go up (Keyter 1975; Mosley 1975). And without doubt, within time, the settler maize producers' interest was increasingly well presented in the colonial legislatures. By 1935, the combination of maize legislation, land evictions, and land policies weakened Africans' position in food marketing in relation to that of settler farmers in Kenya (Mosley 1983; Jayne et al. 1995). The marketing acts that were lobbied (1) created state crop-buying stations in European farming areas without parallel investments in African farming areas; (2) enforced a two-tiered pricing scheme with higher prices for settler farmers than for native Africans; and (3) established restrictions on grain movement from African areas to towns and other demand centers (Mosley 1983; Jayne et al. 1995)

However, Leys and Sorrenson argue that despite the government's influence on maize marketing, it remained mostly in the private sector subject to minimal government regulations. But the rise of state maize marketing boards also encouraged the development of large-scale, grain milling industries using roller mill technology, which was first employed on a large scale in Kenya later in the 1950s.

By the 1920s, maize production in Kenya and most of the African countries got a boost when the hammer mill was introduced. It gave a cost processing advantage to maize over small grains (millet, sorghum),millet and sorghum husks required de-hulling first while maize could be dumped into the hopper for grinding (Shopo 1985). The large-scale industrial processing in Kenya and southern African countries continued to contribute to the preference of white maize in urban areas. Hammer-milled maize became the primary staple food in the grained self-sufficient rural regions of Kenya and many other African countries.

The continued growth of maize production in Kenya led to the formation of Kenya Seed Company (KSC). The company was formed by large-scale farmers in 1956 but agreed with the Kenyan government in 1963 to produce and distribute maize seeds (Karanja 1990). The organization employed many African small-scale storekeepers as their stockists.

Even though there were technical changes and policy enhancement on maize production in Kenya, defining appropriate factual “success" in maize production still exceedingly difficult due to three reasons. First, separating yield changes due to genetic yield potential from those associated with management practice changes is a methodological challenge, given their interactions, especially over larger geographical scales (Haggblade and Tembo 2002). Second, the rate of growth in observed maize yield understates actual yield gains. Without the use of the improved seed, maize yields are likely to decline over time due to declining soil fertility and pests, which would make it even more challenging to meet food consumption requirements as the population continued to grow (Gilbert et al. 1993). Third, the rapid uptake of improved maize seed in Africa has involved a complex interaction between technological, institutional, and policy innovations. Technical change cannot be analyzed separately from changes in the institutional and policy environment. It is nearly "impossible to separate the relative influences of technology, human capital, and institutional innovations with much accuracy" (Bonnen 1990: 263).

8. Kenya Seed Company

The colonial government needed to increase maize yield in Kenya, and that called for a need to invest in maize research. Kenya's public maize research expenditure and the USAID's technical support through to 1977 made the maize seed quality in Kenya a success. This institutional and scientific cooperation created a success story in the 1960s and the post-independence Kenya in the 1970s. Still, it collapsed with the withdrawal of USAID in 1977 and public financial support for research (Hassan and Karanja 1997).

In Kenya, Karanja contended that the maize seed released from the research continued to rise, but unfortunately, later, the rate of increase started to decline (Karanja 1990). The decline was because some of the plant breedings started being periodic rather than being routine. Noted also was that smallholder farmers who were mostly based in the marginal areas were further away from realizing yield potential. The low yield was not only because of the weather but also the genetic advances offered by breeding research had not been marched by the agronomic practices and efficient support service for smallholders (Hassan et al. 1998; Rusike and Eicher 1997). The use of hybrid seeds became too expensive for the smallholders and was only accessible to the large-scale farmers. There was no little advantage for farmers to use hybrid seeds if their yield potential in their soil was less than 1 ton.

Even though the seed company did well in providing varieties of seeds for various weather, smallholders who were mostly Kenyan farmers could not use them because the output was still lower than the input. Large-scale farmers enjoyed the subsidies that also helped them to make maximum profits. However, seed company has remained an important factor due to its research capacity, a diversified asset base, and collaborative technical agreements with a range of multinational companies (Rusike 1998).

9. Farmer Income

Every farmer in the colony had the intention of making a profit from their farm produce. For that matter, many farmers (mainly the settler farmers) used fertilizers and hybrid seeds to increase their productivity. However, their net income did not depend only on fertilizer and hybrid seeds; it also depended on direct and hidden subsidies that reduced the transaction cost. The (settler) farmers achieved impressive maize production growth episodes, driven by interacting innovations in technologies, policies, and institutions. Many of these episodes were even experienced in the post-1965 Kenya (phase two of maize production in Kenya).

After numerous subsidies on marketing, transportation, seeds, fertilizers, etc., the returns to land in maize cultivation increased dramatically. While in the areas where there were no subsidies like native farms, the returns to land in maize cultivation declined dramatically.

10. Economic Subsidies

Turning Kenya into a maize economy meant that the production of maize needed to be increased. Several policy measures were put in place to boost production. As small grains like millet and sorghum failed, and maize becomes more critical, the following advantages worked in the benefit of the settler farmers while taking away African farmers' rights, even as far as prohibiting them from farming maize. The subsidies were; 1) ready market for maize, 2) cheap labor, 3) crop monopoly, and 4) transportation.

i) Ready Market

The British starch market influenced the preference of consumption of white maize over yellow maize in today’s African consumers in the early 1920s. Masters (1994) argues that as early as 1911, the increasing demand and *price premia* were evident for white maize in the British starch market .The North American producers of yellow maize had a decisive transportation cost advantage in supplying Britain. And due to the premium provided to the white maize by the British starch market, legislation was passed in some parts of the region requiring that only white maize be accepted for export.

In the early times, both yellow maize and white maize varieties were grown by settlers. However, they were informed by the Secretary of the London Corn Exchange that exports required better grading uniformity (Weinmann 1972, pp. 19-20). Because maize cross-pollinates, farmers discovered that when the two varieties of maize (yellow and white) were grown within proximity, they cross-pollinate. The grains were mixed in color, rendering it unsuitable for export. Emphasis was given to the white maize as the British market was now readily available. Yellow maize was seen as a vital danger to the maize growing industry, and settler farmers reduced the yellow maize production and concentrated on white maize.

Changing Kenya to a maize economy also provided a ready market for the maize farmers. Small grains, like millet and sorghum, which were the Africans grains, were seen as labor intense with less output. As the colonial government managed to convert Africans to consuming white maize, it opened the local market to the maize farmers. The demand for maize also grew as many Africans abandoned their farms to work on settler farms in many parts of Kenya (Mosley 1983; Jansen 1977).

The enactment of the 1946 agricultural ordinance also stimulated the production of maize as it guaranteed maize market, producer prices, and credits to maize farmers (Byerlee and Eicher 1997, p. 89). The Maize Unit, under the maize marketing board, the board that was created to be the sole marketer for maize, purchased all maize at guaranteed prices, creating a readily available market for many farmers.

There were undoubtedly widespread benefits to maize farmers in Kenya. The rapid rate of population growth provided that ready market. Without the maize production, the rapid population growth would have resulted in a costly bill for the colonial government by importing food to feed its population. However, the ready market also triggered and encouraged more research on maize production in Kenya. For instance, the agronomic research and formation of the Kenya Seed Company (KSC) in 1956 and started producing and distributing maize seeds in 1963.

ii) Cheap Labor

In Kenya, settlers had luxurious lives compared to many other African countries. Most of them doubled as farmers and governors, and this was made possible by the availability of cheap labor and the close vicinity of Nairobi (governing headquarters). Some became 'armchair' farmers. Africans had to be compelled to work, partly by force, partly by taxation, and partly by preventing them from having access to enough land or profitable crops to enable them to pay taxes without working for wages (Leys 1974; 30). Leys (1974;30) summarized this as:

> The very reason that was held to justify the alienation of land to Europeans was the fact that the country was half empty of the people. In point of fact the number of Africans dispossessed by the alienation is comparatively trifling, perhaps no more than 50,000. There was room for colonization. There was really more land than the Africans of Kenya could use. But that very land was in excess of their needs is precisely the area which the Government has for twenty years by every means in its power been to try to make them work upon for the profit not for themselves but of European grantees. The whole situation is essentially absurd…. The real cultivators of the 335 square miles of alien land under cultivation are, of course, the fifty or sixty thousand employees who work for wages, employed, most of them, in growing crops which they could and often do grow just as well at home.

The establishment of the 1902 Crown Lands Ordinance that gave the governor powers to 'sell' freehold in Crown Land to any purchaser did set the ball rolling for many policies to come (Okoth-Ogendo 1991, p. 13). This Ordinance and the prior Orders (Masters and Servants ordinance) prohibited any native from owning land and any land sold with the natives living on it, and the natives surrendered their rights to the buyer. Ainsworth described the resulting practice as follows:

> As a basis of all argument …it has been absolutely laid down that no native has no title to and that the land is the commonwealth of the people. A native's claim to any land is recognized even according to native customs only as long as he occupies beneficially. The principle usage is to recognize all unoccupied land as crown land and the administration is free to deal with it as it considers the best advantage … vacant land, i.e., land vacated by a native revert to the crown automatically."

The policies that followed, including the 1915 Land Ordinance, kept the natives out of their land. As most natives lived on subsistence farming, it became difficult for the native families to support themselves. As a result, many of the men looked for alternative ways of supporting their families by working on settler farms. The 1918 Resident Laborers ordinance converted the 'squatter' laborer into a kind of a serf and bound the natives to work for the owner of their plot for 180 days a year.

Imposing head taxes and hut taxes on the natives pushed many natives to move to settler farms to seek wage employment. Grouping of the natives also created a "natives reserve" that became a reservoir of cheap labor for the settler farms. Even though the natives on the "native reserve" were peasants and small-scale subsistence farmers, the higher taxes imposed on them forced them to seek employment in the settler farms.

In the late 1920s, as the population of Africans increased together with taxation, there were plenty of Africans to work in the settler farms at a very minimal wage. As the population continued to grow, the colonial government continued using the policies and changing the amount of tax to keep suppressing Africans, and they maintained the supply of cheap labor.

iii) Crop Monopoly

After the colonial government managed to change natives from traditional grains like sorghum and millet to white maize society, settler farms dominated white maize production. However, the evidence in Kenya indicates that African farmers were capable of generating maize surpluses at a price below the production cost for most settler farms (Jayne et al. 1995). The low-cost production posed a threat to settler farmers that led to the colonial administration to design and implement controlled marketing systems from the 1930s. But not without opposition from the settler consumer interest groups who opposed the protection of settler maize farmers on the ground, it would raise the maize price (Keyter; Mosley 1975). The main aim of the implementation of marketing controls was to create crop monopoly for settler farmers. With farmers' interest groups well represented in the colonial legislature, the colonial government passed the Native Produce Ordinance in Kenya in 1935.

The Native Ordinance Produce created state crop-buying stains in European farming areas without parallel investments in African farming areas, established restrictions on grain movement from African regions to towns and demand centers, and enforced a two-tiered pricing scheme with higher prices for settler farmers than for native Africans. By 1935, African farmers' position in food marketing relative to that of settler farmers was already weakened by the combination of land evictions, maize legislation, and fiscal policies (Mosley 1983; Jayne et al. 1995).

Jayne et al. 1995 argue that by the 1950s, the controls on private maize movement provided a monopoly on maize meal sales to the licensed roller millers to supply cities and grain-deficit rural areas. This happened after a result of the rise of centralized, state marketing boards that encouraged the development of large-scale, concentrated grain milling industries, using roller mill technology that was employed in Kenya.

Marketing regulation was effective in achieving its principal objective: - maize monopoly. The maize production by settlers expanded, and the settler producers earned prices that generally exceeded export parity, and Kenya remained reliably self-sufficient in maize except during World War II. Instead of the cost of European taxpayers paying for the cost of supporting the settler maize production, the cost was primarily funded by African farmers and consumers. This cost to Africans was made mostly possible through discriminatory pricing made feasibly by controls on marketing (Jayne and Jones 1997).

This stability of the policy and pricing environment limited the competition the settler farmers faced. It contributed to the rapid growth in commercial agriculture, the demand for maize research, and later, the adoption by commercial farmers of hybrid maize varieties. All these increased settler's maize production as they enjoyed the crop monopoly. Broadly, there was competition wherever it benefited the Europeans as consumers and did not hurt them as producers. Everything else was organized and regulated under some degree of monopoly (Leys 1974; 34).

iv) Transportation

The main objective of building the Uganda Railways was to have access to the interior parts of Kenya. However, when the railway reached the White Highlands, access was made to all the leading settler farms. The accessibility made the transportation of the raw material and farm produce to the major towns, including the port of Mombasa, much more accessible. The building of roads and rail were placed under the local council. Central Government funded the construction of the roads on European farms through grants while building the roads leading to

African farms were funded by the taxes on African farm produce and happened to be of not good quality and never lasted long.

The transport system in colonial Kenya also was subjected to policies that benefited the European farmers. Starting from the construction funding. A rating system that involved carrying European crops like maize, wheat, and other foodstuffs at a lower cost than the African crops like cotton and imports for African consumption. The difference in the price of export and import where the Europeans cost was subsidized while Africans were subjected to higher taxes. Higher taxes made it even more difficult for African farmers to move their products. The transportation was controlled by harsh policies that were so discriminative to African farmers, but favorable for settler farmers. The difference in price made it so impossible for African farmers to move their produce to the market.

The presence of a road license also made it too expensive for most African farmers to use it. The monopoly railways had in transporting imports and export to and from the port of Mombasa frustrated the construction of the tarmac road linking Nairobi and Mombasa (Leys 1974). In essence, Africans were blocked by every means possible from moving the product to the market.

Transportation in colonial Kenya benefited from all the laws and policies that were put in place to control the native population. In agriculture, marketing control laws helped the European farms, in that it managed what the natives can sell and import. African farm products like cotton were heavily taxed, such that they could not find a market to sell them for a profit. Land Ordinances that alienated Africans from their lands meant that they could not work on the land, even to building roads to their farms or the native reserves. So, with European farmers enjoying the monopoly in the markets both within and outside the country, transportation also became a monopoly. It was noted that Kenya's colonial economy thrived to a greater extent on monopolies than in any other African colonies. It was much easier to indicate where there was a degree of competition than where there was a monopoly (Leys 1974;33).

With all the laws and policies in place, the European farmers had all the transport subsidies that helped them make maximum profit from their farm produce at the expense of the African farmers. The transport subsidies ranged from having good roads and the rail line from their farms to paying almost zero tax on their transportation. These subsidies continued to the 1960s and only started changing when the local corporation started allowing 'learned' Africans to become members of some of the formed cooperatives like dairy corporative, and National Cereals Produce Board (NCPB) among others.

The aforementioned economic subsidies, without a doubt, improved the settlers' maize production in Kenya. However, the lobbying and the established policies and investments by the colonial government is with no doubt behind the success of maize growing. Despite those policies being against the native farmers who were mostly smallholder farmers, they supported the government initiatives to produce enough maize to feed the growing Kenyan population.

As maize remained a crucial part of the food security in Kenya, investments like seed breeding were only viable for the largescale farmers to get a higher return. Kenyans who were smallholder farmers did not benefit from these investments until the post-independent period when the country experienced a smallholder maize revolution.

Compared to other African countries like Zambia, Malawi, Southern Rhodesia, and South Africa that were going through phase one of maize production as Kenya, it is only in Kenya where the smallholder revolution happened immediately with the change of majority rule in 1965. The revolution involved the demand for the implementation of the policies that supported the settler farmers during the colonial government to be used to support the smallholder farmers. The majority government redressed the neglect of smallholder agriculture during the former colonial period (Jayne et al. 1999). The same controlled marketing systems used by the colonial government that the majority of government inherited were viewed as the best vehicle to implement these objectives.

11. Conclusion

It is possible to recognize that the factors contributing to the maize production and maize yield in Kenya running to the 1960s were as follows. First, weather stability. Second, contraction of state subsidies and market support. Third, investment in public agricultural research and liberation of the maize seed industry. Fourth, motivated maize policies. Fifth, integration of Africans into the agriculture economy, and sixth, market and trade policies established through agricultural settler lobbies explained to a large extent why white maize became dominant food staple in Kenya and the preferred staple of today's African consumers. There is also a school of thought that believed that many institutions established during colonial government and investments made during the colonial government-generated benefits for smallholder maize production in post-independence Kenya. That is an area which this project would like to explore in the future. However, the maize breeding success in Kenya that started in the 1960s is a product of the policy changes and public investment.

As Kenya turned into an agricultural economy, maize remained a crucial part of food security in two ways. First, as a commodity for satisfying the food requirements of a more diversified economy, and second, as a cash crop in areas where it is agro-ecologically suited to provide high returns. However, as the Kenyan population increased, the rising land constraints progressively encouraged farmers to move to other parts of the country and to incorporate mixed farming to explore other possibilities. As farmers ventured into different areas for agriculture, Kenya Seed Company played the vital role of coming up with the hybrid seeds that grow in the semi-arid regions. The importance of public support for the research institution became a necessity, and both farmers and the government benefited from it as it increases the crop output to cater for the domestic population and international market.

Maize is a relatively low value-to-bulk crop, providing consistently high returns per unit of land in only a relatively small proportion of smallholder farming areas. But in the settler farms, many of the farmers were very successful in farming maize for several reasons: first, settler farmers had double lives.

Even though researchers or the colonial government do not mention this, most of the settler farmers doubled as the protectorate governors. White Highlands being so close to the governing headquarter (Nairobi), many of the governors could go back and forth between their offices and the farms and used the foreman to manage their farms. They could just give directives to the foreman and let them handle the farms.

Second, the settler farmers had access to all the resources they need to succeed in farming maize. Support from the colonial government made sure they succeed by all means. It was aiding them by enacting laws and putting up policies that were beneficial to them and eliminated any competition. Creating a monopoly also did not only create the available market, but it also created an opportunity to increase the maize output to feed the increasing Kenyan population and to avert the protest against the colonial government for food. Maize remained a crucial part of the food security equation in Kenya. It remained the purchased commodity for satisfying the food requirement of a more diversified rural economy.

In Kenya, it is also noted that even though the Kenya farmers were shortchanged and introduced to maize farming from farming traditional crops like sorghum and millet, they were capable of producing maize at a lower cost than the settler farmers. Their farming capability also raises the questions. Were the settler farmers able to produce enough maize to cater to the local and international markets without the draconian policies and subsidies?

Generally, many institutions established in the colonial times and the public investments during the colonial government before 1965 led to the maize production legacy. The extension of such policies to the post-independence smallholder farmers also shows that they improved the maize yield. The spur of the maize production in the post-colonial Kenya was as a result of the success stories of the plant breeding and agronomic research. Until the late 1960s, the increase in maize production by large scale farmers was credited to the genetic modification, and not for the case for smallholders. For the Kenyan government to continue seeing growing successes in maize farming in the post-independent period, strategic crop improvement measures were implemented to relieve specific environmental and disease problems and enhance the stability of net returns to farmers. Working with the farmers on this remains very critical.

The strength of the institutions built by settler farmers that mobilizes the constituency to support the public and private investment should be credited for the maize production's success in Kenya. Today such constituencies are so fragmented. The farmers are weakly represented, particularly when their welfare is closely tied to the reliability and efficiency of maize markets where they purchase maize as consumers.

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