Sugar Beet Growing in Nyandarua For Commercial Purposes

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INTRODUCTION

• Sugar beet traditionally grows well in temperate climate unlike Sugarcane which grows in the tropics.

• Kenya is exploring into processing sugar from beet to compliment sugar from cane

• Products from sugar beet include crystal sugar, sugar syrup, molasses and pulp.

• The co-products are precursors for ethanol and biogas respectively which are forms of renewable energy.

• The government vision 2030 stresses the enhancement of the share of new and renewable energy in Kenya’s energy supply matrix.
Farmers in the greater Nyandarua have been yearning for a perennial cash crop that could augment their earnings.

The only cash crop widely cultivated in the district other than milk is pyrethrum.

Both crops have had widely fluctuating market conditions.

The market for milk has been fraught with major difficulties with prices falling to unsustainable levels which led to a major drop in production and consequent drop in earnings.

Pyrethrum has witnessed a nearly collapse of the market with the sole buyer and licensed processor Pyrethrum Board of Kenya unable to pay farmers for crop deliveries for years thus discouraging production.
Objective

• The farmers in Nyandarua get a sustainable perennial cash crop.

• Viability of Sugar beet cultivation in Nyandarua
Pre-1963: Fodder beets and red table beets grown in Nyandarua by white settlers, both for domestic use and for use in animal feeds.
1963-1995: Fodder beets and red table beets continue to be planted and harvested by indigenous Kenyans post-independence.
1995: A few grams of sugar beet seeds are brought back to Kenya from Turkey and a research program on sugar beets begins.
1996-1997: Soil analysis conducted on 6 fields and 1 field is selected for introductory sugar beet trials. Soil and sugar beet samples sent to the Sugar Research Institute in Ankara, Turkey for analysis. Results comeback positive [5.75 PH, 17% sucrose].
1998: Second sugar beet experiment conducted with similar results. The Kiriita Agricultural Self Help Group is formed and registered.
2001-2004: Annual sugar beet trials occur, with reports published each year. Research papers presented in Spain and Sweden.

2005: The KiriitaSugar Beet Farmers Co-operative Society Ltd is created and membership totals 99.

2007: Sugar beet trials continue. A total of 14 seed varieties have been tested in 4 ecological zones in Nyandarua Districts. Nyandarua District is centrally located in Kenya and has the desirable ecological features, soil types, rainfall etc suited for development of a sugar beet industry as illustrated here below.

2008- Collaboration with KESREF
- Small Scale farmers make juice from beets for local use while others sell it directly to be used as food while the leaves are used in dairy
GERMINATION - Typically seeds purchased during each planting season
MATURITY - 6 months
SUCROSE CONTENT - Approximately 16%
BY-PRODUCTS - Pulp, which can be used to create livestock feed
END PRODUCTS - Power Alcohol, Alcoholic and non-alcoholic beverages, sugar beet syrup, pharmaceuticals, confectionery, and white sugar
Commercial Sugar Beet

• Allow diversification away from sole reliance on sugar cane, giving customers more choice and variety

• Bring additional sugar production capacity, moving Kenya towards a path of sugar self-dependency

• Create competition within the sugar industry, forcing cane producers to become more competitive

• Provide jobs and an additional source of government revenue via taxes and levies, which can be reinvested into the sugar industry
Sugar Beet Process

- Beets are washed & cut. Afterwards, a diffuser extracts the juice from beet pulp, discharging the pulp to a dryer. Byproduct: dried pulp used for cattle feed
- Raw juice mixed with milk of lime, treated with carbon dioxide and filtered
- Juice is thickened into a syrup by boiling off the excess water.
- The syrup is boiled further, causing the sugar in the juice to crystallize. This creates a substance containing both sugar crystals & syrup.
- A centrifuge spins, thereby separating out the sugar crystals from the syrup. Byproduct: molasses, used either for cattle feed or as a food ingredient.
Sugar beet syrup and pulp [to be used as cattle feed] have been created by manual slicing and boiling of sugar beets. Direct consumption of syrup give the farmer better returns.
Results from the trials have been promising with the average yields per hectare of 50-100 tons, well surpassing the breakeven point calculated at 50 tons per hectare. Technological maturity was established at 6 months which is nearly a third of the best maturity period for sugar cane in the western parts of Kenya. The sugar content on the other hand was found to be consistently above 16% POL with an average of 15% POL well above that of sugar cane at 9.5%-9.95%. Therefore the trials prove that Nyandarua's climate, soil types and rainfall patterns can support a thriving sugar beet processing industry with distinct advantages over the cane sugar industry in terms of cost competitiveness. At an average production of 50 tons per hectare, the farm returns were calculated at a net of Ksh 32,000 which is deemed attractive enough to recruit the 2,000-4,000 or so farmers required to produce sufficient sugar beets to feed a 1,000 tons per day processing capacity factory.
Strategy

• The strategy is to produce sugar beets throughout growers on contract.
• Farmers will give land and labour and in turn receive necessary training, certified high quality seeds, others inputs such as fungicides and insecticides and financial assistance to help maximize the yield and therefore make a profitable venture.
• The farmers recruited, will be put on a planting programme will be guaranteed 100% purchase of their produce and pre-negotiated contract prices.
• The said price will be negotiated through the farmers’ cooperative after the costs input etc are factored to ensure a return to the farmer
Benefits

- On the other hand sugar beet farming will compliment dairy farming in the district.
- Sugar beet leaves and crown will be fed directly livestock whilst the two key by product of sugar beet pulp and molasses are excellent dairy cattle feed and would be in substantial demand from the dairy farmers.
- Molasses however will be an important income stream and will be sold mainly industrial users.
Availability of Land & Recruitment of Farmers

• The greater Nyandarua districts cover an area of approximately 3356 square Kilometer or 335,600 Ha. Out of this over 210,000 Ha is arable. Only 62450Ha is actually under crop currently with the rest either left as pasture or untilled.

• The initial factory capacity envisaged to fully commercialize the project is 1,000 tons processing per day or a total of 280,000 tons annually after allowing for scheduled minor maintenance and cleaning shutdowns and an annual six weeks major maintenance shutdown.

• At the lowest recorded yield of 50 tons to the hectare only 5,600-10,000 hectare of land will be required to meet or exceed the factories requirements.
Cost of Plant & Equipment and Profitability

• Factory plant 3000TBD is currently estimated to cost Ksh 1,000,000,000 while buildings and other civil works will cost a further Ksh 300,000,000.

• The initial operating capital to purchase raw materials, energy etc estimated at another Ksh 200,000,000 resulting in an initial total capital requirement of Ksh 1,500,000,000.

• Total production annually will top 42,000 tons (with a price of Ksh 57.01 ex-factory per kilogram) by the third year from processing 281,000 tons of sugar beets at 14.5% renderment.

• This will give a revenue estimate of Ksh 1,579,140,000 in the first year rising to ksh1,972,287,000 by the third year and then totaling to Ksh 2,803,129,000 by the 10th year.

• On the other hand preliminary analysis would indicated that the factory will be able to achieve a positive cash flow of Ksh 618,815,000 during the first year of operation rising to Ks 646,424,000 in the third year and finally rising to Ksh 847,347,000 by the 10th year of operation. This cash flow will enable a Return on Capital of about four years even using very conservative estimates.
Conclusion

• Research and trials have proved the agronomic feasibility of growing sugar beets in Nyandarua
• Nyandarua presents an opportunity to establish sugar beets as a cash crop in the region, thereby creating a viable alternative to sugar cane
Summary Way forward

• From the clinical trials that have now been conducted for a period of about 10 years with collaboration with Syngenta AB of Sweden, there is an indicated that commercial cultivation of sugar beet within the greater Nyandarua District can be commercially successful and support a sugar factory.

• The trials further indicate that the factory will be more competitive that the sugar cane based one owing to shorter maturity period, higher sugar content and comparable or better production per hectare of sugar beet over cane as indicated above.

• Consequently Nyandarua Sugar Company has been formed with the intention of setting up a factory to enable the commercial cultivation and exploitation of the crop's potential. NSC is now at the stage of sourcing for financier and project collaborators who can assist to realize this objective.

• Future plans once the factory is set up and fully running is to explore ethanol production which can be a substitute for sugar production and with potentially higher returns.
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Intelligence never urges man to action only
Patriotism, Courage, Ambition, Self –
Sacrifice, Hate, Love can
Life is measured in **Deeds** not Years. He **Lives Longest** who does the **Most** and acts the **Noblest**
Much can be achieved if we do not mind who gets the benefit.

Thank You Very Much.