A technological innovation systems perspective on the emerging shea butter cluster in Uganda

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ABSTRACT

This paper uses a technological innovation systems perspective to analyse the emerging shea butter cluster in east and northern Uganda. The aim of the paper is to describe the structure of the innovation system for shea butter and its associated products. In so doing, it highlights the system's functionality and the underlying policy issues affecting growth of the shea butter cluster in the region. Data was collected through interviews with 20 key informants in the shea districts, three focussed group discussions with farmers' group leaders, processors, local government officials, private sector and development aid practitioners, and observations of shea butter processing in firms. Findings reveal that shea butter production and processing is very much a cottage industry, which is supported mainly by women groups. It could evolve rapidly into a dynamic business cluster if actors and institutions, which currently exist in isolation, start to interact more intensely It means that local governments, universities, private businesses and the community in the shea districts should be willing to interact and learn from each other. The findings point to the need for universities and research organizations in the area to work collaboratively with local government, businesses and the community to promote growth of the shea butter cluster.

Keywords: *Cluster, community, innovation system, triple helix, Shea butter, university, Uganda*.

1.0 INTRODUCTION

From time immemorial, communities in east and northern Uganda (who numbered about 25 percent of the total population in 2002) have used shea butter from the tree *Vitellaria paradoxa* (the shea tree) for food, cosmetics and medicine. Women and children gather ripe shea fruits from the wild, eat the minerals, proteins and vitamins-rich pulp, and keep the kernels (Maranz, 2004). Shea butter/oil is extracted from the kernels and used to flavour food. The oil is also used to smear new born babies, and to relieve muscle aches and soothe the skin. Clinical studies have shown efficacy of shea butter as a nasal decongestant (Tella, 1979). Nectar from shea tree flowers attract honeybees and birds in large numbers (Dukku (2010), which pollinate farmers' crops and provide honey for the community. Traditionally, mortars and pestles (indispensable household tools in this community) are made from the hard wood shea tree. The shea tree is endemic to this part of the country. It extends to southern South Sudan and stretches about 5000 kilometres to Senegal in West Africa (Chalfin, 2004; Okullo et al., 2010). The trees grow in the wild, mature and start fruiting at 15-20 years. They continue fruiting for nearly 400 years (Ferris, Collinson, Wanda, Jagwe, & Wright, 2004). These unique and valuable attributes of the shea tree, have made communities in northern

Uganda to believe and say that, 'shea tree is a gift from God!' Recent studies have confirmed the immense traditional values communities attach to the shea tree and shea butter (Gwali et al., 2011) .

The value of shea butter is widely acknowledged, although it has not been fully translated into tangible economic benefit for the communities in east and northern Uganda. New micro and small scale enterprises have recently emerged, and introduced new methods (cold press) for producing shea butter. These small firms also produce a variety of novel shea butter products like soap, cosmetics and ointments. However, the firms do not have a shared strategy for investing in shea butter production and value addition. For example, it is less understood how firms and other organizations in the shea districts could work together to harness knowledge and technology for value addition to shea butter.

The aim of this paper therefore is to highlight the key policy issues in the development of the shea butter cluster in the region using a technological innovation systems approach. The paper focuses on the diversity of actors interacting in different ways in the production, processing and value addition of shea butter. The structure and dynamics of an emerging shea innovation system is described, as well as the factors affecting shea butter production and value addition.

The technological innovation systems (TIS) approach draws from earlier works of Christopher Freeman, Bengt-Ake Lundvall and Richard Nelson and other scholars who consider it a useful approach to understand the barriers and factors that enable growth and competitiveness of firms (Lundvall, Joseph, Chaminade, & Vang, 2009; Edquist & Johnson, 1997). The innovation system concept is defined by relationships within and between organizations, and how these relationships eventually lead to innovations and competence building (Lundvall, 2010). Learning is a central activity in any innovation system. Therefore, formal educational organizations including schools, colleges and universities, are essential for the system to function well. But equally important is the learning that takes place in non-formal settings through apprenticeship or by using a product or service, where knowledge is gained through experience, practice and sharing (Lundvall, 2010; Oyelaran-Oyeyinka, 2006).

The TIS approach adopted in this paper is based on the framework suggested by Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, (2008). It is a framework for analysing innovation systems in terms of their functions, and usually revolving around diffusion in society, at various levels, of a technology, product or process (Bergek, Hekkert, & Jacobsson, 2008). In this paper, the focus is on shea butter and its derivative value added products. Table 1 is a summary of Bergek et al's framework, specifically presented in relation to shea butter.

Table 1: Functions of technological innovation systems

Function	Description
1. Knowledge development and diffusion	The breath of scientific, traditional and local knowledge, in this case, on shea butter production, processing and value addition;
2. Influence on the direction of search	Factors which make investment in shea butter attractive, including incentives, policy preferences, new markets, etc.
3. Entrepreneurial experimentation	Emerging entrepreneurial activities, for example, new firms venturing into shea production and value addition, the range of products and processing methods employed.
4. Market formation	Trends in the development of the shea butter market, type of the market (nursing, bridging, mature), potential size of the market, and what is generally driving the formation of this market;
5. Legitimation	General perception about shea butter and its products, and acceptability by the community and other actors.
6. Resource mobilization	Resources that are available, e.g. financial, human, and other complimentary products or services for shea butter production and value addition;
7. Development of positive externalities	External economies brought about by the performance in the above functions--political support, advocacy coalitions, etc.

2.0 METHODS

A combination of qualitative research techniques were used in the study. These included focused and open ended interviews; focus group discussions, observations, and review of policy and related documents. Verbal consent was obtained for all interviews and focus group discussions. Questions and topics discussed were related to the respondent's knowledge or experience in shea butter production and their relationships with other actors. The respondents were purposively selected based on their work and experience with shea butter production and processing.

Seven shea butter producers were visited in the shea districts of Soroti, Lira, Pader, Otuke and Moyo. Shea butter production process was observed in three firms. The process was also explained at each of the other firms visited. At each firm an interview was held with either the

owner of the firm, or a senior staff heading the production unit. The firms were located by referral from individuals in the community and other firms earlier met.

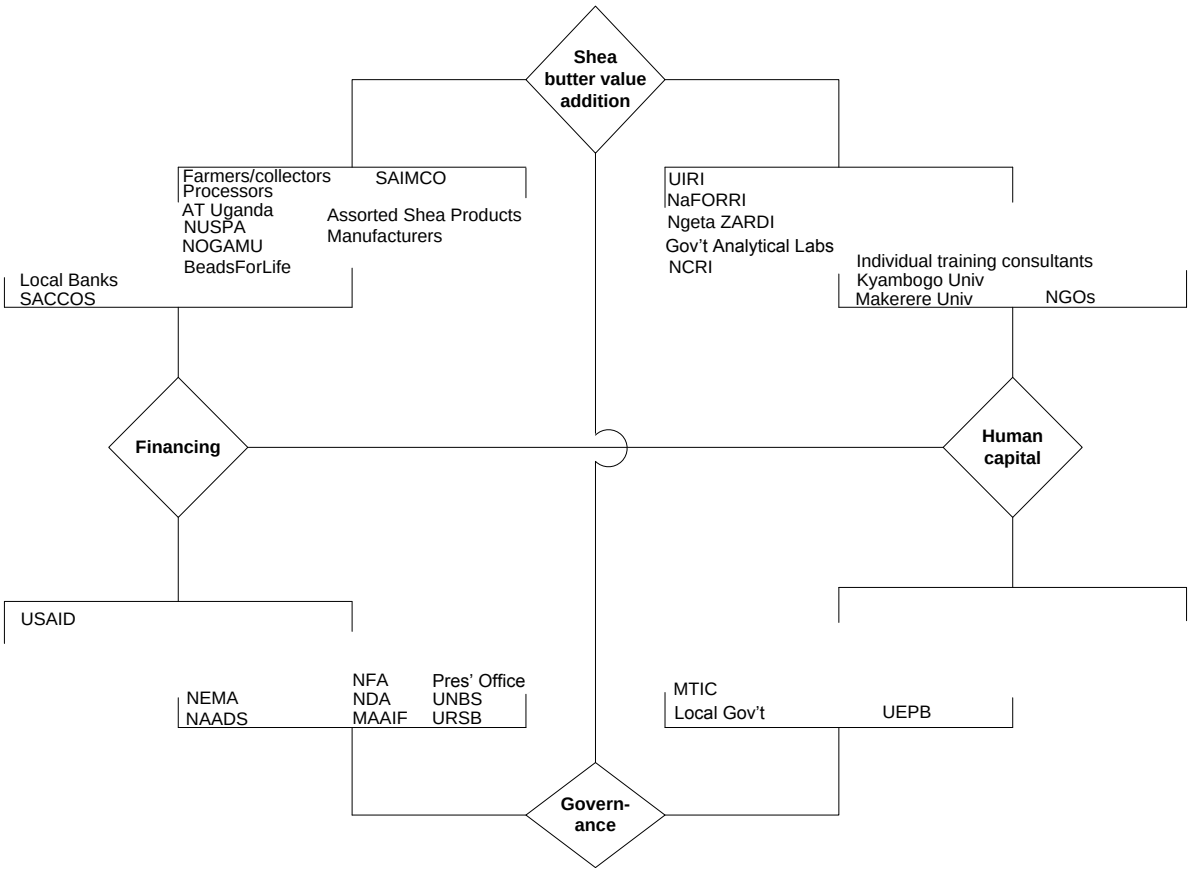
Four focussed group discussions were held with representatives of farmers' groups involved in shea collection in each of the shea districts of Moyo, Agago, Otuke and Amuria. Another focus group discussion was held in Kampala (Uganda's capital city) involving processors, scientists, finance specialists and development aid workers. Each focus group discussion was attended by seven to 12 participants. Three homes of shea kernel collectors were visited in Moyo, Amuria and Agago districts to observe how shea kernels are collected and stored, and how the trees are protected in the gardens.

Furthermore, a total of 20 local government officials were interviewed in all the shea districts in respect of local government policies and plans for shea butter production. These officers included District Forest Officers, District Commercial/Production Officers, District Administrative Officers, and Local Council III Chairpersons (elected officials who head a sub-county). An official from a local non-governmental organization in Lira, two officials from two public research organizations, and one official from an international shea processing plant were also interviewed. A firm which makes shea butter processing machines in Soroti was also visited. Data was transcribed and analysed in accordance with the TIS scheme of analysis.

3.0 RESULTS AND DISCUSSION

3.1 Structure of the Shea Innovation System

First, the structure of the shea innovation system in east and northern Uganda, that is, the actors, networks and institutions involved in shea butter production and value addition is described in this part (Figure1). The structure is looked at in four parts: a) activities directly involved in shea butter production and value addition in Uganda, b) the financing of the activities, c) governance in terms of policy and regulations for shea butter, and d) human resources and skills available. Shea butter value addition includes all activities, which relate to production and processing of shea butter.



Acronyms
URSB-Uganda Registration Services Bureau
NEMA-National Environment Management Authority
NDA-National Drug Authority
UNBS-Uganda National Bureau of Standards
NAADS-National Agricultural Advisory Services
Pres' Office-President's Office
NFA-National Forestry Authority
MAAIF-Ministry of Agriculture, Animal Industry & Fisheries
UEPB-Uganda Exports Promotion Board
SACCOS-Savings and Credit Cooperative Organizations
NOGAMU-National Organic Manufacturers in Uganda
NUSPA-Northern Uganda Shea Processors Association
SAIMCO-Soroti Agricultural Implements and Machines Company
UIRI-Uganda Industrial Research Institute
NaFORRI-National Forestry Resources Research Institute
NCRL-Natural Chemotherapeutics Research Institute
Ngeta ZARDI-Ngeta Zonal Agricultural Research & Dev't Institute
NGOs-Non-Governmental Organizations
MTIC-Ministry of Trade, Industry and Cooperatives

Figure 1: Actors and their roles in the shea butter production and value addition

3.2 Shea Butter Production and Value Addition

Shea butter is produced from kernels left after eating the shea fruit pulp. The fruit is harvested in the months of May through August every year (Okullo, Hall, & Obua, 2009). Harvesting is usually done early in the morning by women and children. The pulp is eaten, and the kernel is sun dried and stored. Yields of 15 to 55 kilograms of fresh fruit per tree have been reported in literature (Ferris et al., 2004).

Women process some of the kernels into oil for household consumption. First the dry kernels are cracked with a hard object (usually wood or stone) to remove the outer shell. It is then put in sand in a large saucepan or pot and roasted. After roasting to dark colour, it is left to cool.

The roasted kernels are ground to fine paste, and boiled with water in a pot or saucepan. After some time, a light yellowish liquid (oil) is decanted into clean vessel, ready to be eaten or used as baby oil. Local communities report a shelf life of up to two years for shea oil produced in this traditional way.

Other kernels are sold in the market or to local shea butter producers. Most of them are cottage firms, that is, small family owned processing units in the backyard of homes in trading centres or small towns. The exact number of shea butter producing firms or cottages is unknown. At the time of this study, only one small scale firm called Guru Nanak Oil Mills in Lira Town produced shea butter at factory scale; but even then, it produced shea butter as a very small fraction (approximately one tenth or less) of its oil products. A substantial amount of shea butter is produced by the wider community using the traditional method. They produce it mainly for household consumption. A little bit of it is also sold in local markets.

Usually middlemen buy kernels and sell to producers of shea butter. Some producers buy directly from organized women or farmers' groups. In such a case, the producers organize and establish their own groups and enter a contract with them to buy/supply shea kernels. A group may be up to 50 women. Besides shea collections, the groups also deal in other commodities like simsim (sesame) and sun flower. In a good harvest season, each group member on average reportedly may collect more than 100 kilograms of shea kernels. Each kilogram of kernels cost up to USD 0.6 at the time of this study.

Producers buy the kernels and sort them into three grades A, B and C according to size, moisture content, and breakage. The cold press method is used to extract shea butter from the kernels. In this method, the kernels are cracked manually to remove the outer shell, and then ground to fine paste using a motor operated grinding/crushing machine. The machines are powered by electricity or most commonly by a diesel generator. After grinding, the paste is put in the oil pressing machine and pressed. The resultant light yellowish liquid (shea butter) is collected in a dry container ready to be used. Producers report a shelf life of two years. It is commonly packaged in plastic containers of various sizes and sold as a raw material for the manufacture of other value added products like ointments, hand and body lotions, hair creams, baby jellies, soap, and other skin care products. In most cases shea butter producers also ventured into making shea butter value added products, especially cosmetics and soap. The left over shea cake is removed and discarded as waste. Some local producers report the cake repels mosquitos. No commercial or other use of this waste by product was reported. Although, local production is beginning to take root, an unspecified amount of shea kernels are also exported and processed abroad.

The cold press machines are manufactured locally, notably by Soroti Agricultural Implements and Machines Company, located in one of the shea districts, Soroti. One local artisan in Lira Town may also be able to fabricate the machine. Some machines are, however, imported from India or China. Each complete unit manufactured locally cost Uganda Shillings three to five million (approximately USD 1200 to 2000).

Bridging organizations helped to organize women groups and producers. They also assisted with machine acquisition and marketing of shea butter. For example, the Northern Uganda Shea Processors Association (NUSPA) supported shea producers with machines for cold press and assisted in marketing the shea butter. NUSPA was formed in 1996 by a United States Agency for International Development funded Shea Project for Local Conservation and Development (COVOL). NUSPA later became a cooperative society. However, when

COVOL project scaled down in 2008/9, NUSPA ceased to be active. Another organization, the National Organic Agricultural Movement of Uganda (NOGAMU) also promoted the production, processing and marketing of organic shea butter. NOGAMU and NUSPA were instrumental in having national standards for shea butter set by the Uganda National Bureau of Standards. Other notable actors were BeadsforLife and Appropriate Technology (AT) Uganda. These non-governmental organizations bought and helped market shea butter from the communities and local producers.

A number of public organizations were involved in research with shea butter. For example, Uganda Industrial Research Institute developed some value added products from shea butter. Makerere University and National Forestry Resources Research Institute carried out research on physico-chemical characteristics of shea butter and ecology of shea trees. Ngeta Zonal Agricultural Research and Demonstration Centre was used for experiments with grafted shea trees. The Government Analytical Laboratories and the Natural Chemotherapeutics Research Institute collaborated in carrying out quality tests on shea butter samples.

3.3 Financing for Shea Butter Value Addition

As Figure 1 shows, financing for shea butter value addition was predominantly by individual firms, especially firms manufacturing shea butter value added products. Cottage firms financed shea butter production with income they obtained from other side businesses or jobs. Occasionally bridging organizations like NUSPA, BeadsForLife, AT Uganda, and NOGAMU provided financial support. In a few instances, communities of collectors formed Savings and Credit Cooperative Organizations to finance their activities. Banks offered financial services, and sometimes micro credit for shea butter production. In the mid-1990s, USAID through COVOL project provided financing for shea butter processing in the region. COVOL operated in almost all the shea districts of Uganda, providing implements, training, and helping establish farmer groups for shea kernel gathering. However, after COVOL scaled down its operations, a number of the initiatives stalled. Some of the then COVOL employees established their own cottage firms for shea butter production.

3.4 Governance of Shea Butter Value Addition

Governance issues were concerned more with the conservation status of the shea tree. Being a hard wood tree species, the shea tree makes good charcoal. Charcoal burning is a serious threat to the shea tree. In some districts like Soroti and Lira, the shea tree is almost depleted due to charcoal burning and clearing land for farming. Charcoal burning became the main source of income for the region which was recovering from two decades of civil unrest and the brutal Lords' Resistance Army rebel insurgency. Government has listed the shea tree as endangered, and through local government councils, it has passed bye-laws banning the cutting of shea trees for charcoal. Enforcement of the bye-law is still weak, but it is welcomed by some local community members who say it reminds them of their old traditional sacred beliefs, which prohibit cutting shea trees. They believe that the shea tree is a divine gift and anyone who cuts it would be cursed.

In a lot of places, individuals and families take initiatives to preserve shea trees in their gardens. They prevent unauthorized felling of the tree for charcoal. It is easier for them do so where land is privately owned, than where it is owned communally (as is the case in most shea districts). In such instances they have to convince their relatives to recognise the value of preserving the shea tree. Those who take initiatives to preserve the shea tree acknowledge that the long term benefit from preserving shea trees is much more than the short term gain from cutting the tree for charcoal. The communities are aware of the importance of the shea tree in

attracting honey bees, which pollinate their crops and gives them honey, as well as manure for their soils. A local community member remarked during an interview:

'This tree [shea tree] is very important because it provides oil, and even when it has flowered…that is where bees go and collect nectar; and its honey is very nice—when you eat, that odour which you smell…'

In 2006, the President of Uganda issued a directive to protect the shea tree from overexploitation. The President also directed that a factory for shea butter production be established in the region. In response partly to this directive, the National Environment Management Authority prepared a National Strategy on Shea aimed at promoting sustainable utilization of the shea tree. The Uganda Exports Promotion Board also included shea butter as a biotrade product to be promoted. Uganda National Bureau of Standards, on the other hand, developed national standards for shea butter and a certification scheme for small businesses, which shea producers could benefit from.

3.5 Human Capital Development

The human resource capacity for shea butter exploitation exists but it is latent. Most of the shea butter producers are schooled individuals with formal education: certificate, diploma or degree certificates. However, majority of them operate cottage firms. Extremely few cottage firms hire full time employees. Those working in the cottage firms have either formal or informal learning from their previous employment. There are no specialised training programmes in shea butter production and processing. However, some work has been done by undergraduate and postgraduate students from Makerere University and Kyambogo University. The students' work is mainly on the processing methods, physico-chemical characteristics of shea butter, and ecology of the shea tree. Occasionally non-governmental organizations hire private consultants to train and provide skills in postharvest handling of shea kernels and processing of shea butter.

4.0 FUNCTIONALITY OF THE SHEA INNOVATION SYSTEM, POLICY ISSUES AND RECOMMENDATIONS

The functional elements within the shea innovation system are discussed here using the technological innovation systems scheme of analysis highlighted by Bergek *et al* (see Table 1 above).

4.1 Knowledge Development and Diffusion

Shea butter has been studied quite extensively especially in West Africa. Carney and Elias (2006) have traced the earliest records on shea butter to the 13th century when it was traded for salt and fish from the West African coast, and by Muslim travellers along trade routes in the Sahara. European explorers, notably Mungo Park in the 1790s, made the first recorded descriptions of shea butter, and how it was processed traditionally (Carney & Elias, 2006). By the 1920s shea butter was traded between West Africa and Europe as a raw material for margarine and candles (Ferris et al., 2004). Recent studies have focused on the ecology of the shea tree, its natural regeneration and propagation by farmers (Okia, Obua, Agea, & Agaro, 2005; Orwa, 2009; Sanou et al., 2004). Other studies by the National Forestry Resources Research Institute plan to develop fast maturing and better yielding varieties of the shea tree. These studies and the shea projects by non-governmental organizations, helped highlight the importance of shea tree in the livelihoods of communities in the shea districts. However, there has been no mechanisms yet to further these studies beyond the academic interests of the students.

Physico-chemical characteristics and fatty acid profiles of Ugandan shea butter show that is it a high value vegetable oil (Okullo et al., 2010; Honfo et al., 2010; Maranz, Wiesman, & Garti, 2003). These studies have shown important differences in the West African and East African varieties of shea butter. A key difference is in the fatty acid profiles. The West Africa variety (*Vitellaria paradoxa sp paradoxa*) has more stearic acid, which makes it a good cocoa substitute in chocolates; while the East African variety (*Vitellaria paradoxa sp nilotica*) on the other hand is richer in oleic acid, which makes it a good moisturizer. The Ugandan shea butter therefore would find greater use in cosmetics, edible oil, soaps, and other skin care products. Firms in Uganda have developed some of these products, but they have not tested them to ascertain their efficacies and to compare quality with other similar products on the market. More research and product development is needed for novel formulations and product blends, design and testing of shea butter products.

Communities in the shea districts have used the traditional method of producing shea butter for decades; and more recently cottage firms have adopted the cold press method. However, efficiency of these methods has not been fully studied. In order to close this gap, firms and local artisans should explore possibilities of collaborating with knowledge centres, like universities and local research organizations, to optimize production efficiencies. This arrangement can propel and enable growth of a vibrant shea butter cluster in the region. A cluster is defined by Colgan and Baker (2003) as a concentration of firms in a geographic region that are interconnected by the market they serve and the products they produce, as well as by the suppliers, trade associations, and educational institutions with which they interact.

4.2 Influence on the Direction of Search

Main drivers for investment in Ugandan shea butter seem to be the anticipated growing global markets especially for shea butter derived cosmetics and other skin care products. Ugandan shea butter is promoted as a good moisturiser because of its higher oleic content. It is also promoted as an organic product because it grows naturally and is collected in the wild. However, it means that if firms are to meet the certification requirements for organic shea butter, the kernels must be collected from farmlands where no pesticides or herbicides have been used. In other words, farmers who wish to trade in organic shea kernels should neither spray their crops nor apply fertilizers in fields with shea trees. Use of fertilizers and agrochemicals is generally low in Uganda (less than 0.6kg/ha), but may rise as farmers begin to grow more commercial crops like maize and sunflower (Ministry of Agriculture Animal Industry and Fisheries, 2010). When this happens, it may pose a challenge in sustaining the organic shea market.

Shea butter production may also be promoted to supplement household incomes in the shea districts, which are recovering from two decades of tyranny of the Lord's Resistance Army rebels. The latter had displaced over one million people from their homes between 1986 and 2006. As communities return to their settlements, diversified sources of income become necessary for households, particularly for the women. In this regard, investing in shea butter production may contribute to inclusive growth in the region, given also that shea butter has received the global Fair Trade certification (Fair Trade Foundation, UK) (Greig, 2006). Fair trade is a global social movement which advocates for fair trading conditions for disadvantaged producers and consumers so that the latter can extricate themselves from poverty and have a sustainable livelihood. Fair trade arrangements offer premium prices for farmers and helps cushion them from fluctuations in the global markets.

A great opportunity for shea butter investment in Uganda, however, comes from the good political will towards shea butter production. The President's directive of 2006 to build a shea butter processing factory in the region is a good example of this political will. This directive has not yet been fully implemented. The holistic strategy for sustainable utilization of shea in Uganda proposed by the National Environment Management Authority aims to support conservation of the shea tree, marketing of shea butter, research in shea and promotes capacity building, collaboration and coordination. A key challenge is to ensure that all shea butter actors engage and interact in a manner that promotes learning and innovation. It seems that the strategy would add greater value if it focused on innovations from shea butter as its locus, in order to enhance collaboration and cooperation among the shea actors.

4.3 Entrepreneurial Experimentation

Shea butter production in Uganda is still very small compared to West Africa (Ferris et al., 2004), and very much a cottage and community activity. Most cottage firms emerged in the last five to ten years. Most of these cottage firms are engaged in shea butter production using the cold press method, and also in very small scale manufacturing of shea butter cosmetics, soaps, and ointments. There is no organized marketing of these products yet. The products are usually sold through networks of friends and families. This may be partly because the shea butter cluster is not yet fully developed. Cottage firm owners and employees also lack entrepreneurial skills. Trade secrecy characterises much of the marketing of shea butter and its products in Uganda.

4.4 Market Formation

Global demand is projected to rise as shea butter is increasingly recognized for its superior properties in making beauty and skin care products, and, in the case of West Africa shea butter, as cocoa substitute in chocolates (Elias & Carney, 2007). However, to penetrate both local and international markets, local shea butter producers and processors, may need to work towards certifying their products for safety and quality. The National Drug Authority is capable of certifying safety of cosmetic and medicinal products; and a quality mark can be obtained from the Uganda National Bureau of Standards. Also, by registering their trademarks (either individually or collectively) with the Uganda Registration Services Bureau, local producers of shea butter and manufacturers of value added shea butter products may have greater control of their markets. Shea butter is also one of the products, which can be geographically indicated because it is endemic to this part of the country.

Within Uganda, the tax regime is favourable for locally manufactured goods and for Ugandan exports. All exports of goods and services is zero rated (Government of Uganda, 2005). This along with other incentives such as the liberalized foreign exchange market and availability of land for investors could promote investment in shea butter production and processing.

4.5 Legitimation

As a product traditionally consumed and used for decades, shea butter is acceptable in the shea districts and communities. Its use as a food flavour is common only among communities in the shea districts. Some people, especially those outside the shea districts, find the flavour quite strong and unpleasant (personal communication). Possibilities of blending with fragrant perfumes and other mechanisms to suppress the smell may be explored when promoting shea butter as cosmetic. However, its fragrant smell especially when traditionally processed is what makes it a delicacy for the communities that consume it as an edible oil and food flavour. This point was emphasised by one of the focus group participants who said,

'…the traditional method of producing the oil we may think produces oil with a bad smell, but that smell makes it what it is, and when you remove the smell, it ceases to be commercialisable among the people who know it….therefore, we should promote both technologies which remove the smell and also retain it.'

4.6 Resource Mobilization

Shea butter production using the traditional method is an art which can be easily learned and perfected with time. About one in ten households in the shea districts are capable of producing shea butter using the traditional method. Similarly, the conventional cold press method can be easily mastered and perfected with time. Therefore, the necessary human resources for shea butter production cannot be in short supply. However, expertise may be required to optimize production processes, and to design and develop shea butter value added products. This expertise and the infrastructure for quality testing and assurance can be made available in the private sector as well as the universities and local research organizations, and could be reasonably afforded at prevailing labour market rates.

This notwithstanding, there is an untapped potential in the three public universities located in the shea districts. These universities are: Busitema University College of Agricultural Sciences in Soroti, Muni University in Arua, and Gulu University of Agriculture and Environment Sciences in Gulu. There are also public agricultural research organizations in the region viz, the National Semi-Arid Resources Research Institute in Serere district and Ngeta Zonal Agricultural Research and Development Institute in Lira, among others. These are potential knowledge providers, which are all within reach in the region. They can make a significant contribution to the development of the shea butter cluster in east and northern Uganda. To begin with, these universities should learn from the experience of Makerere University in creating and working with innovation systems and business clusters.

Most of the investments in Shea butter production and value addition are financed by shea producers themselves through savings and micro credit. Of recent some financial opportunities were put in place, which could support farmers, women groups and small firms involved in shea butter business. An example is the Youth Entrepreneurship Venture Capital Fund, which was set up by government in 2010/11. Under this scheme a youth can access up to USD 2000 to support his/her business, while a group of five youth can access up to USD 10,000 for a joint business venture. Another useful scheme is the Agribusiness Initiative Trust (aBi), which was set up in 2010 by development partners and led by Government of Denmark and Uganda. The aBi offers financial services and technical support for private sector driven agribusiness development ventures. Oil seeds is one of the value chains eligible for aBi support. However, red tape (i.e. severe conditions and bureaucracy) in accessing these financial services is one of the limiting factors for the majority of individuals and small firms engaged in shea butter production and processing.

Another concern is that, whereas financial services are being created to support private sector initiatives, there is no clear mechanism to link this support with potential contribution from the knowledge actors like local universities and research organizations. If shea butter cluster is to grow and become competitive, local governments, universities, research organizations and shea producers should be closely linked. It has been demonstrated by the triple helix concept that innovations thrive and more value is created where universities, industry and government effectively collaborate (Etzkowitz, 2003).

4.7 Development of Positive Externalities

The shea butter cluster in Uganda is still very young. Although the value of shea butter is widely recognised, no real investments have yet been made to fully exploit it. Suffice to say, however, that recognition of shea butter as a high value product has made local governments to pass bye-laws for conservation of the shea tree. Other than the bye-law, local governments of shea districts have not yet prioritized shea butter as a potential investment opportunity. Thus local governments should include shea butter production in their district development plans.

5.0 CONCLUSIONS

The emerging shea butter cluster in east and northern Uganda is characterised by cottage firms and community groups. Therefore, the participatory involvement of the local community and especially of women is critical in any future effort to develop the cluster. A vibrant shea butter cluster in the region would arguably supplement many household incomes. Clustering in the production and processing of shea butter and its associated products is crucial because annual per capita returns from shea kernel collection alone may be small at individual level. While at an aggregate regional level (i.e. as a cluster) returns to investment on shea butter production and processing could be enormous, considering the intrinsic ecological and traditional values people attach to the shea tree and the potential variety of high value shea products on the international market. In order for the shea butter cluster to grow and become competitive, local governments in the region should include shea butter in their district development plans, and promote interaction and learning with like local universities, shea butter cottage firms, other businesses, and the local community. It is apparent, from a technological innovation system perspective, that the essential ingredients for development of a vibrant shea cluster and innovation system are in place. Support is required to close essential knowledge gaps and to improve interaction and learning among the shea actors.

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