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Review

A review of the state of sugar cane crisis in Kenya

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Josephat Barasa Kombo*[1] and Alice Chesambu Ndiema[2]

[1]Department of Agriculture and Veterinary Sciences, Kibabii University-Bungoma-Kenya.
[2]Department of Agribusiness and Extension Management Masinde Muliro University of Science and Technology-Kakamega-Kenya.

*Corresponding Author
Email: jkombo2022@yahoo.com

In Kenya sugar cane farming was once vibrant and source 15% of the agricultural GDP. However, Kenya's sugar industry is under a state of sugar cane crisis as reflected in limited availability of sugar cane for milling and continuous decline in sugar cane farming. Pursuant to this, this paper sought to review the state of sugar cane crisis as perceived by a range of scholars between 1981 and 2022.The review established that the sugar cane crisis is caused by a range of factors. As a consequence, Kenya's sugar industry is increasingly getting skewed towards importation as Kenya remains an attractive destination for imported sugar and a lucrative playfield for sugar cartels. Local millers are operating far below established milling capacity as sugar cane farmers, millers and government experience income challenges. Sugar cane crisis has led to income crisis among local producers and a big negative impact on national economy. There is rationale and opportunity for revival of sugar cane farming in Kenya as reflected in profitability of sugar cane production, agro ecological potential and public goodwill. The paper recommends adoption of Kombo2022 Model to enable revival of sugar cane farming in Kenya.

Keywords: Sugar cane crisis, causes, revival of sugar cane farming, production, sugar security status

INTRODUCTION

Commercial sugar cane production was introduced in Kenya in 1922 with an aim of attaining sugar security to counter dependence on sugar importation (Government of Kenya, 2019). Pursuant to this, Kenya progressively established public mills. These included Muhoroni Sugar Company in 1966 with a rated capacity of 1200 tons of cane per day, Chemelil in 1968 with a rated capacity of 3,000 tons, Mumias in 1973 with a rated capacity of 2,000 tons, Nzoia in 1978 with a rated capacity of 2,000 tons of cane per day and South Nyanza in 1979 as sugar cane entrepreneurship attracted more and more farmers (Kenya Sugar Board, 2010).

In spite of these interventions, Kenya continues to blend local production with importation in order to satisfy the national sugar demand. Therefore Kenya's sugar sector consists of domestic and import subsectors (Waswa et al., 2012). This is because save for 1978 local production does not satisfy Kenya's sugar demand (Government of Kenya, 2019). Over time, more farmers engaged in sugar cane farming and made the domestic sugar sub sector to sink into a state of sugar cane crisis characterized by surplus sugar cane production. In brief the established public mills were no longer able to handle the available quantities of sugar cane due to limited milling capacity.

In response Kenya government embarked on increasing the national milling capacity by licensing private mills. This led to establishment of West Kenya Sugar Company in 1981, Soin Sugar Factory in 2006, Kibos Sugar and Allied Industries in 2007, Butali in 2011, Trans Mara Sugar in 2011 and Sukari Industries in 2012 (Government of Kenya, 2018) and most recently Olepita and Busia Sugar Companies in Busia County . So far Kenya has fourteen mills with cumulative annual milling capacity of one million metric tons (Monroy et al., 2012). If it were not for the state of sugar cane crisis fulfillment of this capacity could satisfy national sugar demand thereby address challenges of acquired sugar security and in particular minimize market opportunities for sugar that is illegally transmitted from other countries (Kenya Sugar Board , 2012).

However, the emergency of the private millers marked the beginning of controversies, challenges and politics in Kenya's sugar industry to the disadvantage of the public mills. Pursuant to this among other issues, Kenya's domestic sugar subsector which was once vibrant, lucrative, a source of 15% of the Agricultural GDP and supporter of numerous rural livelihoods is now facing eminent collapse (Government of Kenya, 2019). In fact Kenya's domestic sugar subsector is surviving marginally due to high tariff and non-tariff protective interventions (World Bank, 2013). The state of eminent collapse crisis is evident in reduced sugar cane production and productivity, excessive debts, exodus of farmers and numerous chaos in Kenya's sugar industry (Onyango et al., 2016; COMESA, 2012).

The state of sugar cane crisis is articulated in or confirmed by public complaints among the farming communities and millers about poor performance of the industry. Unlike the previous modes of sugar cane crisis which were characterized by surplus sugar cane production and limited supply of sugar to consumers, the current state of sugar cane crisis is characterized by limited sugar cane production but abundance of sugar (COMESA, 2012). In fact except for households with financial limitations all sugar consumers in Kenya have access to sugar (Government of Kenya, 2019).

This situation is attributed to artificial or acquired mode of sugar security status. In Kenya sugar security status is acquired through sugar sourced from other countries instead of local production (Kombo et al., 2022). The unique nature of the acquired sugar security status as in Kenya is reflected in the contradictory relationship between the state of sugar cane crisis in the country and availability of sugar to all consumers (COMESA, 2012). In fact while mills in the country are operating under capacity or under receivership due to sugar cane deficiency and subsequently unable to satisfy or fulfill the national sugar demand, sugar consumers in the country have access to surplus sugar largely is sourced from outside (Kombo et al., *2022*).

On average sugar mills in Kenya are operating at only 60% of the installed capacity (Kenya Sugar Board, 2010). Further to this, only three out of the nine public mills in the country specifically Chemelil, Nzoia, and Sony are active but only to a limited extent while the rest are under receivership (Kombo et al., 2022; Government of Kenya, 2019). Mumias, Muhoroni and Miwani sugar companies have particularly been under receivership for a long time (Waswa et al., 2009).

The state of sugar cane crisis in Kenya is also reflected in continuous decline in production (COMESA, 2015). Unlike world class producers like Brazil that have attained sucrose extraction rate of up to 13% in Kenya the average sugar extraction rate is less than 11% (Onyango et al., 2016). According to Kenya Sugar Board (2010) the state of sugar cane crisis started in the early 2000s. Prior to the crisis domestic production catered for about 74% of the national sugar demand yet today it only caters for 48 % and sugar cane production continues declining (Government of Kenya, 2019). According to Kombo et al. (2022) visual inspection of the Western Kenya Sugar Belt and review of relevant documentaries further confirm the state of sugar cane crisis. Sugar cane productivity in Kenya changed from around 130 tons per hectare in the 1980's , 90.86 tones /ha in 1996, 78.42 tones /ha in 1999 and 80 tons in 2010 depicting a reduction of over 38% in a period of two decades (Kenya Sugar Board , 2012). In fact in several sugar zones sugar cane productivity has dropped to less than 50 tons per hectare. The state of sugar cane crisis is further articulated in the fact that in 2019 the industry recorded a significantly noticeable decrease in sugar cane yield in comparison to previous years (Government of Kenya, 2019).

The state of sugar cane crisis in Kenya is further reflected in dominance of sugar cane farming by smallholder farmers instead of larger scale operators yet by nature sugar cane is a plantation crop (Kenya Sugar Board, 2012). The average farm size under sugar cane farming has dropped to 0.7 hectares per household unlike the case of the 1980s when the average was 3 hectares and there is massive transfer of land previously under sugar cane production to alternative projects (Government of Kenya, 2019). For public mills the state of sugar cane crisis is majorly reflected in poor performance of Nucleus Estates all of which are massive in land acreage and occasionally in total failure of the estates in spite of their large sizes and great agronomic potential (Sugar Campaign for Change , 2003).

In brief the criticality of sugar cane crisis in Kenya is the issue of acquired sugar security status occasioned by the financial advantage of sugar importation ventures when compared to domestic production and (Omondi, 2013). According to Sugar Campaign for Change (2003) issues of continuous land transfer from sugar cane farming , exodus of farmers and frequently delay farmers' payments magnify the state of sugar cane crisis in Kenya by discouraging investment and re-investment in sugar cane farming .

Statement of the Problem

In spite of great agro- ecological potential for sugar cane production and good performance in the past, Kenya's domestic sugar subsector which was once vibrant and lucrative to farmers, millers and government in terms of income and livelihood support is facing eminent collapse (Government of Kenya, 2019).This situation is reflected in the state of sugar cane crisis and further in the recent shift of the skewness of the sugar sector in favor of importation against the wish of the public particularly the farming communities (Government of Kenya, 2019, Kenya Sugar Board, 2010).

The issue sugar cane crisis is a challenge to the government, millers and sugar cane farmers in the country and even to the COMESA Council of Ministers (Sugar Campaign for Change, 2003). However, the government, millers and the public are still keen on sugar cane production and the agro-ecological potential is immense, the only concern is how sugar cane farming can be revived to reverse the state of sugar cane crisis especially given that the acquired sugar security is unsustainable. This situation ignites academic and none academic interests in the matter. It is in view of this situation that this paper sought to review the state of sugar cane crisis as a step towards generation of knowledge for revival of sugar cane farming.

An Overview of the Causes of Sugar Cane Crisis in Kenya

Jordan et al. (2005) established that issues that causes of problems provide the best background and context for solutions to the problems. In pursuit to solutions to the sugar cane crisis, this review sought to investigate the causes of the state of sugar cane crisis in Kenya. Chisianga et al. (2014) argue that a variety of policy and non-policy factors are responsible for the state of sugar cane crisis. In 2009 Kenya Sugar Board identified excessive land subdivision as a major cause of the state of sugar cane crisis in Kenya. Excessive land subdivision due to individual land tenure system provokes transfer and subsequently re-allocation of land from sugar cane farming to alternative projects (Waswa et al., 2012).

In the perspective of contractual sugar cane production the state of sugar cane crisis is largely attributed to contracted farmers being discouraged by delay of harvesting, transport and payment services (Kenya Sugar Board, 2010). According to Odera (2014) and Sugar Campaign for Change (2003) delay of farmers' dues leads to exodus from sugar cane farming which aggravates the state of sugar cane crisis. According to Kumar and Arora (2009) the state of sugar cane crisis in Kenya is caused by adoption of non- contracted farming practice because this approach fails to provide for coordination of production particularly the timing of planting, harvesting and transport services with respect to milling services .

The state of sugar cane crisis is largely due to failure of sugar cane farmers to match the right timing and rate of fertilizer application due to variations in rainfall patterns (Kenya Sugar Board, 2010). In Kenya, sugar cane production is totally dependent on rainfall patterns and yet in this era of climate change sugar cane farmers in the country are unable to choose the right time for planting (Waswa et al., 2012). Failure to coordinate sugarcane development, harvesting and transportation services contributes to the state of sugar cane crisis through a vicious cycle of shortages and surplus (Kumar and Arora, 2009).

According to Kenya Sugar Board (2010) poor agronomic practices like inappropriate land preparation practices due to use of hoes and ox-ploughs instead of tractors contribute to the state of sugar cane crisis (Sugar Campaign for Change, 2003). Poor weed management strategies significantly contribute to the state of sugar cane crisis in Kenya (Onyango et al., 2016). Several sugar cane farmers in Kenya depend on hoe weeding which cannot effectively control hardy weeds. This is unlike Brazilian farmers who engage effective chemical control measures (Kenya Sugar Board, 2010). The state of sugar cane crisis is also caused by poor soil management practices due to nutrient deficiencies (United Nations Economic Commission for Africa (2013). The sugar cane crisis in Kenya is attributed to adoption of poor seed cane characterized by limited disease resistance, late maturation and low sucrose yields which lead to low sugar productivity (COMESA, 2019, Solomon, 2016, Netondo et al., 2010).

In Kenya the state of sugar cane crisis is largely attributed to monoculture (Netondo et al., 2010). This is because the productive capacity of land automatically decreases after several rounds of sugar cane crop given that it is a heavy feeder. The situation is worsened by the fact that over 50% of the sugar cane body is taken away during harvesting (Kenya Sugar Board, 2012). Monoculture is a big challenge particularly to small – scale farmers because by virtue of limited land sizes they lack capacity to practice crop rotation yet Kenya's domestic sugar sector is dominated by smallholder producers (Otieno et al., 2003).

The sugar cane crisis in Kenya is also attributed to poor seed technology and over- dependence on ratoon cropping (Government of Kenya, 2019). Improper management of ratoon crop is another cause of the state of sugar cane crisis (Onyango et al., 2016). Observably, varieties with poor productivity especially low sugar content still occupy a sizeable area in Kenya though better varieties have been developed only that the level of adoption is still low (Solomon, 2016; Onyango et al., 2016).

The state of sugar cane crisis is attributed to market forces related to the window and practice of sourcing sugar from other countries. This is because Kenya being a high cost producer is an attractive destination for sugar sourced from low cost producers (Sugar Parliamentary Committee, 2003; Sugar Campaign for Change, 2003). Cheapness of sugar sourced from other countries significantly contributes to the state of sugar cane crisis by locking out locally produced sugar from the domestic market due to price advantage (Institute of Economic Affairs, 2005)).

In line with this, the state of sugar cane crisis in Kenya is an outcome of the economic forces and practices created by trade and market liberalization practices as per the COMESA and WTO protocols and more particularly the Structural Adjustment Programme of the World Bank (Netondo et al., 2010). This is because market liberalization opens up the domestic market to cheaper sugar and even sugar cane from other countries at the expense of local production due to the disadvantage of high production costs . In the long run the locally produced sugar and by extension sugar cane is locked out of the domestic market by pricing forces due to the differences in production costs.

Millers assert that the state of sugar cane crisis in Kenya has roots in the poor state of infrastructure in the sugar zones (Onyango et al., 2016, Sugar Campaign for Change, 2003). Poor infrastructure discourages farmers and millers by increasing production costs and transport losses through cane spillage plus wear and tear on the transportation units (Netondo et al., 2010). According to COMESA (2007a) sugar production cost in Kenya is high due to poor infrastructure.

The state of sugar cane crisis in Kenya is caused and aggravated by sugar cartels (Kombo et al., 2022). According to Kenya Sugar Board (2010) the major challenge in Kenya's domestic market is the fact that the locally produced sugar is more expensive and yet it does not satisfy the market demand making sugar importation to be a highly lucrative business. This is the origin and playfield of the sugar cartels in Kenya (Kenya Anticorruption Commission, 2010). In Kenya the market for sugar cane is highly cartelized and profit levels for both farmers and millers are significantly reduced by middlemen discouraging further investment or reinvestment in the enterprise (Government of Kenya, 2019).

In 2003 Sugar Campaign for Change a lobby group for sugar cane farming established that the state of sugar cane crisis in Kenya is attributed to issues of rampant poverty in sugar zones, the high cost of sugar cane farming and discouragement of millers from extending credit services to farmers for fear of loss associated with rampant sugar cane poaching.

Consequences of the state of Sugar Cane Crisis in Kenya

The world is changing continuously due to emerging issues (Fleming, 2006). Pursuant to this, this paper sought to review changes occasioned by the state of sugar cane crises in Kenya in terms of outcomes and implications on economy and therefore livelihoods. According to Kenya Sugar Board (2012) the state of sugar cane crisis has caused financial crisis in sugar cane farming communities leading to poverty. According to Otieno et al. (2003) statistics indicate that due to the state of sugar cane crisis poverty is becoming endemic in the sugarcane growing areas. Sugar cane farmers and millers in Kenya are in a state of financial crisis and unable to meet their ends due to sugar cane crisis (Odera, 2014). From the onset of the sugar cane crisis the sugar cane growing areas and communities are characterized by unemployment (FAO, 2012; Otieno et al., 2003).

The state of sugar cane crisis has made numerous public millers to sink into receivership (Government of Kenya, 2019). Muhoroni and Miwani sugar companies have specifically remained under receivership for a long time while the rest are operating far below factory capacity due to limited sugar cane availability (Government of Kenya, 2018). Thousands of hectares of land under the Nucleus Estates of the public mills are not engaged productively due to the state of sugar cane crisis. The state of sugar cane crisis has driven virtually all public-owned mills into debts owed to government, suppliers, banks and farmers (Kenya Sugar Board, 2012). As at 2014 public mills in Kenya had a debt burden of 59 billion shillings. Financial constrains occasioned by the state of sugar cane crises are further manifested in insufficient funding of agricultural extension services and the dilapidated state of public owned factories (Government of Kenya, 2019).

Generally the state of sugar cane crisis has made public mills in Kenya to suffer from insolvency (Kenya National Assembly, 2015; Kenya Sugar Board, 2012). Further to this, the sugar cane crisis has driven several private sugar mills into unlicensed sugar importation and the associated vice of malicious repackaging of sugar sourced from other countries in the struggle to sustain themselves in sugar business (Kenya National Assembly, 2014; Kenya Anticorruption Commission, 2010).

The state of sugar cane crisis in Kenya has led to competition and rivalry among sugar millers and eventually cartelization of the sugar cane and sugar market (Kenya National Assembly, 2014). In fact middlemen in the sector significantly reduce farmers and millers profit levels thereby aggravating the state of sugar cane crisis by discouraging further investment and reinvestment in sugar cane production (Government of Kenya, 2019). In brief the state of sugar cane crisis has made Kenya a lucrative playfield for sugar cartels (Kenya Anticorruption Commission, 2010).This is because locally produced sugar is more expensive than imported sugar due to high production costs and yet it does not satisfy the national market demand making sugar importation a highly lucrative business (Kenya Sugar Board, 2010). Therefore the state of sugar cane crises makes Kenya an attractive destination for both legal and illegal sugar imports (Kenya National Assembly, 2014; Kenya Sugar Research Foundation, 2009).

Further to this, due to the state of sugar cane crisis, millers are harvesting immature sugar cane (Government of Kenya, 2008). In fact complains from millers indicate very low sucrose yield and recovery rate because of premature harvesting. At the factory level the state of sugar cane crisis has generated several claims and counter claims of sugar cane poaching and subsequently numerous legal tussles (Kenya Sugar Board, 2012). This has discouraged several sugar millers from further investment in development of sugar cane fields (Sugar Campaign for Change, 2003).

The state of sugar cane crisis has significantly reduced the material capability (sugar cane) of sugar mills leading to factory underutilization (Kenya Sugar Board, 2011). The state of sugar cane crisis has created a situation where some millers have to accumulate cane for several days before milling and this impacts negatively on sugar recovery (Government of Kenya, 2019). Eventually the state of sugar cane crisis also leads to delay of farmers payments causing an exodus of farmers from sugar cane to alternative projects (Waswa et al., 2012; Netondo et al., 2010; Sugar Campaign for Change, 2003).

Similarly, Waswa et al. (2012) noted that poor remuneration occasioned by the state of sugar cane crisis cause an exodus of farmers from sugar cane to alternative projects. At the same time the state of sugar cane crisis has made farming communities and Farmers' Organizations to receive most government interventions like the proposal for privatization with reservations a midst accusations and counter-accusations, allegations and counter – allegations about skewness against sugar cane in favor of tea and coffee (Kenya National Assembly, 2014; Sugar Campaign for

Change, 2003; Waswa et al., 2012) observed that within families the state of sugar cane crisis affects households' succession planning in the matter of sugar farming.

The state of sugar cane crisis has made Kenya's sugar sector highly uncompetitive in international and regional sugar arena. It is notable that over the years sugar cane production in the country has significantly gone down as it goes up in competitor countries like Uganda and other COMESA Member States (COMESA, 2012). According to Government of Kenya (2019) and World Bank (2013) today Kenya's sugar industry is in a state of crisis and only surviving due to high tariff and non-tariff protective measures. In summary the state of sugar cane crisis has become a serious economic headache and campaign tool across all sugar zones in Kenya (Kombo et al., 2022).

Rationale and Opportunity for Revival of Sugar Cane Farming in Kenya

Feasibility and opportunity for revival of sugar cane farming in Kenya is reflected in the fact that Kenya lies in the tropics a region of the world that has great agronomic potential for sugar cane farming (Muteshi and Owino, 2017). The rationale for revival of sugar cane farming in Kenya lies in the fact that domestic production would satisfy the national sugar demand, thereby address the temporary state of the sugar security status acquired through dependence on sugar sourced from other countries (Kenya Sugar Board , 2012). Revival of sugar cane farming will save the exchequer billions of Kenya shillings, provide employment and support several rural livelihoods (Ojeara et al., 2011). Prior to onset of sugar cane crisis , sugar cane farming has been supporting up to 25% of Kenya's rural population and sustains the towns and markets located around the mills (Ojeara et al., 2011: Kenya Sugar Board, 2010: Government of Kenya, 2008; Wawire et al., 2006). Therefore revival of sugar cane farming will provide lifeline for this population.

Economically, revival of sugar cane farming has a great potential on state economy because sugar cane is one of the largest contributors to agricultural GDP (15%). In fact, sugar cane is the third largest revenue generator next to tea and coffee (Kenya Sugar Board, 2010a). Revival of sugar cane farming will significantly contribute to poverty reduction through sugarcane entrepreneurship (Ogolla, 2012). According to Keethipala (2007) like in Sri Lanka, if revived sugar cane farming will provide more opportunities for income generation and employment in Kenya's economy.

Regionally, revival of sugar cane farming will enable Kenya's sugar industry to be competitive and to survive in COMESA market without the protection of the safeguard measures (Owiye et al., 2016). Additionally, the COMESA Member States provide a potential sugar market (COMESA, 2012). In terms of international relations, revival of sugar cane farming will improve Kenya's image in the international sugar arena particularly with regard to membership of World Trade Organization, International Sugar Organization, Common Market for Eastern and Southern Africa and other Sugar-Related Economic Blocs (Ojeara et al., 2011).

More rationale and even opportunity for revival of sugar cane farming in Kenya is manifested in the attractiveness of the domestic market and fast growth of population which increases sugar demand and human resources for farming (Ojeara et al., 2021; Muteshi and Owino, 2017). According to Government of Kenya (2019) the biggest opportunities for revival of sugar cane farming are land availability and market availability as reflected in population growth and increasing dependence on imported sugar.

Market opportunity for sugar cane is reflected in the fact that several sugar factories have been established in the country (Government of Kenya, 2019). Most sugar factories in Kenya are underutilized due to limited material capability (sugar cane) (Monroy et al., 2012).This defines opportunity for revival of sugar cane farming since satisfaction of the established capacity demands for increased sugar cane production. Kenya's long term experience in matters of sugar cane farming (1922-2022) and the presence of essential technologies provide further opportunities for revival of sugar cane farming (Kombo et al., 2022). In the context of Kenya's economy Farming experiences justify feasibility of investment in revival of sugar cane farming in the country (Government of Kenya, 2018: Odera, 2014).

Model design for revival of cane farming when blending sugar production and importation

In 2005 Jordan et al established that in production economics, for every problem causal issues provide the best contextual framework for feasible solutions. In line with the ranking of the causes of the state of sugar cane crisis in Kenya and further in the context of Kenya's sugar industry which blends production and importation, the following alternative hypothesis were identified to provide critical pathways to revival of sugar cane farming;

Hypothesis I: the higher the cost of importation, the higher the stakeholders' focus on revival of domestic production (sugar cane farming).

Hypothesis 2: the lower the cost of domestic production, the higher the stakeholders' focus on revival of domestic production (sugar cane farming).

Hypothesis 3: Enhanced border and market surveillance services promotes revival of domestic production (sugar cane farming) by protecting local producers from cartels (sugar cartels).

Hypothesis 4 Improvement of land administration services promotes revival of domestic production (sugar cane farming).

Hypothesis 5: Improvement of production services promotes revival of domestic production (sugar cane farming).

Pursuant to these a model outlined in Figure 1 referred to as Kombo2022 Model was designed to guide revival of sugar cane farming (domestic production) as a solution to

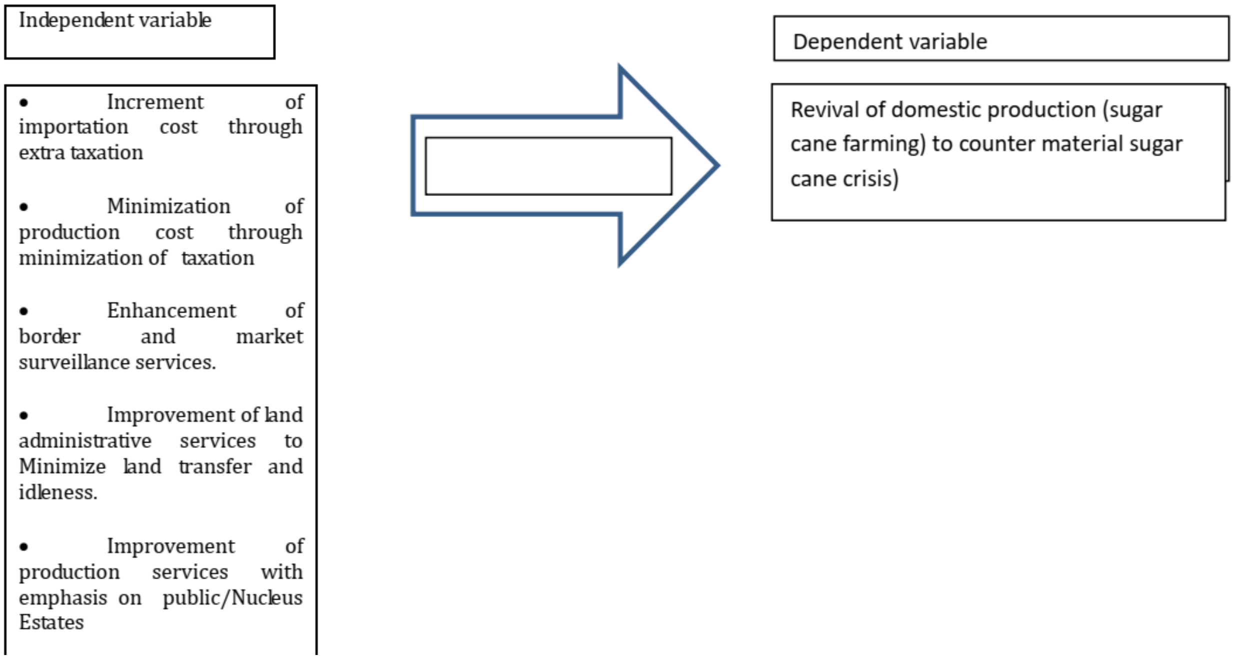

Figure 1: Kombo2022 Model for revival of Cane Farming when domestic production is supplemented with Importation; Source, Kombo (2022)

the state of sugar cane crisis in Kenya.

The model is primarily based on the assumptions that when all other factors are held constant, the state of sugar cane crisis in Kenya is attributed to the identified and specified causes. On the basis of these assumptions hypotheses are drawn to enable testing of the feasibility of different attributes of the model. Subject to scientifically sufficient proof the model provide a basis for development of Kombo2022 Theory to guide economic production programs that seek for promotion of domestic production streams that are blended by importation practices.

Conclusions

The paper has significant implications on promotion of domestic production for nations that survive by blending production and importation. First it reminds the farmers, millers, government and other stakeholders in the sugar industry about the state of sugar cane crisis and its influence in the context acquired sugar security status. Secondly the paper helps to revisit the causes and consequences of the state of sugar cane crisis as perceived by a range of scholars. The paper reminds scholars of the need to produce substantial theories to guide and enable promotion or revival of domestic production as a baseline of the national economy. Pursuant to this, the paper enabled development of a model for promotion of (revival of sugar cane farming) domestic production in an environment or context of blended production and importation. The model provides the way forward not only for revival of sugar cane farming but generally for promotion of domestic production streams that are supplemented by importation. To the academia and especially the researchers this paper provides a platform for further research.

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Declaration of Interest Statement

Authors have declared that there are no competing interests

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