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LA FILIÈRE OLÉAGINEUSE EN AFRIQUE

DOSSIER

Production zones and systems, markets, benefits and constraints of shea (*Vitellaria paradoxa* Gaertn) butter processing

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Abstract – The shea tree is a multipurpose tree crop indigenous to Sub Saharan African. The tree is highly cherished for the oil that is extracted from its kernels and used nationally and internationally in cosmetics, pharmaceutics and in chocolate formulations. The processing and sales represent significant income earning opportunities for rural women who are the main stakeholders in the production chain. Shea nuts and its products are listed among the top ten Non-Traditional Exports of Ghana. In Burkina Faso it is the fourth most important export crop after gold, cotton and livestock and makes a contribution of about 6 million USD to the national economy. Today the shea tree is the second most important oil crop in Africa after the palm nut tree. About 500 million shea trees grow in Africa which has the potential of producing shea nuts worth about 150 million USD yearly. This represents substantial earnings for the Sub-Saharan African economies when fully exploited. Shea trees grow in 21 Sub-Saharan African countries that can be grouped into 3 zones following their potentials for shea nut production per year: high production zone comprising of Benin, Burkina Faso, Cote D'Ivoire Ghana, Mali, Nigeria, Sudan and Uganda that have potentials of producing 70 000–300 000 tons per year; average production zone comprising of Cameroon, Chad, Central African Republic, Guinea Conakry, Senegal and Togo with potentials of 10 000–70 000 tons per year and low production zones made up of the Democratic Republic of Congo, Ethiopia, Gambia, Guinea Bissau, Niger and Sierra Leone with yearly production potentials less than 10 000 metric tons. Though semi mechanized and some few fully mechanized productions methods are employed in the major shea producing countries of West Africa, most of the rural women still used traditional processing procedures. Major importers of shea are European Union, Japan and the USA. The sector is still constrained by lack of mechanized processing in most localities, dwindling number of shea trees (due to bush burning, exploitation for wood, dependence on natural regeneration which is not very effective), lack of adequate technical and financial support to the sector and limited research on proper propagation methods that may shorten commencement of fruit production period from 10–15 years to about 3–5 years.

Keywords: Shea / production zones / women / benefits / constraints

Résumé – Zones de production et systèmes, marchés, avantages et limites de la production de beurre de karité (*Vitellaria paradoxa* Gaertn). Le karité est un arbre polyvalent, culture indigène de l'Afrique sub-saharienne. Cet arbre est très apprécié pour l'huile qui est extraite de ses graines et utilisée nationalement et internationalement en cosmétique, pharmacie et dans des formulations de chocolat. Le traitement et les ventes représentent une possibilité de revenu significatif pour les femmes des zones rurales qui s'avèrent être les parties prenantes principales de la chaîne de production. Les noix de karité et ses produits font partie des dix premières exportations non-traditionnelles du Ghana. Au Burkina Faso, c'est la quatrième plus importante culture d'exportation après l'or, le coton et le bétail, contribuant pour environ 6 millions d'USD à l'économie nationale. Aujourd'hui l'arbre de karité est la deuxième culture oléagineuse la plus importante en Afrique après le palmier à huile. De l'ordre de 500 millions d'arbres de karité poussent en Afrique, soit un potentiel annuel de production de noix de karité de quelques 150 millions d'USD. Cela représente des revenus substantiels pour les économies africaines sub-sahariennes dès lors que la culture est entièrement exploitée. Les arbres

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de karité poussent dans 21 pays africains subsahariens qui peuvent être groupés en trois zones au regard de leurs potentiels pour la production annuelle de noix de karité : une zone de forte production comprenant le Bénin, le Burkina Faso, la Côte-d'Ivoire, le Ghana, le Mali, le Nigeria, le Soudan et l'Ouganda qui offre un potentiel de production de 70 000–300 000 tonnes par an ; une zone de production moyenne incluant le Cameroun, le Tchad, la République centrafricaine, la Guinée Conakry, le Sénégal et le Togo avec des potentiels de 10 000–70 000 tonnes par an ; et une zone de faible production comprenant la République démocratique du Congo, l'Éthiopie, la Gambie, la Guinée Bissau, le Niger et la Sierra Leone avec un potentiel de production annuelle de moins de 10 000 tonnes. Bien que des méthodes de production semi-mécanisées voire entièrement mécanisées soient employées dans la majorité des pays producteurs de karité d'Afrique occidentale, la plupart des femmes rurales continuent d'utiliser des procédés de traitement traditionnels. Les pays importateurs majeurs de karité sont l'Union européenne, le Japon et les USA. Le développement du secteur est limité par le manque de traitement mécanisé dans la plupart des zones de production, le nombre décroissant d'arbres de karité (en raison du brûlage des taillis, de l'exploitation pour le bois, de la dépendance à la régénération naturelle qui n'est pas très efficace), par le manque d'une assistance technique et financière adaptée au secteur et l'absence des recherches sur des méthodes de multiplication appropriées qui pourraient permettre de raccourcir le délai avant la première fructification de 10–15 ans à environ 3–5 ans.

Mots clés : Karité / applications / zones de production / femmes / avantages / limites

1 Introduction

The shea tree *Vitellaria paradoxa* produces fruits whose kernels contain about 40–50 lipids usually referred to as shea butter (Bup *et al.*, 2012). Although the tree is indigenous to Sub Saharan Africa, its oil is highly cherished and used in chocolate formulations as cocoa butter replacers and in cosmetics in Europe, America and some parts of Asia such as Japan, *etc*. The market for shea nuts and butter has been on a constant rise with cosmetics taking about 10% of the total production. Tradition holds that, the main actors in the production sector are women and children who get up early in the production season and work kilometres to collect the nuts. This collection, processing and sale either as dried nuts or as butter represent significant income earning opportunities for these local women (Bup, 2010).

The number of productive shea trees in the shea belt is estimated at about 500 million. Maranz and Wiesman (2003) stated that at least 500 million production trees are accessible in West Africa, which equates to a total of 2.5 million tonnes of dry kernel per annum (based on 5 kg dry kernel per tree). They also asserted that over two million people in 13 African countries process the commodity for cash and consumption. There has been a steady increase in the demand for shea nuts and butter for use in food, chocolates and cosmetics which has also triggered increases in supply though the supply is not commensurate with the demand. The potentials of the production capacity are not fully exploited because not all of the countries in which shea trees grow are involved in the processing and sales of the nuts or butter. For example in Cameroon and the Central African Republic there is no organised women group that processes and sell nuts and/or butter to the international or local market.

In addition, even in countries such as Ghana, Mali, Nigeria, Burkina Faso, *etc*. where the production and sale of shea nuts and butter is already advanced, the production methods are still traditional or are only partially mechanised. More so the buyers are very exigent on the quality and traceability of the nuts and butter.

The foregoing, notwithstanding, the shea sector is one of the promising fields that needs proper attention because the income generated from the sector touches directly the local woman and how children. This oilseed is considered to be the second after palm amongst the oil crops of Africa.

Given the fast rate of growth witnessed in the shea industry over the past decade, it is suggested that sheanut volumes multiplied by recent tonnage prices, even prior to butter extraction, can earn West African Sahel-Savannah rural communities in the region of US$ 150 million (Lovett, 2010). Though the zones of production are known, the level of activity in the sector varies from one zone to the other. The production and marketing of shea nuts and butter are not synchronised so that far reaching decisions that can impact the activities in all producing countries can be undertaken. This paper seeks to highlight the importance of the shea tree as an important crop which should be given attention similar to that accorded to the conventional ones such as palm oil, groundnuts, cocoa, coffee, *etc*. the paper treats shea production zones and volumes produced, production and commercialization systems, benefits and constraints.

2 Production zones and volumes produced

The shea is tree widely encountered in dry savannas, forests, and parklands of the Sudan zone on an estimated 1 million km^2 between western Senegal and northwestern Uganda, where annual rainfall ranges from 500 to 1200 mm (Sallé *et al.*, 1991). Shea trees grow mostly in the wide in about 21 sub Saharan African countries. These are Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Cote d'Ivoire, Democratic Republic of Congo, Ethiopia, Ghana, Guinea Conakry, Guinea Bissau, Gambia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo and Uganda (Lovett, 2004; Hatskevich *et al.*, 2011). Estimates of the potentials of shea nut indicate that major producing countries are found in West Africa. Available data from FAOSTAT (2013), shows that Nigeria has the highest potential of shea nut production. Presently, it produces more than half of the total quantity of nuts which is processed and sold either locally or in the international market (Fig. 1). Following estimates given by FAOSTAT (2013) and Lovett (2004), the 21 Sub-Saharan African countries where shea trees grow can be grouped into 3 zones following their potentials for shea nut production per year: high production zone comprising of Benin, Burkina Faso, Cote D'Ivoire Ghana, Mali, Nigeria,

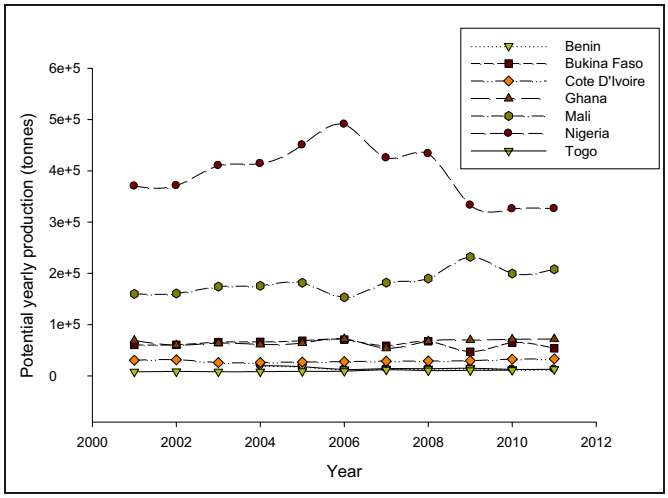

Fig. 1. Production of shea nuts in some selected countries from 2001–2012 (Source: FAOSTAT, 2013).

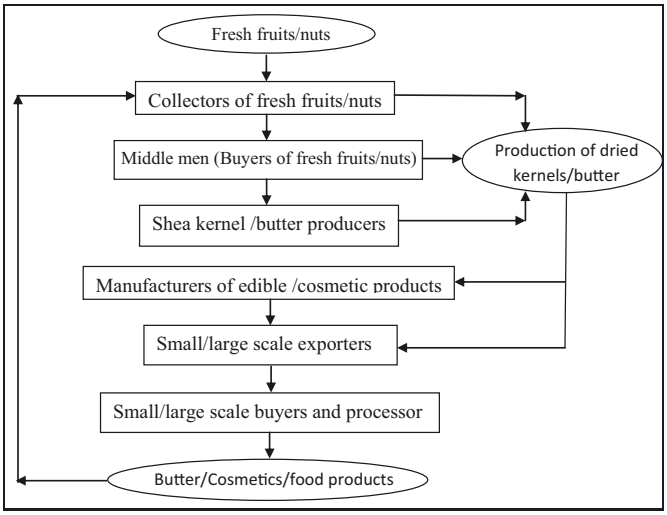

Fig. 2. A generalized flow chart of the shea butter production system.

Sudan and Uganda that have potentials of producing 70 000-300 000 tons per year; average production zone comprising of Cameroon, Chad, Central African Republic, Guinea Conakry, Senegal and Togo with potentials of 10 000–70 000 tons per year and low production zones made up of the Democratic Republic of Congo, Ethiopia, Gambia, Guinea Bissau, Niger and Sierra Leone with yearly production potentials less than 10 000 metric tons.

3 Production and commercialization systems

The shea butter production process may vary between countries and between localities in the same country. For example, in Cameroon, the stake holders involved are simply the harvesters or pickers, kernel or butter processes, local buyers and/or local consumers. In countries where processing is more advanced such as Mali, Ghana and Burkina Faso the main stake holders can be classified into four as follows: shea pickers (mostly women and children), traders who buy directly from the pickers, shea kernel and shea butter processors and exporters (Kletter, 2002). The consideration of Lovett (2004) enlarges the production scheme to more stake holders which involve: village pickers and post-harvest processors of shea kernel; local buying agents; rural or urban butter processors; large-scale exporters of shea kernel; small-scale entrepreneurs formulating cosmetics based on shea butter in Africa; external (US, EU, India and Japan) large-scale buyers and processors of kernel and butter; external companies formulating cosmetics; and external entrepreneurs formulating edible products, including cocoa butter equivalents (CBE) or cocoa butter improvers (CBI) based in shea butter.

Figure 2 presents a generalized flow chart of the shea butter production system. The process begins with the harvesters or pickers of the nuts who sell to the buyers but may also process portions of their harvested nuts into kernels and/or butter. The buyers sell the fresh nuts to the kernels or butter producers and could also be involved in processing. At this stage some of the butter can be supplied to the local manufacturers of edible and cosmetics products while a larger quantity of the kernels and butter is supplied to small/large scale exporters. At the other end of the production system are the large scale buyers who may be local but mostly international. After processing shea products especially cosmetics may come back to the harvesters of shea nuts this time at very high prices.

4 Markets for shea butter

Marketing of shea and its products is done both domestically and internationally. There are conflicting reports on the quantities sold both in the local and international markets. For example, Lovett (2004) suggests that domestic markets consume about 55% of the total shea kernel and shea butter produced, while 45% is exported. Other estimates show that over 75% of all kernels and shea butter produced in Sub Saharan Africa (SSA) is consumed within Africa. Important local markets include Accra, Abidjan, Abuja, Dakar, Bamako, Ouagadougou, Lomé, Cotonou, Lagos, Ibadan, Onitsha, Kano, Nouakchott, Banjul, Niamey and Conakry *etc*. Empirical observations indicate that, in some countries like Cameroon, the Democratic Republic of Congo, Central African Republic all the butter produced is consumed locally. It is estimated that in 2007, six major companies in the international market in the European Union and the USA bought 60% of the nuts and half of the butter produced. Four major players control the refining of shea in the world market. They are, in order of capacity, Aarhus United in Denmark, Fuji Oil in Japan, Karlsham AB in Sweden and Loders Croklaan in Holland (Addaquay, 2004).

5 Benefits of shea butter processing

Shea is an important food crop in the Sahel region where it mostly grows. Here alternative employments opportunities are few, agriculture is often difficult and yields are unpredictable, the shea nuts and other products from the tree provide an important part of the family income. This is because the maturation period for shea fruits fall within the period of famine in the shea growing areas and the sweet fruit pulp which has high energy content is usually eaten to compliment food needs. Shea

butter also acts as one of the major sources of cooking oil in areas where it grows (Nyarko *et al.*, 2012).

Over the past decades trade in shea butter has been on the rise because of increased demands in the European Union, Japan, India, Canada and the United States (Carette *et al.*, 2009). It is worth nothing that while importations of shea into the European Union are both for food products and cosmetics, importations in to the USA is solely for use in cosmetics. This has had significant positive consequences on the local women who are the main stake holders (95%) in the processing of shea. With the integration of non-governmental Organizations and cooperative groups in the processing chain, women can earn higher prices for their shea products because of improved quality and quantity (Cindy, 2008). For example, a kg of certified organic shea butter today sells at 2.75 USD up from 1.5 USD. This has a positive effect on the social status of the woman as she can now take part in house hold management and decision making.

Secondly, several communities benefit from health services and insurance schemes provided by semi processing factories installed for shea processing. In addition, shea is fast becoming an export crop in many West African countries. For example, shea nuts and its products are listed among the top ten non-traditional exports of Ghana. The shea industry, still in its infant stage, is an attractive business entity earning about 30 million USD of foreign exchange for the Ghanaian national economy. This amount is expected to triple when the shea shea production potentials in Ghana are fully exploited (Hatskevich *et al.*, 2011).

In Burkina Faso it is the fourth most important export crop after gold, cotton and livestock and makes a contribution of about 6 million USD to the national economy (Konaté, 2012). Today the shea tree is the second most important oil crop in Africa after the palm nut tree.

6 Constraints

The growth of the shea sector has been greatly hampered by a number of constraints which seem to surpass the benefits outlined above. These include amonsgt others:

Processing methods: though efforts are being made continuously to improve on the shea butter production methods, accessibility to these improved methods still remains low. Majority of the processors still use traditional techniques which are inefficient and lowers the quantity and quality of shea butter available in the market. In fact, Shea butter processing in West Africa involves minimum mechanical input, heavy drudgery and high input of firewood, which has a direct effect on the quality of Shea butter (Carette *et al.*, 2009).

Plant regeneration and maturation: shea trees grow mostly in the wild and produce its first fruits after 10–15 years. Because of the awareness created in the sector, *V. paradoxa* faces a high degree of thinning, selection, and natural mortality leading to a noticeable reduction in density (Lovett and Haq, 2000; Kelly *et al.*, 2004). Indiscriminate burning of bushes and cutting of trees coupled with population increase, insecurity, and expanding agricultural land clearing have led to woodland degradation in some shea producing areas except in those where the shea trees are protected by traditional customs (Kavaarpuo, 2010). Many shea trees are cut for building poles and charcoal because of their ability to resist termite attack and high market ability, respectively (Okia *et al.*, 2005). Additionally, natural regeneration has declined as coppicing and pollarding have limited ability to produce epicormic shoots that usually sustain the wild population (Byakagaba, 2011). Research on the domestication of the plant and development of improved cultivars for sustainable future performance is still limited. In some areas of Uganda, it has been reported that, Land shortage and insecure tree ownership are some of the main challenges to *V. paradoxa* management (Okiror *et al.*, 2012).

Other challenges include: lack of credit support, poor capacity building support and follow-up, need for organizing producers, processors and marketers into efficient groups for greater performance and efficiency, absence of sustainable policy of promoting the industry, absence of reliable data base for planning programs of support, need for effective extension support.

7 Conclusion

Shea is an important sector which is rapidly growing and presents potentials to contribute to the growth of the national economies of the countries in which it grows. The market is expanding in Europe and South America and this nurses a lot of hopes for the African rural woman who is the main stakeholder in the shea processing sector. Major producing countries are Nigeria, Ghana, Mali, Benin and Burkina Faso. An important market exists in the European Union, Canada, Japan and the USA which buys shea mainly for cosmetics and chocolate formations. A good market equally exist locally for shea butter which is used mostly as cooking oil. The production systems and markets were examined in this study. The major constraints in the sector are lack of modern processing techniques, lack of financial and technical assistance, and limited research to produce early maturing species. Research should be focused on producing early maturing species with high stearin contain as well as, efficient and cost effective methods of obtaining stearin from shea butter.

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