

# Externally fostered processing and marketing of non-timber forest products (NTFPs), contribution to household income, the analysis of opportunities and challenges in the value chain

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## ABSTRACT

This article reflects on the contribution of externally fostered processing and marketing of selected non-timber forest products (NTFPs) in marginal districts of Zimbabwe and assesses the opportunities and challenges encountered by rural people as they become part of the production and marketing chain of these products. The contribution of the NTFPs processing and marketing to rural household income and food security is assessed vis-à-vis the poor who are largely collectors of raw materials. The study findings show that rural people as collectors and producers of the products such as baobab, marula nuts, mopane worms and masau and honey are part of the lower levels of the value chain and do not control the process since the role of NGOs in the value chain remains central. Community producers do not understand the NTFP marketing system and heavily rely on intermediaries and NGOs who are knowledgeable and have information and connections with the NTFPs markets. Thus, they remain delinked to the end user or consumer of the products they produce, despite generating income from the marketing of the products. The study conducted in Muzarabani, Gokwe and Mwenezi districts shows that without the intermediaries and supporting NGOs, the processing and marketing of NTFPs is not likely to continue as it remains a new livelihood activity externally fostered. However, despite the delink between producers and the markets, there is evidence of positive contribution to household income although sustainability questions remain unanswered. The markets exist but are beyond the reach of the producers, without the intermediaries, the markets do not exist. At the policy level, community producers should be capacity-built beyond production to be active high level market participants in the value chain.

Key Words: Non-Timber Forest Products, marketing value chain, poor producers, income generation, markets, food security, technologies, and livelihoods

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## 1. INTRODUCTION

This article assesses the contribution of externally fostered non-timber forest products (NTFPs) processing and marketing to household income, based on the position of rural producers in marginal districts along the marketing chain. The study also brings out the role of rural producers of selected products such as baobab pulp and oil, marula oil, honey, masau and mopane worms from three districts of Zimbabwe (Gokwe, Muzarabani and Mwenezi) in the marketing of the NTFP products. The article also brings out the role being played by intermediary players, particularly private companies and non-governmental organisations in the production and marketing of NTFPs and how this is affecting the role of producers and the overall returns to communities. The study used a triangulation of qualitative research methods including in-depth interviews, focus group discussions and observations. This study contributes to the understanding of the externally fostered evolution of the rural economy with a very abstract market-based system. The study also contributes to the understanding of the inequalities that exist in the new marketing system of non-agricultural products.

### 1.1. Objectives of the Study

The objective of this study was to unravel the contribution of externally fostered NTFPs marketing to household income in marginal areas of Zimbabwe. The study also brings out the marginal role played by rural community producers in the market value chain. The article also questions the sustainability of the production and marketing of NTFPs in a market value chain with multiple players including intermediaries.

## 1.2. The problem statement

Despite the successful commercialisation of NTFPs in the areas under study, supported by non-governmental organisations and intermediary organisations, the rural poor collectors and harvesters of the products remain peripheral in the market value chain and are only reduced to consumers of the processing by-products. The marketing of the products to international markets remain largely controlled by intermediary players in the value chain. Thus, despite income being generated, producers remain peripheral in the market value chain and income is not significant and this renders the production and marketing of NTFPs unsustainable.

## 2. UNDERSTANDING NTFPS PRODUCTION AND MARKETING

Non-Timber Forest Products (NTFPs) have fuelled many debates over the past two decades as resources for survival and poverty alleviation, particularly in marginal areas where agriculture does not do well. FAO (1993) defined NTFPs as non-wood forest products which include all goods of biological origin, as well as services derived from forest or any land under similar use, and exclude wood in all its forms. Newman and Hirsch (2000) argue that economics drives rainforest destruction as local people clear forests for various livelihood activities. Over the past 15 years, conservation groups and local communities looked for innovative ways to counteract these pressures and have fought back with market based strategies. This is one of the reasons that has prompted the analysis of the contribution of NTFP products to household income, given the role of rural producers in the market value chain.

As argued by Newman and Hirsch (2000), the development of enterprises based on the extraction of sustainably harvested non-timber forest products became one of the strategies of conserving the forests through production and marketing of the NTFPs but with little attention being given to the profits that the rural producers are likely to generate from a market they do not have control over.

Some NTFPs have high poverty alleviation potential because markets exist for them and many people make use of them. Padoch (1993) in his study of NTFPs marketing in Bolivia contends that there are various socio-economic factors that may render some subsistence NTFPs to become commercial and some commercial NTFPs to become subsistence within different time scales. He further shows that this creates some dynamism in the production and marketing of NTFPs. Campbell et al. (2002), however, observed that there was a positive economic viability of NTFPs production and trade with the increasing interest in natural ingredients in the treatment of diseases in the developed world.

However, the study falls short of showing the contribution of income generated from the trading in NTFPs to household livelihoods, given the role and positioning of producers in the market value chain. Campbell (2002) is convinced that rural producers, particularly in Zimbabwe, remain poor as they do not benefit from the value of the products they produce, as the products move through the market chain to the end user. The study shows that this situation is created by lack of information, low value addition and poor competition in the market place. Adding value to what local producers are already selling can generate higher revenues without increasing off-take of natural resources.

Newman and Hirsch (2000) are of the view that markets for NTFPs are not easy as they argue that if markets were perfect, then forests would be valued differently and NTFPs might be easier. They do not doubt that rural producers of NTFPs face numerous market failures and barriers to entry in commercialising their products. The first are classic market failures, that is, lack of capital and information. Producers may have immediate access to products in which the market has great interest but firms and producers usually do not know about each other and face huge investment costs in bridging the gap. Pimentel et al. (1997) similarly show that creating strong markets for NTFPs involves working along the entire length of the value chain from the forest to the end. She contends that building financially healthy enterprises in the middle of the forest without running water or electricity, is fairly a daunting task.

### 2.1. Product Selection and Technology use

Clark and Sunderland (2004) correctly point out that NTFP product selection should make the best economic sense for the producers over the long term. Selection of products based on particular clients makes producers totally dependent on a single buyer. Edwards (1996) shares the same view as he indicates that to have the real value, products must have a market and it must be possible to commercialise them. He believes that improving the value chain for existing products is important. In most rural areas, the harvesting, production and marketing of most products is not always done efficiently. When linking producers with the market, a realistic assessment should be made of the markets' needs, the producers existing production capacity and the economic and ecological time pressures. To Edwards (1996), as one travels along the value chain processing, marketing and distribution, strategies become more complex hence, making it difficult for the poor to manoeuvre.

Sauter et al (2008) view NTFP production technologies as critical in adding value as producers working without conventional sources of energy and requisite technologies need to be creative in gaining efficiencies and reducing costs in their production systems. High costs may reduce opportunities of generating significant income. Thus, any NTFP requires investment in innovative harvesting and production technologies to increase product competitiveness and bring greater benefits to the producer. According to Newman and Hirsch (2000), the expectations of local income generation potential have frequently been unrealistic and not achievable in practice.

### 2.2. NTFPs Marketing Value Chains

Malleson (2001) asserts that a value chain describes the full range of activities required to bring the product from the producer to the consumer, emphasising the value that is realised and how it is commercialised. Different literatures use the terms supply, value and marketing chain. Supply chain is favoured by economists to highlight issues of competitiveness (Malleson, 2001). The sociological literature tends to use value chain when examining the relationships between actors. Where products are traded internationally, the term global value chain is used, the analysis of which is concerned with how lead firms go about setting up and maintaining production and trade networks (Kanti, 1997).

To Padock (1993a), value chains include at least two separate functions that are production through collection and then sale of the product. Most value chains require some combination of processing, storage, transport and marketing of NTFPs. In most cases, the role of the producer, processor and trader are quite different. Sauter et al. (2008) indicate that in the value chain, there is collection, management and transportation of the wild resource from the harvesting site to the home, along the value chain, identifying and developing good market niches, and then sale, often between several sets of actors in the value chain. Sauter et al (2008) warn that in NTFPs, it would be a misconception to think of value chains as simple linear sequences of activities. Most value chains closely resemble networks in which many activities, such as storage and transport, are repeated several times by different people and at different locations before the final product reaches the end consumer.

Newman & Hirsch (2000) note that analysis of value chains is required for the design of appropriate policies and development interventions, which are often based on the assumption that the poor and politically powerless extractors suffer from high levels of exploitation by intermediaries.

In the value chain, processors and intermediary traders tend to make higher profits than community collectors, except when processing is occurring at community level. In the value chain, income and access to credit, as well as level of education, is higher for NTFP traders than collectors (Clark and Sunderland, 2004). Most traders are from outside the producing communities or are members but staying outside their communities. Thus, very few poor NTFP collectors and producers are able to move along the value chain and become traders. FAO (1993) shows that in NTFP trading, traders can only make a reasonable return if they trade high volumes for which financial capital to buy, store and transport the product is needed.

Lack of information in the value chain keeps local producers of NTFPs in weaker positions to traders. Cavendish et al. (1997) contend that only a more transparent marketing chain would enable the local producers to be aware of monthly price information from key points in the marketing chain. To Cavendish et al. (1997), a sound knowledge of all producers, buyers, sellers, importers, exporters, brokers and agencies, among others, in the marketing chain would enable local producers to have a stronger bargaining power with traders. Mater (1993) shows that NTFP marketing has been largely ignored in research and management partly due to their geographical fragmentation and lower dollar returns per unit of labour time.

### 2.3 Contributions of NTFPS to Household Income

Cavendish et al. (1997) observe that NTFP-based incomes in livelihood vary greatly between products and communities and that there is also a great deal of variation in productivity, between households. The study shows that some households may barter their NTFPs for household goods rather than being paid in cash. Gondo (2007) is of the opinion that NTFP- derived income is supplementary to more important farm and non-farm income generating activities. A study by Flynn (2001) in Bolivia shows that NTFP activities are carried out on a regular basis often in the non-agricultural season and contribute between 7-79% of cash income to the household. There is no doubt from Cavendish's (2000) study that NTFPs are a source of cash income in subsistence communities where families often have no other cash generating opportunities.

Campbell et al. (2002) in their study in Chivi district of Zimbabwe, approximated that about one third of rural household income has been estimated to come from NTFPs with the proportion higher in poorer households. McGregor's (1995) study in the same district shows that about 15% of the non-timber forest products contribute to the household income and the household's value per year is US\$99.00 per season. McGregor is convinced that NTFPs help bridge the seasonal gaps in income and food. In Zimbabwe, in recent years, the dependence on NTFPs has relatively increased due to the prevailing weak micro- economic system. The same conditions affect the role played by community level producers in the value chain and also affects the income generated from the sale and ultimate contribution to household income.

## 3. STUDY METHODS

A triangulation of qualitative research methods was used for the study. A total number of 32 interviews with 32 different key informants and six focused group discussions (FGDs), each with an average of 15 people giving a total 90 participants were carried out. Sampling of the 32 interviewees and 90 FGD participants was purposive and convenient, aimed at targeting those known key stakeholders and participants involved in the collection and marketing of selected NTFPs supported by non-governmental organizations involved in the promotion of NTFPs.

The study purposively targeted officials from various stakeholders such as key informants (six NGO officials from SAFIRE and Plan International, seven ward councillors, two officers from Phyto Trade, a private company involved in the processing and trading of NTFPs locally and internationally, three officials from three rural councils, three officials from Forestry Commission and eight traditional leaders). Specific interview guides for the key informants were developed to gather specific information regarding their roles and control of resources. This method also gathered data with regards to the sustainability of the production and marketing of NTFPs beyond external support from NGOs.

A total of six Focus Group Discussions (two FGDs in each district) with an average of 15 participants (men and women) were conducted largely with rural producers of marula, baobab and mopane products. Focus group discussion guides were also developed and the data gathered was triangulated with findings from interviews. Group discussions gathered data on insights into the roles played by community producers, opportunities and the challenges they are facing in the NTFP production and marketing. Participants in FGDs also suggested what they thought could be done differently for the producers to have a key role in the value chain and marketing of NTFP products, given the nature of the work and labour requirements in the collection and processing of the products.

## 4. FINDINGS AND DISCUSSION

### 4.1 Externally Fostered Commercialization of Non-Timber Forest Products

According to FAO (1987), small-scale rural enterprises were seen as a major source of livelihood in developing countries as the capacity for agriculture declined. FAO observed that small forest-based activities, mostly in dry districts, accounted for a substantial proportion of the total income of rural populations in developing countries. This corroborates the study findings on the commercialisation of non-timber forest products, which show that non-timber forest products play an important complementary role to agricultural production in semi-arid districts. The role of non-timber forest products was more noticeable during periods of food deficit and considerable income was generated to purchase maize and other basics for food security. The intervention was aimed at enhancing dry communities' benefits through the development, production, expansion and marketing of non-timber forest products in areas of marginal agricultural potential.

Although findings show that it is a challenging task to convert poor rural smallholder farmers who are largely dependent on agriculture into small-scale entrepreneurs producing non-timber forest products for consumption and food security, smallholder farmers had no choice but to co-operate with supporting NGOs. SAFIRE officials highlighted that a lot of investment is needed to develop marketable products, identify and develop markets for the products, ensure production capacity and linking them to private partners for sustainability and growth. However, this is the challenging part of this intervention that is largely dominated by NGOs. Specific sub-interventions focused on product development and improvement, natural products technology development and production, market identification and marketing, and capacity building of poor people as well as natural resource management, to ensure sustainable harvesting to avoid depletion. Below is a summary of specific interventions under entrepreneurship based on commercialisation of non-timber forest products.

### 4.2 Product Development and Improvement

For NGO officials, product development is a continuous process involving exploratory, development and improvement work even after commercialisation of the product. The process involves considerable investment in equipment and highly skilled personnel to conduct regular reviews of the product performance, production systems and technology performance. During the past decade, a number of products were developed and marketed at both local and international markets to generate cash income for rural people to buy cereals for food security.

#### *i) Marula products*

Marula (*sclerocarya birrea*) trees are found in abundance in most semi-arid regions of Zimbabwe. The fruit is usually eaten fresh, and has edible nuts. People crack the nuts to eat the kernel inside. Before commercialisation, there were only two ways to consume them but now there are three major products that are developed from marula, for both local consumption and marketing.

*Marula jelly*, made from ripe marula fruit pulp, is developed for food security at community level. The fruit is picked from the forest, the skin is removed and the fresh pulp extracted. The pulp is then cooked with sugar to produce the jelly, which is used mostly for feeding children. This is convenient to produce at the community level because sugar is the only addition.

In Mwenezi district, 11 258 households were trained by SAFIRE and PhytoTrade technical personnel to produce the jelly for household consumption during the period 2007-2013. In Muzarabani, a further 11 643 households benefited from the same intervention during the same period.

The fresh fruit is also used to produce *marula jam* for sale and for household consumption. Rural people pick the fruit and sell it to Specialty Foods of Africa, a company based in Harare that specialises in the commercialisation of wild fruit products. However, not all people were engaged in harvesting, processing and marketing of the natural products, but only certain target groups were noted to have adopted the activity.

It emerged in the Participatory Rural Appraisals (PRA) sessions that the commercialisation process was not very popular because rural people found that the proceeds from selling fresh fruit to Specialty Foods of Africa were too low to be attractive. People preferred to consume the fruit in the form of jelly for food security purposes.

*Marula oil* is the third marula product. It is extracted from the nut for both commercialisation and local consumption. SAFIRE links various households from producing communities to Specialty Foods for commercial purposes. SAFIRE has qualified food scientists who test and develop products from wild fruits in an endeavour to commercialise and to increase various products for rural people to benefit. Marula crude oil was developed for the purposes of local household consumption since very few rural households can afford to buy conventional cooking oil from the local stores. The crude oil product observed is thick and has more residues from processing and is recommended for household consumption by local people.

The oil can further be processed to reduce the residue. This improves its quality by removing impurities and facilitates its use as edible oil as well as lengthening its shelf-life and, making it more viable for marketing, according to an interviewed food scientist from SAFIRE. The refined marula oil generates more income if sold at international markets. The SAFIRE product development officer indicated that the oil attracted a number of international and local markets after further purification.

Government officials from the Department of Natural Resources indicated that the products are only meant for commercial purposes, because the final quality product is too expensive for local communities and the markets are international and beyond the reach of the local poor from marginal areas. The government assists with the quality control of the products before they are sold on the international market. Marula oil production is very labour intensive, particularly marula nut cracking to access the kernel inside. These products are developed by skilled people from NGOs based in Harare and then brought to rural communities. This process takes away the ownership of the product development from the community. Community beneficiaries are largely trained in areas of production that are not the actual development of the product. During the period 2007 to 2013, 1 800 people were trained in Mwenezi and Muzarabani for production to a point but had no idea of how the products were further developed. The majority of these people produced crude marula oil on a small scale for their own household consumption and marketing.

*Marula butter* is a by-product of marula oil processing. It comes from the residue that remains after marula kernel pressing for oil production. This product is developed for local consumption at household level. The product has diversified food availability at household level as communities use it as butter on homemade bread and as a replacement for cooking oil. More than 125 000 households, according to statistics from SAFIRE, benefit from the consumption of marula butter, either directly or indirectly in communities where marula oil production takes place.

#### ***ii) Baobab Products***

Baobab interventions were aimed at income generation for the rural poor. Three products (baobab oil, baobab cake and baobab pulp) were developed for commercialisation in Muzarabani district since 2005 because of the area's high density of baobab trees. A number of by-products such as baobab flavoured yoghurt and chocolate were developed from baobab pulp with support from SAFIRE in partnership with Specialty Foods of Africa.

Baobab oil was extracted from baobab seeds with an oil pressing machine developed and procured from ATA, a technology development centre in Harare, and distributed to local producing communities. However, unlike the marula oil, baobab oil is not recommended for home consumption because it is believed to have side effects on the reproductive system of human beings if consumed in excess. Health and nutrition officials from the Ministry of Health and Child Care indicated that the oil, if consumed continuously, would cause sterility, especially among men.

The baobab oil producers sell baobab oil to local people for consumption despite health warnings, and generate their own income for other livelihood activities. On a commercial basis, the oil is used in the cosmetics industry. SAFIRE collects large quantities of oil produced by rural communities and sells it to international markets in Europe and Asia on their behalf. Based on statistics from SAFIRE, large quantities of baobab oil are produced in the dry districts including others not covered by this study, intended for export to Australia, France, Switzerland and India. Findings also show that the product requires high hygienic standards during production to meet the quality standard required for international markets.

*Baobab pulp*, the second product from the baobab fruit, is the main product from the tree consumed by rural people. Baobab pulp is used for cooking porridge in rural areas without necessarily generating income. This has added more value and a different dimension to how rural people benefit from the common natural product that they have been using for many years. Rural communities were provided with a crushing machine for free by SAFIRE and a separation machine that separates pulp from seed. This technology increased the uptake of baobab commercialisation in rural communities.

Well sieved pulp from selected quality baobab cobs is packed into 10kg or 20kg bags, mainly for a local market. To SAFIRE officials, baobab pulp is used for producing infant porridge and in children's homes in Zimbabwe. Since 2007, baobab pulp has been used to produce baobab flavoured yoghurt, a product formulated by the Dairy Development Programme in association with SAFIRE and community producers. The yoghurt is produced from a mixture of milk and pulp and other additives for preservation and colouring. This product increased the range of the baobab pulp market for rural people.

In 2007 a new baobab product, the bao-bar chocolate, was developed from baobab pulp mixed with different cereals or nuts, such as crisped rice, roasted oats, dried apricot, syrup, sesame seeds and other additives. The new product was developed by SAFIRE and Specialty Foods for Africa to increase the range of baobab products, create a new demand and expand the market for the baobab pulp for rural people to remain in business. The product has been commercialised and community producers are now marketing the baobab pulp to Specialty Foods of Africa for baobab chocolate production.

*Baobab cake*, the fourth baobab product, is the residue left after pressing the baobab for oil. It is used for cattle feed, mainly in semi-arid districts. After a vigorous marketing strategy by Specialty Foods for Africa, commercial livestock farms buy the cake from the community producers and this has become a key livelihood activity for the producers in the communities involved.

### *iii) Mopane Worm*

Findings show that a variety of insects are widely used across Zimbabwe and form an important part of many rural people's diet. Among these insects is the caterpillar that feeds on the mopane tree leaves, known as the mopane worm. It is found in most semi-arid districts but has been commercialised only in Mwenezi and Muzarabani districts. The mopane worm, according to community participants, is a delicacy for rural people, and is becoming increasingly so in urban areas.

The interventions focus on value addition through the improvement of the quality of the mopane worm for marketing locally, nationally and regionally. The quality of processed mopane worms has improved over the past eight years through processing and packaging, including canning. The trade in mopane worms, according to the interviews, is now worth several thousand USD a year. However, during plenary discussions, community participants indicated that the mopane worm breeds unpredictably and most of the value is captured by mobile, large-scale traders rather than poor local communities because middlemen buy in large quantities at low prices from local harvesters and processors.

Specialty Foods of Africa in Harare is the largest buyer of the mopane worm for canning and marketing, which requires controlled drying and processing. The improvement and marketing of this product increased the levels of harvesting and processing of mopane worms, mainly by children and women, as a key livelihood activity.

#### *iv) Honey Production and Processing*

In Mwenezi and Gokwe districts, honey benefits a total of 3 206 bee-keeping farmers trained by Practical Action, an international NGO, with technical support from the Department of Agricultural Extension Services. The support developed rural technologies for improved bee keeping in partnership with German Agro-Action and Care Zimbabwe in Gokwe and Mwenezi respectively. The training, according to PRA participants, focused on honey harvesting, processing and marketing and this helped improve the quantity and quality of honey from rural communities.

Community level data shows that, on average, each farmer has a minimum of 30 Kenyan Top Bar (KTB) hives and at least 20 traditional bark hives for honey production. During the 2007 harvest season, one farmer in Gokwe produced 500kg of honey, realising about USD9 000. This shows that the intervention contributes to income generation for rural livelihood diversification.

German Agro Action officials indicated that in Gokwe, all wards benefit from honey production for income generation. A number of beekeeping associations and enterprises were established in the two districts with both government and donor support because the districts are found to be conducive for honey production. For commercialisation purposes, harvested honey is processed and packaged in clean bottles for selling locally and nationally. The various enterprises were provided with honey pressing machines to ensure that quality honey without residue would be acceptable for sale, generating income for other livelihood activities such as procuring inputs for agricultural production.

#### *v) Masau Jam and Strips*

Muzarabani district is renowned for its indigenous masau trees, which have been a source of livelihood for its inhabitants for years. They grow naturally and the seeds are very strong and drought resistant, so they grow during the rainy season. Large tracts of the trees are communally owned but over the years, most families have privatised communal land where there are fruit trees to control the produce.

Rural District Council officials indicated that the fruit is sold in urban areas in both their fresh and dried state. The raw fruit can be sold for up to USD40 per 50kg bag in Harare. The trade is dominated by middlemen who travel to Muzarabani district to purchase the fruit at low prices and bring it for resale in urban areas where it is sold at higher prices and in smaller quantities. Although the fruit is seasonal, some farmers earn more income from the fruit than from the maize and rapoko or millet they grow for subsistence. Some farmers use the raw fruit to barter for maize, chicken, goats and even clothes with the middlemen who come to buy it.

Phiri (2003), a researcher into African fruits, estimated that Zimbabwe produces 200 000 tons of the fruit per year, but most of this is subject to post-harvest losses. In fact, over 60% is wasted due to incorrect methods of drying and storing. In an endeavour to reduce this loss, Specialty Foods of Africa developed masau strips as a new product to improve its nutritional quality, appearance and shelf-life. The masau fruit pulp is ground to produce the strips, which are dried using a solar drier. This is usually used for food security and local consumption, with limited marketing because the market for the product is not readily available, nor is it familiar.

Masau jam was easily commercialised in the local market and it is one of the products sold in most retail chain shops such as Spar and the Thomas Meikles Retail Chain Group (TM). The fruit's skin and nut are separated from the pulp and the pulp is then made into jam with a few additives to increase its appeal and shelf-life before it is canned. PRA sessions revealed that rural people harvest fresh ripe fruit for sale to Specialty Foods of Africa for jam making, but the income is limited because they are not involved in processing the fruit into the final commercial product. The development of this product established a ready market for rural people in the district. This enabled them to generate income when the fruit is in season, usually from April to August. The challenge is that local people simply harvest the fruit and market it without adding any value, and this does not generate sufficient income for harvesters.

### 4.3 Natural Products Production Technologies

For successful development and commercialisation of products, appropriate technology development is required. Different processing technologies have been developed locally by different companies for non-timber forest products since the industry started in 2003. Interviews with officials in these companies revealed that the objective of technology development is to improve the processing, packaging and storage of processed products.

Concerns were raised by these officials that technology for non-timber forest products is not readily available, and requires adaptation and modification of other processing technologies. This indicates that most of the technology is modified and more time is taken in experimenting with various technologies to meet the requirements of crushing, separating and grinding specific fruit, depending on their texture. The findings show that during the past eight years, this aspect was at the centre of the production of natural products by rural communities, driven by the partnership between NGOs and the private sector. Adoption of each technology by rural communities determined the levels of commercialisation of each of the wild fruits discussed above. The following are the specific technologies developed to ensure the success of non-timber forest products in the two districts.

#### 4.3.1 Natural Oil Expressing Technologies

Various oil pressing machines were observed during the study field visits. A total of 26 rural enterprises in Mwenezi and Muzarabani districts benefited from this technology. Two types of oil pressing machines were observed. The first was for marula oil, a relatively simple machine for pressing soft marula kernels. The second was for pressing baobab oil and this is a far more powerful machine because baobab seeds are much harder than marula kernels. The third machine type observed during the visits was the baobab fruit dehulling machine that separates baobab pulp from seeds.

Dehulling machines have a thick sieve that shows great resistance and low wear and tear. It has the capacity to process about 150kg of unsieved pulp per day, which produces about 145kg of clean and marketable baobab pulp. Using a manual process, ten people can produce only about 10kg of pulp per day. A SAFIRE technology expert indicated that one dehuller, operating at full capacity and maximum efficiency, can produce up to 21 750kg in six months. Based on the 2007 calculations by SAFIRE, this translates to USD32 625, assuming that raw material supply and technology performance remains constant. This demonstration shows that the development of this crushing and separating machine increased the efficiency levels of processing baobab products at an early stage.

The baobab oil pressing machine has the capacity to produce up to 15kg of crude oil per day, translating to 300kg of oil per month as they work five days per week. If the machine operates at maximum efficiency for six months, it can produce about 1 800kg of crude oil, generating a total income of USD19 800 if sold on international markets where higher prices prevail. However, officials indicated that there is a lot of training investment required for the appropriate use of these technologies at community level. The performance of the machines also depends on the entrepreneurs' skills, availability of electricity and labour turnover in the use of the machine. These machines facilitate both baobab and marula oil production in the three study areas as well as the successful establishment of oil pressing enterprises.

#### 4.3.2 Honey Production Technologies

Information from the Bee Keepers Association of Zimbabwe shows that the Kenyan Top Bar beehives were introduced to commercialise honey production, and replaced the traditional beehives made from tree bark. The new beehives have a bigger carrying capacity, make harvesting easier and allow bees to continue making honey after the harvest. In essence, they are bee-friendly. Communities were provided with honey harvesting kits such as veils, hats and smokers that do not kill bees, unlike traditional approaches that use fire during harvesting. A new honey pressing machine was also introduced for processing. The technology, though manual, produces quality honey for marketing in bigger quantities, which generates higher income.

## 5. MARKETS AND MARKETING OF NATURAL PRODUCTS

The natural products industry is a relatively new one at nine years. Developing the right market for the products means the industry can evolve at the community level and become viable by generating income for both livelihood options and business recapitalisation. The slow development and growth of markets is attributed to the generally slow uptake of new products by consumers who were used to agricultural and other conventional products. It was also affected by risk-averse companies reluctant to undertake new product development, as well as by low levels of disposable consumer incomes in the increasingly inflationary economy during the period under study.

Despite these challenges, statistical information collected from PhytoTrade indicates that most of the already developed and new products attract the interest of a small but growing market. The available markets were identified on behalf of the rural communities by NGOs through public exhibitions such as Zimbabwe International Trade Fairs, Harare Agricultural Shows and Travel Expos, among others, including e-marketing. The available information from the small industry shows that there are 14 markets (six international and eight national markets) excluding individuals interested in the products.

Aldivia from France and Nature Shop from Australia are international markets for baobab oil and marula crude and refined oil, whilst Dioniso from Switzerland is a market for baobab pulp. Nationally, Specialty Foods for Africa is a market for baobab oil, marula oil and mopane worms. Makonde industries are a market for baobab pulp and Natravista for baobab and marula oil. During the intervention, particularly during the period 2008-2013, concerted efforts by different supporting stakeholders, including PhytoTrade Africa, resulted in a steady growth in demand for these oils, particularly for cosmetic purposes. During the mentioned period, the stakeholders recorded a considerable increase in the size and number of orders for oils from both international and local markets.

During the period 2008 to 2013, 3 200kg of marula and baobab oil was ordered by both international and local markets, but the producing communities only managed to produce 830kg (730kg baobab oil and 100kg of marula oil) to realise a total of USD9 530. The international market identification is disadvantageous to local communities because they are not directly linked to these markets, but are dependent on intermediary organisations. Development agencies act as intermediaries for the local communities and there are transactional costs involved when marketing the products to international markets. Community producers do not benefit as expected from the production process. Below is a summary table that shows production figures and what was ordered by the markets as well as income generated for the year 2007.

**Table1: Summary of non-timber forest product markets and revenue generated in 2012 in Mwenezi and Muzarabani Districts**

Product	Quantity Client	Quantity Ordered/kg	Actual in USD/kg Supplied	Product Price in USD/kg	Total Revenue generated in USD
Baobab pulp	SFA, Extra care	200 000	4 874	1.50	7 311
Baobab oil	Nature Shop, Natravista	1 600	730	11.0	8 030
Marula oil	Nature Shop, Natravista	1 600	100	15.0	1 500
Mopane worms	SFA, Jagers	17 500	1 270	2.50	3 175
Honey	Local markets	500	364	1.05	2 638
Masau jam	SFA	1 500	1 200	3.50	4 200
<b>TOTAL</b>					<b>26 854</b>

Source: SAFIRE Marketing Statistics, 2013

The figures in the table indicate that although international markets are readily available, local communities do not meet the demand. Operational challenges that hinder production include the newness of the interventions and the fact that technology is a challenge for rural people not familiar with it. This leads to frequent break down of pressing machines.

Statistical information from PhytoTrade shows that total revenue of USD26 854 was generated within a year, benefiting 100 people. According to the Consumer Council of Zimbabwe report (2009:19), the average income for rural people in dry districts is between USD0, 50 and USD1 per day. Based on these calculations, there is evidence that the intervention increased average income for beneficiaries to USD7, 10 per day. A total of USD26 854 for 100 people translates to USD2 600 per person per annum or USD213 a month. This is seven times more than the average income in the dry districts of Zimbabwe. This intervention contributed to increased income in dry areas used for procuring livelihood assets and food for immediate survival.

The failure to meet demand also indicates that, due to food deficits in semi-arid regions of Zimbabwe, most of the producers consumed what they produced for their own survival and only sold surplus. This explains why rural communities did not meet market demand. One local producer in Mwenezi pointed out that marula seed produces more oil than baobab, so people prefer to consume it and sell the surplus for income generation.

## 6. CONCLUSION

The study shows that the processing and marketing of NTFPs is not an old livelihood activity in rural Zimbabwe but was externally fostered by non-governmental organisations and private players to support rural producers improve their livelihoods through income generation. Significant income is generated from the marula and baobab oils as the products are sold to international markets, however, producers remain peripheral in the market value chain as they do not negotiate for prices but are involved at the benevolence of external players. The community producers remain largely collectors not processors due to technology and capacity limitations. Most of the packaging, storage and transportation to intermediary centres is done by intermediaries, indicating the important role they play for rural communities to benefit from the marketing of NTFPs. There is evidence that the majority of the products are locally consumed during periods of scarcity and this limits the amount of products left for marketing. For international markets, demand for certain products, particularly oils, is high and the supply side is very limited due to capacity and the nature of the business. This also limits the contribution of NTFPs to household income. The withdrawal of NGOs from the target communities would, however, signify the collapse of the new industry in target communities.

### 6.1 Policy Recommendations

The article recommends that for the full participation of communities in the market value chain and maximisation of benefits, there is need to link them with both the regional and international markets such that they do not continue to occupy the lower echelons of the value chain.

NTFPs processing technology at community level should be simplified so that machinery can be repaired locally to reduce long periods of breakdown that may affect the marketing chain of the products.

Whilst the role of intermediary NGOs is commended, there should be an exit strategy that ensures the smooth taking over by local communities in the processing and full marketing of NTFP products.

Since NTFPS are seasonal, the interventions should not ignore agricultural activities but rather, income generated from NTFPs should be used to fund other livelihood activities to reduce food security deficit periods.

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