
CONCEPTUALIZING SMALLHOLDER SUPPLY CHAIN ACTIVITIES OF HIBISCUS
SABDARIFFA (ZOBO LEAF) WITHIN THE RURAL CONTEXT OF NIGERIA

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Abstract

This paper addresses the challenges facing smallholder Zobo Leaf supply chain in Nigeria. It provides background information about Zobo Leaf cultivation in Nigeria, its international supply chain management performance, and managerial configuration. It then classifies the main challenges into five distinct categories and provides some solutions to the challenges, using some supply chain management approaches to culminate into smart economic strategies. In the face of deteriorating and unstable competitiveness of the smallholder Zobo Leaf supply chain in Nigeria. This paper recognizes the special role of actors relationship capitalizing on supplier and consumer relationships, smart value addition, information and communication technology (ICT), symmetric information flow, tractability in internal production capability, upgrading of Zobo Leaf sprouting, proper organization, management, policy reforms, training, studying internal and external environment context, management decisions, irrigation, venturing in new markets through partnership, and civil society engagement as competitive supply chain strategies.

Keywords: *Hibiscus sabdariffa (zobo leaf), challenges, sustainability, supply chain management*

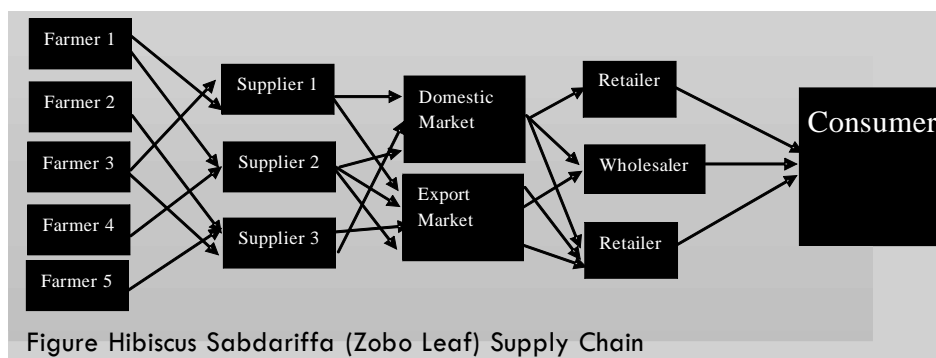
Introduction

Agriculture is the main contributor to the Nigerian economy in terms of GDP according to the Central Bank of Nigeria (CBN, 2019). It has noted that the supply chain of agricultural commodities accounts for about 24% of Nigeria's Gross Domestic Product. Further, an estimated 65% of the population depends on the agriculture either directly or indirectly (NBS, 2020). Agriculture is the second largest provider of foreign exchange through export earnings of agricultural products. In 2018, it was reported that Hibiscus Sabdariffa (Zobo Leaf), accounted for \$35million earnings of exports revenue especially with 1,983 containers exported to Mexico. It has been documented that innovative agricultural performance in the Nigeria can turn into measurable improvements in the earnings of families (Okpala et al., 2021). The purpose of this paper was to highlight activities of Nigerian smallholder Zobo Leaf

supply chain with an aim of addressing the challenges facing the supply chain in more sustainable ways. Many studies done on Zobo Leaf supply chain have concentrated on Zobo Leaf usage and have largely ignored the smallholder Zobo Leaf supply chain performance.

Zobo Leaf Industry in Nigeria

The cultivation of Zobo Leaf for commercial purposes in Nigeria commenced in Nigeria in the last three decades after the discovering that it can serve as tea or juice drink. It is a crop that is opened to the local farmer's participation and since then its cultivation had spread to various parts of Northern Nigeria especially Katsina, Bauchi, Kano, Jigawa, Gombe, Niger and Borno (Oluwamukomi, 2021; Oduori et al., 2022). Since then Zobo Leaf cultivation is wide-spread thing in Nigeria and it is a major economic activity of many smallholder farmers. Nigeria currently prides itself as one of the world's leading producers of Zobo Leaf. Zobo Leaf supply chain in Nigeria operates under the Ministry of Agriculture which provides technical and policy guidance. The current existing market outlets for Zobo Leaf are mostly in the Northern part of the country with about 85% consumers residing in the North. The Zobo Leaf sub supply chain in Nigeria is wholly liberalized and its marketing is independently carried out by local traders. However, the Zobo Leaf cooperatives in Nigeria as the apex body in the supply chain plays a major responsibility in cultivation the traditional markets for Nigerian Hibiscus Sabdariffa (Zobo Leaf), as well as diversification into new markets. The Zobo Leaf cultivation industry in Nigeria is unique because it has two separate supply chains; large scale supply chain and the small scale supply chain. The large supply chain is owned by large scale Zobo Leaf producers and companies, mostly multinationals such as beverage industries Zobo Leaf while the smallholder supply chain is owned by local small scale cultivators. The smallholder supply chain has more than half a million Zobo Leaf retailers strewn throughout Nigeria, who sell their Zobo Leaf through small holder Zobo Leaf processors that are run by private individuals.



According to Raheem et al., (2022). Nigeria is the third principal producer and the primary exporter of Zobo Leaf in the world at 24%. Nigerian Zobo Leaf is grown in the fertile areas of the north.

This gives Zobo Leaf a distinctive quality and taste. Zobo Leaf cultivation in Nigeria involves no application of pesticides and chemicals. Fertilizers are added to replenish soils. Nigeria's Zobo Leaf cultivation regions are endowed with ideal climate; tropical, loaming soils; well distributed rainfall ranging between 1300mm to 1500mm per annum; and long sunny days. Production of Zobo Leaf is done all round the year with two peak seasons of high crop between March and June and October and December, which coincide with the high rainfall seasons. Planting materials are done through vegetative propagation of high-yielding, well adapted clones Monteiro (2019). almost 72 % of the total Zobo Leaf crop in Nigeria is produced by more than 562,000 small-scale farmers. Smallholder farmers produce and sell their Zobo Leaf through the local agents and from there it usually finds its way into the global market. The rest of Zobo Leaf is produced by large-scale Zobo Leaf farmers and processors.

White and red Hibiscus Sabdariffa (Zobo Leaf) s are the two types of Zobo Leaf processed in Nigeria. Currently, the most sought for is the red hibiscus sabdariffa all Nigeria Zobo Leaf Development Agency processors are only processing privation Hibiscus Sabdariffa (Zobo Leaf). Red Zobo Leaf is different from white Zobo Leaf because fermentation of red leaves is disappearing during boiling or processing red Zobo Leaf (Ezigigwe, 2018). Nigerian Zobo Leaf has for many years been sold in its whole form, although in recent times the Zobo Leaf supply chain has been looking at the likelihood of selling Zobo Leaf extract.

Challenges Facing Small Scale Zobo Leaf Farmers in Nigeria

Interconnected Challenges Related to Production

The production interconnected challenges include old Zobo Leaf farmlands, low quality of Hibiscus Sabdariffa (Zobo Leaf), drought and climate changes, poor hibiscus pickers and employee relationships, privation of labour and high costs of labour, high costs of inputs and other operational costs, poor access to information, privation of training, use of child labour, marginalization of women in distribution of Zobo Leaf income. In Nigeria, most Zobo Leaf farmlands are over 30 years old and past their most productive age. Substitution of these old farmlands with new varieties could bring about considerable gains Nwaiwu et al., (2020) showed that mature and young farm portions are more productive than old farm portions and it would be advantageous if farmers were to continuously replace the old farm portions observed that with adoption of young Zobo Leaf farm portions, production can be increased by 3,818kg/hectare all other things held constant. Although, the Zobo Leaf Research Foundation in Nigeria has developed five Zobo Leaf varieties, farmers have not adopted them because Zobo Leaf as tree crop has a long gestation period (roughly

3-5 years). In addition, the cost of planting Zobo Leaf to maturity is huge, making it difficult for farmers to adopt new varieties. There is also a problem of information dissemination whereby many farmers may not be aware of new varieties of Hibiscus Sabdariffa (Zobo Leaf). Adoption of new varieties by farmers may be achieved if the supply chain management practices (discussed later in the paper) are adopted. Academic Researchers would also play a great role in encouraging farmers to adopt new varieties that are more productive.

Low Quality Hibiscus Sabdariffa (Zobo Leaf)

Farmers in Nigeria have specialized in production of bulk homogeneous Zobo Leaf with focus on volume rather than quality. The Export Promotion Council has noted that smart value addition remains the major investment opportunity for the Zobo Leaf supply chain in the country (NBS, 2020). On the same vein, Agri-food Consulting International (2009) notes that for Zobo Leaf supply chain to be a driver of rural growth, interventions in the supply chain must address the means of raising quality in the value chain. This can be done by adopting improved varieties of Hibiscus Sabdariffa (Zobo Leaf). However, the adoption is hindered by high costs of inputs and gestation period of Hibiscus Sabdariffa (Zobo Leaf). Other measures of improving quality include applying right amount of manure, application of fertilizer and tugging methods.

High Costs of Labour

This is a challenge to small scale farmers with over 10 acres of land whereby they may plant hibiscus pickers to pick their Hibiscus Sabdariffa (Zobo Leaf). Non-availability of Zobo Leaf pickers has pushed the Zobo Leaf plucking's average kilogram payment from N 320 in 2019 to N 550 in 2020 to N 850 in 2022. It is significant to note that at the time of writing this paper, suppliers were paid N 350 per kilogram. This implies that the Zobo Leaf retailers take more than half of what the farmer is paid per kilo. This trend of labour shortage had however been predicted by the intergovernmental group on agricultural products export consultation on domestic market issues in 2002, that despite the projected Zobo Leaf production expansion in Nigeria, there was potential labour shortage for Production during COVID-19 Pandemic. Other reasons contributing to labour shortage in Zobo Leaf cultivation areas is young people negative perception towards employment in agricultural supply chain. To ensure sustainability in availability of labour, the government needs to improve the general conditions of people in the rural areas by providing social amenities, improving roads and communications structure and providing electricity among many others. It is also significant to emphasize the importance of agriculture in economic development right from the time the child enters primary school.

High costs of inputs and other operational costs-

The cost of fertilizer, the major input, is very high making the cost of production

enormous. In 2021, the average price of 50-kilogram bag of NPK 20.10.10 fertilizer is N5000 subsidized by the government compared to Dangote urea fertilizer sold at an average N. 9800 per 50kg. The other operational costs are the costs of weeding, pruning and plucking. According to (2008) the cost of Zobo Leaf production in Nigeria is N150per Kg, and this compares poorly with other countries such as Senegal (USD 0.21 per Kg) as well as its neighbours in Central Africa community; Sudan (USD 0.19 per Kg) and Mali in the same West African Block (USD 0.18 per Kg). *Poor access to information*- Smallholder farmers have privation of information on better Zobo Leaf farming methods since the Zobo Leaf supply chain was liberalized in 1990s. During the days of government control of the supply chain, farmers used to get extension services (including information on better Zobo Leaf farming practices) from the Ministry of Agriculture. After liberalization, farmers are required to pay for these services, which most are unable to pay or they are ignorant about their usefulness. As noted earlier, Zobo Leaf local associations has developed 2 varieties of Zobo Leaf but many farmers are yet to adopt them due privation of information about their availability.

Inadequate Supply for local consumption

Although, the local association on Zobo Leaf export consultation on Zobo Leaf market issues (Raheem et al., 2022) projected that consumption of Zobo Leaf in Zobo Leaf cultivation countries would grow by 21.1% per year, this may surpass the expectation in Nigeria because generally the promotion of Zobo Leaf especially among the young generation is fast increasing. Aggressive advertising, coupled with conviction messages of health and style of Zobo Leaf consumption is needed to ensure sustainability of smallholder Zobo Leaf supply chain. In addition, production of variety of Zobo Leaf based products will increase total demand of Zobo Leaf in the Nigeria Oluwakemi (2021)

Challenges Interconnected to International Supply Chain

Fluctuation of Zobo Leaf prices

Like other agricultural products, Zobo Leaf prices keeps on fluctuating. For instance, in a study on the impact of changing Zobo Leaf prices on family income of smallholder s in Nigeria (Raheem et al., 2022) noted that the price paid to Zobo Leaf farmers atZobo Leaf factory in 1999/2000 decreased from N 7000 per bag to N23,000. They also identified fluctuation of Zobo Leaf prices as a major problem affecting Zobo Leaf farmers. This is because it led to distinction of family income encouraging farmers to continuously adjust their way of life. If a family did not have another source of income, the Zobo Leaf price changes would be more devastating. Affecting children's education and health, family would suffer debts and inadequate food (Raheem et al., 2022). The problem of fluctuation of Zobo Leaf prices can be addressed through holding of bumper stock, keeping maintenance funds, value

addition to products, quality enhancement and diversification of supply to markets. These measures will ensure sustainability of the Zobo Leaf supply chain in Nigeria. Further, the negative effects of fluctuation in prices can be reduced through increased local consumption of Hibiscus Sabdariffa (Zobo Leaf).

International certifications- Zobo Leaf

Exports require international certifications to access international markets and to fetch high prices. For instance, Kosher certification an international certification body awards certification to Zobo Leaf processors association that have produced Zobo Leaf in an environmentally sustainable manner. Kosher requires farmers and processors to produce Zobo Leaf ethically by avoiding environmental degradation, child labour and protecting the health of hibiscus pickers both at the farm and factory levels (AHFEN, 2011). For instance, IYA FOODS Zobo Leaf Company in North Aurora, USA was among the earliest Zobo Leaf factory in the world to be awarded Kosher Certification Alliance certification award. The award can be re-applied every three years. Costs of certification and compliance to fair trade and other international standards that are incurred by smallholders are prohibitive and must be handled by a well-organized smallholder association. Despite these challenges Zobo Leaf processors must acquire these certifications so that their Zobo Leaf can be able to access international markets in the developed nations. This is one of the ways of sustaining the Zobo Leaf supply chain that continues to rely on export markets.

Challenges Interconnected to managing Supply Chain in the Nigerian Context

According to Ahiduzzaman et al.,(2021) supply chain are sets of entities involved in the flows of products, services, finances, and/or information from a source to a consumer. Therefore, supply chain management offers firms' a management thinking to handle their activities and integrate them with downstream and upstream partners as well as firm's internal supply chain. As earlier discussed smallholder Zobo Leaf supply chain in Nigeria has so many actors who may benefit from the supply chain management practices. For instance, AHFEN has developed suitable Zobo Leaf varieties that respects the climatic condition here but they are yet to reach the farmers. This shows a loophole in the Zobo Leaf supply chain which should be closed through proper supply chain management practices. According to Monteiro (2019) the aim of supply chain management is to improve the performance of the whole supply chain. It seeks to improve competitive performance by close integration of internal functions within a firm and effectively connecting them with external operations of suppliers, consumers and other channel members. Thus, in order to improve the performance of the Nigeria small holder Zobo Leaf industry all the actors should be closely integrated.

This paper recommends an adoption of some supply chain management practices in smallholder Zobo Leaf supply chain in Nigeria in order to address the main challenges facing the supply chain. The adoption of these practices will bring about competitiveness within the Zobo Leaf supply chain both domestically and globally.

These practices include:

Strengthening supplier and consumer relationship

Supplier and consumer relationship can be defined as a set of firm's activities concerned with managing its relationships with consumers and suppliers to improve consumer fulfilment and synchronize supply chain activities with suppliers as well as leverage supplier's capability to provide superior products to consumers (Ahiduzzaman et al., 2021). Involving suppliers in product development enables firms to make better use of their suppliers' capabilities and technology to deliver competitive products. Joint arrangement with suppliers also results in record reduction, smoothing production, product quality and lead time reductions. In Nigeria, AHFEN is providing financial services to smallholder farmers to enable them cut down on rising costs of production (AHFEN). Provision of credit to cultivators who are suppliers of the key raw material will lead to production of high quality Zobo Leaf leading to enhanced consumer fulfilment. Further, AHFEN should identify and partner with appropriate organizations which can add value to smallholder Zobo Leaf and thus, provide an efficient network for delivering value. There should be a mechanism through which buyers and small-scale farmers develop a direct relationship, this would assist Zobo Leaf farmers to know what quality and quantity these buyers need, this can be made possible via unions or associations that need to be created or strengthened (Islam, et al., 2021). *Smart value addition of Nigeria Hibiscus Sabdariffa (Zobo Leaf)*.

Zobo Leaf Local associations managed processors should aim at being market oriented by producing Zobo Leaf that consumers need. The agency should conduct marketing research in order to understand market requirements. The agency has been producing semi-processed Zobo Leaf in Hibiscus Sabdariffa (Zobo Leaf) d of adding value to farmer's produce resulting in low prices for the farmers. An analysis of the India Zobo Leaf export market, where there is significant value addition, shows that Nigeria exported more Zobo Leaf in volume than India in 2009 by 15 % but the India earned 36% more from its exports than Nigeria did (Oduori et al., 2022). India also sells 41% of her Zobo Leaf in bulk and 29 % in value added form (Monteiro, 2019). Diversifications in the industry need also to be encouraged so as to encourage good prices.

Implementation of information and communication technology (ICT) as a facilitator

The way people conduct business today has changed as a result of revolution in information and communication technology (ICT) (IT) and communications. Latest networking technologies have huge potential in business according to managers and academic researchers (Islam et al., 2021). According to Lazarevic et al. (2007), information and communication technology (ICT) (IT) is a major facilitator of effective supply chain management. Information and communication technology (ICT) provides firms with competitive advantage. As supply chain span many organizations in

delivering products to consumers both upstream and downstream and many functional areas within the firm, information and communication technology (ICT) allows the firm to enhance communication and organization of various value adding activities with their partners and between functions within their own operations (Ogunsola et al., 2018). Zobo Leaf industry in Nigeria will benefit a great deal from adoption of information and communication technology (ICT) because its supply chain has so many actors as discussed earlier. Information and communication technology (ICT) will improve organization among the parties encouraging efficiency and effectiveness. According to Monteiro(2019) and Oluwakemi (2021) internet technology offers firms opportunities of reducing costs, increasing their tractability, increasing their response time and improving consumer services. As mentioned earlier, AHFEN has already computerized its operations at Zobo Leaf buying centers and this has already started yielding dividends in terms of greater accountability and returns. Networking all the actors within the Zobo Leaf supply chain through computerization would yield greater benefits in terms of information access, market access and in operational efficiency.

Symmetric information flow for seamless integration within Zobo Leaf supply chain

Symmetric information flow is a significant feature in achieving seamless integration in a supply chain (Ahiduzzaman et al., 2021). Symmetric information flow can bring many benefits to suppliers and buyers such as inventory reduction and low manufacturing costs while poor distribution of information across the supply chain may lead to poor organization that results in high inventories, inaccurate forecasts, low utilization and high production costs. To facilitate organization between many supply chain partners in the Nigeria Zobo Leaf industry, symmetric information flow is essential. The Ministry of Agriculture as the overall overseer of the industry should devise strategies for encouraging symmetric information flow among the parties. Information can be shared through organizing joint consultative meetings, conferences, workshops, seminars, websites, and emails among many others. Symmetric information flow may also bring other benefits to the Zobo Leaf industry such as increasing pricing transparency, real time information and leverage in supply negotiations.

Management

There is privation of strong producer associations among Zobo Leaf farmers for watching over vital issues such as quality production of seeds, inputs provision to producers on credit, quality of inputs such as pesticides and extension services. With strong institutions clearly expediting their roles, the efficiency within the Zobo Leaf supply chain may be achieved. Successful implementation of competitive strategies largely depends on human assets of the Zobo Leaf supply chain. In order to increase yield in poorly-managed farms, management decisions and value chain modification may be required as proposed in China and Thailand. This can aim to enhance their yield, production as well as the quality of Hibiscus Sabdariffa (Zobo Leaf). Salami and Afolayan (2020)proposed the Thailand's model, where cooperative farming is practiced among Zobo Leaf farmers. This can be replicated in Nigeria, with

modifications. Farmers should be encouraged to form strategic alliances among themselves in order to improve performance. Where such alliances are started, equipment and mechanization is possible which will end up saving cost and overcoming poor land management and plucking inefficiency. Effective competitive strategies require managers to have an understanding of supply chain dynamic and ability to use information based tools. Therefore, Zobo Leaf industry should think about the skills requirements and education when integrating its smart value addition activities with their partners. Training significantly contributes to improving supply chain management performance. According to (Ogunsola et al., 2018) effective training and knowledge based learning is essential in developing and maintaining new supply chain management skills. Parties in the Zobo Leaf supplychain in Nigeria should invest in human resource training and capacity building.

Studying internal and external environment context

This is significant since it helps the firm to identify opportunities and threats facing the firm. According to Islam et al., (2021) a marketing opportunity is an area of buyer need and interest in which there is high probability that a firm can profitably satisfy that need. An environmental threat is a challenge posed by an unfavorable trend or development that leads, in absence of defensive marketing action, to deterioration of sales or profits (Oluwakemi, 2021).

AHFEN on behalf of the smallholder farmers should continuously monitor the trends in the marketing environment with the objective of identifying marketing opportunities and threats. For instance, AHFEN, should be able to exploit such global opportunities as a trend towards a healthier lifestyle and greater emphasis on fitness. The firm should produce red Zobo Leaf that is regarded as having great health benefits. In addition, it should promote the health benefits of taking Hibiscus Sabdariffa (Zobo Leaf). Similarly, to ensure sustainability of the supply chain the firm should identify threats that are likely to undermine the industry. Some of the threats facing supply chain include perception of use of child labour in Zobo Leaf plucking, use of chemical fertilizers, marginalization of women labour, use of wood fuel, contamination of water catchments areas, protection of wildlife, high cost of energy, labour and fertilizer, climate change, frost, and high consumption of cola products by young generation. It is significant to note that some of these threats have global dimensions and failure to address them will lead to Nigerian Zobo Leaf being denied access in some global markets. It is imperative for AHFEN to address problems relating to the use of child labour, marginalization of women in Zobo Leaf industry, use of wood fuel, and working conditions of Zobo Leaf hibiscus pickers among other issues that have international dimensions. By addressing these challenges AHFEN will ensure sustainability of the smallholder Zobo Leaf supply chain in Nigeria.

Conclusion

This paper provides a detailed background information on the smallholder Zobo Leaf supply chain in Nigeria; its performance and contribution to the economy; and categorizes specific challenges facing this supply chain. The Nigerian smallholder Zobo Leaf supply chain has tremendous prospective for rural entrepreneurship development, economic growth and household income generation, if the important supporting measures are taken to overcome the many challenges and ineffectiveness in the supply chain. This paper has recommended numerous approaches to enhance competitiveness in this supply chain. Among these plans are: supplier and consumer relationships, value addition, information and communication technology (ICT), symmetric information flow, tractability in coreproduction capability, upgrading Zobo Leaf sprouting, proper organization, management, policy reforms, training and monitoring business environment fluctuations.

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