

Encroachments and Deforestation in Uganda: A Case of West Bugwe Central Forest Reserve, Busia District

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Abstract: The central forest reserves in Uganda are open access loosely guarded by ostensibly ill-enforced Uganda Forestry Policy 2001. Conflict of interest amongst the stakeholders led to their devegetation by the local communities engulfing them exemplified by their immense encroachments in the country. A study of 225 households in the proximity of West Bugwe Central Forest Reserve (WBCFR), Busia district revealed that fuel wood collection and extraction of construction materials had gone beyond the legally accepted reasonable quantities hence instrumental to deforestation there was a high/strong relationship at $r = 0.66$ at a 0.05 level of significance between the Bulumbi sub-county local communities and the Busitema sub-county local communities' perception on illegalities leading to deforestation of WBCFR, Busia district, charcoal burning as an illegality destined to Busia conurbation as was detrimental to the conservation of WBCFR, Busia district and none of the strategies the NFA officials adopted to curb deforestation viz. strict supervision, imprisoning encroachers, mass sensitization, reforestation and trustworthiness was statistically significant at $df = 2$ at $0.01 = 9.210$. Researchers therefore recommended that there was a need to accommodate the local communities in the management of WBCFR in their proximity through collaborative forest management to avoid administrative conflicts in this area. Through this, NFA should introduce participatory monitoring, evaluation and effective sensitization to avert the ineffectiveness of strict supervision and imprisonment.

Key words: Collaborative forest management, domestic uses, forestry policy 2001, illegalities, local communities

INTRODUCTION

The first forest reserves in Uganda were gazetted in 1932 facilitated by policies and laws put in place by the colonial government. The boundaries as the forest estates more or less as they stand currently were established in 1940s (Hamilton, 1984; Mupada, 1997). Some of these reserves were established through the Uganda Memorandum of Agreement (Forest) 1907 and the Forest Ordinance 1913 such as the Toro Agreement 1900, Ankole Agreement 1909 and later Bunyoro Agreement 1933 (Hamilton, 1984). These agreements were ostensibly quasi-legal hence not understood by the local communities torching the forest reserves they affected and elsewhere in the country.

Kantwi (2001) reported that the colonial governments viewed the reserves as established projects where traditional systems of resource management were

criminalized and referred to as customary laws giving room to more civilized, scientific management by the state. Many researchers asserted that the independent states inherited the system of state ownership of all resources continuing the colonial tradition (Hamilton, 1984; Loeffler, 2000; Mugenyi *et al.*, 2005). This therefore arbitrarily placed these valuable resources in the hands of the powerful and as far as possible excluded the silent local communities in their proximity who were the majority.

Many writers agree that it was possibly clear that forest management in pre-colonial Uganda was communal and forests were used as an open access resource. People utilized them for wood and non-wood forest products. They were a cultural asset within a Kingdom thus, communally managed in the contest of the existing political and cultural institutions at the time (Bikaako-Kajura, 2002; Mugenyi *et al.*, 2005; Kamugisha-Ruhombe, 2007; NEMA, 2008). Besides that

some elders, through divinations also provided guidance on natural resource utilization and control. Above all to show the intricate relationship some cultures viz. Banyoro, Baganda, Acholi, Akarimajong planted trees to mark the birth of a child (NEMA, 2008). This ascertained compliance with unwritten rules which were apparently legitimate compared to the current forest policy.

The Central Forest Reserve's (hereinafter referred to as CFR) encroachment in Uganda dates back in the colonial times especially in 1951 where people attempted to go back to Mabira Forest after eradication of mbwa flies (*Simalium damnosum*) making life attractive in the reserves. These could be envisaged in South Ankole (>100 people) East and West Mengo (245 people); Kadam Central Forest Reserve (400 people) and several others (Webster *et al.*, 2003). Despite all these Mugenyi *et al.* (2005) claimed that these illegalities were not serious problems before the 1960s. In the post independence Uganda, it started during the politically turbulent 1970s and continued up to early 1990s (Kamugisha-Ruhombe, 2007; NEMA, 2001; Mugenyi *et al.*, 2005). Mupada (1997) added that the 1970 Forest Policy stressed timber production, harvesting and utilization and under played the conservation requirements and the need for participation of local authorities. Thus, given the anarchy that existed in the country by then encroachment was opened with some impunity.

Post independence encroachment in Uganda has its genesis from the then president of Uganda Iddi Amin who called for people to double their production following the departure of the Asians in 1972 and the declaration of economic war. This officialised encroachment in the country by then (Hamilton, 1984). Characteristically, the regulated communities are always meekly skewed towards political allegiance and personalities. Uganda's current president, Yoweri Kaguta Museveni has always directed the NFA to stop all evictions which has always been a set back, worsened by there being no clear guidelines on evictions, resettlement and compensation of culprit. Thus, many people have made their ways back to the CFRs in large number (Tenywa, 2007).

The 1988 forest policy was crafted in a bid to stamp out encroachment in the CFRs. This policy stressed on forest conservation, research, agro-forestry and extension services (NEMA, 2001). Besides that, NEMA (2001) also reported that in 1991, the government consequently evicted all encroachers from gazetted forests and cancelled all land titles issued for lands within the forest estates between 1971 and 1986. Most CFRs were resurveyed, boundaries re-opened and demarcated (NEMA, 1999a, b, 2001). Nsita (2006) claimed that after

demarcations and evictions the National Forestry Authority (hereinafter referred to as NFA) embarked on planting the formerly encroached land with indigenous species of trees. This echoed the planting of musizi tree species (*Maesopsi eminii*) on hitherto encroached cleared forest land of about 500 acres in West Mengo forests (Webster *et al.*, 2003). Many authors agreed that competitive 2006 presidential elections thwarted this noble course and drew the country to the 1970s to 1985 conditions (Nsangi, 2006; Nsita, 2006; Tenywa, 2007; Temmerman, 2007; Natusiimira, 2007; Kamugisha-Ruhombe, 2007).

The February, 2006 Executive Order halting evictions led to spontaneous increase of the number of encroachers from 170,000 to >300,000 (Watasa, 2009). The presidential ban on evictions like any other has been misinterpreted by the encroachers to mean permanent settlement into the CFRs (Siminyu, 2009; Watasa, 2009; NEMA, 2001; Hamilton, 1984). Siminyu (2009) claimed that the encroachers assaulted, abused, bit up and even killed some NFA officials with impunity. They have gone further to destroy equipments such as vehicles, indiscriminately cut down trees and burnt forest reserve (Natusiimira, 2007).

The following also rose up in the CFRs as result of the February, 2006 Executive Order in Uganda; houses built from 34,800-42,476 livestock from 133,903-163,362 while areas under cultivation increased from 56,200-68,609 ha within a year (Temmerman, 2007). Temmerman (2007) also added that the encroachers discouraged commercial timber plantations in South Busoga CFR by deliberately grazing, setting fires to the planted areas and even directly uprooting tree seedlings in the reserve. In case of attempting normalcy by NFA, they petition the President and the Speaker about harassment by NFA using the Executive Order.

West Bugwe Central Forest Reserve (hereinafter referred to as WBCFR) an epitome of government forestry in Uganda was in the verge of devegetation through encroachments save for the forest estate yet rich in biodiversity though small in area. The researchers were out to:

- Assess the impact of domestic uses of the forest resources on deforestation of WBCFR
- Busia district
- Establish illegalities practiced by the local communities living adjacent in WBCFR, Busia district
- Assess the strategies taken by NFA on curbing illegalities in WBCFR, Busia district

Description of the area of study: WBCFR is a small forest reserve (31 km²) with an altitudinal range of 1113-1235 m located between 00°30'-00°33'N and 30°56'-34°05'E in Busia district covering parts of the following parishes; Bubango, Bulumbi and Busitema. The first two parishes are within Bulumbi sub-county and Busitema in Busitema sub-county. It comprises three blocks viz. Amonikakineyi (Busitema parish), Sidimbire (shared by all the parishes) and Sitambogo (Bubango parish) (Davenport *et al.*, 1996). The area receives a total annual rainfall of about 1080 mm with two rainy seasons; a mean annual maximum temperature of 28.7°C and a mean annual minimum of 16.2°C (Meteorology Department cited in NEMA, 1999a). It has ferrallitic soils and deep sandy loams (Lands and Survey, 1967). This therefore makes the area favourable for vegetation growth manifested in the savanna forest reserve much less in woody species except for *Mvule Melcian Excelsa*. The forest reserve is generally medium altitude moist semi-deciduous with broad-leaved grass susceptible to fire. NEMA (1999a) added that the forest has thorny shrubs as *Capparies Erythrocarpus*, *Toddalia Asiatica*, *Harrisonia Abyssinica* and *Antiaris Toxicaria*. The neighbourhood of the area is predominantly agricultural at subsistence level growing; finger millet, maize, sorghum, cassava, sweet potatoes, beans, groundnuts and cotton-major traditional cash crop. Besides the following animals were kept for both consumption and commercial purposes; cattle, goats, poultry and sheep (NEMA, 1999a). NEMA (1999a) added that there was gold mining at Tiira in Busitema sub-county discovered and production started in 1937.

MATERIALS AND METHODS

This was a case study conducted through a cross-sectional survey research design. It was concerned with determining the effectiveness of NFA's strategies as lead agency in forestry on enforcement of forestry policy at WBCFR, Busia district. Ideally, issues are appropriately investigated using a cross-sectional survey research design. The design enabled the researchers to obtain information that described existing phenomena with respect to one or more variables (Mugenda and Mugenda, 2003). Given its nature as viewed by many authors including the researchers, triangulation was used (Gay *et al.*, 2009; Bailey, 2007; Amin, 2005; Morse and Richards, 2002; Nachmias and Nachmias, 1987). A total of 225 respondents participated randomly selected from the neighbourhood households of WBCFR. This number especially of the households was chosen in line with Krejcie and Morgan sampling size for research activities determination table (Amin, 2005). There was also

triangulation of sampling techniques thus both probability and non-probability sampling techniques were concurrently used (Bailey, 2007; Amin, 2005). The techniques applied were stratified sampling, snowballing, purposive sampling and convenience sampling techniques.

Researchers used questionnaires, interviews, observation and document analysis as the main tools for collecting data. The researchers were mainly concerned with views, perceptions, opinions, attitudes and behaviors of the respondents. Most authors including the researchers agreed that such information could be best collected using the given tools (Bell, 1999; Cauvery *et al.*, 2007; Oso and Onen, 2005). The percentage distribution technique was used to show the particular frequencies of respondents preferring a particular alternative to give the face value implications of encroachments on deforestation of WBCFR. Statistical Package for the Social Sciences Version 10 was used given the number of respondents and carrying out cross tabulations which cannot be done either manually or using Excel (Fisher, 2007; Freankel and Wallen, 2008). A Spearman correlation analysis was done to establish the relationship between the local communities' in both Bulumbi and Busitema sub-counties' perception on illegalities leading to deforestation of WBCFR, Busia district. The χ^2 -test for goodness of fit was used to analyze the frequencies in line with the research questions (Kothari, 2004; Oso and Onen, 2005).

RESULTS AND DISCUSSION

The characteristics of the household respondents in relation to encroachment of WBCFR, Busia district were as in Table 1. From Table 1, it was clear that the respondents were male dominated given by more than two thirds of the households (78.7%). This reflected the male African societal dominance amongst most house holds in the rural settings. Thus, males take most decision within the households (Otieno *et al.*, 2012). The respondents' mean, mode and median ages were beyond 18 years, age of consent in the Ugandan constitution hence authenticated the results of this research (The Republic of Uganda, 2003). More than half of the respondents were married (59.1%) with more than three quarters of them (88.9%) having dependants ranging from one dependant to >10 dependants. The dependency syndrome could have provided an impetus of viewing the forest reserve in their proximity as a point of eking life. This could have been in line with Simon (1981)'s assumption that man is a resource utilizing animal. This therefore explained why WBCFR, Busia district was deforested.

Table 1: Socio-demographic characteristics of the household respondents engulfing WBCFR, Busia district (n = 225)

Characteristics	Number	Percentage
Gender		
Male	177.0	78.7
Female	48.0	21.3
Age		
Mean	33.5	-
Mode	26.4	-
Median	31.0	-
Marital status		
Married	133.0	59.1
Single	71.0	31.6
Divorced	11.0	4.9
Widowed	10.0	4.4
Dependants		
0	25.0	11.1
1-4	114.0	50.7
5-9	67.0	29.8
10 and over	19.0	8.4
Educational background		
None	55.0	24.4
Primary	57.0	25.3
Secondary	106.0	47.1
Post secondary	7.0	3.1
Occupation		
Peasantry	117.0	52.0
Civil servants	53.0	23.6
Business	13.0	5.8
Casual work	17.0	7.6
Students	25.0	11.1
Parish of residence		
Bubango	78.0	34.7
Bulumbi	73.0	32.9
Busitema	74.0	33.9
Block in WBCFR of proximity and ancestry		
Sitambogo	26.0	11.6
Sidimbire	128.0	56.9
Amonikakineyi	23.0	10.2
None	48.0	21.3

Table 1 shows that slightly more than three quarters of the respondents (75.6%) had attained some form of formal education. In this slightly more than a quarter (25.3%) had basic education and close to half (47.1%) had secondary education. This was an enlightened population which could ease the compliance and enforcement of forestry policy 2001 in the area so as to conserve WBCFR, Busia district. Slightly more than half (52.0%) the households were peasants and only slightly close to a third (29.4%) of the respondents had fairly stable occupation that give room for full engagement in forest resource exploitation viz. civil servants and business persons. This therefore, made most of the respondents susceptible to a drive into eking a living from the forest resources utilization at any cost given the gestation period of farming products comparatively.

All the respondents were from the parishes torching WBCFR, Busia, district viz. Bubango (34.7%), Bulumbi (32.9%) and Busitema (33.9%) (Table 1). These were within Bulumbi (for the first two parishes) and Busitema (for the last parish) sub-counties of Busia district. Table 1 shows

that more than half (56.9%) of the respondents were close to Sidimbire block and generally 78.7% claimed both proximity and ancestry of the three blocks of WBCFR, Busia district. This justified the arbitrary gazettement of the forest reserves country wide (Mugenyi *et al.*, 2005). Attesting the arbitrary gazettement notion was the etymology of the names given to the blocks which had a connotation of no consultations with the local communities currently in their neighbourhood.

Domestic uses of the forest resources and deforestation of West Bugwe Central Forest Reserve, Busia district:

The current Forest Act No. 33 and 34 allows for collecting of either dry wood or bamboo from the forest reserves without compromising the sustainability of the CFRs (The Republic of Uganda, 2003). WBCFR was therefore exploited as in Table 2.

Table 2 shows that fuel wood was the most highly used forest resource from WBCFR by more than two thirds (71.1%) of the households engulfing the forest reserve. Bubango parish was the highest consumer of fuel wood at 79.5% while Busitema was the lowest consumer at 63.5%. The 71.1% utility of fuel wood was slightly below the national which stood at 90% in the rural households (Mwebesa, 2000). Fuel wood was preferred for it was cheap, accessible and consumed using simple technology with inexpensive equipments compared to other energies such as electricity. The technology was as simple as merely using three stones. This was in line with a postulation that it is the main source of heat and cooking to approximately half of the world's poor populations, Uganda inclusively (Salvage, 1982).

Through observation it was clear that local communities living adjacent to WBCFR collected the firewood and destructively distilled the fuel wood to produce charcoal for both domestic and commercial purposes. The fuel wood was marketed in trading centres and towns of Busia, Tororo, Iganga, Bugiri and exported to Busia, Kenya. This commercialization of fuel wood was contrary to reasonable quantity allowed by the 2003 NFTP No. 33 (The Republic of Uganda, 2003). This makes the users cut more than the forest can re-grow besides permanently destroying trees or shrubs that have survived for long. Therefore due to demand in ever increasing market fuel wood collection was detrimental to conservation of WBCFR, Busia district.

Less than a quarter of the respondents (13.3%) agreed that the forest reserve provided food (Table 2). Busitema led in this claim though dimly at (20.3%) with Bubango having the least at (3.8%). FAO (1995) had it that fruits, fibres and flavours from the forests relieve the rural populace of hunger periods in agricultural cycles and

Table 2: The local communities' domestic use of forest resources at WBCFR, Busia district

Use	Household response per parish							
	Bubango (n = 78)		Bulumbi (n = 73)		Busitema (n = 74)		Total (n = 225)	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Fuel wood	62	79.5	51	69.9	47	63.5	160	71.1
Grazing land	3	3.8	2	2.7	4	5.4	9	4.0
Provision of food	3	3.8	12	16.4	15	20.3	30	13.3
Medicinal provision	10	12.8	9	12.3	8	10.8	27	12.0
Construction materials	68	87.2	54	74.0	30	40.5	152	67.6

Table 3: Shelters that accommodated the local communities living adjacent WBCFR, Busia district

Type of shelter	Household response per parish							
	Bubango (n = 78)		Bulumbi (n = 73)		Busitema (n = 74)		Total (n = 225)	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Permanent house	16	20.5	15	20.5	7	9.5	38	16.9
Hut (grass thatched)	47	60.3	45	61.6	59	79.7	151	67.1
Semi-permanent	15	19.2	13	17.8	14	18.9	42	18.7

smooths out other seasonal fluctuations. Other than animal foods discussed here later the following were commonly used as food stuffs; white ants, yams, fruits such as amakhu (mango like fruit) and amachaungo (pawpaw like fruit). Observably, there were numerous ant hills in WBCFR making white ants gathering a common practice depending on their seasons. White ants were a delicacy of the local communities engulfing WBCFR, Busia district. Yams were harvested during dry seasons when the gardens could not provide food especially in December to March. This apparently was an impetus of the local communities in the neighbourhood of WBCFR to illegalities in the forest reserve which eventually led to the deforestation of the forest reserve.

Table 2 explicitly has it that the medicinal provision was minimal at 12.0%. Bubango led on this at 12.8% and Busitema was least at 10.8%. This was contrary to the fact that most cultures have used plants as a source of medicine since time immemorial. The unique biological compounds in the forests are of great medical value. Thus, 80% of the world's people depend on traditional medicine for their primary health care needs. The greater part of traditional therapy involves the use plant extracts or their active principles (Pickering and Owen, 1994). Through interviews, it was revealed that herbs from WBCFR treated measles, yellow fever, boils and malaria. In this case omululusa herb was used for malaria; emotos herb resembling cassava was heated on fire for boils by Itesots. Despite all these revelations statistics appeared deceptive for most respondents ostensibly viewed traditional medicine from the witchcrafts' point of view thus primitive.

According to Table 2, construction materials provision was next fuel wood provision at 67%. It was

highest utilized at Bubango parish at 87.2% and least by Busitema parish at 40.5%. This use was depicted in Table 3.

Table 3 shows clearly that grass thatched huts were dominant shelters amongst the local communities engulfing WBCFR, Busia district (67.1%). Interviews had that the grass thatched shelters were a tradition and a pre-requisite in the cultures of most of the surrounding communities viz. Bagwe and Itesos. The former dominated both Bubango and Bulumbi parishes while the latter dominated Busitema parish although through migrations they were found in all the parishes hence the huts in the area. These huts were constructed using most materials from WBCFR which included among others grass and poles. The permanent houses in the area were mainly of baked bricks where bricks baking used fuel wood from WBCFR evidenced by brick baking kilns in the neighbourhood of the forest reserve. Besides the fuel wood hard core rocks were also excavated from the forest reserve in the local communities' proximity. For semi-permanent houses poles were got from the forest reserve. These were in contravention of the NFTP No. 33 and 34 where one is allowed to use only dry wood and prevent damage to other forest produce in the course utility (The Republic of Uganda, 2003).

The local communities' illegalities in West Bugwe Central Forest Reserve, Busia district: The local communities in this case were house hold residents engulfing WBCFR, Busia district their encroachment activities included among others the ones on Table 4.

More than three quarters of the respondents (85.3%) agreed that charcoal burning was both the most destructive and practiced illegality in and within the

Table 4: The local communities' encroachments and deforestation of WBCFR, Busia district

Type of illegality	Household response per parish							
	Bubango (n = 78)		Bulumbi (n = 73)		Busitema (n = 74)		Total (n = 225)	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Farming	33	42.3	36	48.6	46	63.0	115	51.1
Settlement	24	30.8	15	20.3	17	33.3	56	24.9
Charcoal burning	69	88.5	68	91.9	55	75.3	192	85.3
Pitsawying	17	21.8	35	47.3	28	38.4	80	35.9
Grass burning	26	33.3	18	24.3	26	35.6	70	31.1
Poaching	22	28.2	34	45.9	19	26.0	75	33.3

proximity of WBCFR, Busia district (Table 4). It was mostly practiced in Bulumbi parish (91.9%) and least practiced in Busitema parish (75.3%). Compared to farming interviewed encroachers, agreed that charcoal burning had a short gestation period hence giving quick returns. In a transect of the forest reserve, it was common to see fresh and harvested charcoal kilns. Most authors agreed that charcoal burning was backed by increasing urbanization in Uganda and the high cost of electricity besides easy storage, cheap equipment and technology, portability, high energy compared to fuel wood (Muthoka *et al.*, 1998; NEMA, 1999b; Gachanja, 2000). This made it the most detrimental activity in WBCFR, Busia district.

Table 4 has it that farming was the second most destructive illegality in WBCFR, Busia district. Slightly more than half of the respondents (51.1%) had this in mind. It was mostly practiced in Busitema parish (63%) and least practiced in Bubango parish (42.3%). From the field it was observable that Amonikakineyi block, established in 1930's for the development of forest species, had been cleared for the growing of maize amidst eucalyptus tree stamps. This made Busitema lead in farming for the said block is located within it. In Sitambogo block (Bulumbi parish) which was next to Amonikakineyi (Busitema parish) bush burning was being practiced to clear farming fields yet the block was dominated by grass vegetation. With the bush burning deforestation spreads easily hence farming practices becomes very destructive in WBCFR, Busia district.

More than a third of the respondents (35.9%) casted their perception on pitsawying as the third most destructive activity in WBCFR, Busia district (Table 4). It was mostly in Bulumbi parish (47.3%) and least in Bubango parish (21.8%). Ironically through both observation and interview Busitema parish could have led on this for the defunct Ruwenzori Saw Mill was located in Busitema parish which milled eucalyptus tree trunks into timber hence the deforestation of Amonikakineyi block at its proximity. It was also claimed that the forest officials also participated in this by proxy. Besides the local council officials openly participated in the pitsawying

activity in and outside the forest reserve when in the latter stage the logs were sourced from WBCFR. This was therefore detrimental to forest conservation in WBCFR, Busia district.

Table 4 shows that a third of the respondents (33.3%) participated in poaching in WBCFR, Busia district. This was mostly in Bulumbi parish (45.9%) and least in Busitema parish (26%). The edible wild animals such as wild pigs, hares and antelopes were hunted by the local communities in the neighbourhood of WBCFR. This led to the creation of several paths with traps in WBCFR. Through interviews it was claimed that the baboons maintained themselves through their cruelty, aggressiveness and above all not being a delicacy of the local communities engulfing WBCFR, Busia district. This was not new these locals for it was reported that about 14 kg of bush meat per household was consumed in Kitui district, Kenya (Erskine, 2001). This though not very detrimental in deforestation was a reduction in the forest biomes.

Grass burning was the second least practiced and destructive illegality to settlement according to Table 4. It yielded mere 31.1% with Busitema parish leading (35.6%) and Bulumbi parish least (24.3%). It was caused mainly by grazers in need of soft, succulent grass during the rainy season. Through an interview with the forest official some of them claimed that it was the most destructive for, fire spread to trees and covered a wide area given the ill equipment of the department to control it. Worse still fire destroyed the ecosystem in totality hence very destructive compared to all the mentioned activities in WBCFR, Busia district. Through observation compared to other forest reserves no individual had settled in the forest estate giving an assumption that eviction was perfectly done in WBCFR, Busia district.

Charcoal from WBCFR was destined to the towns mentioned in Table 5, below hence continuous supply which was detrimental to the integrity of the forest reserve.

More than three quarters of the respondents (87.6%) claimed that Busia which is about 20 km away was the main destination of charcoal burnt from WBCFR (Table 5).

Table 5: Destination of charcoal burnt from West Bugwe Central Forest Reserve, Busia district

Household response per parish								
Destination	Bubango (n = 78)		Bulumbi (n = 73)		Busitema (n = 74)		Total (n = 225)	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Tororo town	1	1.3	7	9.5	3	4.1	11	4.9
Malaba town	2	2.6	2	2.7	0	-	4	1.8
Busia town	67	85.9	64	86.5	66	90.4	197	87.6
Local community	3	3.8	0	-	0	-	3	1.3
Iganga and Bugiri towns	0	-	0	-	2	2.7	2	0.9
Kenyan towns	3	3.8	1	1.4	2	2.7	6	2.7
Nearby trading centres	0	-	1	1.4	1	1.4	2	0.9
Other areas	2	2.6	0	-	0	-	2	0.9

Table 6: A Spearman's rank correlation of the perceptions of the local communities of bulumbi and busitema sub-counties on illegalities leading deforestation of WBCFR, Busia district

Bulumbi sub-county's perceptions (n = 151)			Busitema sub-county's perceptions (n = 74)			d	d ²
Type of illegality	Values	Rank	Type of illegality	Values	Rank		
Farming	69	2	Farming	46	2	0	0
Settlement	39	6	Settlement	17	5	1	1
Charcoal burning	137	1	Charcoal burning	55	1	0	0
Pitsawying	52	4	Pitsawying	28	3	1	1
Grass burning	44	5	Grass burning	26	4	1	1
Poaching	56	3	Poaching	19	6	-3	9
							$\sum d^2 = 12$

This idea was mostly cherished by Busitema parish (90.4%) and the rest of the parishes compared to other destinations. Surprisingly the local communities torching WBCFR minimally consumed the charcoal they produced at 1.3% neither was this charcoal consumed in nearby trading centres viz. Ndaiga, Namutere, Namungodi, Busitema, Tiira and Muwayo satisfactorily at 0.9%. As per the interviews this business boomed from the late 1970's as per the forest officials records when Kenya banned charcoal burning country wide. This made WBCFR the sole supplier of charcoal to Western urban centres in Kenya. Charcoal to Busia was transported on bicycles openly other means included lorries, passenger vehicles and at times the bags were loaded on heavy load vehicles. With this immense demand for charcoal the charcoal burners through interviews claimed that they could burn their ways through densely thorny vegetation to fell a tree for charcoal burning. This was a double tragedy for WBCFR which was at the verge of devagation.

In abid to establish intra correlation amongst the sub-counties on the local communities' perceptions on illegalities Table 6 was constructed.

Table 6 through tabulations shows that $r = 0.66$. This value lay on a (0.6-0.79) segment of the strength of a correlation, manifesting a high/strong correlation at a 0.05 level of significance (Fowler *et al.*, 1998; Mugenda and Mugenda, 2003; Fraenkel and Wallen, 2008). It could therefore be concluded that there was a high/strong relationship between the Bulumbi sub-county local

communities' perceptions and the Busitema sub-county local communities' perception on illegalities leading to deforestation of WBCFR, Busia district.

National Forestry Authority's strategies to curb illegalities in West Bugwe Central Forest Reserve, Busia district: NFA is the government lead agency entrusted with the management and oversight of all the 506 central forest reserves in Uganda (Mugenyi *et al.*, 2005; NFA, 2005). The local community living adjacent to WBCFR perceived their activities as in Table 7.

More than two thirds of the respondents agreed that both mass sensitization (68.9%) and strict supervision (68%) was carried out to the local communities engulfing WBCFR, Busia district (Table 7). From the interviews the media mainly used were radios and local council meeting per parish. Bubango parish (76.9%) apparently was the most sensitized while Busitema parish (56.2%) was least sensitized. Kiyingi (2006) reported that much of NFAs' mentions over the radio and television were aired during prime news times for most people/listeners target news segments. The prime news times in Uganda were at 7.00 am, 1.00, 7.00 and 9.00 pm. Besides, radio programmes were spot announcements that were taped played and repeated at scheduled intervals (Zziwa and Waiswa, 2007). Some of these mentions were in the local languages, Kiswahili and English thus making the local communities torching WBCFR aware. Ironically, the statistics negatively compared with the illegalities

Table 7: The local communities' perceptions on the NFA officials' activities towards conservation of WBCFR, Busia district

Activities	Household response per parish							
	Bubango (n = 78)		Bulumbi (n = 73)		Busitema (n = 74)		Total (n = 225)	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Strict supervision	53	67.9	55	74.3	45	61.6	153	68.0
Imprisoned encroachers	43	55.1	37	50.7	33	44.6	113	50.2
Mass sensitization	60	76.9	54	73.0	41	56.2	155	68.9
Reforestation	52	66.7	39	52.7	27	37.0	118	52.4
Practiced illegalities	30	38.5	42	56.8	40	54.8	112	49.8
Corrupt	36	46.2	38	52.1	37	50.0	111	49.3
Trustworthiness	47	60.3	44	59.5	41	56.2	132	58.7

practiced by the well informed, strictly supervised and imprisoning adamant encroachers amongst the local communities living adjacent WBCFR, Busia district.

Table 7 shows that more than half of the households (58.7%) had trust in NFA ostensibly due to their expertise in conservation. This contradicted what many authors perceived given the inheritance of the then Forest Department's problems and non-compliant local communities torching South Busoga Central Forest reserve where NFA took a negative local language connotation NFA meaning am dying manifested in sour relations (Hamilton, 1984; Otieno *et al.*, 2012). Ironically, the trust was downplayed by the fact that close to half the respondents claimed that NFA was engaged in illegalities (49.8%) and corrupt (49.3%).

These could have been the premises used by the local communities to engage in illegalities for they contradicted the values NFA was supposed to cherish viz. excellence, integrity and transparency (NFA, 2005; Otieno *et al.*, 2012). The NFA officials' engagement in illegalities either directly or by proxy was a serious impetus to encroachment by the local communities in the proximity of WBCFR, Busia district. The locals perceived their illegalities as retaliation to NFAs' exploitation of the forest resources at their expense.

From Table 8, it was clear that none of the activities the NFA officials was statistically significant at $df = 2$ at $0.01 = 9.210$ for none of them was <9.21 at $df = 2$ at 0.01 . There was no correlation between the responses and observation particularly on strict supervision and charcoal burning in this area. Through observation the forest officials abandoned the official station located in WBCFR in the Amonikakineyi block which appeared vandalized. This therefore justified ineffective supervision manifested on monotonous transit of sacks of charcoal and bunches of fuel wood destined to Busia town where the officials resided. This explained why WBCFR was at a verge of devegetation manifested by apparent illegalities with impunity.

Table 8: Summary of Chi square statistic value of the NFA activities in the conservation of WBCFR, Busia district (n = 225)

Activities	Local communities' views			
	Observed	Expected	χ^2 -calculated	χ^2 -tabulated
Strict supervision	153	225	23.0	9.21
Imprisoned encroachers	113	225	55.8	9.21
Mass sensitization	155	225	21.8	9.21
Reforestation	118	225	50.9	9.21
Practiced illegalities	112	225	56.8	9.21
Corrupt	111	225	57.7	9.21
Trustworthiness	132	225	38.4	9.21

$df = 2$ at $0.01 = 9.210$

CONCLUSION

The most important domestic use of WBCFR was source of fuel wood (71.1%) followed by construction materials (67.6%). The former had gone beyond the reasonable quantity allowed in the Uganda 1964 Forest Act echoed in the current 2003 NFPTA No. 33 (The Republic of Uganda, 2003). The fuel wood was commercialized destined to Busia towns, an apparent conurbation of two municipal councils separated by a common international boundary of both Uganda and Kenya hence detrimental to conservation of WBCFR, Busia district. Construction materials used by the local communities was also instrumental to deforestation for they included the following; cutting poles, plucking and cutting grass, fuel wood for baking bricks and extraction of hard core stones from WBCFR. The exploitation of forest resources for construction materials led to devegetation of the forest reserve and contravened the following aspects of the 2003 Act, No. 33 and No. 34 (The Republic of Uganda, 2003).

There was a high/strong relationship at $r = 0.66$ at a 0.05 level of significance between the Bulumbi sub-county local communities' perceptions and the Busitema sub-county local communities' perception on illegalities leading to deforestation of WBCFR, Busia district. The most instrumental illegality practiced by the local communities in WBCFR was charcoal burning (85.3%) followed by farming (51.1%). The charcoal burnt at WBCFR was minimally consumed at its neighbourhood

(2.1%) but much in the Busia conurbation (87.6%). This therefore made charcoal burning the most destructive illegality in WBCFR, Busia district.

None of the strategies the NFA officials adopted to curb deforestation viz. strict supervision, imprisoned encroachers, mass sensitization, reforestation and trustworthiness was statistically significant at $df = 2$ at $0.01 = 9.210$ for none of them was <9.21 at $df = 2$ at 0.01 . In practice the local community torching WBCFR acknowledged the following strategies taken by the NFA officials; strict sensitization (68.9%), supervision (68%), trustworthiness of officials (58.7%) and imprisonment of encroachers (50.2%). The traits of the officials such as corruption to disregard illegality and direct and proxy engagement in illegalities, marred both compliance and enforcement of the forestry policy, hence deforestation in WBCFR, Busia district.

RECOMMENDATIONS

The following tree species should be introduced to the local communities engulfing WBCFR so as to detach them from the forest reserve: *Calliandra calothyrsus* (multipurpose for, firewood, poles, fodder, shade, nitrogen-fixing, ornamental, bee forage, erosion control and soil rehabilitation), *Markhamia lutea* (timber, furniture, mulch, soil conservation and interestingly charcoal production) and *Sesbania sesban* (firewood, fodder, shade and nitrogen-fixing) (Ekise *et al.*, 1994). These tree species are fast growing and can address the main illegalities leading to deforestation of WBCFR as per the findings especially fuel wood, charcoal burning and farming, they can be planted in wood lots and through agro forestry.

Ceramic stoves should be introduced in both rural and urban settlements for they use less charcoal and fire wood which heats the soil eventually heating the food. These stoves form a practical and effective solution to both fuel wood collection and charcoal burning in WBCFR. There is a need to use dry wood which emit less smoke and conserves energy that would be used to dry up the wet wood before it burns. This therefore makes sensitization on the use of ceramic stoves and their enforcement a highly needed aspect so as to curb deforestation in WBCFR, Busia district. Sensitization could be through the NFA officials and local council officials.

NFA should cherish their organization's core values viz. excellence, integrity and transparency to thwart both corruption and indulgent in illegalities so as to separate the sheep from the shepherds, consequently effecting admirable management of the forestry resources. Besides

that in adoption of both agro forestry and wood lots they should be ready to train the local communities on tree management as follows; looping-cutting tree branches for fodder, fuel wood, pest and disease control, tree protection, weeding, agro forestry, pruning and thinning. This would eventually detach the local communities from WBCFR, Busia district.

There is a need to accommodate the local communities in the management of WBCFR in their proximity through collaborative forest management to avoid administrative conflicts in this area. Through this NFA should introduce participatory monitoring to avert the ineffectiveness of strict supervision. In this case, NFA officials would be guiding the local communities on; keeping track of the activities as per set out targets, timely removal of constraints, carrying out corrective measures and replanning of activities so as to justify the use of resources. Besides the NFA and the local communities need to adopt both evaluation and effective sensitization so as to collectively curb deforestation in WBCFR, Busia district.

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