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An investigation on the utilisation of forest resources for rural food security and economic development in Chipinge communities

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Abstract

Forestry as a secondary food system substitutes or enhance food from the primary food system, when the later become scarce and expensive for the poor villagers. The research sought to investigate on the utilisation of forest resources for rural food security and economic development, with a view of establishing why communities continue to exist in poverty while they live with forests resources that could be exploited for their economic benefits. Descriptive design survey was used to collect qualitative and quantitative data. Sample of 4150 participants were selected out of 40000 households through stratified sampling, simple random sampling and purposive samplings. Data collection methods used were questionnaire, interviews, focus group discussions and field observations. Communities are not full utilizing the forest resources, except extraction of firewood, get bush meat, white and brown ants, fish, wild berries, forest leaves, fruits, honey as well as mushroom. Challenges noted were deforestation, illegal logging, fire outbreak, lack land tenure and user rights, markets and poor negotiating skills, poor network infrastructures, of environmental psychology, and human and wildlife conflict. Forestry could offer employment opportunities to local communities and rural economic development. There is high inconsistencies in policy and legislation between land tenure and resource use rights. Recommended for access to forest resources through improved land tenure, strengthening forest management policies at local management of natural forest, and partnerships between smallholders or communities and commercial companies. Communities should aim to establish food storage and processing factories for fruits, honey, mushroom, as well as vegetables among others.

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Introduction

Mukherjee (2007) reviewed that food production and distribution specifically at micro level remains a challenge. Despite policies aimed at making food available to the vulnerable sections of society, food insecurity at the community level persists. Though the intensity and duration of the food insecurity periods may be different in different states, of the villages studied even in the best case scenario, people go food insecure for at least three months in a year.

Even if the food intake in the non-food insecure months is enough in quantitative terms, the quality of food and the consequent nutritional element are areas of major concern (Mukherjee, 2007) In order to address the food insecurity in the villages, Mukherjee (2007) ended by stressing the importance of the secondary food system. Secondary food from forests, water bodies and other microenvironments, the author stated that the consumption from this system increases during the months when the consumption of other food, particularly rice, is to be curtailed. Thus, food from the secondary food system substitutes food from the primary food system, particularly potatoes and rice, when these become too expensive for the poor villagers to afford.

Forests cover one third of the global land that is to say about 4.06 billion hectares of land which translate to about 0.5 hectares of forests per every person on the planet. According to the World Bank (2004), about 54% of the earths` forests are found in Russia, USA and China. According to World Bank (2004) forest resources help countries reduce food insecurity and poverty levels among people, they increase economic growth, help create employment, generate essential services that sustain key sectors such as agriculture, water and energy. FRA (2005) indicated that 11 million people were employed in the forestry industries in year 2000. Forests provide an important ` hidden harvest" for the rural population that is to say it keeps people out of extreme poverty. It is an important aspect of rural livelihood living near forested areas deriving as much as 22% of their income from forests resources according to FRA (2005).

World Bank (2004) further noted that forests produce more than 5000 types of wood-based products and generate an annual gross value addition of over US600 billion which is about 1% of the global GDP. Forests support rural economies in many countries and create jobs and wealth for populations with few alternative off-farm employment options. About three quarters of world's` food crops rely at least in part on pollination by insects and other animals and up to US577 billion worth of annual global production relies directly on pollinators (World Bank, 2004).

According to Tedesse *et al. (*2017) forests provide food, medicine, aromatic plants and plant products. They further provide bush meat, honey, beeswax, fruits, berries and nuts which are identified as main food products in most countries for example leaves in India, Cork in the Republic of Korea. Tedesse *et al. (*2017) added that about 180 million hectares of forests are used for social services, which include recreation, tourism, and educational research, religious and spiritual sites. According to the FRA (2005), 1.5 billion of world forests are mainly primarily for production of wood and non-wood products. Masiero *et al. (*2019) noted that forests serve important ecological functions that underpin Africa livelihood and national economies. Rural livelihood depends on natural products and fuel wood as primary source of energy.

Negash and Kelboro (2014) concurred that firewood and charcoal is one of the major forest provisioning services that is significantly used by most households in Africa. In Ethiopia, households depend on wood biomass for cooking and heating up to 81% of the population. Sunderlin (2008) noted that a greater portion of forest income goes on to support household through direct consumption rather than through cash sales. Forests` chief role for rural household is to provide energy security, a house and its furnishings, to contribute to food and nutritional security and to health. All these aspects of forest income reduce vulnerability of household to the unforeseen. Cavandish (1999) found out that in most developing countries of Southern Africa, 35% of Zimbabwe

households derive income from environmental products, 43.9% in Ethiopia and 22% in Zambia also derive income from forest products. Therefore, forest income share are higher for poor households.

The economic value of many other forest goods and services like environmental services, biodiversity and carbon sequestration go unrecognised by the market as a result, new mechanisms are needed to ensure effective forest management systems in some rural areas. Cavandish (1999) further noted that there is weak governance and that existing legal framework do not clearly give local communities control over their natural resources.

As a result, there is limited access to forest exploitation due to initiative policies of trying to ensure sustainable exploitation of forestry products. This has led to unlawful harvesting and logging activities, corruption, serious inadequacies in forest location, poor administration and monitoring as well as fraud at high levels. Therefore, the problem noted has been food insecurity and poverty among the rural communities despite the fact that the study area is surrounded with vast natural resources in the form of forestry. The research sought to evaluate the contribution of forest utilisation towards rural food security and economic development of Chipinge communities. It is against the background that the researchers sought to investigate the contribution of forest utilisation towards rural food security and economic development of Chipinge communities.

Research methodology

Research questions

i. What is the contribution of forests to rural livelihood strategies in food security and poverty alleviation?
ii. Which challenges are encountered in forest related livelihood strategies towards food security and poverty reduction?
iii. What are the food security and poverty levels among Chipinge communities?
iv. Which are the economic developments were contributed by forestry utilization?

Theoretical Framework

The theoretical framework used in this research was Forest Transition Theory. Marther (1992) used this theory to evaluate the contribution of forests to economic development of rural communities. The theory refers to a geographical reversal or turn around in land use trends for a given territory from a period of net forest area loss to a period of net forest area gain. It is based on empirical observation that, as income rises in poor countries, deforestation increases up to a certain point but tend to decrease (Commons Condition Trends). Reasons for this trends are relative price and scarcity that is to say as people may clear land to practise subsistence agriculture but as economic development increases, farmers may abandon land and migrate to urban areas with better economic opportunities. Marther (1992) further noted that the abandoned land, fields and pastures revert to forest due to both spontaneous regeneration and active regeneration or both. According to Aide and Grau (2004), forests after rural out migration have been considered to enhance the recovery of natural ecosystems and hence contribute to biodiversity conservation. Regrowth may also be a result of redistribution of labour resources from areas of low fertility to areas of greater fertility promoting regrowth in areas experiencing depopulation. Demand for forest products for example wood may create market incentives to plant more trees and effectively manage them thereby creating more forest regrowth. The theory also blames deforestation as the root cause of degrowth in developing economies. To this end, forests are considered as more important in conserving the environment, ensuring economic growth and improving peoples` lives. The research was conducted in Chipinge rural communities, the researchers used both positivist and intrepretivist paradigm approaches but largely remained qualitative because the approach provides high data reliability, openness and flexibility.

Research design, population and sample

In order to understand any phenomenon well, one needs to study it holistically and in depth. There is no single route or a particular method to knowledge.

Several routes are possible just as there are different ways of eating and different ways of worshipping. There are varied and multiple realities since different people in different circumstances or contexts would understand the same phenomenon differently. Also anything not understood in more than one way is not understood at all. Against this background, the researcher opted to use both positivist and interpretivist paradigm in this research whereby a descriptive design through a survey to gather both qualitative and quantitative data was used. Probability and non-probability sampling procedures were applied, through stratified sampling, the villagers were grouped into male and female, thereafter simple random sampling was used for each group. The targeted population was 40000 households, used both stratified sampling and simple random sampling to come up with a 2080 female sample and 1920 males respectively. Purposive sampling was used to identify 150 key informants, thereby bringing the total sample of 4150 participants.

Data collection methods, instruments and analysis

Questionnaires, interviews, focus group discussions and observation were used as the research methods and questionnaire guideline form, interview checklist, focus group discussion checklist and direct observation were used as the data gathering tools or instruments. These methods produced primary data where information was captured at the point where it was generated. Secondary data was collected through google scholar search of articles, journals, books and reports. The researchers did self-administer of the data collection instruments. Analysis started coding data according to the objectives of the study. The collected data was organised according to the themes that emerged from the response. This was an act of transforming data with the aim of extracting useful information and facilitating conclusions, and a research report was produced.

Results

Demographic characteristic of the participants

In this research, from a sample size of 4150 participants, 52% were female and 48% were males. Participants within the age group 41– 50 years constituted the highest percentage that is 27%, whereas the lowest age group (below 30 years) constitutes the lowest proportion (10%). Participants that reported to have attained no education and primary education generally possess higher FIKM, compared to those that have attained secondary education.

Table 1. Age characteristics of participants by percentage.

Age	Number participants		Percentage
group	Male	Female	(%)
<30	180	220	10
31 – 40	390	520	22
41 – 50	580	550	27
51 – 60	530	460	24
61+	310	410	17
Total	1990	2160	100

Table 2. Relationship of Education characteristics, Forest Indigenous Knowledge Management (FIKM), and Forest Indigenous Knowledge System (FIKS).

Education level	Number	Per (%)	FIKM (%)	Characteristic	FIKS level	Age group	Score (%)	Rank
None	940	23	75	Very low	0-20	<30	22	5
Primary	980	24	55	Low	21-40	31-40	31	4
Secondary	1320	32	35	Average	41-60	41-50	56	3
Tertiary – Diploma	740	18	20	High	61-80	51-60	79	2
Tertiary – University	170	4	15	Very high	81-100	+60	92	1
Total	4150	100						

In terms of linkages between age characteristics and levels of FIKS in forest resource management for participants, elders were ranked first in terms of having more Forest Indigenous Knowledge System while young participants were ranked fifth.

Contribution of forest rural livelihood strategies in food security and poverty alleviation

The research found out that 98.3% of the rural population of Chipinge still rely on wood fuel as their source of energy for heating and cooking while 1.7% have access to electricity or gas.

The participants also confirm that indigenous fruits harvested and sold at bus terminuses, a household averaging USD25.50 per month during the summary and autumn seasons. The fruits were consumed as raw, either as snacks or as dietary supplements and generally used for making beverages for example beer in the study area.

Table 3. The uses of different tree species in the rural communities.

Species	Use of food security	Use in improving livelihood
Muuyu (*Adansonia digitate)* African baobab	-oil from seed for cooking young leaves used as vegetables -fruit eaten as dried fruit -fruit juice made from fruit powder	-barks string used for weaving, bags and mats making -cosmetic oil from seed -baobab flavoured yoghurt
Mapfura (*scherocarya birrea)* Jelly plum	-fruit used for making wine production -oil from seed used for cooking	-marula oil,jelly butter -leaves used for feeding cattle -fruit relished by wildlife -wood used for making mortar
Musau (*Ziziphus mauritiana*) Chinese Apple	-fruits eaten fresh	-masau jam -masau dried strips
Muzhanje (*Uapaca kirkiana*) sugar plum	-fruits eaten fresh	-fruits used in jam production -fruits sold in informal urban markets
Muhacha (*Parinari curatellifolia*) Hissing tree/ Mobola plum	-cooking oil -fruits eaten fresh	-cosmetic oil
Mopane (*Colophospermum mopane*) butterfly tree	-host of edible worms	-commercial sales

Fuel wood is also the energy source for a range of small-scale home backed industries in rural areas like beer brewing, brick firing and roasting green-mealies for sale. Table below shows the percentage different energy sources by different class of people in Chipinge. There are three classes of family household found, rural rich, poor and extremely poor people. These villagers were classified according a percentage scale to number of meals a household have per day, assets and properties, number of wives and children, and variety of domestic animals a family have.

Table 4. Source of energy in the Chipinge rural communities in percentage.

Energy sources	Rural rich	Poor	Extremely poor
Electricity	66.0	0.9	0.2
Firewood	17.6	98.2	99.4
Gas	12.7	0.8	0.3
Others	3.7	0.1	0.1
Total%	100	100	100

Extremely poor who are the majority, 99.4% of their energy comes from forest resource as firewood, as they extract firewood from the forest. The research also revealed that different trees were utilised in different forms and in many varieties to produce food.

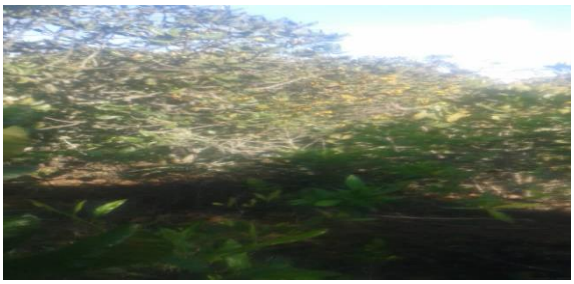

Plate 1. Indigenous forest where people harvest fruits including sugar plum *(Uapaca kirkiana)* and mushroom in Chipinge.

Most fruits that are gathered from forests and surrounding bush land, include Muzhanje *(Uapaca kirkiana)* sugar plum, Nzviru *(Vangueria infausta)* wild medlar, Matohwe (*Thespesia garckeana*) snot apple, Maroro *(Annona senegalensis*) wild custard-apple and Muuyu (*Adansonia digitate)* african baobab just to mention a few, the above photo reflects where the community harvest fruits, mushroom and medicine.

About 80% of participants indicated that they are always employment opportunities on temporary and permanent basis for every age group. Twenty percent indicated that most of the tasks being menial are labour intensive hence are reluctant to take them. Participants indicated that through the sale of non-timber forest products and timber products, they have been able to buy kitchen utensils, goats, school uniforms as well as buying agriculture inputs like vegetable seeds, as 65% of their sales is from forestry resources.

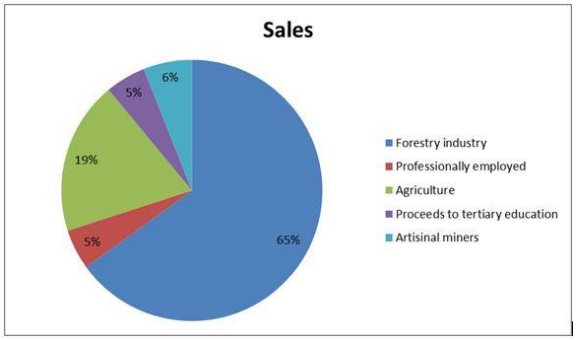

Fig. 1. Pie chart of income revenue prospects for most rural Chipinge communities.

The rural poor also derive benefits of grazing livestock in forest areas, it provide browse and fodder, whilst the animals provide manure and help breakdown residues which are critical for maintenance of ecosystem.

Challenges to full utilisation of forest resources for food security and poverty alleviation

It emerged less young people for the communities are employed by the forestry organisations, hence defeating the livelihood strategies to poverty alleviation. About 56% of participants indicated that while they do exist employment opportunities for both permanent and casual workers at all times in forest estates, the remuneration level remains very low so that it cannot break the poverty cycle to those living in generational and absolute poverty. There is deforestation that is slowing down poverty alleviation. It was noted that 78% of the participants agreed that to a certain extend mental and psychological issues were negatively affecting the full utilisation of the forest resources. From this research, the following causes emerged.

Plate 2. Deforestation in progress as people cut trees for farmland expansion.

- Expansion of farming land - About 60% of clearing of forests in Chipinge is mainly for agriculture purposes. As land degrades people are forced to transfer or vacate land and explore new forests borderlines thereby increasing deforestation.
- Illegal logging and fuel wood collection - It came out that 75% of logging activities do not necessarily cause deforestation, as the trees will coppice again, but can be destructive if it is illegal and selective. Logging in Chipinge is more intensive and has been above 80% destructive in most cases.
- Urbanisation - It was noted that Chipinge town is expanding due to growing population and urban infrastructures are demanding forest land. The key informants indicated that the past 5 years the town has consumed 1789 hectares of forestry land due to expansion.
- Fires - Fire is a good servant and a bad master meaning that they should not be an overreliance on the use of fire as a major tool for clearing forests for shifting permanent agriculture. Each year, veld fires in forests in the rural communities of Chipinge destroy thousands of hectares of forests and United State Dollars' worth of property losses.

Veld fires are a major setback in realising full potential of forests by rural communities. Forest area is burnt yearly, property worth millions of dollars, loss of lives and every year there is livestock losses, which is one of the measurement of rural people's wealth, major causes being arson and animal poaching.

About 82% of participants indicated that they lack land tenure and user rights to fully utilise forest resources to alleviate poverty while 18% have access to user rights. The research also found that communities lack markets negotiation power and skills when it comes to selling forests products and services. About 80% of participants bemoaned the poor state of road network in most rural areas of Chipinge districts while 20% indicated that some rural roads are fairly accessible. There is massive exploitation of local communities when it comes to negotiation and pricing as timber buyers have been able to get a 30 tonne truckload of timber worth US7500.00 for a paltry US1200.00 only.

Table 5. Fire area burnt and damages in the forest areas between 2011 and 2020.

Year	Number of forests fires	Area burnt (ha) per year	Loss and damage – Value of property and livestock, human death	Major cause
2011	63	1542	$1.8m, 12 animals, 1 live	Arson, hunting
2012	67	1780	$2.2m, 18 animals,	Arson, hunting
2013	59	1423	$1.4m, 6 animals,	Arson, hunting
2014	40	1233	$1.9m, 8 animals, 2 lives	Arson, hunting
2015	35	921	$0.7m, 14 animals,	Arson, hunting
2016	43	1323	$1.2m, 16 animals, 1 live	Arson, hunting
2017	58	1345	$1.6m, 10 animals,	Arson, hunting
2018	38	1023	$1.2m, 4 animals,	Arson, hunting
2019	53	1398	$1.7m, 6 animals, 3 lives	Arson, hunting
2020	46	1244	$1.5m, 7 animals,	Arson, hunting
TOTAL	502	13232	USD$15.2m, 101 animals, 7 lives	Arson, hunting

Ninety percent of participants indicated that there is competition for resources with formal sectors while 10% have been contracted as out growers. Only 10% indicated that there is lack of social corporate responsibilities by established forestry organisations in communities areas they operate. They rightfully or wrongfully accuse these organisations of failing to plough back to the community.

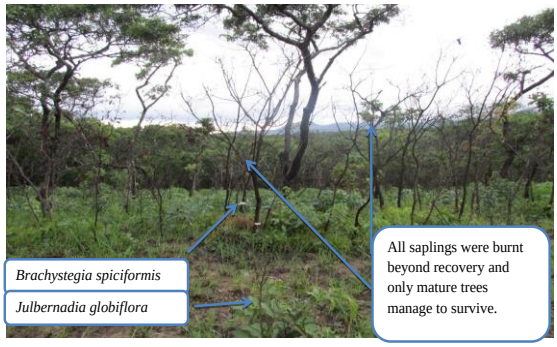

Plate 3. *Brachystegia spiciformis* and *Julbernadia globiflora* burnt beyond recovery

Plate 4. Forest woodland where the illegal timber buyers extract timber.

Food security and Poverty levels and causes of poverty in Chipinge district

The interviews, questionnaires and focus group discussions revealed that 93.3% of the people are living in the poverty zone. Majority 80% attributed this to lack forest resources utilisation as there are not in control or management of the forest woodland and resources. The other 20% attributed to poor and slow rural development as there is insufficient access to markets in urban and neighbouring countries. Poverty levels vary from Ward to Ward; poverty is most prevalent in Ward 30 where it is estimated to stand at about 93.3% and is least prevalent in Ward 5 where it stand at about 65%. Households in Ward 30 live in extreme poverty despite the existence of some natural indigenous plantations around them.

Poverty was also blamed on droughts and natural disasters like floods, earthquakes and hailstorms. More than 50% of participants indicated that they have lost substantial livelihood assets and capital goods to natural disasters.

Poverty was also being accelerated by rampant disease outbreak like cholera and malaria among others. Approximately 26% of the rural population were affected by cholera in 2008 in areas around Tongogara and Chibuwe. About 10% of participants indicated that there is shortage of health facilities and awareness campaigns among factors causing health challenges.

Contribution of forest on economic development of rural communities

It emerged that they are always up to 90% formal and informal employment opportunities at any time of the year in the forestry sector. There is opportunity to increase the household income through sustainable utiilisation of the forest resources in the Chipinge communities. Currently, forest revenue is contributing up to 15-20% of household total income per annum in high forested areas like ward 2 while making up to 8-10% of total household income in less forested areas like Chipinge South. In some rural areas of Chipinge, ward 30 and 2, forestry has resulted in infrastructure development to the advantages of the poor households. In ward 30, proceeds from CAMPFIRE projects have been used to build roads, clinics and establish Mahenye secondary school which brought relief to pupils who were travelling more than 15km to school. In ward 2 a forestry organisation has also build a school, a clinic ,a grinding mill and constructed an weather access road that links it with the rest of the surrounding communities, a processing factory for honey which added value to forest products.

Discussion

Demographic characteristic of the participants

In general, the community has a low level of education including young age group lack forest indigenous knowledge systems (FIKS). The small proportion of people with secondary and tertiary education reflects the fact that most of the people with secondary or higher education migrate to urban areas in search of employment. Forest indigenous knowledge management (FIKM) level progressively decreases among those in the secondary and tertiary categories. This suggests that modern knowledge system tends to replace indigenous knowledge system as people acquire more education, hence a probable disregard for indigenous knowledge as modern knowledge increases.

The level of FIKS was based on scores relating to knowledge of traditional forest management systems that are practiced, those that have been abandoned and explanations for their abandonment, perceptions, number of traditional crops grown, justification for this, as well as indigenous trees known and managed. Elders of the community possess greater FIKS than lower age groups. This gives an indication of a knowledge gap between age groups and hence a gradual loss of IKS in forest management. As highlight by literature, natural forests are home to human evolution and human population that have lived for years at relatively low level of socio-economic development. Forests often serve as an employer of last resort for economically marginalised people. Byron and Arnold, 1999) identified three categories of forest dwellers which are Hunter and gatherers, Swidden cultivators, farmers living adjacent to forest including artisan, traders, small entrepreneurs and employers in forest sector. Regardless of their economic value, forests are one of rural areas most mishandled resource. Many rural areas with substantial forest resource has been subjected to deforestation.

According to Rameisteinner and Simula (2013), a global deforestation rate of 10 million hectares per annum has been recorded. This high rate of deforestation is attributed to overgrazing, unmitigated shifting cultivation, infrastructural development like the construction of road, dams, hydro-electrical installation, anthrophonic fires as well as the effects of climate change all negatively impact on forests. Sunderlin (2008) cited deforestation as a result of lack of empowerment of communities over forest resources. Anold (2001) estimated that each year about 13 million hectares of land are destroyed to clear land for cultivation and other activities and Africa continues to lose about 0.7% of its forest cover per year due to deforestation due to lack of education and tradition indigenous knowledge.

Contribution of forest rural livelihood strategies in food security and poverty alleviation

The existence of both natural and exotic planted forests in Chipinge offers an opportunity for the rural people to change their lives if they are able to fully utilise forest resources for their benefit. Most households being poor lack access and affordability of electricity, gas, and solar as alternative sources of fuel. These findings concurs with what Negash and Kelboro (2014) posits that firewood and charcoal is one of the major forest provisioning services that is significantly used by most households in Africa. Fuel wood is also the energy source for a range of small-scale home backed industries in rural areas like beer brewing, brick firing and roasting green-mealies for sale. The rural communities eat edible products like fruits, seeds resin root, tuber and leaves are used in making alcoholic beverages. Rural poor of Chipinge also utilise wild leaves, fruits and mushroom which are consumed fresh or dried. Tedesse *et al. (*2017) also observed that in countries like Uganda, bush meat, white ants, wild berries, forest leaves and vegetables are among forest products utilised by the poor. It also emerged from the study that non-timber forest products collection and utilisation was results in cash saving. Cavandish (1999) concurred that the magnitude of the cost is greater to poor households than for wealthier households simply by virtue of the reduced total income sources and sizes of poor households. This alleviates some cost that the government would incur had it to provide these services in rural areas. Resultantly, the government has a vested interest in involving the sustainable supply and use of forest resources.

The research also highlights that forestry resources provides a safety net for the poor up to 50%.This refers to the role of forest assisting households cope in times of adversity and sudden shock or sudden change in the economy, social, climatic and environment in which they exist and function. Mutenje *et al. (*2010) indicated that non-timber forest products constitute an important source of livelihood in times of hardships and a provides a safety net, afford social, cultural and spiritual benefits to rural communities. According to findings from this research, communities and households identify and reserve certain sacred sites within forest and woodlands and these sites are used for traditional ceremonies like rainmaking and appeasement ceremonies. Notable examples found in this study are Chirinda forest, which is a sacred reserved site and "Gwasha reNgaone" which is used for rainmaking "Makoto", initiation ceremonies, prayer and fortune telling among others. Tedesse *et al. (*2017) agreed that about 180 million hectares of forests are used for social services, which include recreation, tourism, and educational research, religious and spiritual sites.

Challenges to full utilisation of forest resources for food security and poverty alleviation

It was unfortunate that the participants accuse the forestry organisation operating in the communities of deliberately underpaying workers given the current economic hardships in the country. This points to why communities living around forest areas remain in state of poverty. The environmental psychology issues were also a major challenge as there was lacking of transaction between human and environment. The mutual influences as effects of human behaviour on environmental quality and effects from environment on human well-being and behaviour are not full utilised. Proshansky and Fabian (1987) indicated that environmental psychology and to a lesser extent, social psychology teaches that individuals, groups, and still larger aggregates of people change in the patterning of their physical, biological, social, and cultural characteristics over time. This life-cycle approach can be applied with equal success to the physical settings that define people's day-to-day lives (Proshansky and Fabian, 1987). Conceptualizing the changing character of physical settings over extended periods of time requires that the people in their mind be very sensitive to and fully informed about the processes of human development and how they can sustainable utilise the forest resources for rural food security and economic development (Proshansky and Fabian, 1987). The clearing of forests area for agriculture purposes, remain a high cause of deforestation in the area.

This findings relates well with what Broadley (1994) highlighted on deforestation, that it is a major drawback to local communities because the economic value of many goods and services like environmental services, biodiversity and carbon sequentration go unrecognised by the market. Veld fires has been destroying the forestry each year, resulting in huge losses of potential revenue thereby continuing to perpetuate a state of poverty existence among rural poor. Rameisteinner and Simula (2013) indicated that anthrophonic fires negatively impacts on forests.

The lack of markets is rips communities of potential revenue to take them out of the poverty cycle. FRA (2005) reviewed that lack of access to markets and marketing skills among rural players. Lack of social responsibility and no local empowerment initiatives being done by the forestry organisation. This is defeating the need to economically empower the local community so as to alleviate poverty in the area. These findings do concur with to FRA (2005) findings that in most organisations there is greater emphasis given to formal sector creation of employment as opposed to facilitating and supporting informal sector development. There is failure to build on local skills and initiatives in finding new projects that empowers the local. As a result communities continue to exist in poverty.

Food security and Poverty levels and causes of poverty in Chipinge district

Poverty being a multidimensional phenomenon has numerous causes depending with the socio-economic, political and environmental conditions prevailing at a particular location. Ward 30 is the most poverty hard hit because of its dryness as well as its poor road and other infrastructure facilities that are required by rural communities to improve their standard of living. Ward 5 is the lowest hit as it covers areas around Chipangai irrigation schemes and is also accompanied with good road network and mobile network hence low level of poverty than compared to other wards that are geographically inaccessible. Ward 2 is endowered with vast natural and planted forests hence its low levels of poverty compared to other ward like ward 27. Mutenje *et al.* (2010) suggested that remoteness, low production and mountainous terrain present formidable barrier to development even beyond typical poverty situation. For these families, forestry resources can provide a safety net and it is in these critical periods that the importance of forests is greatest. Poverty is caused by lack of infrastructure especially sufficient roads that would increase access to markets. Mutenje *et al.* (2010) indicated that poor infrastructure hinders communication resulting in social isolation among rural poor many who have limited access to media. It hinders integration with urban society and established markets, which can result in greater development and economic security. Natural disaster have also not spared the Chipinge communites, the district has been hit by cyclones and droughts living the community people in a very poverty state without food and properties in some instance. Anold (2001) indicated that an excess of 4.1 million of Zimbabweans face food insecurity and malnutrition due to drought.

Contribution of forest on economic development of rural communities

As the results reflected that, there are great employment opportunities in forestry activities, prospects of employment are pinned on forestry organisations and informal forestry activities. These employment opportunities allows members to become productive members of society especially school leavers and those who fail to proceeds to tertiary level due to different challenges. Broadley (1994) indicated that more than 13000 are employed in the forestry industries. This research greatly basing the definition of employment on FRA (2005) which puts it any type of work performed or services rendered under a contract or hire with written or oral agreement in exchange for wage or salary, in cash or kind. Therefore, the level of employment is an indicator of both its social and economic value of the sector. On forestry revenue to the household, the results revealed that at least 4% of rural household are engaged in selling one or more forest products such as charcoal, fruits, honey and mushroom. They are at least 350 people involved in craft industry

especially in Chipinge South, with Broadley (1994) concurring that rural communities of Chipinge such as Mutema get as much as up to 40% household income from basketry.

However, it came out clearly that more could be done on social responsibility by the surrounding forestry organisation including training of local people in firefighting, nurseries establishment and management, planting and management of species as well as sustainable harvesting. Lin (2017) defined economic development that, it is a process by which a nation improves its economic, political, social wellbeing of its people through focus on skills, innovation and infrastructure, thereby regards the above activities forestry would contribute to food security and economic development of Chipinge rural communities.

Despite the fact that the country is a party and has rectify some of the international convention, the rural communities have not seen progress on the implementation and benefits of the convention of making the communities sustainably utilise the forest resource to address food security and economic development. According to Sahn and Stiffle (2003), climate change is aggravating some challenges to rural livelihood resilience strategies that are being employed as a buffer against shocks and stresses in the face of harsh climatic conditions.

Table 6. International Environmental Conventions of which Zimbabwe is either a party or has ratified.

Convention	Party	Ratified
Cartegena protocol on bio-diversity	√	
Convention on world cultural and natural heritage	√	
CITIES		√
UN Convention of the law of sea		√
Veinna Convention for protocol of ozone layer		√
Montreal protocol on ozone layer		√
UN convention on climate change(UNFCC)	√	
Kyoto protocol		√
UN Convention on bio-diversity(CBD)	√	
UN Convention on drought and desertification	√	
Rammar		√

Anold (2001) maintained that forest authorities often lack the dimension to implement policy reforms and programme like the use of extra budgetary financing satisfactorily. Despite significant resource flow, international concern and political pressure, a combination of market and institutional failures has led to forests failing to realise its full potential to reduce food insecurity, alleviate poverty and promote economic development (Anold, 2001)

Table 7. Summary of challenges on utilisation of forest.

Focus area	Challenges
Land, resource, tenure access	-insecure tenure or access rights to land and forest resources. -state and private enterprises not allowing harvesting of natural resources on land -weak and eroding institutional control of forest resources.
Competition for land and resources	-potential competition between domestic and commercial forested land resources -competing use of specific land use or undermining local group initiatives and management practises -biodiversity and water yields impact further development of commercial plantations
Markets and marketing	-insecure or distant markets -non- existent or weak marketing skills among the rural player
Knowledge and skills	-extremely low education and skill base of rural user entrepreneurs and job seekers -poor local and scientific knowledge regarding management harvest level of many species
External intervention	-failure to build on local skill and initiatives in favour of finding new projects and organisation structures -greater emphasis given to formal sector -employ creation as opposed to facilitating and supporting informal sector development -excessive bureaucracy and regulation in establishing small scale -failure to recognise and build upon the fact that rural household engage multiple livelihood strategies -insufficient capital to develop small scale initiative

FRA, (2005) also provided a summary overview of main features of the relationship between forest output and livelihoods and ways they are utilised for development of rural poor.

Table 8. Summary overview of main features of the relationship between forest output and livelihoods.

Livelihood input characteristic	Impact of change
Subsistence and cultural: forest are integral of peoples` social and cultural framework for forest dwellers -for people who survive on agriculture, forest product supplement inputs of fuel wood, medicinal plants -forests are important in filling seasonal and other food gaps especially staple diet, vitamins and proteins.	-forests impact becomes very important where households income declines
Agricultural inputs: forests provide rational starting agricultural protection. -no farm trees provides shade , windbreaks and contour farming -forest provides low cost nutrients.	-trees can become increasingly important as a low capital means of compacting site productivity and as a low cost means of keeping in productive use.
Income: forest help to diversify farm household income and provides counter seasonal sources of income in hard times. -forests provide a more permanent basis for more full time and higher return activities usually associated with higher skill and entry demand.	-they contribute to reduce household vulnerabilities -such activities are likely to prosper saving urban and rural markets.

According to the Sahn and Stiffle (2003), there is high inconsistencies in policy and legislation between land tenure and resource use rights and Acts in forestry, forest produce, traditional leaders, parks and wildlife, and environmental management. Communities in communal lands do not legally own the land which they occupy. Although the desire in Community Areas Management Programme for Indigenous Resources (CAMPFIRE) is to give the rural communities the full responsibilities to manage wildlife and other natural resources at their local level, communities cannot enter into any contractual agreements involving land without the authority of RDC (Anold, 2001). This impairs community decision making which needs to be continuously sanctioned by the council. They are no adequate provisions to safeguard long-term community investment.

Broadley (1994) noted that human and wildlife conflict, which is a serious challenge in the participatory conservation programmes such as CAMPFIRE, and constitute a big cost to communities and it is likely to remain so for a long time.

Conclusion

The researchers concluded that despite having vast forest resources, Chipinge rural communities are failing to utilise forest resources for rural food security and economic development. Communities are failing to benefit forestry resources so as to break the poverty cycle. There is need for the use forest transition theory, in addressing the inconsistencies in policy and legislation between land tenure and resource use rights, and environmental psychology issues. The mutual influences, effects of human behaviour on environmental quality and effects from environment on human well-being and behaviour are not full utilised.

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References

Aide TM, Grau HR. 2004. Globalisation, migration, and Latin America ecosystem. Journal of science **305,** 1915-1916.

Anold JM. 2001. Role of Forestry in Poverty Alleviation. Introductory note to the FAO/DFID International Forum on the role of Forestry in Poverty Alleviation September 2001. Cortevechia, Italy.

Broadley DG. 1994. Reptiles of Chirinda Forest. Forest Commission. Harare

Cavandish W. 1999. Poverty, Inequality and environmental resources: Quantitative analysis of rural households`` Centre for the study of African Economics (CSAE) Paper series, paper 93.

FRA. 2005. Global Forest Resource Assessment: Towards Sustainable Forest Management, chapter 7 pp107-110.

Lin Nan. 2017. Building a network theory of social capital. Social capital, 2017, Taylor and Francis Group, Routledge

Marther M. 1992. The Forest Transition Area **24,** 367-379.

Masiero M, Pettenella D, Boscolo M, Barua SK, Animon I, Matta JR. 2019. Valuing forest ecosystem services: a training manual for planners and project developers. Forestry Working Paper No. 11. Rome, FAO. 216 pp. Licence: CC BY-NC-SA 3.0 IGO.

Mesele Negash, Girma Kelboro. 2014. Effects of Socio-Economic Status and Food Consumption Pattern on Household Energy uses: Implications for Forest Resource Degradation and Reforestation around Wondo Genet Catchments, South-Central Ethiopia. Eastern Africa Social Science Research Review **30(1),** 27-46 DOI:10.1353/eas.2014.0001

Mukherjee A. 2007. Micro-level food insecurity in contemporary India: perspectives of the food insecure. Eldis. United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) unescap.org/

Mutenje MJ, Ortmann GF, Ferrer SRD and Darroch MAG. 2010. Rural livelihood diversity to manage economic shocks: Evidence from south-east Zimbabwe. Agricultural Economics Research. Policy and Practice in Southern Africa **Vol. 49 (3)** 20 10. Agricultural Economics Association of South of Africa pp 338-357

Neil Byron, Michael Arnold. 1999. What Futures for the People of the Tropical Forests? World Development **27(5),** 789-805

Proshansky HM, Fabian AK. 1987. The Development of Place Identity in the Child. In: Weinstein C.S., David T.G. (Eds) Spaces for Children. Springer, Boston, MA. https://doi.org/10.1007/978-1-4684-5227-3_2

Rameisteinner E, Simula M. 2013. Forest certification-an instrument to promote sustainable forest management, Journal of Environmental Management **67,** 87-98.

Sahn D, Stiffle D. 2003. Urban-Rural Inequality in Living Standards in Africa Journal of Economics **12(1),** 564-97.

Sunderlin WD. 2008. Why forests are important for global poverty alleviation. Oxford University Press. New York.

Tadesse Z, Kelbessa E, Bekele T. 2017. Floristic composition and plant community analysis of vegetation in Ilu Gelan district, West Shewa Zone of Oromia region, Central Ethiopia. Tropical Plant Research **4(2),** 335-350

World Bank. 2004. Sustaining forests. A development strategy. Washington. D.C. World Bank.