Agriculture and Food Sciences Research
ISSN: 2411-6653
Vol. 2, No. 1, 25-31, 2015
http://www.asianonlinejournals.com/index.php/AESR

A Comparative Evaluation of the Economic Contributions and Uses of *Strychnos cocculoides* and *Schinziophyton rautanenii* Fruit Trees to Poverty Alleviation in Mile 20 Village of Namibia

Selma N. Elago[1*] --- Lisias T. Tjaveondja[2]

[1,2]Okahandja National Forestry Research Centre, Okahandja, Namibia

Abstract

In Namibia, plant foods including indigenous fruits are amongst the most important non-timber forest products. Indigenous fruits constitute an important source of livelihood for the people of Rundu Rural West constituency and as such this study compared two species: *Strychnos cocculoides* and *Schinziophyton rautanenii* and assessed which species contribute more to the households' cash income and food source so as to encourage its promotion. The study further assessed the traditional and other uses of *Strychnos cocculoides* and *Schinziophyton rautanenii* fruits and products. The study focused on Mile 20 Village in the Kavango region of Namibia. *The study adopted an emergent, exploratory, and inductive qualitative approach* and a triangulation method comprising of self-designed household survey questionnaire, interview and observation methods were employed in gathering data. To get the target sample from the three hundred households' population, the village was stratified into four zones of North, South, East and West. Simple random sampling was used to select thirty-one households from all the zones. The study findings indicates that *Strychnos cocculoides* contribute to households' cash income only, while *Schinziophyton rautanenii* contribute both to cash income and to food. Chi-square test showed that there is significant differences ($P \leq 0.05$) in the sources of the contributions of households cash income ($X^2 = 36.516$, df = 6, *P=0.001*) as well as the contributions of *Schinziophyton rautanenii* to cash income and food source ($X^2 = 11.645$, df = 1, *P=0.001)*.The results further indicate a wide range of products can be obtained from these two fruit trees species. Some of these products are identified as medicinal, firewood, crafts and oil.

Keywords: *Strychnos cocculoides*, *Schinziophyton rautanenii*, Indigenous fruits, Livelihood, Cash income, Namibia.

Contents

* *Corresponding Author*

1. Introduction

Rural people have been eating indigenous fruits, nuts and tubers for millennia and those foods still form a high proportion of the diet of some people, especially in poorer households. In Namibia, plant foods are amongst the most important non-timber forest products. More plant foods are available in Northern and North-astern Namibia, mainly because this is where most species that bear fruits occur. Of all the tree species in Namibia, 157 species (35%) have been recorded as being used for food in one form or another [1]. Namibia is a country at South of the Sahara located in Southern Africa with a size of 852,418 km^2 and with a population of about 2 million at a rate of 1.87% from 2005 to 2010 [2]. Majority (68%) live in the rural areas where most people earn a living from agriculture [3]. Namibia is not a forest-rich country, most of the country's territory (65%) covered by sparsely wooded savannah and denser woodlands of 20% occurring in the wettest regions in the North-east of the country [4]. Community forests in Namibia are central to promoting sustainable and participatory forest governance and enhancing livelihoods in communal land areas like Mile 20 [4]. Communal land in Namibia covers 26 million hectares, representing 36% of total land cover [4].

In the early 1990s the government of Namibia placed great emphasis on a more sustainable and equitable approach to the exploitation of natural resources which included the forestry sector [4]. The development of forestry was one of the main strategic directions of poverty reduction and economic growth that resulted in the increase of the country's gross domestic product (GDP) [5, 6]. The Namibian economy is dominated by mining. However, Agriculture, Fisheries and Tourism sectors also contribute significantly to the national economy. Forestry for instance contributes more to the informal and subsistence activities. Non Timber Forest Products (NTFPs) play an important role in the local economy of the Namibian people. The direct and indirect contribution of NTFP to national economy during 2004 was estimated to be N$ 619,459,000 (U$ 77,432.375) [1]. For these reasons commercial and personal harvest of forest products has being increasing every year because the products derived from forest and trees are important sources of cash income and employment for the rural poor. For example, *Strychnos cocculoides* harvested in Kavango have been used to produce a liqueur which has been exported to South Africa [1].

Indigenous fruits constitute an important source of livelihood for the people of Rundu Rural West constituency. The local people in this constituency depend on indigenous fruits in their day-to-day life and also contribute to household income. Indigenous fruits (IF) have currently received considerable interest from various stakeholders, due to their economic and nutritional values [7]. NTFPs are now globally recognized for their contribution to improved rural livelihood by providing food, nutrition and medicine, and by generating employment, revenues and foreign exchange earnings. The forestry sector social inputs lies in its fuel-wood and NTFPs contribution, which are the main origin of domestic energy for the majority of people, and an important source of food security and income generation. As revealed by Ramadhani [8], there is a substantial amount of trading and consumption of *Uapaca kirkiana* and *Strychnos cocculoides* indigenous fruits in both rural and urban areas of Zimbabwe and these fruits reduce poverty by 30% and generate income above the poverty line throughout the year. Dagmar [9] also proved that majority of rural household benefits from consumption and sale of indigenous fruits. Ekane [10] in his study on the socio - economic impacts of forest products revealed that forest resources are a major source of livelihood for forest dwellers or people living in most rural areas.

Rural poor people live in marginal lands, far from economic growth points, such that during off-cropping season they have no other sources of income generating activities rather than harvesting and selling indigenous fruits. The government programs has focused more on timber production and overlooked commercial production of indigenous fruits. The socio-economical contribution of individual indigenous fruit trees has not been looked at properly although it is well-known that indigenous fruits play a significant role in many rural people's livelihoods. Indigenous fruits were said to be very important to Rundu rural west community especially during years of drought, when the harvest of people's staple food is low, they rely on indigenous fruits for their survival. There is therefore the need to assess the socio-economic impact of indigenous fruits in order to help the Government to improve the status of local people. It is against this background that this study was conducted as part of a broader study in order to assess and justify if the rural community derive their main source of cash income from the sale of indigenous fruits. The study has compared two species: *Strychnos cocculoides* and *Schinziophyton rautanenii* and assessed which species contribute more to the households' cash income and food source so as to encourage its promotion. The study further assessed the traditional and other uses of *Strychnos cocculoides* and *Schinziophyton rautanenii* fruits.

2. Materials and Methods

2.1. Description of Indigenous Fruit Tree Species

2.1.1. Strychnos Cocculoides

Strychnos cocculoides is a small tree ranging from 2 to 8 meters high. It is mostly found on deep sand in North-eastern Namibia, elsewhere occurring in Northern South Africa, Zimbabwe, Zambia, Botswana, Malawi and Angola. The fruits are globose in shape dark green when young and yellow to orange when ripe. *Strychnos*', meaning 'deadly', is an ancient Greek name given to a certain poisonous member of the Solanaceae family. Linnaeus, who founded the genus *Strychnos* on the Indian species S. nux-vomica, which yields strychnine, possibly associated the deadly qualities of both groups when he named the genus. The fruit of this species is popular in North-eastern Namibia, and are frequently sold along the road and in informal markets in towns and villages. The fruits can also be fermented into alcoholic drink locally known as "kashipembe". The fruit ripen between April and August and are about the size of oranges. *Strychnos* ripen best on the tree. Fruits are harvested when fruit skin turns yellow or when they taste sweet (russeted types, but most are picked earlier and ripe in storage). Ripe fruit is eaten fresh or is used to prepare alcoholic drink. Furthermore, it used for medicinal purposes of which the unripe fruit can be pounded and mixed with water. This mixture can be used to treat snake bites, ear pain, and swellings. The leaves of the tree can be wrapped around the neck for treating neck pain, and the roots can be eaten to treat stomach ache in children. The

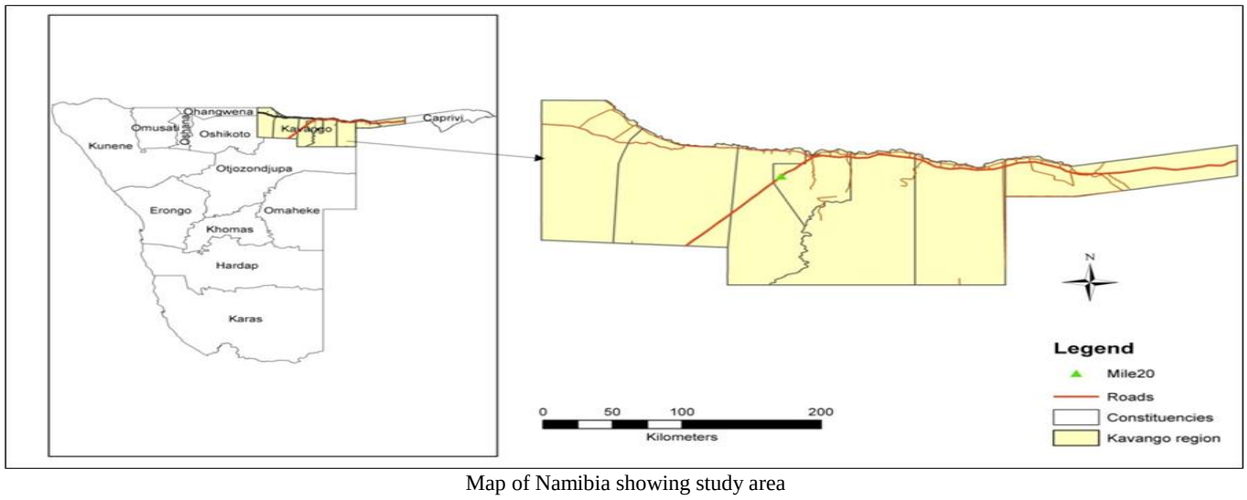
roots from a young tree can be used for treating chest pain; coughing and stomach ache [11]. The wood of the tree is not highly valued and therefore not really used for anything.

2.1.2. Schinziophyton Rautanenii

Schinziophyton rautanenii (formally known as *Ricinodendron rautanenii*) is a medium to large deciduous tree growing to a height of 12 meters. *Schinziophyton rautanenii* belong to the Euphorbiaceae family and were declared a protected species in Namibia in 1952 [1]. It is distributed across Northern Namibia, growing on deep Kalahari sands. It is dominant and most abundant species in the Kavango region. The fruits ripe on the tree from November to February and fall down when fully matured, from March to May. It is left drying on the ground (March-May) before been collected. The fruits can be harvested from May to August. The bark is smooth, yellowish to yellow-grey, with pieces peeling off to expose a yellowish under bark. The fruits of this tree species serve multiple purposes, for example the pulp of the fruits can be made into porridge, the peel and flesh can be used for the production of hot fermented alcoholic drink locally known as "kashipembe". The nuts can be finely crashed and added to the meat/vegetables to make a tasty soup. The nuts yield a high quality yellow oil of which about 60% is used for food and cosmetics [1]. The species is also used for medicinal purposes. The bark of the *Schinziophyton rautanenii* tree is used for treating stomach aches, sleepless night, fever, back pain and some rare traditional diseases. If people are really sick they can sit in a bath of stamped bark and water. The wood is used for making canoes, and carving crafts and utensils.

2.2. Description of the Study Area

The study was conducted in Rundu Rural West constituency in Kavango region, North East of Namibia. Kavango region is one of the thirteen political regions in Namibia and lies between 18.00^{o}E and 22.00^{o}E and 17.09^{o} and 18.01^{o}S. Within the region there are other constituencies namely Kahenge, Kapako, Mashare, Mpungu, Mukwe, Ndiyona, Rundu rural East and Rundu urban. The population is estimated to be 26 622 while that of the whole region is estimated at 202,691 [3]. The study specifically focuses on Mile 20 Village within the constituency. Mile 20 is located approximately 32 km south of Rundu, along the Rundu-Grootfontein main road. Kavango region has an average annual rainfall of 550 mm, which increases slightly from southwest to northeast. The first rain falls in September or October and the late rains in May. Eighty percent of the rain falls between December and March, where the maximum rainfall in 24 hours can be 100-120mm [12]. Animal husbandry and Horticulture is playing an increasing role in the economic lives of the Kavango people [1]. Another important economic activity is fishing, which provides a substantial source of protein to the people. The most important crops are pearl millet (*Pennisetum glaucum)*, sorghum and maize. Ground nuts, beans, pumpkins, and tobacco are cultivated on a smaller scale [1]. The site was selected based on the highly abundant and marketing potential of *Strychnos cocculoides* and *Schinziophyton rautanenii*. Most of the local people in the study area are engaged in indigenous fruits collection and marketing. Furthermore the area is easily accessible and the community had been visited in 2003 by the fruit tree improvement specialist program in the Directorate of Forestry (DoF) in collaboration with the Food Agriculture Organization (FAO).



Map of Namibia showing study area

2.3. Research Design and Data Collection

The study adopted an emergent, exploratory, and inductive qualitative approach. The reason for choosing this approach is that qualitative research certainly excels at generating variables that are very detailed, has special value for investigating complex and sensitive issues and is good when one really want to achieve a deep understanding of the issue under study [13]. To harness the needed information, a triangulation method comprising of self-designed household survey questionnaire, interview and observation methods were employed in gathering data from the respondents. The researchers also conducted documents review and also collected qualitative information from forestry experts in the Kavango region to complement the other methods. The questionnaire sought to capture data on the use of indigenous fruit trees as well as their role within the household system in the study area. The questionnaire consisted mainly of close-ended questions which required the respondents to tick their best option. To get the target sample from the three hundred households' population, the village was stratified into four zones of North, South, East and West. Simple random sampling was used to select thirty-one households from all the zones. The questionnaire was administered to all the residents in the household after which focus group discussions were used to gain insight into participant's view on the subject under consideration. Household heads were purposefully

interviewed. In addition, physical observation was also done in order to have a clue on the socio-economic impact of indigenous fruit trees in the study area. All the households sampled were involved in indigenous fruits collection and sales. Research assistants from Hamoye Forestry Office and the authors collected the needed data. The data obtained from all the sources were evaluated using, content analysis, cross-tabulations, descriptive statistics and graphs.

3. Results

3.1. Demographic Description

From the analysis, it was observed that the respondents who represented the households, 74% were females and 26% were males. In terms of age, 14 were 18-30 years, 10 were in the age group of 30-50 years while 7 were between 50-80 years. Occupation wise, the respondents were mainly farmers and their dependents were mostly children, husband and housewives. The survey also indicated that 21 respondents have 1-10 dependents in their family, while 8 had 10-20 family members. The highest family size was 20-30 which was reported by 2 respondents.

3.2. Comparison of *Strychnos Cocculoides* and *Schinziophyton Rautanenii* Contribution to Households' Cash Income and To Food

To compare *Strychnos cocculoides* and *Schinziophyton rautanenii* contribution to household's cash income and to food, data have been analysed quantitatively to bring out the extent of socio-economic contribution in the Mile 20 village. From Figure 1, all (100%) of the respondents reported that *Strychnos cocculoides* contribute more to household cash income and not to food. In contrast 80.6% of the respondents stated that *Schinziophyton rautanenii* contributes more to household cash income while 19.4% stated that it contributed to food.

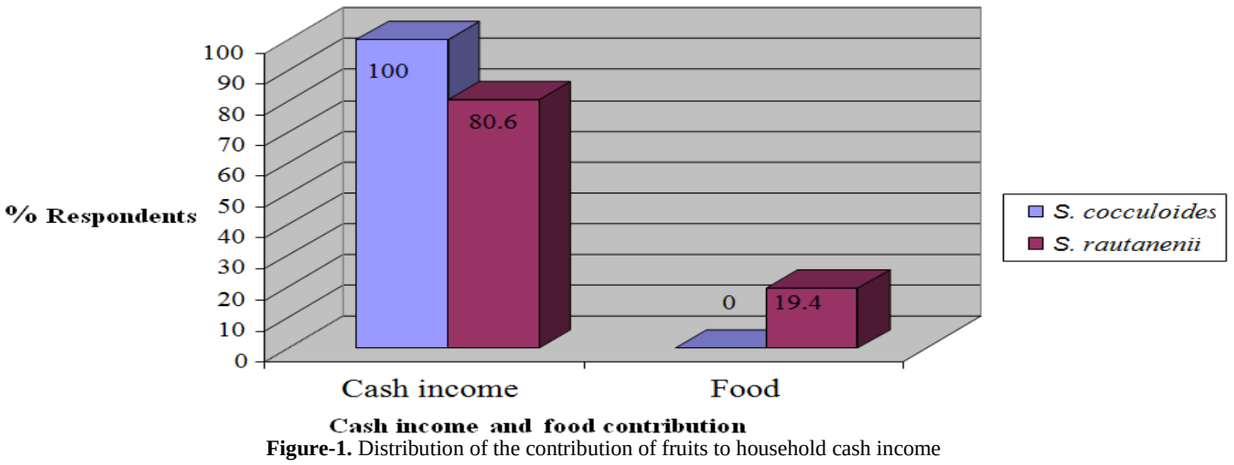


Figure-1. Distribution of the contribution of fruits to household cash income

Figure 2 shows income and livelihood change percentages. The figure shows that 51.6% of the household members stated that the income earned is enough to sustain their families while 48.4% respondents felt that the income is not enough. Chi-square test showed no significant differences (P>0.05) in the respondents by the households members (X^2= 0.032, df =1, P 0.857). However all household respondents reported that there is a change in their livelihood. From the figure it is clear that there has been a general improvement in the socio-economic well-being of the respondents.

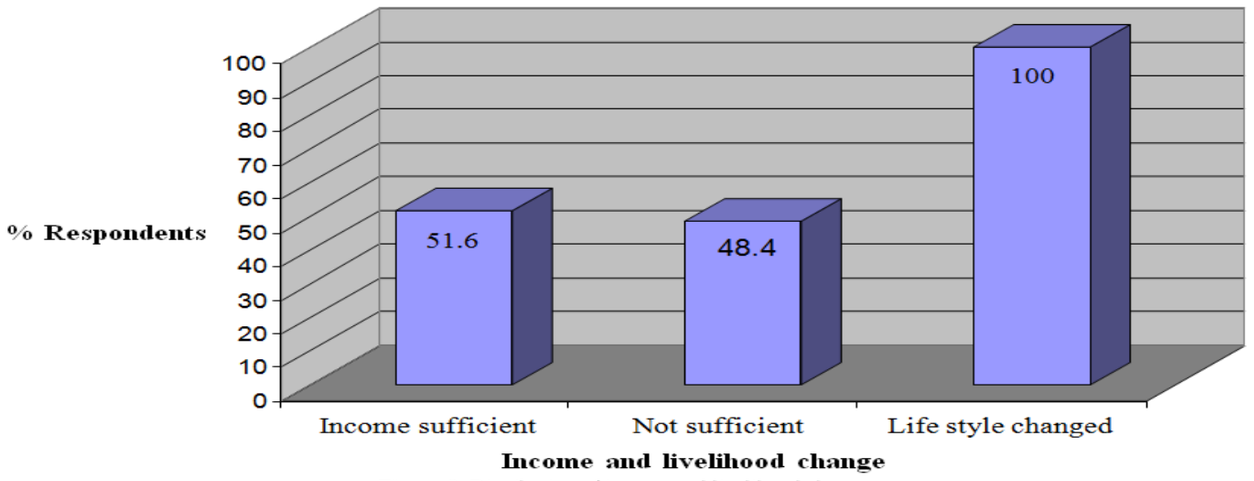


Figure-2. Distribution of income and livelihood change

3.3. Chi-Square Test (X^2)

Chi Square was used to expressed the probability to accept that the groups have different distributions if $p < 0.05$; or $p < 0.01$ by comparing the results obtained with the theoretical results for cross-tabulations. The Chi Square tells us whether the frequency distributions in the various columns are similar in shape, or are different. We determined whether the Chi Square value is what would be expected by chance alone, or not, and with what probability. Table 1 shows results of the cross-tabulation between sources of cash income.

Table-1. Source of cash income

Source of cash income	Observed N	Expected N	Residual
Indigenous fruits	16	4.4	11.6
Formal employment	4	4.4	-.4
Casual	2	4.4	-2.4
Pension	3	4.4	-1.4
Farming	2	4.4	-2.4
Wages & salaries	3	4.4	-1.4
Others	1	4.4	-3.4
Total	**31**		

Table-2. Chi-square test of Source of cash income

	Source of cash income
Chi-Square	36.516
Df	6
Asymp. Sig.	.000

Chi-square test (Table 2) shows that there is significant differences (P≤0.05) in the source of the contributions of households cash income (X^2= 36.516, df =6, *P=0.001*).
Table 3 shows results of the cross-tabulation between cash income and food source.

Table-3. Cash income and food source contribution of *Schinziophtyton ratautanenii*

	Observed N	Expected N	Residual
Cash income	25	15.5	9.5
Food source	6	15.5	-9.5
Total	**31**		

Table-4. Chi-square test of Cash income and food source contribution of *Schinziophtyton ratautanenii*

	Cash income and food source contribution
Chi-Square	11.645
Df	1
Asymp. Sig.	.001

Chi-square test shows that there is significant differences (P<0.05) in the contributions of *Schinziophyton rautanenii* to cash income and food source (X^2= 11.645, df =1, *P=0.001).*

3.4. Traditional and Other Uses of the Fruits

To assess the traditional and other uses of *Strychnos cocculoides* and *Schinziophyton rautanenii* fruits at the household level is the third objective of this study. The data for this objective has been analysed quantitatively and presented in Table 5 which revealed that 18 respondents obtain medicinal products from *Strychnos cocculoides* tree while 24 respondents obtain from *Schinziophyton rautanenii.* About 10 respondents use *Schinziophyton rautanenii* for fuel wood. Other 31 respondents revealed that they make crafts and tools from *Schinziophyton rautanenii*.

Table-5. Traditional uses of the indigenous fruits

Purpose	Tree species Uses	Number of respondents	
		S. cocculoides	***S. rautanenii***
Medicine	Leaves	8	
	Roots	8	
	Bark	1	15
	Oil		9
	Medicine/ other	1	
Wood	Firewood		10
	Making crafts		31
	Making tools		31
	Fencing		
	Others		

4. Discussion

4.1. Comparison of *Strychnos Cocculoides* and *Schinziophyton Rautanenii* Contribution to Households' Cash Income and To Food

Indigenous fruits constitute an important source of livelihood for the people of Rundu Rural West constituency. The local people in this constituency depend on indigenous fruits in their day-to-day life and also contribute to household income. The findings show that all the households' respondents were of the view that *Strychnos cocculoides* contribute only to household cash income and not to food. In contrast 80.6% of the respondent's stated that *Schinziophyton rautanenii* contributes to household cash income, while few respondents (19.4%) stated that it contributes to food. However, in terms of cash income contribution, both fruit trees species contributes significantly and there is no significant difference between the contributions of the species. The reason why all the respondents were of the view that *Strychnos cocculoides* contribute only to household cash income may be attributed to poor

storability of the fruits. Therefore the fruits are sold as soon as they are collected, whereas *Schinziophyton rautanenii* has good storability hence consumed in period of food shortage. Households mainly collect *Strychnos cocculoides* fruits for marketing purposes. In addition the fruits are also sold in urban areas across the country whereas *Schinziophyton rautanenii* fruits are mostly sold at local markets in the region. These results are contrary with the study of Dagmar [9] that revealed that *Strychnos cocculoides* is more important for home consumption during food shortage and not for household cash income. The main reason for this contradiction may be because Dagmar [9] conducted the study in Zimbabwe and he was comparing *Uapaca kirkiana, Strychnos cocculoides* and *Parinari curatefollia*. In his findings *Uapaca kirkiana* fruits were more important in generating cash income than others.

This study further reveal that half of the households investigated were of the view that the income generated is sufficient enough to sustain household family members while the other half felt that it is not enough. Even though some felt that the income is not enough, all the households respondents have experienced changed in their livelihood and well-being as a result of the income generated from the sale of indigenous fruits. With these cash income, some households within the village have been able to bring water pipe line in their homesteads. Some respondents pointed out that from the sale of indigenous fruits; they are able to purchase various kinds of goods. These goods include new clothes for their family members, buy households needs, variety of food types, cell phones etc. These respondents that were of the view of inadequate income encounter problems during indigenous fruits sale. Some of the respondents identify such problems as low pricing, competition in selling, lack of customers and lack of transport to transport the fruits to other marketing areas. One of the respondent states that the income she generate is not enough because fruits are only sold within a short season. The results show that forest resources are a major source of livelihood for people living in rural areas. The findings have proven that *Strychnos cocculoides* contributes significantly to household's cash income only, while *Schinziophyton rautanenii* contributes both to cash income and to food.

4.2. Traditional and Other Uses of the Indigenous Fruit Trees

People in the rural areas have access to a wide range of products from the indigenous fruit trees. Both *Strychnos cocculoides* and *Schinziophyton rautanenii* are multipurpose trees, fruits are the main products, but other products such as medicine, firewood, crafts, can also be obtained. The findings show that both species treat many different medical ailments. For example the unripe fruit of *Strychnos cocculoides* can be pounded and mixed with water, this mixture is used to treat snake bites and swellings. The liquid of the unripe *Strychnos cocculoides* fruit can be applied to treat ear pain and one can drink it to cure stomach ache. The bark of the *Schinziophyton rautanenii* tree is used for treating stomach ache, and some rare traditional diseases. If people are sick they can sit in a bath of stamped bark and water. All households' respondents confirm that the wood for *Schinziophyton rautanenii* can be used to make canoes, carving crafts and making utensils while the wood for *Strychnos cocculoides* is not important, therefore is not used for anything. The results are in line with the report of FAO [14] that reported that NTFPs contribute to the improved rural livelihood by providing other traditional products such as medicine and wood products. The results have proven right, the hypothesis that *Strychnos cocculoides* and *Schinziophyton rautanenii* fruits products have other important traditional uses at household level apart from income generation and food security.

Currently, there is no policy implication in the utilisation of the indigenous fruits. NTFPs have the potential to diversify the rural economy and improve the rural household livelihood in terms of food security. Commercialisation of both species can give rural people a possibility to improve their economic situation and secure people's livelihood. Based on the observations and informal interview with the household respondents, *Strychnos cocculoides* and *Schinziophyton rautanenii* fruit trees are regarded as the most important fruits trees in the area. There is a need for the Ministry to improve the sale of *Strychnos cocculoides* and *Schinziophyton rautanenii* fruits, by encouraging the communities to supply more fruits to both rural and urban markets within the country. Therefore, this action will improve cash income of the rural people not only in Rundu Rural West Constituency, but also in other places within the country.

5. Conclusion

Namibia's forest resources constitute an important heritage which provides both economic and environmental benefits. Among the strategies used by the rural people to overcome food shortages, is the use of wild fruits from indigenous fruits trees. *Strychnos cocculoides* and *Schinziophyton rautanenii* are the most popular fruit species in Rundu Rural West Constituency - Kavango region and both indigenous fruit trees contribute significantly to their livelihood and household cash income and to households' food. The study compared the economic contributions and traditional uses of *Strychnos cocculoides* and *Schinziophyton rautanenii* fruit trees. The results show that forest resources are a major source of livelihood for people living in rural areas. The findings proved that *Strychnos cocculoides* contributes significantly to household's cash income only, while *Schinziophyton rautanenii* contributes both to cash income and to food. Chi-square test showed that there is significant differences ($P \leq 0.05$) in the source of the contributions of households cash income ($X^2 = 36.516$, df = 6, *P=0.001*) as well as the contributions of *Schinziophyton rautanenii* to cash income and food source ($X^2 = 11.645$, df = 1, *P=0.001)*. Apart from the fruits, *Strychnos cocculoides* and *Schinziophyton rautanenii* also provide a wide variety of products. The two species provide other products such as medicine, firewood, craft and utensils. Wood for *Schinziophyton rautanenii* can be used to make canoes, carving crafts and making utensils while the wood for *Strychnos cocculoides* is not important and therefore is not used for anything.

6. Acknowledgement

The authors would like to thank the Namibia Ministry of Agriculture, Water and Forestry for funding this study. We are grateful to the Directorate of Forestry for granting us the opportunity to undertake this study. We extend our

appreciation to the people in the study area particularly the people of Mile 20 village, Rundu rural West constituency, Kavango region who took great interest in the study, shared their knowledge and patiently answered many questions.

References

[1] J. Mendelsohn and S. El Obeid, "Forests and woodlands of Namibia," Research and Information Service of Namibia, Directorate of Forestry, Ministry of Agriculture, Water and Forestry, Namibia, 2005.

[2] UN, "Population growth rate of Namibia in 2005-2010. Population division of the department of economics and social affairs of the united nations secretariat, world population prospects: The 2010 revision." Available http:esa.un.org/undp/unpp/index.htm, 2010.

[3] Central Bureau of Statistics, "Population and housing census 2001. National planning commission," Government of Republic Namibia, Report, 2001.

[4] A. Benkenstein, S. Hengari, and W. Mbongo, "Community forests in Namibia: Ensuring sustainable local-level forest management. South African institute of international affairs (SAIIA), SAIIA policy briefing 119." Available www.saiia.org.za, 2014.

[5] T. O. Oksanen, B. Pajari, and T. Tuomasjukka, "Forests in poverty reduction strategies: Capturing the potential," in *European Forest Institute Proceedings No. 47.Tuusula, Finland*, 2003.

[6] J. E. Mbaiwa, *The socio-economic and environmental impacts of tourism development on the Okavango Delta. North-Western Botswana, harry oppenheimer okavango research centre*. Botswana: University of Botswana, 2002.

[7] M. Chakanga, "Timber trade and timber industries in Namibia. Ministry of environment and tourism, directorate of forestry, Namibia," FAO Working Paper FP/30F, 2003.

[8] T. Ramadhani, *Marketing if indigenous fruits in Zimbabwe. Socio-economic studies on rural Development* vol. 129. Kiel, Germany: Wissenschaftsverlag Vauk, 2002.

[9] M. Dagmar, *Economics of indigenous fruits tree crops in Zimbabwe*. Germany: University of Hannover, 2004.

[10] N. B. Ekane, "The socio economic impact of pronus Africana management in the Mount Cameroon region. Case study of the bukwango community," Master of Science Thesis, Department of Urban Planning and Environment, Royal Institute of Technology Stockholm, 2006.

[11] M. C. Palgrave, *Keith coates palgrave trees of Southern Africa*, 3rd ed. Cape Town: Struik, 2002.

[12] A. Erkilla and H. Siikonen, "Silvica Calerica 20 forestry in Namibia 1850-1990. University of Joensuu, faculty of forestry, Finland, 1992 survey of research needs in Northern and Southern Namibia," Directorate of Forestry, Research Division, Forestry Research and Development Project, 1992.

[13] A. D. Day, *How to write and publish a scientific paper*, 5th ed. Cambridge, United Kingdom, 2003.

[14] FAO, *Forest resource assessment 2005*. Rome: Food and Agriculture Organistaion of the United Nations, 2005.