

Contribution of non-timber forest products to poverty alleviation and forest conservation in Rufiji District - Tanzania

J Kimaro and L Lulandala*

*Tanzania Wildlife Research Institute
Arusha, Tanzania
jegaki@hotmail.com*

** Sokoine University of Agriculture, Faculty of Forestry, Morogoro, Tanzania*

Abstract

The study was carried out to determine contribution of Non-timber Forest Products (NTFPs) towards poverty alleviation and sustainable forest management in local communities surrounding Ngumburuni Forest Reserve in Rufiji District, Coastal Region, Tanzania. Data were collected from three villages closest to forest namely Mkupuka, Mangwi and Umwe North using participatory rural appraisal, structured interviews, focused group discussion and participant observation.

A total of one hundred and sixty species distributed both in forest reserve and general land were recorded. Local end-uses of NTFPs including fuel wood, food, construction materials, medicine and traditional rites items were identified. This indicated significant contribution of NTFPs to local community income and livelihood resilience and thus, incentive for sustainable forest management. While access to NTFP is important to guarantee the socio-economic well being of the forest adjacent communities, their sustainable management has not been taken seriously by local government officials and policy makers thereby contributing to reduction of biodiversity resources and irretrievable loss of most species. To ensure the sustainable utilization of NTFPs from Ngumburuni Forest Reserve and similar tropical forest environments, a number of conservation approaches are proposed.

Keywords: community, disturbances, policy, resources, sustainability

Introduction

The role of Non-timber Forest Products (NTFPs) for sustainable forest management and poverty reduction has received increased attention for many past years (Sheil and Wunder 2002). They play an important part in supporting household livelihoods and therefore can be used to raise the perceived value of forest resources (Arnold 2002). In many developing countries, including Tanzania, majority of rural household and a large proportion of urban household depend on NTFPs to meet some parts of their nutritional, health, construction material and income from selling these products. FAO's experience in community forest management in developing countries has documented important roles of NTFPs which include: income generation for rural development; more equitable sharing of the benefits of forest; and local participation in forest management (FAO, 2001). In economic terms, NTFPs contribute substantially to national economic growth and international trade. For example, wild plant resources contribute an income of around US\$ 1200 per household per year in Southern Africa (Shackleton et al 2001). Likewise, Jimoh and Haruna (2007) reported that the NTFPs have potential to contribute around 68% of total monthly household income within Onigambari Forest Reserve, Nigeria.

Despite of these potential benefits that are offered by the non-timber forest products, it has been widely documented that forest still offers little in terms of opportunities for expanding livelihood options and accumulation of wealth and assets required to reduce livelihood vulnerability (Anorl and Ruiz-Perez, 2001). The question is needed to be asked whether or not the same applies to Ngumburuni Forest Reserve which forms one of most important part of Coastal Forest of Tanzania. Based on this, the study was carried out to determine the contribution of NTFPs towards poverty reduction and sustainable forest management by assessing the potential and constraints experienced by adjacent local communities towards their exploitation.

Material and Methods

Study area

Ngumburuni Forest Reserve is located in Rufiji District, Coast region, Tanzania between $7^{\circ} 38' - 7^{\circ} 48' \text{ E}$ and $38^{\circ} 52' - 39^{\circ} 6' \text{ S}$. With elevation of 200m from the mean sea level, the forest covers about 10 000 ha (REMP, 2003). Average annual rainfall varies from 900 mm to 1 400 mm, with significant daily, monthly and annual fluctuations; temperature is ranging between 24 and 31°C with average of 26°C (Burgess and Crarke, 2000). The main economic activities of adjacent communities are agriculture and forest dependent activities such as logging and charcoal production (Semesi, 1990 and URT, 2003). The vegetation of the study area is characterized by four easily distinguished ecological units which include coastal, miombo, woodland and riverine forests (Burgess and Clarke, 2000). There are about 484 different tree species with high level of plant species endemism (Munishi et al 2004). Similarly, several species of endemic mammals and birds are found in the coastal forests.

Data collection

Data were collected from three villages closest to the forest reserve namely: Mangwi, Mkupuka and Umwe North, in three phases. Phase one involved Participatory Rural Appraisal (PRA), in which 30 people from each village of different age groups and gender participated. PRA tool included participatory wealth ranking, pair wise and preference ranking. The second phase involved structured and semi-structured questionnaire administration. The total of 90 households using sampling intensity of 5% was interviewed using structured questionnaire. Systematic sampling was adopted so as to include people of different age, gender, and wealth categories, as reflected from PRA results. Semi-structured questionnaires were used to interview key informants who included, district officers, village elders, businessmen and traditional healers. The third phase of data collection involve field survey, which aimed at identifying plant species commonly used by local communities to harvest products like medicines, fruits, ritual and fibres. Participant observation was done to observe activities relating to access and use of ecosystem services from neighboring community.

Secondary information like village demographic data, previous reports were collected from village registries, district library, Sokoine Universities of Agriculture library and Rufiji Environmental Management Project Office (REMP).

Data analysis

Data collected using PRA was analysed with the help of communities, and the results were communicated back to them. A combination of qualitative and quantitative methods was used to analyse data collected in the second and third phase. Qualitative data were analyzed using content

analysis (Kajembe 1994) while quantitative data were analysed with the aid of Statistical Package for Social Sciences (SPSS) version 16 and Excel Spread Sheet 2003. Analysed data were presented in descriptive statistics, charts and tables. Pearson correlation test was used to establish influence of NTFPs utilization and sustainable forest management.

Results and discussion

Existing NTFPs and their importance at household level

The study findings revealed that firewood (80%), medicine (60%), construction materials (55%) and fruits (45%) were the most collected NTFPs at household level compared to other NTFPs (Fig.1). There were also significant benefits accruing from environmental goods and services such as water from catchments forests and spiritual sites present in the forests. The high demand for firewood by adjacent communities might be attributed by several factors including being obtained freely of charge from the forest. The same observation was made in Malawi by Malinski (2008) whereby fuel wood is used by 97% of rural household. On other hand, lack of alternative cooking energy at household level also influences high rate of firewood use. Response from key informants revealed that most households within Rufiji have no access to power from national grid and they still use traditional three-stone stoves for cooking. These open fire stoves normally consume huge amount of cooking biomass fuel which demand frequent access to forest to look for firewood (Arnold et al 2003; Abbiw 1990).

Food products from plants were accounted to have higher demand compared to those obtained from animals (Figure 2). Wild fruits from tree species like *Vitex doniana*, *Manilkara sansibarensis*, *Syzygium guineense*, *Tamarindus indica* and *Suregada zanzibariensis* and several edible mushrooms are widely used by local people near in Ngumburuni forest reserve.

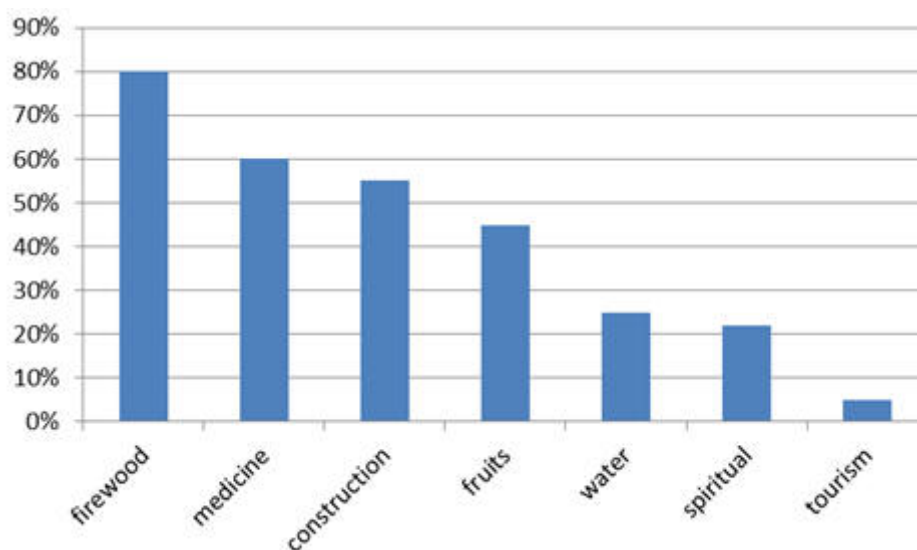


Figure 1. NTFPs as sources of household income

Similar observation was done by Maghembe (1994) who reported that wild foods from wild plants constitute the most important groups in terms of their contribution to the economy and well-being of rural community. On other hand, the low demand of animal product has been influenced by some altitudes within a community. It has been noted that over 90% of residents in Rufiji are Muslims (URT, 2003) whose ethics limit them on consume some animal products. According to Simoons (1994), religion is one of social factors that can limit consumption of certain food type.

For example, in Islam, swine meats are taboos. Food consumed by Muslim devotees must be Halal (Omar and Jaafar, 2011).

Medicinal plants were observed to be important NTFPs to community around Ngumburuni. Observation done by Mogaka (1992) reported that plants from coastal forests have significant proportion of the medicine value that can be useful to surrounding populations. Based on our findings, a total of 356 plant usages were mentioned by respondent (Table 2). The medicinal use most frequently reported was for malaria (25%), fever (18%) and stomach ache (15%). *Hugonia castaneifolia* was cited five times and it is used to heal: wound, rashes, hernia, snakebite and skin diseases. Following our personal observation, we could see relatively small number of modern dispensaries compared to that of traditional healers.

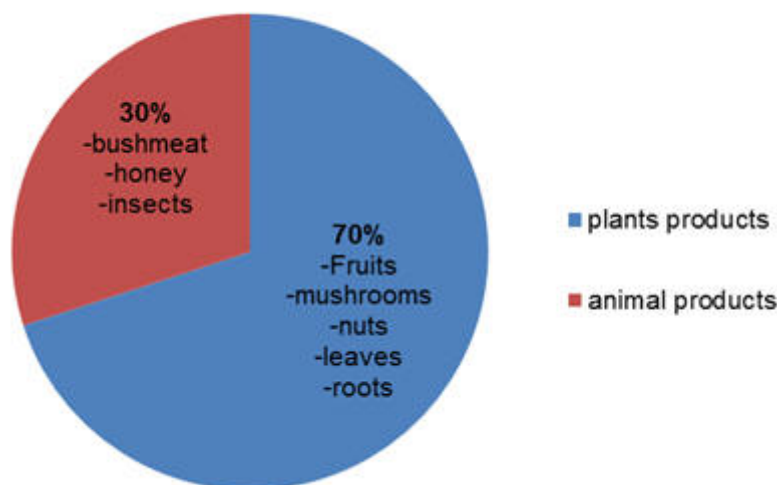


Figure 2. Various food products obtained from Ngumburuni Forest

Table 1. Reputed therapeutic effect of medicinal plants according to villagers around Ngumburuni Forest Reserve

Therapeutic effect	Report for each Effect (%)	Number of species reported (%) [#]	Species that were mostly reported
Malaria	88(25)	45(49)	<i>Sorindeia madagascariensis</i> , <i>Uvaria spp</i> , <i>Accacia spp</i> , <i>Albertisia undulata</i>
Fever	64(18)	34(37)	<i>Chassalia umbraticola</i> , <i>Dichrostachys cinerea</i> , <i>Suregada zanzibariensis</i> , <i>Hugonia castaneifolia</i>
Stomach ache	55(15)	23(25)	<i>Combretum pentagonia</i> , <i>Bridelia atrovidis</i>
Cough	42(12)	18(20)	<i>Paulinia pinnata</i> , <i>Combretum apiculatum</i> , <i>Rourea orientalis</i>
Rashes	34(10)	16(17)	<i>Vismia orientallis</i> , <i>Clausena anisata</i> , <i>Hugonia castaneifolia</i>
Skin disease	17(5)	15(16)	<i>Sphonochirtus aethipicus</i> , <i>Hugonia castaneifolia</i>
Diarrhea	15(4)	11(17)	<i>Dalbergia abovata</i> , <i>Platysepatum inopinatum</i>

Tooth ache	13 (4)	12(13)	<i>Cissus populnea, Vitex buchananii, Gwewia holstii, Harisonia abyssinica</i>
Snakebite	10(3)	9(10)	<i>Monanthotaxis forcicata, Hugonia castaneifolia</i>
Hernia	10(3)	10(11)	<i>Triclisia sacleuxii, Gwewia holstii, Hugonia castaneifolia</i>
Swollen spleen	8(2)	6(7)	<i>Olyra latifolia</i>
Total effects reported			

Refers to (%) calculated from 92 species reported.

Construction materials like poles, roofing thatches, ropes are easily obtained from the forest reserve or sold at lower price by local suppliers. The high demand of these materials is contributed by faster population growth at Rufiji District especially after improvements of infrastructure including completion of Mkapa Bridge in 2006 (Milledge and Kaale 2005). Poor housing status within the study area demand frequent rehabilitation to maintain structural functions of thatched roofs and mud walls. Monella et al (1993) reported that most villagers have a good knowledge of tree species important for house construction such as *Dombeya rotundifolia*, *Acacia nigrescens*, *Spirostachys africana*, *Pteleopsis myrtifolia*, *Markhamia obtusifolia* and *Casuarina livingstonei*. Roughly 300 poles are needed for an average-sized rural house, which lasts between three and ten years, while a new roof is always needed before beginning of long rains.

Contribution of NTFP in forest management

To determine the role of NTFPs in sustainable management of Ngumburuni forest Reserve, a correlation analysis was conducted. The Pearson correlation coefficient reveals that there is a strong positive correlation relationship between NTFPs utilization and sustainable forest management as is testified by large coefficient correlations (R) from the forest reserve which is managed through Joint Forest Management (0.74). However, results indicated small correlation from village general land (0.32). This implies that there is less contribution of NTFPs in forest management in general land because of small amount of ecosystem services derived from there. As more forest resources become available to the people, there is a tendency of community to develop a vested interest to natural resources around them since they get direct benefits from the ecosystem which assures long term resilience to their livelihood (FAO, 2001). Similarly, Fabricius (2004) found that sustainable natural resources management mutually benefits the community. Taking into account of the existing NTFPs within Ngumburuni Forest Reserve, the adjacent community would develop a commitment of protecting the forest from possible disturbances like bushfire, logging and cultivation.

Policy implication

Despite of existing evidences that NTFPs have potential to reduce community poverty and enhancing sustainable forest management, there is little attention from the Tanzania Government since it lacks clear legal and regulatory framework for development of NTFPs. The forest policies still consider NTFPs as inferior products compared to timber within forest management programmes and policies. This has impacted negatively on their management which includes promotion, processing and marketing. There is need for a well-defined policy or institutional framework that can be easily understood and adopted by wide range of stakeholders especially those at the forest base. Integrating enabling environment within reviewed policies such as provision for secure property rights or incentives for good forest management will foster

participation of local communities in forest management (Lambin, 2005). Furthermore, profitable and sustainable utilization of NTFPs demand integration of policies from different sectors rather than focusing to forest sector alone. This brings knowledge and experience together that serves appropriate decision making and sound management.

Limitations to NTFP utilization

Poor commercialization strategies

Although most of the NTFPs were mentioned to be picked freely from the forest, most (90%) of local people from study area still lack skills for appropriate extraction that would allow harvesting, processing, packaging and marketing NTFPs to the full potential of commercialization.

Lack of processing and packaging skills subject local producers remain isolated from potential existing local and international markets. Over 76 % of the producers sell products in their raw form without adding value. This is likely caused by lack of reliable power, storage facilities or financial capital. Most perishable products like mushrooms and fruits from rural areas get spoilt within a few days before reaching market (Clair, 2005).

Failure to compliance with quality standards is another major challenge to NTFPs in Tanzania. Worldwide, discussions on labeling and certification have increased recently, which benefit entrepreneurs to get premium price from their sales. Unfortunately, Standards for labeling of NTFPs in Tanzania are not well developed which hinder the promotion of NTFPs in the country and internationally. According to Oldfield (2012), forest management and chain of custody timber certification is potentially an important means to raise the value of timber for local communities involved in production as well as demonstrating sustainability to the end users. Although there is potential for the international market for some NTFPs in Tanzania, most farmers (82%) within surveyed villages have very limited capacity in meeting packaging requirement for NTFPs.

Influence of human disturbances

About 70% of respondent mentioned that ecosystem services within Ngumburuni Forest are affected by different forms of human disturbances. Fire has been a common feature almost in every activity being undertaken in the forest reserve, such as clearing bush for logging, clearing vegetation for farms, production of charcoal and escaping fires during activities such as harvesting honey, bush meat hunting, etc. This is supported by David (2004) and Andress (2005), who observed that fire have been observed to cause changes on vegetation cover and tree biodiversity of several forest ecosystems. Logging has also been reported to occur at varying scales from extraction of few building poles for individual house construction to massive cutting of large diameter trees for commercial export (Songas 2003). Expansion of human population in villages around Ngumburuni forest reserve coupled with abject poverty is likely to escalate exploitation of trees as the cheaply available building materials. Average quantity of 15 - 20 poles per week is harvested by one pole harvester in Rufiji District (Mzava 1983 and URT 2001). Similar to this, our personal observation at Ikwiriri town revealed on-going production of sawn wood conducted by four sawmills which are located few kilometers from the reserve and other small ones around the forest. It is likely that the raw materials for these factories are obtained from Ngumburuni forest reserve. As responded by key informants, smuggling of logs from the reserve is still undertaken especially during the night when forest patrol is less active. Study by REMP (2003) reported presence of criss-cross roads in the reserve which revealed existence of illegal logging within the

forest. Data regarding harvesting areas and relative harvesting pressure in Rufiji District between 2000 and 2001 (Figure 3) revealed that the area of highest harvesting pressure was Ngumburuni. This indicates that, for many years logging has been one of the main causes of disturbances in the Ngumburuni forest reserve.

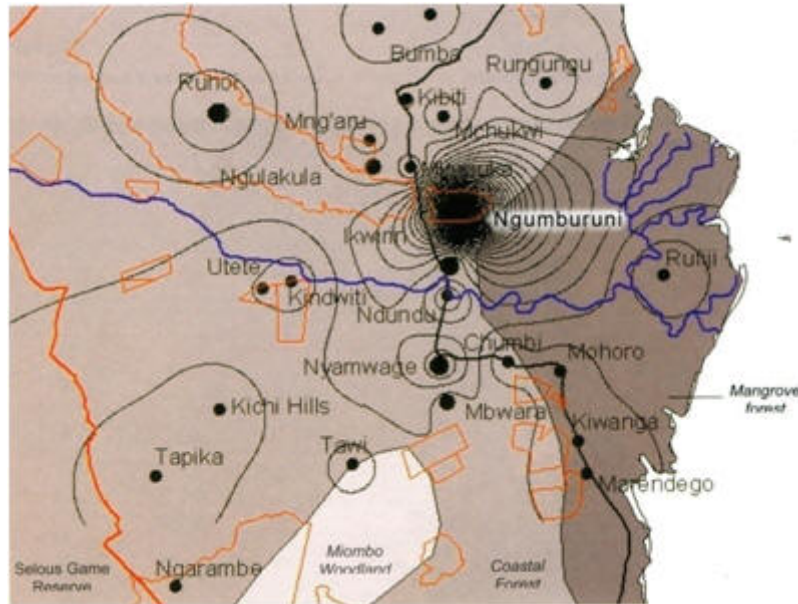


Figure 3: Timber harvesting pressure in Rufiji District (Source: TRAFFIC-WWF 2003)

Conclusions

- The study has revealed significant role of NTFPs towards poverty reduction and sustainable forest management to community adjacent to Ngumburuni. The products represent very significant component of the household livelihood and income options. It was further noticed that, villagers realized more NTFPs from reserved forest compared to that obtained from the general land. However, Ngumburuni Forest Reserve is still facing disturbances especially that caused by human activities such as illegal logging, bush fire and shifting cultivation. Similarly, lacks of unclear policies and low commercialization skills have been found to be major limitations to optimal use of NTFPs.
- Based on findings from this study and previous researches conducted within this forest, further comprehensive studies are needed to examine and quantify the amount of NTFPs collected over time against the existing stock. This will provide much needed information to be used for the sustainable utilization and management of the forest resources. Ongoing disturbances that threat quality and quantity of NTFPs at Ngumburuni FR should be addressed by involving local people, their leaders, local government authorities and central government. Furthermore, Tanzania Government is supposed to formulate new policies that will enhance the potential of NTFPs in poverty reduction and empower communities through clear institutional framework to respond to the increasing demand.

References

Arnold J E M 2002 Identifying links between forests and poverty. *ECTF/IIED Forestry and Poverty Reduction Workshop*, Edinburgh 13 June 2002.

Arnold J E M and Ruiz Perez M 2001 *Can Non-timber Forest Products Match Tropical Forest Conservation and Development Objectives?* NY: Ecological Economics and Management, Cornell University, Ithaca.

Andress H 2005 Climate change-driven forest fires marginalize the impact of ice cap wasting on Kilimanjaro. *Journal of Global Change Biology* 11(7): 1013-1023.

Abbiw D K 1990 Useful plants of Ghana: West African uses of wild and cultivated plants. Intermediate technology publications, London and the Royal Botanic Gardens, UK, p. 337.

Arnold M, Kohlin G, Persson R and Shepherd G 2003 Fuelwood Revisited: What has Changed Since the Last Decade? Occasional Paper no. 39, Bogor Barat, Center for International Forestry Research (CIFOR), Indonesia.

Burgess N D and Clarke G P 2000 *Coastal Forest of Eastern Africa*. IUCN, Gland, Switzerland. 443pp

Claire K 2005 Managing ecosystem services: What do we need to know about their ecology? *Journal of Ecology Letters* 8(5): 468-479.

David M 2004 Woodland loss and restoration in a savanna parks: A 20-year experiment. *African Journal of Ecology* 42(2):111-121.

Department of Forestry Nepal (DOF) 2004 Community Forest Resource Inventory Guidelines, 2061, Community Forest Division, Department of Forest, Kathmandu, Nepal 2004 25pp

Fabricius C 2004 The Fundamentals of Community based Natural resources Management: *Rights, Resources and Development: Community Based Natural Resources Management in South Africa*. London: Earth Scan Publishers Ltd., VA: Sterling, pp. 3-43.

FAO 2001 Resource assessment of non-wood forest products: Experience and biometric principles (eds, Jennifer LG, Kirsti T and Nell B). FAO, Rome 2001. 109Pp

Jimoh S O and Haruna E A 2007 Contributions of Non-Timber Forest Products to Household food security and income around Onigambari forest reserve, Oyo State, Nigeria. *Journal of Environmental Extension*. Vol 6. 2007. Pp 28-33

Kajembe G C and Luoga E J 1996 Socio-economic aspects of tree farming in Njombe District. Consultancy report HIMA Njombe conducted by FORCONSULT, Faculty of Forestry, SUA, Morogoro.

Lambin E F 2005 Conditions for sustainability of human environment systems: Information, motivation, and capacity. *Global Environmental Change*, 15: 177- 180

Maghembe J A 1994 Out of the forest: Indigenous fruit trees in Southern Africa. *Journal of Agroforestry Today* 6(2):4-6.

Malinski B 2008 *Impact Assessment of Chitetezo Mbaula*. Improved Household Firewood Stove in Rural Malawi. GTZ. Probec.

Mnzava E M 1983 *Tree Planting in Tanzania. A voice from villagers*. Ministry of Natural Resources and Tourism. Forest and Beekeeping Division. Dar es Salaam, United Republic of Tanzania. 112pp.

Milledge S A H and Kaale B K 2005 *Bridging the Gap - Linking Timber Trade with Infrastructural Development in Southern Tanzania: Baseline data before completion of the Mkapa bridge*. TRAFFIC East/Southern Africa, Dar es Salaam, Tanzania. 124pp.

Mogaka H R 1992 Local Utilization of Arabuko-Sokoke Forest Reserve. *Socio-Economic Report (Report No. 6.)*. Kenya Indigenous Forest Conservation Project Nairobi. 72pp.

Monela G C, O'Kting'ati A and Kiwele P M 1993 Socio-economic aspects of charcoal consumption and environmental consequences along the Dar es Salaam–Morogoro highway, Tanzania. *Forest Ecology and Management* 58:249-255.

Munishi P K T, Shear T H, Wentworth T, Temu R P C and Maliondo S M 2004 Sparse distribution of pattern of some plants species in two afro-montane rain forests of Eastern Arc Mountains of Tanzania. *Tanzania Journal of Forestry and Nature Conservation* 75: 74 - 90.

Oldfield 2012 FSC Certification for maintaining ecosystem services, Tanzania. TEEBcase. <http://www.teebweb.org>.

Omar E and Jaafar H 2011 Halal Supply Chain in the Food Industry - A Conceptual Model in Business. *Engineering and Industrial Applications (ISBELA) 2011 IEEE Symposium* (pp. 384-389).

REMP 2003 *Report on Strategy for Assessment of the Woody Vegetation of the Rufiji District*. REMP, Rufiji. 34pp.

Sheil D and Wunder S 2002 The value of tropical forest to local communities: Complications, caveats and cautions. *Conservation Ecology*, 6 : 2-9.

Simoons F J 1994 *Eat not This Flesh: Food Avoidance from Prehistory to Present*. London: The University Wisconsin Press.

Shackleton S, Shackleton C and Cousins B 2000 Re-valuing the communal lands of Southern Africa: New understanding of rural livelihoods. ODI Natural Resource Perspectives no. 62. The Overseas Development Institute, London

Songas 2003 SongoSongo Gas to Electricity Project, Environmental Studies. *Final Report*. SONGAS Ltd., Dar es Salaam. 63pp.

United Republic of Tanzania (URT) 2001 *Community Based Forest Management Guidelines*. Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division, Dar es Salaam, United Republic of Tanzania. 86pp.

Received 3 April 2013; Accepted 10 April 2013; Published 1 May 2013

[Go to top](#)