

Full Length Research Paper

Comparison of three modes of improving benefits to farmers within agroforestry product market chains in Cameroon

Facheux Charly¹, Amos Gyau^{2*}, Diane Russell³, Divine Foundjem-Tita², Charlie Mbosso², Steven Franzel² and Zac Tchoundjeu²

¹African Wildlife Foundation, Kinshasa, Democratic Republic of Congo.

²World Agroforestry Centre, P.O Box 16317 Yaoundé, Cameroon.

³US Agency for International Development, Biodiversity team. USAID/EGAT/NRM/B, USA.

Accepted 6 March, 2012

Many organizations have tried to assist farmers in improving returns to forest and tree products but few have systematically tested interventions to improve post-harvest practices or marketing. This paper describes the results of three types of interventions in the market chains for njansang (*Ricinodendron heudelotii*) and kola (*Cola* spp), which are important agroforestry derived products for Cameroonian farmers. The interventions compared include group sales, facilitating a village-level stabilization fund to allow for off-season sales and provision of storage methods that allow for more profitable off-season sales. The interventions were compared based on their financial costs and benefits, the number of individuals benefiting, social costs and benefits and their sustainability. The results indicated that there are strengths and weaknesses associated with each of the three modes of interventions considered in this study. The modes are highly complementary; for example, the coupling of improved storage and guarantee funds help enhance farmers' capacity to delay sales at harvest time until periods of scarcity when prices are higher. However, improved storage requires access to technology and guarantee funds require access to capital. Since group sales do not involve the use of new technology or credit facilities, they can serve a good starting point for helping groups achieve quick and meaningful gains, as a prelude to introducing other post-harvest and marketing interventions.

Key words: Farmer, non-timber forest products (NTFPs), marketing, costs and benefits (social, finance).

INTRODUCTION

Non-timber forest products (NTFPs)¹ and agroforestry products² are important sources of livelihoods for millions

*Corresponding author. E-mail: a.gyau@cgiar.org. Tel: +237 22 21 50 84. Fax: +237 22 21 50 89.

The contributions of Diane Russell are her own and do not reflect the views of the United States Agency for International Development or the United States Government.

¹ De Beer and Mc Dermott define NTFP as encompassing all biological materials other than timber which are extracted from forest for human use.

² In many areas of the tropics such as Cameroon, the distinction between agroforestry products and forest products is blurred as products found in markets, could come from either state-owned forests, agroforestry plots (that is, trees on farms) or from both.

of rural dwellers throughout the tropics. Kola (*Cola* spp) and njansang (*Ricinodendron heudelotii*) are two of such products stimulant. Njansang kernels are an important ingredient of sauces. Both products serve many other purposes including medicine, cultural uses and they are sold to generate income and have important local, regional and international market potential. Despite their importance, the market chains for these and many other agroforestry and NTFPs are not well developed as a result of bottlenecks such as poor product development, packaging, standardization, high transaction costs and lack of market information (Facheux et al., 2007; Foundjem- Tita, 2009). These may partly be attributed to poor infrastructure, low levels of research and information available on these commodities, reduction of the tree populations (case of kola) and the overall barriers to

trade in Cameroon, which include practices such as frequent “inspections” of forest products on their way to the market (Ruiz-Pérez et al., 1999; Ndoye and Ruiz-Pérez, 1999; Facheux et al., 2007; Brian and Schreckenber, 2007). In view of this, the development and research organisations have been using various approaches to help rural dwellers improve the marketing and trade of agroforestry and NTFPs in Cameroon and other parts of the world (Lecup and Nicholson, 2000; Macqueen, 2009; Gyau et al., 2011a). These interventions include: provision of improved storage methods that allow for more profitable off-season sales, facilitating farmers’ to embark on group sales to traders, and facilitating a village-level stabilization fund to allow for off-season sales. Although, these interventions have been used in the case study sites and many other parts of Cameroon, their relative importance and capacity to enhance benefits to producers are not known. Such an analysis is important since it will provide a guide for the development organizations to decide on the appropriate intervention strategies to enhance rural livelihoods through marketing and commercialisation of these NTFPs.

This paper attempts to fill this information gap in the literature. Using exploratory studies, the paper compares the results of three types of interventions in the market chains of njansang (*R. heudelotii*) and kola in Cameroon. The interventions are compared using the decision matrix approach and based on their expected financial costs and benefits, social cost and benefits and their potential for sustainability. This approach has been selected since subjective opinions about the different intervention approaches can be made more objective using the decision matrix analytical framework (Pugh, 1996). The remaining sections are organized as follows. First, the sites where the work took place and the specific tree products were described, after which the methodology used for the study was discussed. This was followed by a comparison of the three modes in a decision matrix and a discussion of their implications. Finally, conclusions and future research are presented.

MATERIALS AND METHODS

Case study and site description

The main methodology used for this analysis is a case study of the interventions in the kola and the njansang supply chains in Cameroon. The interventions have been implemented since the year 2004. The results of the interventions were observed continuously after they were introduced in the study region. Two case study sites in Cameroon where at least one of these interventions have been introduced were selected. The sites selected are the MIFACIG area and the ADEAC area.

MIFACIG area

Twantoh Mixed Farming Common Initiative Group (MIFACIG) is a farmers’ organization created in 1993 with the objective of alleviating poverty through sustainable agriculture, job creation and

capacity building. The organization’s headquarter is in Belo, North West region where vegetation is highly modified with small areas of natural forest. Average annual rainfall in the area is between 2500 to 3000 mm and altitude ranges from 500 to 2000 m. The groups’ headquarter is in Belo and its activities are spread out in all 4 sub-divisions of the Boyo division in the North West region. Its area of intervention in terms of land size is estimated at about 85 km² with varying radii of between 11 and 45 km from Belo. Membership is estimated to comprise about 40 individuals divided into two categories namely; capacity building members and lay members.

A nine-man team heads the executive bureau of the group. MIFACIG is a member of a union of 40 common initiative groups under the umbrella of Ijim Trees Farmers Union (ITFU). The smallest group in MIFACIG area has a membership of six while the largest has hundred. On the average group size is 35 members. The average number of men and women involved in each group is 16 and 19 respectively (Gyau et al., 2011a). The average age of members is 38 years. The activities of MIFACIG are centered on: agroforestry, bee-keeping, growing of medicinal plants, domestication of fruits and agroforestry species, environmental protection, gender and development. Its main partners include International Centre for Research in Agroforestry (ICRAF), Support Services for Grassroot Initiative for Development (SAILD), International Circle for the Promotion of Creation (CIPCRE) and the American Peace Corps.

ADEAC area

Association pour le développement intégral des exploitants agricoles du Centre (ADEAC) is a farmers’ organization working in the centre region of Cameroon. The region belongs to the humid forest. The Centre province has a density of 33 inhabitants per km². Farmer institutions have been disrupted by significant migration from the area and “boom and bust” cycles of the major crop, cocoa. In the rainy season, roads are impracticable and as such crops and products rot in villages.

ADEAC activities are going on mainly in two villages (Epkwassong and Ondeck). Epkwassong village is located in the North-east of Nyong and Mfoumou division, 42 km from Ayos with a population of around 3,000 persons. Ondeck village is located in the same division, 75 km from Akonolinga. The population is around 3,000 persons and constitute of two ethnic groups. Crops in the two villages include cocoa, coffee, plantain, cocoyam, groundnuts, cassava and palm and maize.

ADEAC has a total of 816 active members (with 216 women) working in six different sub-areas: perennial crops, food crops, fish farming, small animal husbandry, crafts and vegetable farming. Each member can adhere to more than one of the sub-sectors. One of the objectives of ADEAC is to reinforce the economic power of its members through a participatory communication system with the aid of its principal actors, with the principal one being a non-governmental organization (NGO) called SAILD (Service d’Appui aux Initiatives Locales de Développement). ADEAC is divided into nine zones each having about 450 members.

Description of the species

Ricinodendron

R. heudelotii commonly called njansang is an endemic African tree species belonging to the family of Euphorbiaceae. The distribution of this species spans across Senegal to East Africa and Madagascar. The tree is fast growing and reaches a height of 40 m and a width of 120 cm (Ayuk, 1999). When matured, its fruit drops from the trees and are processed to obtain the seeds. Both the seeds of *Ricinodendron* and the trunk of the tree have varying uses.

The focus of this paper is on the seeds (kernels) that are used

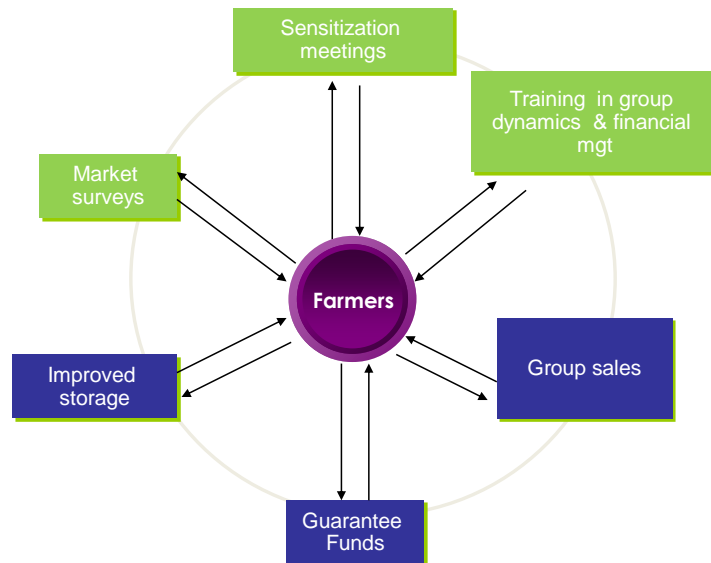


Figure 1. Integrated farmer-based model for introducing modes for improving farmer benefits from kola and njansang in Cameroon; green boxes show preliminary modes of interaction with farmers; blue boxes show subsequent modes assessed.

in Cameroon for preparing soup and a variety of dishes due to its appetizing aroma. Tiki et al. (2002) reported that the kernels of the fruit are rich in fatty acids and essential oils (49.2 to 63.5%) and proteins (49.9 to 65.2%) and low in carbohydrates (4.9 to 6.4%). The species also gives high energy values (2.748 to 3.558 KJ 100 g⁻¹ DM) as compared to food crops (84 to 2500 KJ 100 g⁻¹ DM). Other important uses of the tree include cultural (making drums) and medicinal.

Njansang (*R. heudeloti*) seeds have a good market potential within and outside of Cameroon. A study carried out on 104 households in Yaoundé in 2004 showed that 98% of them consume njansang. A total of 36 tons worth over 43 million CFA was sold in Yaoundé in 1995 (Ndoye et al., 1998). The marketing of this product provides employment to many people who sell njansang either singly or in combination with other tree and forest products. A total of 1120 of such traders were reported in Yaoundé in 1997 (Ndoye et al., 1998). Traders in Douala earn an average net margin of 10, 400CFA from sales of *Ricinodendron*. It is a source of employment and income especially, for women (Vabi and Tchamou, 1999).

Kola

Kola is a tropical genus of the family Sterculiaceae. It is a native to the coastal regions of West Africa (Ogutuga, 1975). It comprises of about 125 species. Kola is comparatively richer in caffeine than cocoa and coffee. The kola nut is also of high socio-cultural importance to many African peoples (Mbile et al., 2004). Kola nuts are widely consumed in West and Central Africa as a masticator to counter fatigue, suppress thirst and hunger and are believed to enhance intellectual capacity.

Trading in kola provides employment to a good number of farmers, middlemen, wholesalers and retailers involved in its marketing chain. A survey conducted in 2004 revealed that it is a main or only source of income to many traders. Though men champion wholesale activities, it is very common to find women retailing in many markets in Southern Cameroon. Kola weevils are

a major pest of kola nuts, both prior to harvest and storage. Initial attack on the field is sometimes very high.

The kola market in Cameroon is estimated at 20,400 tons. In 1983, revenue from the sales of kola nuts from certain households in the Southwest province of Cameroon was higher than that of coffee (considered amongst the major cash crops alongside cocoa). Proceeds from the sale accounted for 5 to 37% of total cash income (FAO, 2002). In the humid forest zone of Cameroon, a total quantity of 509 tons worth 221,990,000 FCFA was sold in 1995.

Interventions in the marketing of njansang and kola

NGOs have undertaken different development schemes in the selected areas for njansang and kola producers and traders. These schemes include collective action initiatives in which producers sell in groups and training in financial management, group dynamics and conflict management. Other initiatives include linking farmers to traders, provision of stabilisation funds to assist farmers to be able to store their produce and sell when prices are favourable and provision of storage techniques and facilities. For njansang, a cracking machine has been developed and tested to help farmers reduce the depulping time for njansang. Market information systems have also been introduced to provide farmers and traders access to price and quality information. The initiatives are represented in Figure 1.

Analysis

A decision making matrix was used to evaluate the various intervention approaches. A decision matrix is an arrangement of qualitative or quantitative values in rows and columns that allow an analyst to systematically identify, analyze, and rate the strength of relationships between sets of information (Vasilakos, 1962). It is normally used to describe a multi-criteria decision analysis. The method was considered relevant for this analysis because of the multi criteria nature of the different interventions. For quality improvement activities, this approach can be useful in selecting a

project, evaluating alternative solutions to a problem or in designing a remedy.

The approach for instance was used by Roy et al. (2007) to analyze the reasoning frame of Indian farmers in choosing which seeds to plant. Chen et al. (2006) used the decision matrix approach to deal with supplier selection problems in supply chains by proposing a hierarchy multiple criteria decision-making (MCDM) model based on fuzzy-sets theory.

Brit et al. (2009) applied decision matrix that incorporates the results of chronic toxicity analysis and computer simulation of leaching behavior to decide which registration action may be appropriate for assessing the leaching potential of pesticides and the chronic toxicity of pesticides and chronic toxicity of pesticides in ground water. Kueppers et al. (2004) proposed a policy tools in the form of decision matrix which can be used to evaluate the potential and completed land use project for their land use projects for their climate, environmental and socio-economic impacts simultaneously.

In the context of this study, this approach is applied to assess and evaluate the three modes of intervention in the supply chains of kola and njansang. the three modes of intervention namely improved storage, group sales to traders, and the stabilization fund, were put in the first column and their evaluation criteria based on their financial cost and benefits, social cost and benefits, and the level of their sustainability in the subsequent columns respectively. The matrix was such that each cell represents the evaluation of individual modes on a criterion.

The financial costs and benefits were assessed by comparing pre and post intervention prices of the products less the costs of the intervention and the number of individuals benefiting. The social cost and benefits were assessed based on a matrix of social factors that shows which methods affect which aspects of household and village life such as the potential for engendering conflicts in producer groups, conflicts among villages, negative or positive effects on intra-household dynamics and transaction costs of the intervention to the organization. The sustainability potential of each option is assessed in terms of its potential for farmers and community-based organizations and/or traders to take up the method without external assistance. This measure is assessed using a checklist of different variables including cost of the option, ease of use, and preferences of different stakeholders.

Overall, a qualitative assessment of the dimensions was used by looking at the strengths and weaknesses of the three modes of intervention measured on each dimension.

RESULTS AND DISCUSSION

Description of the three modes of intervention

The three main interventions used in the two areas are described as follows; the first improved storage, involves only kola in the MIFACIG area. The second, group sales, and the third, guarantee fund, involved both kola in the MIFACIG area and njansang in the ADEAC area.

Improve storage to sell off-season

MKNE is seeking to capture incremental profits by performing services on the kola nut product that are currently being performed by other constituents in the value chain. In collaboration with the World Agroforestry Centre (ICRAF), MKNE is seeking to develop a technology to aid in the storage of kola nuts whilst mitigating the damage to the product caused by weevils.

With the technologically advanced storage, MKNE can help farmers to limit weevil losses and sell kola nuts in period of scarcity.

Better storage techniques are expected to result in a higher quality product and better availability. MKNE may also decide to offer after-market service in the form of storing and sorting kola nuts so that wholesalers can avoid the time and expense of doing this operation themselves. Central storing by MKNE may offer further differentiation such that wholesalers will have one-stop shopping for their kola needs, and will therefore, avoid the collection costs of traveling from farmer to farmer to obtain kola nuts.

Two main storage techniques were tested using chemical treatment and natural treatments. Actellic powder 50 EC (pirimiphos methyl) was used for the chemical treatment. The results show its curative and preventive efficiency against kola nut weevils. The doses (50 and 75 ml) were efficient in reducing the residues deposits. Only the chemical treatment showed improvement in conservation. Chemical treated kola was tested in the laboratory and no residues of the actellic powder were found indicating that the use of chemical treatment might be a good option to improve storage. Natural treatment using local root herbs like Neem (*Azadirachta indica*) and vetiva roots (*Chrysopogon zizanioides*) did not lead to improvement in storage. Despite the effectiveness of the chemical treatment, care needs to be taken in applying the recommended dose since overdose can be dangerous for human health especially, against the background that kola is usually eaten raw and usually not washed. Supply of kola nuts into the markets is closely linked to the seasonality of the product. There are significant periods of scarcity and abundance resulting into fluctuations in availability, price as well as, returns. One of the main benefits of a storage strategy, if successful, would be to hold kola nuts until periods of scarcity, thereby enabling the enterprise to gather higher price in the market during this period of time. Table 1 indicates that prices in scarcity periods are more than twice during the period of abundance of the kola nuts.

Economic analysis revealed that by reducing post-harvest losses by 5% and increasing production by 5%, the profitability of the kola enterprise can increase by 17%. By reducing post-harvest losses by 15% and increasing production by 10%, the profitability rises to 39%.

Group sales

Development of linkages between stakeholders within a commodity chain enables the pooling of different resources such as credit, information, transportation and labor. This approach was used in the ADEAC and MIFACIG zones to help farmers generate more income from the sales of njansang and kola, respectively. A meeting was organized between farmers and traders to

Table 1. Indication of prices (FCFA)/basket of 1000 kola nuts received by chain actors in periods of abundance and scarcity in 2008.

Stakeholders	Market	Abundance	Scarcity	Difference
Producers	Village	3600	8000	4400
Collectors	Village	4000	11200	7200
Wholesalers	Urban	4500	10000	5500
Wholesalers	Ngaoundere	9500	19000	9500
Retailers	Urban	9000	14000	5000

assess their interest in group sales and to help them organize such sales. It was a good platform to negotiate the terms of the sales including quantity, quality, price, place and date of transaction.

Group sale is a strategy that facilitates the connection between actors in the sub-sector, mostly traders and producers. Group members individually sort their products in different grades. Then the marketing officer of each group comes for inventory of the available quantity which is communicated to trader groups. Traders and producer representatives then negotiate prices by phone. When both parties agree on the price, they choose a market day, the place of market and the starting time of the market. Each group member comes with his product on the selected day and all products from the group members are put together (after registration) for group sale. At the end of the group sale, marketing officers and three other executive group members distribute the amount owned by each member according to the quantity registered.

Farmers succeeded in getting higher prices for their products because of three reasons: selling in bulk, better negotiation skills and grading. Njansang farmers realized on the average, a 31% increase in their selling price as compared to what they would have received through individual sales and without grading of their newly acquired negotiation skills. The concomitant increase for kola farmers averaged 16%.

Another benefit from the group sales was that farmers could sell a substantial quantity of their harvest at a single point in time, since the traders who were invited had high purchasing power.

The successes achieved this far, especially, that of forming a consolidated group working towards the same objective have trickled down to the entire communities and even to neighboring ones. The groups have now developed partnerships with groups in neighboring communities to increase their production and negotiation power.

Guarantee funds to facilitate selling off season

Poor farmers are often portrayed as living with financial pressures that do not permit them to develop appropriate

marketing strategies for the selling of their products. Some farmers seek to borrow money when they are confident of the returns. Again, most of the time, the only lenders for small farmers are traders who expect repayment in kind at harvest time when prices are low. The terms of these exchanges are generally highly beneficial to the trader, although, it is acknowledged that traders take real risks in providing loans.

A solution tested in one village in ADEAC area is the use of "guarantee funds." Seventy farmers were involved in this financial option to secure farmer production until njansang production could be sold in the off season. The guarantee funds requested for these farmers enabled them to store their produce and sell when they could obtain the best price. A loan agreement was signed individually with farmers marketing njansang. The farmer organization is very important here as it plays the role of social guarantee and helps ensure the repayment of the loan. The loan was given out at a monthly interest rate of 2%. The management fee for this loan at the level of the farmer organisation was kept low since the loan was reimbursed at the time of the group sale of their products.

The total amount was deposited at the farmer organization's local credit facility and the loan given out in conformity with the requirements of the facility. Each farmer's capacity to borrow money depended on the amount of his savings. This amount was known by the credit management committee. The members' products were also assessed by the sector's management committee. The amount loaned to each farmer was half the monetary value of his or her production valued at the price prevailing in the low season.

The results of this experiment showed an increase in njansang (*R. heudeloti*) sold and prices obtained by farmers. Moreover, farmers were of the opinion that this was a good strategy to help them solve their immediate financial needs and therefore, enabled them to keep the njansang until periods of scarcity when prices were higher. Repayment rate for this option was 98% which was very encouraging.

Comparison of the 3 intervention modes

In the next stage of the analyses, the different types of

Table 2. Comparison matrix for the three market facilitation modes.

Mode	Financial cost and benefits	Social cost and benefits	Sustainability
Improve storage to sell off-season.	Long term benefit.	Requires a strong farmer organization.	Good, depending on the cost of the technology.
	Generate bigger income.	Affects more people indirectly.	Maintenance is important.
	May need post harvest technology.		
Direct contact traders-producers.	Short term benefits through higher prices.	Requires a strong farmer organization.	Fragile if there is no organization (NGOs, CBOs) to supervise.
	Develop farmer bargaining power.	Directly affect household income level.	Could be continued if trade goes well.
Guarantee funds to allow selling off season.	Short and mid-term benefit.	Farmer organizations can help facilitate repayment and improve repayment rates.	Fragile, if reimbursement process is not well developed.
	Need to master price and market information.	Directly affect household income level.	Could be linked to savings and micro credit schemes.

benefits, costs and risks of each mode are studied.

Improved storage is seen as a longer term benefit because the technology is still in the development stage and not yet finalized. However, this could potentially reach a large number of farmers. More needs to be known of the costs of the technology including maintenance costs of any storage facility. It is anticipated through modeling that the cost of storage technology is around USD 600 per year for the njansang (*R. heudeloti*) enterprise (Facheux et al., 2006). However, this approach requires stronger farmer organizations in order to make it acceptable and is dependent on the complexity of the storage facilities provided. This approach is more grounded in the technology acceptance literature. For instance, the Technology acceptance model (TAM) (Davis et al., 1989); Lee et al. (2005) postulates that the ease of use of a technology is an important factor which influences its acceptability and subsequent adoption. In view of this, it can be argued that the storage technology which will be introduced needs to be simple and easy to use in order to improve its chances of acceptance by the intended beneficiaries.

Bringing farmers and traders together in group sales has the advantage of quick returns and building farmers' confidence and bargaining power. But it requires external facilitation that is costly and needs to be phased out as soon as is feasible. For example, it is estimated that the cost of facilitation in the case of njansang (*R. heudeloti*) sales group is 20 Frs/kg. This represents 40% of the increment in prices. Such interventions as group sales are often not sustainable since it might die out as soon as the external facilitation ends. Given the situation, it is

recommended that organizations choose groups that are matured and organized for purposes other than marketing intervention in order to enhance the sustainability of group sales. Matured groups are more likely to continue to function even after external facilitation has ended (Gyau et al., 2011a).

The guarantee fund option is perhaps more risky given the possibility that sale will not occur, prices may decline, or that loans will not be repaid. However, when linked to micro-credit facilities, it may be quite flexible and a useful option. This option is closer to what farmers are used to in the cocoa economy. It may also build the financial management capacity of groups. The cost of the guarantee fund here is simply the interest rate of 2% per month.

From the farmer perspective in terms of cost-benefit standpoint, the improved storage option is likely to be the most cost effective as the operational cost per farmer is very small. Other social benefits and costs need to be considered. The comparisons of the three modes of interventions are summarized in Table 2.

Conclusion

The aforesaid analysis shows that there are strengths and weaknesses associated with each of the three intervention modes discussed in this article. This therefore, suggests the need for a thorough analysis of the interventions to be tested taking into account the peculiarities of the study area, product concerned and also the characteristics of the individuals and the groups

to be used. For instance, the use of improved storage technologies are more likely to yield a positive response for kola than njansang since the best known preservation techniques for kola is only 50 to 70% efficient and there is no problem with the storage of njansang. Furthermore, the use of group marketing approach to link farmers and traders is more likely to be sustainable when a group which has been in existence for longer time is used. The argument is that, such a group is more likely to experience continuity even after the intervention. This strategy is supported by the literature on collective action by Barham and Chitemi (2009) who argued that groups with maturity and functioning activities are more likely to succeed since they may be able to mobilize resources and take advantage of emerging markets than newly formed groups which are more likely to lack such experience.

It is however, important to note that the system of intervention approach chosen should be dependent on the level of integration of the approach to traditional system, how holistic is the approach and linkages to other projects and systems (Gyau et al., 2011b). For example, one reason that the guarantee fund was successful was that it was built on the traditional 'njangi' system of group credit (Niger-Thomas, 1995).

Furthermore, the different modes should not be considered as mutually exclusive. In fact they could be combined whenever possible in order to reap the benefits associated with each under some conditions. For instance, the provision of guarantee funds can be combined with group sales in order to ensure that farmers are able to obtain market and generate funds to repay borrowed money. In the same view, the use of storage and guarantee funds can also be used together in order to enhance farmers capacity to delayed selling at harvest time until periods of scarcity when prices are higher. However, improved storage requires access to technology and guarantee funds require access to capital. Since group sales do not involve the use of new technology or credit facilities, they can help groups achieve quick and meaningful gains and thus, serve as a good starting point for marketing interventions. Group sales can then be gradually and systematically combined with other intervention modes as described.

This research has some limitations which need to be taken into considerations in interpreting the results. First, the qualitative decision matrix methodology used did not assign numerical values to the three modes on the various dimensions. Furthermore, no weights were given to the various dimensions based on which comparison was done. Future comparisons involving scoring and ranking can help ensure a more systematic comparison of the various intervention approaches.

REFERENCES

- Ayuk ET (1999): Uses, Management and economic potential of *garcinia kola* and *ricinodendron heudelotii* in the humid lowlands of Cameroon. *J. Trop. Fore. Sci.*, 11(4): 746-761.
- Barham J, Chitemi C (2009). Collective action to improve marketing performance: Lessons from farmer groups in Tanzania. *Food Policy*, (34), 53-59.
- Brian B, Schreckenber K (2007). Commercialisation of Non-timber Forest Products: A Reality Check. *Dev. Policy Rev.*, 25(3): 355-377.
- Brit J, Mcdowell T, Dwinell S (2009): Matrix decision procedure to assess new pesticides based on relative groundwater leaching potential and chronic toxicity. *Environ. Toxicol. Chem.*, 11(5): 721-728.
- Chen C, Lin C, Huang S (2006). A fuzzy approach for supplier evaluation and selection in supply chain management, 102(2): 289-301.
- Davis F, Bagozzi R, Warshaw P (1989): User acceptance of computer technology: a comparison of two theoretical models. *Manag. Sci.*, 35: 982-1003.
- Facheux C, Tchoundjeu Z, Manga T, Foundjem D, Mbosso C (2006). From research to Farmer Enterprise Development in Cameroon: Case study of Kola Nuts - *Acta Hortic.*, 699: 181-187.
- Facheux C, Tchoundjeu Z, Foundjem- TD, Degrande A, Mbosso C (2007). Optimizing the production and marketing of NTFPs. *African Crop Science Conference Proceedings* 8: 1249-1254.
- Foundjem- Tita D (2009). A transaction cost analysis of factors affecting market arrangements in the agroforestry tree product value chains in Cameroon. Dissertation submitted for Master of science degree, University of Ghent.
- FAO (2002). Département des forets. Programme produit forestier Non ligneux. La collecte l'analyse des données statistique sur les produits forestiers non ligneux. Une étude pilote au cameroun.
- Gyau A, Tchoundjeu Z, Foundjem T, Asaah E, Mbosso C (2011a). Effects of Group. Sales on Marketing Performance of Kola in North West Region of Cameroon. *J. Dev. Agric. Econ.*, (in press).
- Gyau, A, Tchoundjeu, Z, Franzel S. (2011b). Checklists for evaluating high value products Projects: The Experience of the Pacific Island Developing Countries. *Afri. J. Agric. Res.*, 6(7): 1902-1908.
- Kueppers L, Baer P, Harte J, Haya B, Koteen L, Smith M (2004): A decision matrix approach to evaluating the impacts of land use activities undertaken to mitigate climate change. *Clim. Chang.*, 63: 247-257.
- Lecup I, Nicholson K (2000). Community-based tree and forest product enterprises: market analysis and development. *Forest, Trees and People Program*. FAO. pp. 360.
- Lee M, Cheoung C, Chen Z (2005). Acceptance of internet based learning medium. The role of intrinsic and extrinsic motivation. *Information and Management*, 42(8): 1095-1104.
- Macqueen DJ (2009). Supporting small forest enterprises – a facilitator's toolkit -. International Institute for the Environment and Development. Edinburgh, UK.
- Mbile P, Foundjem T, Tchoundjeu Z, Facheux C, Asaah E, Degrande AC, Mbosso, Ngo-Mpeck ML, Tsobeng A, Sado T (2004). Culture, indigenous trees and biodiversity in Cameroon. Paper presented at the 9th International Congress of Ethnobiology, University of Kent, Canterbury, UK. 14th -17th June.
- Ndoye O, Ruiz Pérez M, Eyebe A (1998). The Markets of Non-timber Forest Products in the Humid Forest Zone of Cameroon. *Rural Development Forestry Network Paper* 22c, Winter ODI, Portland House, Stag Place, London SW1E 5DP, UK.
- Niger-Thomas M (1995). Women's access to and the control of credit in Cameroon. In: Ardener, S. and Berman, S.(eds.) *Money-go-rounds: The importance of rotating savings and Credit Associations for Women*. Berg, Oxford, UK.
- Ogutuga D (1975). Chemical composition and potential commercial uses of Kolanuts, *Kola nitida* (Vent.) Schott and Endl. *Ghana J. Agric. Sci.*, 8: 121-125.
- Pugh S (1996): *Creating innovative products using total design*. Addison Wesley, Longman.
- Roy D, Herring R, Geisler C (2007). Naturalising transgenics: Official seeds, loose seeds and risk in the decision matrix of Gujarati cotton farmers. *J. Develop. Stud.*, 43(1): 158-176.
- Ruiz-Pérez M, Ndoye O, Eyebe A (1999). Marketing and income generating activities for Non-Timber Forest Products in the Humid Forest Zone of Cameroon. *Unasylva*, 198(50):12-19.

Tiki M, Fondoun T, kengue J, Thiengang C (2002). Chemical composition of *Ricinodendron heudelotii*: an indigenous fruit tree in southern Cameroon. *Afri. Crop Sci. J.*, 8(2): 195-201.

Vabi MB, Tchamou N (1999). A farming systems perspective to non-wood forest product exploitation in the support zone of the korup national park of Cameroon: Determining the connections between the household and the forest. CARPE: Limbe non-wood forest products workshop.

Vasilakos GJ (1962). A decision matrix as the basis for a simple data input routine *Communications of the Association for Computing Machinery.* 5(12), 599-601.