From Research to Farmer Enterprise Development in Cameroon: Case Study of Kola Nuts

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Abstract

Recent research conducted by ICRAF and collaborators has demonstrated a strong demand for Non Timber Forest Products (NTFPs) in the humid forest areas of Cameroon. These NTFPs include: *Cola nitida*, *Ricinodendron heudelotii*, *Gnetum africanum* and *Irvingia* spp. However, farmers find it difficult to achieve good returns from these products, even with viable national, regional and international markets for the products. In response to that, ICRAF-AHT (Africa Humid Tropics) is leading a “Farmer Enterprise Development” project aimed at empowering rural households through the development of appropriate marketing strategies that can be used for a range of products. The innovative approach combines training and development of farmer entrepreneurial skills, the development of NTFPs markets through adding value and developing appropriate technologies to improve product quality, harvesting, storage, processing and packaging. The approach is based on research, development of appropriate technologies, partnerships and farmers’ group-enterprise development. This paper looks at the importance of biophysical and market research in order to develop a holistic enterprise development strategy using kola nut as a case study. Results show that there are clear limitations to significantly increasing income from kola nuts business in Cameroon: limited market access, low resource regeneration, limited available capital, and lack of appropriate processing technology. Results also show that *kola* weevils (*Balanogastris kolae* & *Saphrorhinus* spp.), attacking the nuts both prior to harvest and during storage, are the major problem faced by kola producers, wholesalers, retailers and even consumers. Economic simulations have demonstrated that reducing post-harvest losses to 5% and increasing production by 5% could increase the profitability of the kola nut business by 17%. The efficiency of various weevil control methods as used by farmers is assessed in on-farm trials to provide appropriate control approaches. Meanwhile, group-marketing approaches are also evaluated with farmer groups in the Northwest province of Cameroon and links between kola producers and traders are established.

INTRODUCTION

The humid tropics of West and Central Africa contain a wealth of forest resources. However, forest exploitation, demographic pressure and rapid conversion to agricultural land have led to reductions in the livelihoods of resource-poor farmer households. Agroforestry is now widely considered as one of the most effective means to mitigate the decline in quantity and quality of trees and to diversify rural families income. Recent research has demonstrated strong demand for key Non Timber Forest Products (NTFP) in the humid forest areas of Cameroon. These include: *Cola nitida*, *Ricinodendron heudelotii*, *Gnetum africanum* (often unsustainably harvested) and Irvingia. However, as it is in most parts of Africa, farmers in Cameroon find it difficult to achieve good returns...
from trees and culinary products, even with viable national, regional and international markets for these products. The farmers marketing potential is reduced by limited and conflicting market knowledge, a lack of networks and associations, and inadequate processing and storage methods. The project entitled “Farmer Enterprise Development” uses an innovative approach to assist small-holder farmers develop marketing skills and knowledge while also assisting them to increase on-farm production of indigenous fruits and culinary products. The project capitalizes upon existing ICRAF research to facilitate a well-targeted project to enable poor farmers with space for a limited number of fruit trees to benefit from increased returns.

The main objective of this project is to empower rural households through development of appropriate marketing strategies that can be used for a range of products. This will be achieved through the following activities: (1) train and develop rural entrepreneurial skills of farmer households (especially women) to improve and test NTFP marketing strategies to enable better financial returns; (2) increase market scope and dynamics in order to enable producers (farmers) and traders to understand and capitalize on shared opportunities and constraints and to develop the NTFP market including adding value to existing products; (3) research, develop and test appropriate technologies to improve product processing, quality, harvesting, storage and packaging; and, (4) training and dissemination.

The present paper looks at the importance of biophysical and market research in order to develop a holistic enterprise development strategy using kola nut as a case study. It outlines methodologies used by the World Agroforestry Centre (ICRAF) in Cameroon to achieve research and development to enable the farmer households to get the best possible returns on their indigenous fruit trees and culinary products.

MATERIAL AND METHODS

If research for development is to help small farmer enterprises, there must be greater emphasis on linking research with development. This requires a participatory research approach where farmers become directly involved in the researcher process (Bosh et al., 1995).

As an initial step, a diagnosis on group dynamics was carried out in the Northwest province of Cameroon. The overall objective of the diagnosis was to appraise existing groups and associations operating in the two selected project sites. This approach is justified by the fact that these groups and associations were created with different objectives and reasons and might be working to attain alternative results. With the aid of a Venn diagram and using a participatory process consisting of questions and answers, an inventory of existing groups in the localities was made. The Venn diagram assisted us in identifying relationships within the chosen groups. This activity also determined if some groups were already specialised in kola and/or whether the groups were strong enough to accept new members and activities.

The species studied here is kola. Kola, as a member of the family Sterculiaceae, has a long history in West Africa and in Cameroon specifically. The genus *Cola* has 39 species in Cameroon among which *C. acuminata*, *C. anomala* and *C. nitida* are the most exploited. Much is already known about the physiology and cultivation of *Cola* from the contributions of Fotso et al. (2002), Opeke (1987) and Goormans and Pujol (1955).

The kola nut is like a Brazil nut, only smaller. It grows on tall trees, which produce pods containing three to seven cotyledons or nuts. The nut is bitter and provides energy when eaten (as such, it is similar to drinking coffee for the caffeine it provides). Other persons consume kola nuts to fight against tiredness, hunger and drowsiness, and some kola nuts varieties even have aphrodisiac characteristics (SAILD, 2000). Lewis and Elvin-Lewis (1985) describe how cola nuts are used for ‘refreshing’ the mouth, due to its unique bitter-sweet taste, alleviating thirsts, and its twigs are used as chewing sticks to clean the teeth and the gums.

However, the kola nuts greatest value is cultural: people living in the West region of Africa (i.e., Cameroon, Nigeria, Gabon, Congo, etc.) traditionally "break" kola nuts
when receiving visitors in their homes. This gesture is a sign of hospitality. Finally, kola nut consumption is not limited to local African markets. The kola nut was one of the original ingredients used to make today's famous soft drink, Coca Cola (cola being the other spelling for kola). Today, however, cola manufacturers do not use kola nuts in their secret recipes, but rather rely on other ingredients. In many areas where other stimulants are not available, such as in regions influenced by Islam with its prohibition on alcohol, the cola nut may substitute for them, and it is in such places where the ritualistic role of the crop may be most evident, particularly if the nut is imported (Sundstrom, 1966). The kola from North Cameroon is used in dyeing clothes and some people mentioned that kola nuts are used in the processing of some beers in Cameroon.

In addition, we explored the market linkages and knowledge so that kola producers and traders (wholesalers) can understand and capitalize on the opportunities and constraints. This consisted of focus group meetings and workshops and an evaluation of ‘winners’ and ‘losers’. Consumer behavior and preferences need to be well understood in order to add value to the product.

Finally, kola weevils are the major pest of kola nuts, both prior to harvest and during storage. Initial attacks in the field are sometimes very high, with Goormans and Pujol (1955) recording losses of 50-70%. While removal of all dropped fruits from a kola plantation reduces the initial attack, a multi-location researcher-designed farmer-managed trial was undertaken to assess the efficiency of various indigenous techniques used to combat weevil infestation in kola nuts. Factors such as time of infestation, labor used, physical losses and financial impact were taken into consideration. A comparative experiment was also set up on the research station with a similar design, but evaluating two chemical insecticides (Actellic 50 EC solution and Malagrain DP5 powder) and one organic insecticide (neem [Azadirachta indica] extract). An additional objective of the on-station experiment was to identify the type of weevil.

RESULTS AND DISCUSSION

At the end of the initial diagnosis of group dynamics, one farmer organization (MIFACIG) was selected as a research partner based on group cohesion, interest in marketing tree products, involvement in previous marketing research, and abundance of tree products mainly kola in their localities. The sub sector approach was developed with them to achieve the objective of sustainable income generation from the sale of Cola spp.

The Boyo self-managed Cola Enterprise has been created in MIFACIG with an overall objective of organizing cola group markets, to organize cola production and tree domestication in general. Farmer leaders were trained on tree domestication, marketing and farmer groups creation, scaling up and sustainable forest resources management.

Unlike any business, there are potential organizational challenges for the Boyo self managed Cola Enterprise. Having all members contribute to everything is idealistic, but impracticable in terms of an efficient and professional operation. Accountability and transparency in management must be in place, and any impediment to these could destroy the organization. It is acknowledged that a professional management team, chosen from within the ranks of farmer members, should be hired to run the enterprise to ensure that the scope and mission of the organization is fulfilled.

Supply of kola nuts into the markets is closely linked with the seasonality of the product. There are significant periods of scarcity and abundance resulting in fluctuations in production, price and returns. Furthermore, the price of kola nuts varies significantly each year. Buyers from Nigeria come to northern Cameroon only after the supply in Nigeria begins to wane. One of the main benefits of a storage strategy, if successful, will be to hold kola nuts until periods of scarcity, thereby enabling the enterprise to gather higher prices in the market during this period of time. Inspection of the weekly prices for kola nuts reveals that there is much price variation in the market (Fig. 1). Information was collected from over 250 farmers who sold their kola nuts to collector agents and/or wholesalers over a 22 month period.

It is very important to indicate the specific steps taken by the producer to prepare
the product for distribution and sale. Every step of the production process should add value to the product. It is often helpful to visualize the production process and to associate the time and costs associated with each stage of production. Figure 2 shows how this is illustrated for kola using a flow diagram.

It is also important to identify stages in the production process that impede the process. These stages, often known as bottlenecks, must be addressed to improve production efficiency. Currently, the most expensive activity for farmers is the peeling-sorting of kola nuts, accounting for approximately 50% of the total costs of harvesting and processing kola (Fig. 3). This is due to the large number of hours that are required to complete the peeling and sorting of kola nuts. Therefore, the enterprise should target this activity for any potential cost reductions. For example, if the Boyo self managed Cola Enterprise were to lower its peeling costs by 25% by introducing a faster process or machinery, it could improve overall net profits by more than 10%. However, efficient and appropriate post-harvest technologies that meet the needs of kola farmers and traders are not currently available. Thus the success of the Boyo self managed Cola Enterprise relies on two factors:

- Technologically advanced storage: must find appropriate storage techniques to limit weevil losses that will enable farmers to sell kola nuts in times of scarcity,
- Lower cost of collection: must find a way to collect kola nuts from farmers for a lower cost than wholesalers, either through cheaper labor, more coordinated collection, or through technology improvements. Lowering the cost of collection is important to provide a buffer against important price fluctuations.

In Cameroon no cola processing is done. Therefore practices observed or recorded relate to packaging and storage. Most care is taken to reduce weevil attack. To this end, many traditional practices were noted:

- the use of dried vertiver grass roots as repellent,
- the use of dried Eucalyptus leaves that are placed in layers in the baskets with the pilled cola nuts,
- the use of cypress fresh leaves spread in stored cola baskets,
- the use of Tabacco dried leaves in a similar manner to Eucalyptus leaves,
- the burial of the un-pilled cola nuts in termites’ mounts,
- the use of chemical powder such as artellic.

Kola weevils are the major pest of kola nuts, both prior to harvest and during storage. Several curculionid weevils attack the nuts. The most common weevil species are Balanogastri kolae and Sophrorhinus spp. (Table 1). These weevils are reported to attack wounded and non damaged fruits. Eggs are laid in the nuts or in other parts of the fruit. The period from laying to the emergence of the adult weevil is approximately one month. Balanogastri has an average adult lifespan of 53 days while Sophrorhinus is 20 days.

On-farm as well as on-station experimental trials are underway in farmers’ homesteads and in the lab with the objective of identifying the most appropriate and most efficient weevil control methods. The on-farm experiment is presently assessing various traditional methods of controlling weevil infestation with a considerable input from cola nuts producers.

Preliminary results indicate that neem extract and dry eucalyptus leaves reduce weevil infestation by 17%, whereas Actellic 50 EC remains the best pesticide (23%). Results also show that four months later, Actellic solution is more efficient for conserving the cola nuts as it kills more weevils compared to Malagrain powder and neem extract (Figs. 4 and 5). Greater emphasis is placed on organic pesticides with regards to their availability and low cost. Future research will provide answers on the quantity to apply and sorting frequency of organic material applied to reduce weevil damage.

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Literature Cited

Tables
Table 1. Summary of pests recorded on kola nuts.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>Pest status</th>
<th>Damage done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kola pod weevils</td>
<td>1. <em>Balanogastri kolae</em></td>
<td>Major</td>
<td>Larvae &amp; adults feed in the nuts &amp; on pods on the trees</td>
</tr>
<tr>
<td></td>
<td>2. <em>Sophrorhinus</em> spp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown cocoa mirid</td>
<td><em>Sahlbergella singularis</em></td>
<td>Major</td>
<td>Piercing &amp; sucking of young &amp; old pods cause die-back &amp; abortion of pods</td>
</tr>
<tr>
<td>Pod husk miners</td>
<td><em>Characoma stietigrapta</em></td>
<td>Major</td>
<td>Larvae burrow into the pods but do not directly affect the nuts.</td>
</tr>
</tbody>
</table>

Figures
Fig. 1. Price fluctuations of *Cola acuminata* in southern Cameroon.
Fig. 2. Flow diagram of cola nut business activity in Cameroon.

Fig. 3. Share percentages of cola nut post harvest activities in the northwest province of Cameroon.)
Fig. 4. The effect of interacting treatment and time on the rate.

Fig. 5. Variation of remaining quantities according to time.