Raising incomes of smallholder coconut producers in Kenya through more efficient value chain management

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Summary

This paper discusses the results of a study undertaken to identify the challenges to sustainable and economic production of coconuts in Kenya. A constraint and opportunity analysis was undertaken along the value chain to identify the key challenges limiting economic production of the crop. The results indicated that coconut production in Kenya is constrained by inadequate use and high cost of inputs, limited availability of clean planting material, pests and diseases, poor agronomic practices, poor knowledge base, poor market access, low farm-gate prices and low yields amongst others. The project likewise identified seasonal availability of raw materials, lack of modernised processing equipment and inadequate skills base as the main factors limiting value addition of coconut through processing. Marketing, on the other hand, is limited by high transport costs, inadequate storage facilities, and lack of skills in product preservation and packaging. Potential interventions to mitigate the identified challenges are discussed.

Key words: Coconut, value chain management, Kenya

Introduction

Coconut (Cocos nucifera L.) provides livelihoods for about 10 million people worldwide in cultivation, processing and related activities. The crop is cultivated mainly in lowland tropical and subtropical habitats. The most important product is coconut oil, which is rich in lauric oils, available in large volumes only from coconut and palm kernel oil (from oil palm seeds). Coconut production in Kenya dates back to the 16th century when it was introduced by the Portuguese. Production spans six districts at the Kenyan coast, namely, greater Kilifi, Kwale, Mombasa, Malindi, Lamu and Tana River. Over 80% of the coastal farm households derive their livelihood either directly or indirectly from coconut and coconut by-products (Kadere, 2009). The potential value of the coconut sub-sector in Kenya is estimated at US$181 million annually, of which only 25% (US$45 million) is currently exploited in the form of nuts accounting for about 24%, coconut wine (60%), Makuti roofing materials (12%), brooms (3.3%) and coconut wood (1%) (Kadere, 2009).

The coastal region of Kenya has an estimated 4 to 7 million coconut trees (Kadere et al., 2004) but in the past two years there has been an increased rate of felling for construction, carvings and furniture production. The main reason for this is because the main coconut products are considered
to bring insufficient rewards when sold as primary commodities and using the current marketing system. Reversing this negative trend necessitates urgent measures to revitalise the competitiveness of coconut as an income generating crop. This requires a good understanding of the key constraints and opportunities to economic and sustainable production of the crop in the country in order to transform the coconut sub-sector from its current subsistence nature to a more commercially oriented market system. Production systems that combine system sustainability, crop productivity, produce quality, on-farm value addition, value chain efficiency and effective marketing must be established. This would result in improved livelihoods for coconut farmers through increased productivity and increased share of their products’ market value, without compromising their food security.

This paper reports an analysis of the coconut value chain in Kenya identifying key constraints as well as suggesting some interventions for improvement.

Materials and Methods

An analysis of coconut production, processing and marketing systems in Kenya was conducted using both primary and secondary data. A simple cross-section survey design was applied to collect the data, where households of the farmers, nursery operators and tappers were given an equal chance of being selected for the survey. Input suppliers, processors and key informants also provided data. Both stratified and area sampling methods were employed for the purpose of this survey. The population was first divided into homogeneous groups (strata), which were mainly the farmers, nursery operators and tappers. Processors, traders, input dealers, regulatory bodies and key informants were purposively selected (Tongeo, 2007; Marshall, 1996). Area sampling then followed in which administrative boundaries in selected districts in Coast Province were used (Brown et al., 2001; Cochrane, 1977). Six districts, Bahari, Kaloleni, Kilifi, Kwale, Malindi and Msambweni were selected and from each, corresponding divisions, locations and sub-locations were identified and surveyed. This approach was used to determine the exact sub-locations where the actual survey was to be conducted. The survey was subsequently conducted in August 2008 by trained enumerators.

From each of these districts, farmers, nursery operators and tappers were randomly selected from lists in the districts. Numbers of farmers, nursery operators and tappers selected from each district were proportional to the numbers in the respective districts. A total of 338 farmers, 241 nursery operators and 247 tappers were interviewed using well structured and specially designed questionnaires. The unit of analysis was the household in the case of farmers, nursery operators and tappers. In the case of input suppliers, processors, key informants and traders, the unit of analysis was the individual (William, 2008; Cochrane, 1977).

Data collection involved surveys, internet searches and document analysis. The main tool used for the survey was a structured questionnaire. Primary data was collected from all the listed data sources. Farmers, nursery operators, processors, tappers, and marketing agents who included wholesalers, brokers and retailers were interviewed to determine the range of inputs used, prices, costs, output, constraints and opportunities. Coconut processors, marketing agents, input dealers and regulatory bodies were interviewed using information checklists. The interviews were backed up by external data from government and other sources. Secondary data was collected on the last 8 years (2001–2008) on coconut production trends, area, trends in average prices, production constraints, level of agronomic practices, and key players in the marketing chain and their share of income from coconut.

Data processing and analysis were done using Microsoft Excel and SPSS statistical program. Univariate descriptive statistics (John & Alexandra, 2010) including case summaries and frequency distributions were extracted to provide a quantitative summary of the random variables observed in the survey data. Multivariate analysis using ANOVA and comparison of means were performed to examine the important relationships among variables within the population as depicted by the inferential statistics of F- and t-tests.
Results

Production and productivity

Results on the household characterisation revealed that coconut production in Kenya is undertaken mainly by smallholder farmers with an average of four acres under coconut and earning an average annual income of US$260. Men account for 81% of coconut producers. The majority of the farmers in all the six districts were either illiterate (37.6%) or had primary school certificates (41.1%), with very few (17.2%) having secondary and 4.1% with tertiary education. The average age of farmers was estimated at 54.4 years, indicating the younger generation preferred other income generating activities. The types of house owned and the corresponding percentages of farmers owning them are permanent (24%), semi-permanent (37.3%) and grass/makuti roof and mud walls (38.7%). Using house type ownership as an indicator for wealth status, it may be inferred that a majority (76%) have relatively low wealth status, which is likely to lower their capacity to use improved inputs in coconut production.

The survey identified a number of constraints associated with low coconut productivity of coconuts. These constraints included inadequate use of productivity enhancing inputs, lack of improved varieties and inadequate access to clean planting materials, marketing problems, low technical know-how and limited financial resources for purchasing improved production inputs (Table 1). Possible solutions are also summarised (Table 1).

Table 1. Main coconut production constraints and some potential solutions in Kenya

<table>
<thead>
<tr>
<th>Production constraint</th>
<th>Solution to constraint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate use of inputs, e.g. fertilizers, pesticides</td>
<td>Awareness creation; provision of skills and access to credit facilities; formation of farmer groups</td>
</tr>
<tr>
<td>Poor source of clean planting materials</td>
<td>Establishment of certified nurseries</td>
</tr>
<tr>
<td>High cost of inputs</td>
<td>Subsidized, bulk purchase through farmer organizations</td>
</tr>
<tr>
<td>Slow maturing varieties</td>
<td>Development and provision of early maturing varieties</td>
</tr>
<tr>
<td>Poor agronomic practices</td>
<td>Training in Good Agricultural Practice</td>
</tr>
<tr>
<td>Pests and diseases</td>
<td>Pest and disease management</td>
</tr>
<tr>
<td>Poor market access</td>
<td>Intensify promotions, form marketing federation</td>
</tr>
<tr>
<td>Poor market chain</td>
<td>Develop a structured market chain</td>
</tr>
<tr>
<td>Limited seedling availability</td>
<td>Initiate farmers’ nurseries</td>
</tr>
<tr>
<td>Low farm gate prices</td>
<td>Organised marketing e.g. through group marketing, target markets and clearly defined selling arrangements</td>
</tr>
<tr>
<td>Limited value addition technology</td>
<td>Develop/adopt enhanced processing technologies aided by formation of farmer organizations</td>
</tr>
<tr>
<td>Low yields</td>
<td>Introduction of fast maturing and high yielding varieties</td>
</tr>
</tbody>
</table>

Despite the similarities in the agro-ecological conditions, of the six districts studied, average productivity and value of coconuts per household varied significantly. Results of a one-way ANOVA indicated significant differences ($P < 0.05$) in coconut production and income across all the districts that were surveyed (Table 2). There were no significant differences ($P < 0.05$) in area under coconut.
Table 2. Coconut production characteristics in six districts (average per household) in Kenya

<table>
<thead>
<tr>
<th>District</th>
<th>Area (acres)</th>
<th>Production of nuts per acre</th>
<th>Annual coconut production nuts</th>
<th>Coconut annual income (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahari</td>
<td>3.67</td>
<td>1311.05</td>
<td>10533.30</td>
<td>11912.50</td>
</tr>
<tr>
<td>Kaloleni</td>
<td>3.54</td>
<td>958.34</td>
<td>2863.52</td>
<td>47270.41</td>
</tr>
<tr>
<td>Kilifi</td>
<td>3.93</td>
<td>2311.01</td>
<td>8867.56</td>
<td>30700.00</td>
</tr>
<tr>
<td>Kwale</td>
<td>3.10</td>
<td>1115.17</td>
<td>2133.14</td>
<td>4791.18</td>
</tr>
<tr>
<td>Malindi</td>
<td>3.19</td>
<td>843.72</td>
<td>2369.82</td>
<td>17598.71</td>
</tr>
<tr>
<td>Msambweni</td>
<td>4.35</td>
<td>1353.41</td>
<td>3615.57</td>
<td>10106.45</td>
</tr>
<tr>
<td>All Districts</td>
<td>3.61</td>
<td>1302.01</td>
<td>4179.60</td>
<td>21363.29</td>
</tr>
</tbody>
</table>

F5,306 ≠0.64  F5,221 =2.22  F5,225 =3.15  F5,296 =3.43  Sig. 0.67  0.05  0.009  0.005

Differences in production and productivity can be attributed to differences in the level of husbandry practices, resource endowment and levels of farmer education. Farmer education levels were low, which may be militating against adoption of improved technologies. The average level of coconut income is low across all the education categories. The highest being US$316 (Ksh. 25,244) per annum for farmers with primary education and the lowest was US$220 (Ksh. 17,630) annually for households headed by persons educated to secondary school level. Household heads with non-formal education generated an average of US$231 per year (Ksh. 18,467), while those with post secondary education had an average of US$290 (Ksh. 23,183). There were significant differences (P < 0.05) in income between the various education groups. This means that efforts to improve coconut production and productivity will have to target all education categories of farmers.

Processing

In terms of value addition, 26 processors, mainly small scale, were interviewed to provide data on source of raw materials, value addition activities, types and ownership of the processing facilities, end products of processing, processing costs, target markets for the end products and the processing constraints. From this data, the main raw material for processing was the coconut fruit, which is either directly sourced from the farmers or from a central collecting point. The processors normally pay suppliers immediately for raw materials delivered.

Processing activities reported included de-husking, crushing of the nuts, shredding of the flesh, extraction of oil and packaging. Oil is by far the most important processing product and is used in the production of cooking oil, making of soaps and cosmetics. At the time of the survey, coconut oil was selling at an average price of US$4 (Ksh. 300) per litre. Coconut soap and copra cake were other end-products of coconut processing. The processing facilities available in the coconut growing zone were mainly oil extraction equipment owned by individuals and private entrepreneurs. No group ownership of the processing facilities was reported.

From the processors point of view, the main challenges limiting efficient coconut processing in the country includes lack of market outlets, lack of policy guidance in marketing of coconut products, financial constraints, inadequate and seasonal availability of raw materials, lack of improved processing facilities such as oil presses and graders, high processing costs, poor marketing and branding of Kenyan coconut and inadequate knowledge and skills.

Marketing

There is no clearly defined marketing channel for coconut in Kenya. Key players in marketing chain are individual producers, local traders, brokers and wholesalers. Transporters are involved in the marketing channel as service providers. Selling of coconut products is organized by individuals, groups, agents or direct sales by the farmers to the final consumers. Normally producers/growers

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sell to traders who take it to local markets in the village, big towns (Kilifi, Mombasa, Malinda, Taveta) and to Tanzania. Transportation is done by hand carts, vehicles and motor cycles. There is no single and organised source of market information on prices, market places, level of demand in the various markets, preferred types and varieties and competitors. This information is gathered ad-hoc by farmers, agents/middle men, traders, transporters.

Payments and/or prices are determined by the forces of supply and demand in the local markets. Market forces are subsequently influenced by seasonality in production and demand. A few farmers engage in informal forward contracts which are not legally binding.

In terms of challenges, a number of factors were cited as impediments to efficient marketing of coconuts in Kenya. Key among them include unfair competition from other wholesalers mainly through price undercutting, few buyers who purchase in small quantities, low and fluctuating prices, inaccessibility due to poor roads, inadequate access to capital, lack of structured marketing system, inadequate skills and knowledge in packaging and product preservation, fluctuating and seasonal demand, poor nut quality coupled with inadequate grading of the primary produce, lack of storage facilities and high transport costs.

**Discussion**

This study has indicated weakness in the entire coconut value chain in Kenya i.e in production, processing, marketing and policy. The returns to the producers are poor, marketing is poor, value addition is negligible, and productivity is low. These constraints need to be addressed.

Given the high number of old coconut trees it is necessary for research to promote the adoption of high yielding coconut varieties for establishment of new orchards and replacement of old trees. Lack of improved varieties requires a clear research focus especially with respect to breeding varieties as demanded by farmers. Input supply and use is another constraint for coconut production and productivity. Many farmers do not use inputs as they cannot afford them and there is limited input availability. The farmers' low financial base was a major underlying concern for use of improved technologies. An immediate approach in this regard is organization of producers. In fact, formation of farmer cooperatives or producer clubs would be necessary step to address many of the weaknesses of the value chain. Mobilization of the farmers into bigger functional groups or business units would allow them to pool resources as well as allowing them greater access to credit using group status as collateral. Such bigger organized groups would be more able to influence government policy too with regard to financial support, logistical support and capacity building with associated large impacts on productivity. Lack of transport infrastructure was also alluded to as a impediment during interviews conducted with farmers and again changes in government policy would be needed to improve the transportation network in the coastal areas.

Improved technologies of processing and production are needed but for improved technologies to be adopted, enhancement of skills levels in the producers is also needed. As similarly reported by Kadere et al. (2004), most of the coconut farmers in this study have limited levels of formal education. Capacity building is crucial and an extension service provision is needed but efforts aimed at technology dissemination must use participatory approaches. Initially, there is need for awareness creation amongst the farmers, followed by facilitated access and promotion of the improved technologies such as the use of superior varieties or good agronomic practices, to reduce pests and diseases and improve post harvest handling. Capacity building and facilitating access to information is urgently needed by all the participants in the value chain including the processors.

One opportunity for the smallholders to increase their income share from coconuts is to conduct more primary processing. As with enabling farmers to have access to credit, by forming cooperatives and installing primary processing facilities to process their own nuts, producers would reduce their operation and marketing costs through economies of scale. Currently, processing facilities in Kenya are quite rudimentary using hand held grating tools. The installation of motorized graters
at cooperatives would improve oil extraction. Upgrading of processing facilities will improve the efficiency and quality of the processed products. Quality standards for raw nuts and associated harvesting, storage and processing protocols would need to be established. Compliance to such standards would be more easily applied and controlled through farmer organizations.

An underdeveloped marketing system is another challenge in the value chain. In the absence of an organised marketing system, farmers frequently sell to local traders and brokers at non-remunerative prices. Therefore, the marketing system has to be improved to ensure the farmers reap the benefits. As part of market streamlining, it is necessary to equip producers with knowledge and skills necessary to undertake coconut production as a business. This will require training not only on good agronomic and harvesting practices but also on access to relevant production and marketing information improve their decision making process.

Conclusion

In conclusion, there is enormous potential for improving the production and productivity of coconuts in Kenya. There is a large internal market for vegetable oil that could be exploited by improving production and use of locally produced coconut oil. However currently many weaknesses exist throughout the coconut value chain in Kenya and these weaknesses have to be addressed in order to transform the coconut sub-sector from its current subsistence nature to a more commercially oriented market system. Nevertheless, opportunities do also exist both through intensification and increasing the area under coconut cultivation. Organization of the farmers into business entities such as co-operatives would greatly help to address many of the constraints. It would aid producer negotiations with traders, processors etc and stabilise the supply of coconuts into the market as well as providing a focus for training on agronomic improvement and could help promote a quality culture among group members. Organised groups could also provide requisite storage and grading facilities, catalyse investment into value addition facilities as well as form the basis for rural savings through savings and credit schemes. Through such groups, farmers could designate collection points for their produce where records of produce by individual farmers in the form of volumes and quality are kept and payments made on the basis of quality of the produce.

References


