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*Full Length Research Paper*

# Dissemination of market access and technology information among coconut farmers: a case study of Kilifi County in Kenya

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**The study was to determine the effectiveness of value chain approach to upgrading the coconut sub-sector. Focus was on identification and assessment of farmer's personal attributes influencing farmer-to-farmer dissemination of market access and technology information. A baseline survey, preceding a participatory value chain analysis, involving 113 sampled households in Kilifi County was conducted. Data collected was analysed using Statistical Package for Social Sciences. Tests on factors associated with farmer-to-farmer and processor-to-farmer dissemination of market access and technology information were done. Findings show that 88.5% of households were headed by male farmers with gender of household heads showing no significance in information dissemination on market access (p= 0.730) and market access and technology information (p= 0.574). Most farmers (63.6% males and 42.3% females) had secondary and above levels of education and were giving more market access and technology information than their counterparts. Statistical analysis also shows a difference in dissemination amongst farmers with different levels of education which was not significant (p=0.183). Processors with investment above average (37.2%) showed a tendency to disseminate information more than their counterparts but this was not significant for market access information (p=0.259) and market access and technology information (p=0.571).**

**Key words:** Kenyan Coast, Coconut, Value Chain Analysis, Market Access, technology information

## INTRODUCTION

In Kenya, the coconut sector is depicted as "the sleeping giant", as it earns revenue of US $40 Million annually, which is barely a quarter of its potential (CDA/DANIDA, 2000). It is estimated that in Kenya there are over 7 million coconut palms, covering about 200,000 Ha (Kenya Coconut Development Authority, 2009).

Coconut is referred to as "the tree of life" along the Kenyan Coast, because it is widely used as a cash crop and food crop by all communities in the Coast Province (Waijeng, 1993). Apparently, the crop's main product in Kenya is wine which constitutes 60 %; while other popular products include nuts, leaves for roofing (commonly known as 'makuti'), brooms, coco wood, and copra which is processed into oil mainly for the soap industry, cosmetics, and candle wax. Some copra has been refined to edible oil, yet Kenya imports approximately 95% of its edible oils and also imports an additional 80% of its palm oil estimated at about US$ 18 Million whilst it has the potential for self sustenance in edible oil production using coconuts. This observation is corroborated by FAO (2007) where it is reported that, along the Kenyan Coastal Region coconut production has the potential to substitute 30% of the oil imports in the country.

Kenya's Economic Recovery Strategy (ERS) focuses on creating employment and wealth through economic management in various sub-sectors, including

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Agriculture (GOK 2003). In the Coastal Region, coconut palm offers enormous potential in fulfilling the ERS objectives. This potential can be realized through value addition to coconut produce to yield a diversity of products for both domestic and international markets (ABD-DANIDA/CDA, 2007).

The tapped palm sap *(mnazi*) is used for sugar production and making of toddy beverages (Severio *et al.,* 1996). Additionally, studies by Crabbe *et al*., (2001) report that bio-diesel can be generated from palm oils, with an aim of substituting diesel fuel. This fuel is environment friendly because there is substantial reduction of unburned hydrocarbons, carbon monoxide (CO) and particulate matter emission when it is used in conventional diesel engines. Moreover, it contains no sulphur, so the sulphate fraction in the fuel is eliminated and since the oil originates from vegetable matter, the CO produced is sequestered, and the net CO released into the atmosphere would be reduced greatly, thus contributing to environmental sustainability.

Based on the fact that there are many different categories of products that can be derived from the coconut tree, the crop can therefore be regarded as one of the high value cash crops with the potential for intensification (Adkins *et al*., 2006). Coconut farmers in Kenya are not able to exploit this potential due to low farm productivity and poorly developed markets for their products. Lack of incentives and poor government policy have also been cited as contributing factors to low productivity of coconut (Kadere *et al.,* 2009). Some of the factors that hinder the indigenous community from benefiting from the coconut sector in Kilifi County, Kenya include low prices of the coconut products, unclear legal framework, lack of proper markets, poor farming methods, low productivity and lack of financial support from the government and financial institutions (Mwachiro and Gakure, 2011).

The objective of this study was to determine the effectiveness of the value chain approach to upgrading the coconut sub-sector, by identifying and assessing farmer's personal characteristics which influence farmer-to-farmer dissemination of information on market access and technology along the coconut value chain.

## MATERIALS AND METHODS

The study was carried out in Mariakani, Mtwapa, Tezo/Roka and Matsangoni. These areas were purposively selected because they are known for growing coconut palm tree within Kilifi District, Kenya. With regard to methodology, the study adopted two approaches.

First, a four day residential participatory value chain analysis workshop was carried out where the stakeholders which included representatives from all livelihood stakeholders within the county such as the line ministries of the Government of Kenya (GoK), Kenya Agricultural Research Institute (KARI), Kenya Coconut Development Authority (KCDA), Input Suppliers, Community Based Organizations (CBOs), Non-Governmental Organizations (NGOs), Academic Institutions, Financial Institutions, Local Farmers and other interest groups were engaged. The primary task in the workshop was to rank the selected value chains in the county including coconut. From this exercise, key coconut processing units were identified for the study. The workshop also presented tools and methodologies for programme design. According to (Baker, 2006), such designs can combine the strengths of sub-sector analysis with methods for identifying commercially viable market solutions that promote the competitiveness of local agro-businesses.

Second, a baseline survey involving 113 coconut farmers selected based on the principles of probability and non-probability sampling was carried out to collect both qualitative and quantitative information through questionnaires.

Primary data collection was done using questionnaires and Key Informant Interviews were done for the identified coconut processing units. Information of the farmers including age, gender, education level, main occupation, leadership position, and wealth status were collected. Farmers were also questioned on their current agronomic practices and whether they are familiar with technologies such as tissue culture. They were also questioned on how they marketed their main coconut products. The collected data was analyzed using the Statistical Package for Social Sciences (SPSS) where descriptive and inferential statistics were generated.

## RESULTS

### Effect of personal attributes on farmer to farmer dissemination

The following personal attributes were tested for their association with farmer-to-farmer dissemination: age, education level, main occupation, leadership position, and wealth status. The composition of the sample population with regard to these personal attributes is summarised in Table 1.

### Effect of gender on farmer to farmer dissemination

As seen in Table 1, over four fifths (88.5%) of the households were headed by a male farmer, while slightly over 11.5% were headed by a female farmer. On average, the households headed by males gave market access to 11.6 persons, as compared to households headed by females, which gave market

**Table 1:** Composition of sample population with respect to personal attributes

| Personal attributes | Male | Female |
|---|---|---|
| Gender of household head | 88.5% | 11.5% |
| Average age | 57.4 years | 51.9 years |
| Education: | | |
| No formal education* | 4.2% | 9.6% |
| Primary education | 32.3% | 48.1% |
| Secondary education | 34.4% | 28.8% |
| Tertiary education | 29.2% | 13.5% |
| Current main occupation: | | |
| Farming | 76.3% | 88.6% |
| Formal employment** | 15.5% | 5.7% |
| Self employment | 8.2 | 5.7% |
| Past main occupation: | | |
| Farming | 26.0% | 70.9% |
| Formal employment | 50.0% | 21.4% |
| Self employment | 24.0% | 7.8% |

*Formal Education means education within the national education system
** Formal Employment means pensionable employment

access to 9.3 persons (Table 2). Households headed by males gave market access and technology information to 22.4 persons, while the figure was 14.2 persons from households headed by females (Table 2).
Using t-test, and assuming equal variances, gender of the household head had no significant relationship with dissemination for farmers given market access ($p = 0.730$) and for farmers given market access and technology information ($p = 0.574$; Table 2). This implies that both men and women are active in information dissemination.

**Level of education of the respondents**

The results indicate that of the total sample, only 4.2% of the men and 9.6% of the women had no formal education while most of the male (63.6%) and female (42.3%) farmers had secondary school education and above. From the data it appears that farmers with secondary education gave more market access information and technology information to other farmers than those with lower levels of education (Table 2). Those without any formal education disseminated information to the least number of persons. However, from the analysis, the differences in dissemination among farmers with different levels of education were found not to be significant between farmers given market access information ($p = 0.183$) and farmers given both market access information and technology information ($p= 0.215$), when tested using ANOVA (Table 2).

**Wealth status of respondents**

The indicators used to assess the capital investment of the processing units included the main farm cash flows, the materials used in construction of the unit, and whether there were off-enterprise sources of finance (non-coconut). The most important sources of financing were banks (81.4% of the households) and equity (77.9%). Processing units that were constructed with stones or bricks and roofs of iron sheet or bricks were associated with high income and these were owned by 38.2% of the sampled units.
About 37.2% of the enterprises had no off-enterprise source of income, while 23.9% of them got income from running small businesses, 20.4% from shares, 15.9% from equity, 7.0% through cash transfer from family members, and 3.6% strategic partners as computed based on Table 2.
There was some tendency for processors with investment above average (37.2%) to disseminate more than those below average but the difference was not significant for market access technology information ($p=0.259$ and for both market access technology information and technology information ($p= 0.571$), using ANOVA).

**DISCUSSION**

The data presented in this study supports the fact that the level of knowledge and leadership position

**Table 2:** The association of personal attributes with dissemination of market access only (a), and with dissemination of both market access and technology (b).

| **Personal attributes** | **(a) Mean number of farmers given market access by respondents in each category** | **(a) p value and level of significance** | **(b) Mean number of farmers given market access and technology information by respondents in each category** | **(b) p value and level of significance** |
|---|---|---|---|---|
| Gender of household heads | | | | |
| Male | 11.6 (2.355) | 0.730 (**NS**) | 22.4 (5.173) | 0.574 (**NS**) |
| Female | 9.3 (4.326) | | 14.2 (6.358) | |
| Age of household head (mean of 57.7 years) | - | 0.791(**NS**) | - | 0.586 (**NS**) |
| Education: | | | | |
| Without any formal education | 5.8 (3.376) | 0.183 (**NS**) | 8.3 (4.802) | 0.215 (**NS**) |
| With primary education | 8.3 (1.827) | | 20.3 (7.272) | |
| With secondary education | 17.9 (5.738) | | 33.5 (11.200) | |
| With tertiary education | 7.6 (6.841) | | 9.0 (1.489) | |
| Current main occupation: | | | | |
| Full time farmers (73.4%) | 11.8 (2.656) | 0.795 (**NS**) | 19.8 (4.898) | 0.513 (**NS**) |
| Off farm employment (26.6%) | 10.5 (3.459) | | 26.3 (11.492) | |
| Wealth status: | | | | |
| Below average (12.4%) | 6.9 (2.311) | 0.259 (**NS**) | 8.9 (2.493) | 0.571 (**NS**) |
| Average (50.4%) | 9.2 (1.532) | | 21.8 (6.911) | |
| Above average (37.2%) | 15.9 (5.280) | | 25.1 (8.197) | |
| Total (100%) | 11.4 (2.139) | | 21.4 (4.636) | |
| Level of knowledge: | | | | |
| Excellent (35.4%) | 17.7 (5.473) | 0.134 (**NS**) | 40.8 (12.205) | 0.017*** |
| Good (40.7%) | 9.6 (1.890) | | 13.7 (2.643) | |
| Fair (21.2%) | 5.7 (1.266) | | 6.6 (1.305) | |
| Poor (2.7%) | 0.33 (0.333) | | 0.3 (0.333) | |
| Total (100%) | 11.4 (2.139) | | 21.4 (4.636) | |
| Leadership position: | | | | |
| Having leadership position | 14.2 (3.804) | 0.219 (**NS**) | 25.5 (7.422) | 0.533 (**NS**) |
| Not having leadership position | 7.9 (1.450) | | 18.5 (7.107) | |
| Number of groups household belonged to: | | 0.457 (**NS**) | | 0.004** |

Standard error of the mean shown in brackets.

Key**:** p= level of significance

*** (p<0.01) - highly significant

** (p<0.05) – significant

* (p<0.1) - marginally significant

(**NS)** – not significant

significantly influenced dissemination of information, its extent and success in coconut processing units.
Indeed, in this paper the researchers identify the processing chain level activities within the coconut value chain and the cost drivers within the chain that contribute to competitive advantage. An in-depth analysis of how the value chain strategy has been used in the selected common interest groups accurately reveals the impact on their performance, challenges faced and the specific areas that supporting partners are able to focus on within the entire value chain.
Although coconut is the most abundant and sustainable rural resource of Coastal Sub-Humid Lowlands of Kenya, it is still increasingly viewed as just a subsistence crop because farmers are less and less willing to engage in the hard and dirty work of producing copra both for local use and for export. This paper reports that although there is adequate farmer to farmer dissemination of both market access and farm-level processing technology information, adoption levels are still low, regardless of the gender, education level and wealth levels prior to coconut farming among the farmers. This is, partly, because of the laborious machines that are currently in use on-farm processing whose efficiencies are low.
Additionally, there have been major failures by export promotional and marketing authorities, and by Research Institutes focussed on embodied crop technologies. These failures have occurred over time amid volatile and falling prices of coconut oil on local and world markets and have had catastrophic consequences for farmers and their families. Furthermore, the number of coconut processors is still very low, and mostly involves utilization of older technologies in nut processing (Mwachiro and Gakure, 2011). To change this scenario, product diversification and attention to processing technologies, drawing on local knowledge and directed towards local demand, should be emphasized. These are the keys to sustained benefits within the coconut value chain in general (Heiko, 2007).

## CONCLUSION

Although coconut is the most abundant and sustainable rural resource of coastal sub-humid lowlands of Kenya, it is still increasingly viewed as just a subsistence crop because farmers are less and less willing to engage in the hard and dirty work of producing copra both for local use and for export. This paper reports that although there is adequate farmer to farmer dissemination of both market access and farm-level processing technology information, adoption levels are still low, regardless of the gender, education level and wealth levels prior to coconut farming among the farmers. This is partly because of the laborious machines that are currently in use on-farm whose efficiencies are low.
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## REFERENCES

Adkins SW, Foale M and Samor YMS (2006).Coconut revival; new possibilities for the “tree of life”.Australian centre for International Agricultural Research, Canberra.

Agricultural Business Development programme of the Danish International Development Agency, in collaboration with Coast Development Authority (ABD-DANIDA/CDA, 2007).The coconut sub-sector in Kenya; Results of a census of coconut trees in Coast Province.

Baker D (2006). Agriculture value chains: overview of concepts and value chain approach, presentation prepared for the FAO LDED Regional Workshop for Asia, Bangkok. In: HeikoBammann (2007). Participatory Value Chain Analysis for Improved Farmer Incomes, Employment Opportunities and Food Security. Pacific Economic Bulletin 22 (3): 34-41

Crabbe E Nolasco, HipolitoCN, Kobayashi G, Sonomoto K and Ishizaki A (2001). Biodiesel Production from crude palm oil and evaluation of butanol extraction and fuel properties. Process Biochemistry 37: 65-71.

FAO (2007).Overview of the FAO-Government of Kenya Agro-biodiversity Programme. FAO-Netherlands Partnership Programme (FNPP II – 2005-2007).

Government of Kenya (GOK, 2003). Economic Recovery Strategy for Wealth and Employment Creation, 2003-2007, Government Printers: Nairobi, pp 23-25

HeikoBammann (2007). Participatory Value Chain Analysis for Improved Farmer Incomes, Employment Opportunities and Food Security. Pacific Economic Bulletin 22 (3): 34-41

Kadere TT, Oniango RK, Kutima PM and Njoroge SM (2009). Production, marketing, and economic importance of Mnazi and other coconut- based products in Kenya; Res. J. Agric. Biol. Sci., 5(5): 815– 822

Kenya Coconut Development Authority (2009).Annual Report of 2009.

MwachiroEC, and Gakure RW (2011). Factors affecting the coconut Industry from benefitting the indigenous communities of KilifiDistrict, Kenya. Int. J. Humanit. Soc. Sci., 1(4): 214-230.

Severino SM, Batugal PA,Ramantha RV and Bong C (1996). Intercropping and toddy/sugar production in coconut based farming systems: Possible integration with germplasm conservation and varietal improvement, in promoting multipurpose uses and competitiveness of the coconut. In: Batugal, P. A., V. RamanathaRao and C. Bong(Eds), 1998. Promoting Multi-purpose Uses and Competitiveness of the Coconut. Proceedings of a workshop, 26-29 September 1996, Chumphon, Thailand. IPGRI-APO, Serdang, pp 57 - 82.

Waijeng H (1993). The Coconut Palm Tree in the Coast Province of Kenya, Tree of life and Bone of Contention, Ph.D thesis, Netherlands.