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Collaborative Forest Management in Uganda: A Strategy for Controlling Deforestation in West Bugwe Forest Reserve, Busia District

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Abstract: The idea of Collaborative Forest Management (CFM) is ostensibly a conservation panacea in conflict prone forest resource management in developing countries. Most of these economies have about 40% of their population poor and eking life from natural resources in their neighbourhood, a point of conflict with government agents meant to conserve the resources, West Bugwe Forest Reserve (WBFR) epitomized this situation in Uganda. The study aimed at assessing the potentialities of CFM with a goal of sustainable forest resource management of WBFR. The findings from 233 respondents revealed that illegal human activities viz. charcoal burning, fuel wood collection and farming were responsible for the deforestation of WBFR; the forest officials were both actively involved and by proxy engaged in the given illegal activities; main push factors to the forest reserve were poverty, domestic needs, inadequate land, landlessness and ignorance of the policy and CFM was found to be a significant tool in reducing deforestation of WBFR. It was felt that government enhance the resources in the forest department, motivate the forest officials and encourage CFM to resolve the disparities between the local communities and foresters, making both parties accountable and benefit from the forest resources at their proximity.

Key words: Local communities, national forestry authority, forestry act, illegal activities, WBR, CFM

INTRODUCTION

Establishment of scientifically managed forest reserves has a colonial bearing in developing countries, Uganda inclusive. They were created in order to conserve the erodible forest areas and allow forests to act as the main regulator of the hydrology of an area (Lind and Morrison, 1974; Vink, 1975). Prior to colonialisation, forest in Uganda were traditionally managed under a variety of property rights dependent on different regions in the current Uganda. These different rights in land could be transferred from one generation to the next. Decisions regarding use of the forests were made by clan heads but often resulted from discussions in the family and clan, guided by customs that took into account the needs of various persons in the user group (Kamugisha and Sepp, 1996; Gombya-Ssembajjwe and Banana, 1998). Hamilton (1984) traces the creation of forestry services in Uganda to 1898 with the appointment of the first Director to the scientific and forestry department and consequent enactment of forest policy 1929 and gazettement of forest reserves as from 1932. This outlawed the traditional utilisation of the forest resources limiting, the entry and harvesting of forest resources by the locals, thus a point of conflict of interests. Hamilton (1984) stressed that the established forest reserves by the colonial government were out of bound for exploitation by communities torching them without permits, paying taxes and the stipulated items which could be extracted without payment, the latter included firewood and poles for private use. The defiant seemingly silent majority was kept aloof but always looking for opportunity to benefit from the resources in their neighbourhood. Probably, this opportunity for deforestation in Uganda by the locals came in the 1970s with political instability where timber was immensely harvested and official forest encroachment allowed without a need for participation of the local communities in decision making (Mupada, 1997). Thus through deforestation, the tropical high forests cover declined from 12.7% of the total area in 1900 to about 3% by 2000 (NEMA, 2001).

The National Environment Management Authority (NEMA, 1999b) reported that the forest estate in Uganda amount to about 1,490,600 ha of which 730,000 ha (49%)

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is comprised of tropical high forest. Much of the remainder is comprised of savannah woodlands (50.3%) and artificial forests (coniferous and eucalyptus) constitutes 0.7%. The tropical high forests have been under the Forest Department (FD) manning about 417,000 ha while the Uganda Wildlife Authority manages about 321,000 ha (Mupada, 1997). Currently, there are 506 central forest reserves under Natural Forestry Authority (NFA), a body transformed from the FD since 2003 (MWLE, 2003; NFA, 2006).

The idea of co-management of the forest reserves is not new in Uganda. It was started in 1970s when forest officers saw the importance of community forestry and promotion of afforestation. Currently more than ever before, there is a need to consider the needs and concerns of the people who depend on the resources for effective conservation of the forest. Collaborative Forest Management (CFM) is where local communities are genuinely involved in the management of the forest resource through negotiated process in which rights; roles, responsibilities and returns for sustainable management of such forest resources are shared. The community engulfing WBFR is very much willing to take it up as per this study.

Collaraborative forest management evolved from different situations and contexts, namely co-management in Eastern and Southern Africa, community forestry in Nepal, joint forest management in India and extractive reserves in Brazil (Hoefsloot, 1997). Elsewhere, it has been introduced and succeeded in Ghana and Tanzania. It is a new concept in Uganda and failed in Butto-Buvuma forest reserve (Gombya-Ssembajjwe, 1998). There has been some success in Mt Elgon National Park, Mabira Forest Reserves and Budongo forest reserves in Uganda (Mupada, 1997; Hoefsloot, 1997). In WBFR, it needs a trial for the community living adjacent to it was very much will to work with Busia Forest Department to avert deforestation of the forest reserve.

Description of the study area: West Bugwe forest reserve is a medium altitude moist, semi-decidous forest. The grass within it is broad-leaved and fire prone (Lands and Survey, 1967). It is located between 00°30'-00°33' N and 30°56'-34°05' E. It covers an area of 31 km^2 with an altitudinal range of 1113-1235 m (Davenport *et al*., 1996). It is a central forest reserve within Busia district in the South Eastern Uganda absolutely lying between 33°5' E and 34°1' E and 0°10' N and 0°35' N (NEMA, 1999a, b). It is divided into three blocks namely, Central Block (Sidimbire) which is 3054 ha (79%), Sitambogo Block 650 ha (17%) and Amonikakineyi Block 163 ha (4%). The central block (Sidimbire) has natural forests, Sitambogo block has woodland forest and grassland, Amonikakineyi block has artificial eucalyptus plantation. This makes it representative of the country in small scale. Amonikakineyi has been heavily deforested and turned into a peri-urban plantation. Devegetation has also affected the remaining blocks especially through charcoal burning, bush burning in Sitambogo block and Sidimbire central block. According to NEMA report, the forest has large scattered trees of *Antiaris toxicaria* and *Melcian excelsa* amidst *Capparies erythrocarpus*, *Toddalia asiatica*, *Albizia grandibracteata* and *Celtis africana* in the forest reserve.

The area receives an annual rainfall of about 1080 mm with a double maxima and a mean annual maximum temperature of 28.7°C besides a mean annual minimum of 16.2°C Meteorological Department cite by NEMA (1999b). The area has ferrallitic soils and mainly sandy loams, deep with little differentiation in clearly defined horizons possessing fine granular structure, often molded into layers, weakly coherent clods which are very friable and porous (Lands and Survey, 1967). These variables combine to make the area predominantly agricultural at subsistence level given the population. The following crops are cultivated in the area: finger millet, maize, sorghum, cassava, sweet potatoes, beans, cotton and ground nuts while the following animals are reared; cattle, goats, poultry and sheep. Other economic activities engaging people in this area are gold mining at Tira and eco-tourism (NEMA, 1999a).

MATERIALS AND METHODS

This study adopted a cross-sectional survey research design. It was an on the spot investigation dealing with the causes of deforestation, illegal activities in the forest reserve; examination of communities' willingness to jointly manage WBFR with the forest department and an assessment of whether CFM could minimize deforestation of WBFR. The design enabled the researchers to obtain data that described existing phenomena with respect to one or more variables (Mugenda and Mugenda, 2003). The unit of analysis was the local communities living adjacent West Bugwe Forest Reserve and the officials of the forest department. A total of 233 respondents were sampled through stratified sampling of the households in accordance to parishes, the smallest administrative unit in Uganda. Snowball sampling was used to reach the respondents after stratification (Kumar, 1999). Besides purposive and convenience sampling was used to access the forest officials (Kumar, 1999; Mugenda and Mugenda, 2003). The instruments used in the study were; questionnaires, interview schedule and document

analysis guide. Face validity of the instruments was attained by giving the instruments to experts in the field of study for review and a revision done to fine tune them. This research used triangulation in data analysis where questionnaire analysis involved the use of description statistic such as frequencies, percentages and measures of central tendencies. Chi-square test was carried out due to the nature of the variables on one single which was human activity.

The dependent variables tested were; charcoal burning, farming, fuel wood collection, pitsawying, forest officials' involvement and possibility of using CFM in curbing deforestation. The data gathered from the document analysis, observation and interviews were also transcribed, organised thematically before analysis. The data were then reported in form of text.

RESULTS AND DISCUSSION

Demographic and socio-economic characteristics: The results shown in this study are responses of a total of 233 respondents whose demographic and socio-economic characteristics are shown in Table 1.

Table 1 is specific on the local communities torching West Bugwe forest reserve, thus deducts eight respondents from the forest department and the Strabag Company. More than half of the household were peasants engaged in petty businesses such as; tailoring, charcoal selling and *boda boda* that is bicycle taxi-operation. Less than half were below the age of 29 with a mean age of 33.5 and a mode of 26.4, this coupled with education level of over 97.8% having acquired primary education, authenticated the data given the Ugandan constitutional 18 years of age for consent.

More than half of the households were married with more than a third having family size of >5 people. The pressure to support such a size of family ostensibly pushed them to the forest reserve. About 80% of them claimed to have ancestral linkage to the forest estate and could utilize the forest resources without hesitation. More than half were sheltered in grass thatched huts with some in either permanent or semi-permanent shelters. And 52.9% declared to have utilized the forest resources to for their construction of the shelters allowed by the forest Act 2003; 33:1 (but in a reasonable quantity and when dry). This was relative.

Reasons for the deforestation of West Bugwe forest reserve, Busia district: This was shown as in Table 2 where the illegal activities in the forest reserve were attributed to the reasons presented. Table 2 shows clearly that poverty represented by 91.5% of the population was an overriding factor amongst the push factors to deforestation. It is manifested in one's incapacitation to meet his basic needs. The research also

Table 1: Demographic and socio-economic characteristics of households living adjacent to West Bugwe forest reserve (N = 225)

Household characteristics	No. of respondents	Percentage
Sex		
Male	177.0	78.8
Female	48.0	21.3
Age		
<29	100.0	44.4
30-49	103.0	45.8
>50	22.0	9.8
Mean Age	33.5	
Family size (number of people)		
1-4	114.0	50.7
5-9	67.0	29.8
>10	44.0	19.6
Occupation.0		
Peasant	117.0	52.0
Civil servant	53.0	23.6
Business	13.0	5.8
Students	25.0	11.1
Others	17.0	7.6
Education background		
No formal	05.0	2.2
Primary	57.0	25.3
Secondary	105.0	47.1
Tertiary	57.0	25.3
Ancestral claim of WBFR		
Sitambogo block	26.0	11.6
Sidimbire central block	128.0	56.9
Amonikakineyi block	23.0	10.2
None	48.0	21.3

Table 2: Reasons for households living adjacent to WBFR to engage in illegal activities leading to deforestation (N = 225)

	Number of Respondents per parish			
Reason	Bubango (%)	Bulumbi (%)	Busitema (%)	General (%)
Poverty	72 (92.3)	69 (93.2)	65 (89.0)	206 (91.5)
Amin's government gave them	07 (9.0)	07 (9.5)	62 (2.7)	16 (17.1)
Lack of enough land	29 (37.2)	39 (52.7)	41 (56.1)	109 (48.4)
Landlessness	38 (48.7)	26 (35.1)	27 (37.0)	91 (40.4)
Proximity to the forest	16 (20.5)	14 (18.9)	17 (23.3)	47 (20.9)
Forest department's negligence	37 (47.4)	19 (25.7)	22 (30.1)	78 (34.7)
Domestic needs	37 (47.4)	43 (58.7)	40 (54.8)	120 (53.3)
Ignorance of the law/policy	32 (41.0)	22 (29.7)	27 (37.0)	81 (36.0)
Demand in urban centres	29 (37.2)	26 (35.1)	19 (26.0)	74 (32.9)
Others	12 (15.4)	08 (12.6)	03 (12.6)	23 (10.2)

revealed that 67.1% of the respondents lived in huts where 52.9% claim to have accessed building materials from the forest reserve a testimony to poverty. It was also clear that other reasons such as; unemployment, ancestral land claim, non-sensitization, lack of other income generating activities, cheap fuel and the next are negligible though also pushed 10.2% of the households. Population pressure was also evident as serious factor leading to lack of enough land by 48.4% and landlessness by 40.4%. The research also revealed that 50.7% of the respondents had 1-4 children, 29.8% had 5-9 children and 8.4% had over 10 children. All these formed a driving force to deforestation evidenced by 53.3% driven by domestic demands. This was in concomitant with the fact that man is a resource utilizing animal (Valentine, 1991). Inadequate policy enforcement is also depicted from the table portrayed by forest department's negligence 34.7%, ignorance of the policy 36.0% despite government guarantee evidenced by only 17.1% and proximity to the forest reserve 20.9%.

The Chi-square statistics in Table 3 shows that there was a significant relationship between the human activities with the deforestation of WBFR. For instance the forest resources were exploited to produce charcoal, fuel wood and timber. The forest reserve was also cleared for farming and this was more explicit in Busitema where Amonikakineyi block is situated. Over 63% of the households from this parish participated in farming which was permitted by the forest office, Busia district. The results further suggested that charcoal burning was the most destructive and progressively followed by fuel wood collection which had gone out of the reasonable quantities permitted by 2003; 33 (The Republic of Uganda, 2003). Firewood was used domestically and commercially. Pit sawying's influence grew after the closure of the Rwenzori Saw Mills in the area; thus comparatively not very significant. Other activities which exhibited low significance were; settlement and grazing in the forest reserve. Less than a third of the respondents agreed that settlement was responsible for the deforestation of WBFR but were evicted. The open land in the forest estate was used for grazing by 4% of the households. The deforestation attributed to this was burning of the grass which spread to the trees. Therefore, the activity though not very significant had a part to play in the deforestation. Through this, it was clear that increasing human activities led to deforestation of WBFR by 89.3% of the respondents.

Community's attitude to joint management of WBFR with forest department Busia district: From Table 4, it was clear that the local community admitted that they were responsible for the deforestation of WBFR manifested by more than two thirds of their response. The mentioned activities were farming, settlement, charcoal burning, pitsawying, grass burning and hunting. About 62.2% of local communities were willing to stop the given activities so as to conserve the forest reserve and were willing to work with forest department towards this goal by 83.1%. It was also clear that more than half of them trusted the forest officials on agreement to work collaboratively. But ironically, only slightly more than a third of the population was aware of C.F.M. Almost half, the population did not trust the forest officials due to the following as revealed by the research; some of them engaged in illegal activities either directly or by proxy (49.8%), they were corrupt (7.6%), they were not flexible (3.1%) and land issues (8.4%).

Through their experience, the foresters were very strict in supervision and ended up imprisoning some of the encroachers 68%. Thus amongst the Samia Bugwe culture, it is impossible to share with one who has organized a to be shareholder's imprisonment. These challenges scared the locals to wholesomely manage WBFR jointly; this was in concomitant with literature written on foresters (Hamilton, 1984). On conservation, the local communities were willing to reforest the reserve by 83%, conserve the wildlife by 80.4% and unwilling to

Table 3: Chi square statistic value for communities' activities per parish which led to deforestation of West Bugwe forest reserve, Busia district

Activity	Bubango	Bulumbi	Busitema	Total
Charcoal	0.390	0.250	1.270	1.91
Fuel wood collection	1.420	0.099	0.745	2.30
Farming	0.114	0.029	0.457	3.60
Pitsawying	3.700	2.370	0.153	6.12

df = 2 at 0.01; 9.210

Table 4: Community's attitude towards joint management of WBFR with forest Department Busia district (N = 225)

	Responses per parish			
Aspect	Bubango	Bulumbi	Busitema	General
Human activities led to deforestation	70 (89.7)	67 (90.5)	64 (87.7)	24 (84.3)
Being aware of C.F.M	29 (37.2)	32 (43.2)	22 (30.1)	83 (36.9)
Agreeing to work with F.D.	58 (74.4)	68 (91.9)	61 (83.6)	187 (83.1)
Possibility of stopping illegal activities	52 (66.7)	54 (73.0)	34 (46.6)	140 (62.2)
Trusting the forest officials in agreement	47 (60.3)	44 (60.3)	41 (56.2)	132 (58.7)

redistribute the forest estate for agricultural production by 81.3%. To detach themselves from the forest reserve, they claimed that they would engage in the following activities; farming 60.4%, business 44.5%, projects 41.3% and crafts 24.4%. The area is agriculturally potential in the growing of cassava, maize, millet, beans observable on small farm holds.

These had ready market in Busia towns an apparent conurbation of two towns only separated by the international boundary of both Uganda and Kenya. The same commodities were very paramount in business. The projects expected included among others; fish farming, bee-keeping, poultry, piggery, rabbit keeping and brick laying. From both interview and observation, the following community based organization tilted towards conservation of WBFR were operational; West Bugwe Forest Conservation Project (WBFCP) and an affiliate project Namungodi United Development Association (NUDA). The former aimed at conserving wildlife, maintaining the forest reserve boundaries and planting indigenous trees. While the latter's objectives were to create awareness to the community on agro-forestry and improve on economic status of the members through income generating activities. These formed a basis for collaborative forest management and a conservation panacea. According to Fisher (1995), CFM builds on local capacities where the indigenous knowledge of the environment and local organization of the regulated communities is very paramount.

Possibility of collaborative forest management in West Bugwe forest reserve, Busia district: Collaborative Forest Management (CFM) is a mutually beneficial arrangement in which a local community or forest user group and a responsible body share roles, responsibilities and benefits in a forest reserve or part of it (NFA, 2003; Hoefsloot, 1997).

It is generated from the Constitution of The Republic of Uganda (1995), the Convention on Biological Diversity, the National Forestry Plan and the current National Forestry Plan 2001 (NFA, 2003). WBFR local community was ostensibly ripe for it given their overwhelming support of 83.1% of the respondents; despite the ills they attributed to the forest department. Through interviews with the forest officers of Busia and Tororo districts, their department was ill prepared to effectively manage the forest reserve. The following were evident, under staffing, inefficient supervision; abandoned forest office in the forest reserve, ill funding and ineffective payment of staff emoluments; large expanse of responsibility especially being in charge of L. Victoria Environmental Management Programme, Busia Town and West Bugwe Forest Reserve, besides private forests. All these vividly made fertile grounds for co-management for sustainable resource use of WBFR. The situation in Uganda is not new in the developing countries of its equivalent status (Poffenberger, 1996; Hamilton, 1984). Thus, corruption to overlook illegal activities was common amongst the patrol men and some forest officials besides participating directly and by proxy in the illegal activities. The Chi-square values testing the significances (critical absolute involvement) of forest officers were a^2ob was 4.11 which was <9.210 at df = 2 and at 0.01 level of significance. This meant that the results were statistically significant with implication that forest officers were responsible for deforestation of WBFR. Despite this forest officials participated in planting new trees and replacing trees rated at slightly more than half, the respondents hence can effectively concede to conservation in an agreement.

More than half the respondents trusted the forest officials in agreement for CFM while ironically > 3 quarters agreed to work with them. The research revealed that the mistrust can be attributed to the minimally presented variables viz. corruption of the forest officials 19.6%, indirect involvement in the illegal activities 10.2%, poor management 8%, harshness of the officials 2.2% and failures 2.2%. The results, thus showed that the specific variable willing to work with the forest officials was 0.846 which was <9.210 at df = 2 at 0.01 level of significance. This by extrapolation meant that a change in behavour was statistically significant. That is CFM could significantly reduce deforestation of WBFR. Table 5 explicitly shows that the community was willing to

Table 5: Aspects of collaborative forest management of WBFR, Busia district (N = 225)

	Response per parish			
Aspect	Bubango (%)	Bulumbi (%)	Busitema (%)	General (%)
Decision making	62 (79.5)	55 (74.3)	53 (72.6)	170 (75.6)
Sharing management	40 (51.3)	35 (47.3)	40 (54.8)	115 (51.1)
Protection of the forest reserve	38 (48.7)	20 (27.0)	30 (41.1)	88 (39.1)
Maintenance of forest boundary	43 (55.1)	59 (79.7)	50 (68.5)	152 (67.6)
Alternative to illegal activities	46 (59.0)	43 (58.1)	40 (54.8)	129 (57.6)
Rights of members	30 (38.5)	36 (48.6)	38 (52.1)	104 (46.2)
Conservation measures	29 (37.2)	37 (50.0)	21 (28.8)	87 (38.7)
No more imprisonment	17 (21.8)	10 (13.5)	11 (15.1)	38 (16.9)
Roles to be played by both parties	29 (37.2)	11 (14.9)	22 (30.1)	62 (27.6)
Others	28 (35.9)	25 (34.2)	39 (52.7)	92 (40.9)

participate in the governance of the forest reserve through decision making given their 76% response. The same was viewed by half of the forest officials. The local community was already organized for this venture given that they had community based organisations like WBFCP and NUDA. Close to decision making was sharing management functions which had more than half positive response. Bubango and Busitema parishes which were observably more forested had more than half of their respondents willing to share in the management. In equivocal way, the local community were ready to maintain the forest boundary by more that two thirds and call off illegal activities by more than half. Contradictorily, only slightly above a third were willing to protect the forest boundary and conserve the forest reserve besides less than a third of them were willing to get particular tasks/roles in the co-management. It was ostensibly clear that the locals were willing to comply with any rule and regulations applied to conserve the forest reserve manifested in less than a quarter unwilling to comply with punitive enforcement such as imprisonments.

CONCLUSION

In this study, illegal human activities such as: charcoal burning, wood fuel collection and farming activities in WBFR have led to its deforestation. It was revealed that the forest officers were also found significantly influencing deforestation. The forest officers' engagement was by both proxy and direct. That is, they were involved in the omissions policy to enable local communities succeed in the illegal exploitation from which they have a share as part of their emolument. The forest department's negligence to strict supervision was also paramount in the deforestation.

Both the local communities and FD were willing to collaborate through CFM with intent to conserve the forest reserve. Some of the former were a bit resistant, given the acts of the latter such as corruption, punishments in consistence and lack of trust claimed by them. But despite all the ills of FD, CFM remains apparently the way forward for both have benefited from illegal activities and seen the dangers of their acts.

RECOMMENDATIONS

Basing on the findings of the study, the researchers wish to make the following recommendation to the stakeholders of the WBFR, the government through the Forest Department should embrace the concept of Collaborative Forest Management (CFM). Centralized management is in total disregard of the local communities who had lived in harmony with the forest reserve for time immemorial. The local community living around WBFR are willing to embrace CFM and through it, there are promises that both parties work hand in hand to get alternatives to illegal activities such as, utilize the resources sustainably, engage in other economic activities or productive nature on this public land, maintain the forest estate in totality with management style which will be cost effective as it will give time for regeneration of biodiversity, reforestation of the forest reserve, ecotourism and agro-forestry.

Government should sufficiently remunerate the FOs if they are not to be tempted to turn against the resource under their custody. This is because Uganda government policy has been contradicted to state control forest resources and paid little attention to local community participation in forest management. Failure to recognize indigenous systems of forest management and local communities' right to economically and sustainably access valuable forest resource leads to excessive use of primitive measures by the state to enforce forest and environmental policies. These draconian laws cause loss of interest in local communities' positive engagement in afforestation activities and management. CFM may not succeed if the forest department and the local communities' agreement become quasi-legal as it were in Buto-Buvuma (Gombya-ssembajjwe, 1998).

For effective CFM in WBFR, Busia district Forest Department and the local communities living adjacent the reserve by agreement and with a hope to stand by it should do the following collaboratively, make joint decisions, share management functions with transparency and accountability, get involved in protection through agreed by-laws and conservation measures and practice afforestation in the open spaces in the forest reserve with a hope of reforestation. For effective sensitization, lateral transfer of the existing undignified forest officials would change the face of their service. The sensitization should be through village councils, radios, billboards, songs, public debates and through schools. It is sensitization combined with collective responsibility which will reverse the trends of deforestation in WBFR. This would make CFM a success in the area, engaging in it from the start to the development.

NFA should train the local communities on tree management such as, cutting tree branches for fodder, fuel wood and so on referred to as looping, pests and disease control, management of trees, in hedges and boundaries, home gardens, agro-forestry and afforestation, tree protection, weeding, pruning, thinning and so on. They should establish woodlots and practice agro-forestry on their personal lands. The following species of trees are recommended; *calliandra calothyrus* multipurposely used for firewood, poles, fodder, shade,

nitrogen fixing, ornamental, bee-forage, soil erosion control and soil rehabilitation. Other species include; *markhamia intea* and *grevillea robusta* for timber, furniture, mulch, soil conservation besides what *calliandra* does. Exceptionally, *markhamia intea* can be used for charcoal burning highly needed by the communities living adjacent to WBFR (Ekise *et al*., 1994). These trees are multipurpose and very fast growing, hence would detach the community from illegal activities in WBFR. Thus, an assurance that they can manage their own trees and eventually reforest areas deforested in WBFR.

NFA should engage on participatory monitoring, to collect periodic data and record information on the activities of the local community members. This is needed in order to keep track of the progress of the activities as per set out targets, for timely removal of constraints, carrying out corrective measures and re-planning of activities to avoid embarrassing situations and to justify the use of resources. Participatory monitoring is collaborative in nature, hence needs technocrats in the capacity of forest officials. Besides evaluation of CFM is needed by both NFA and local communities with emphasis on the former being technocrats so as to gather, analyse and present information and data as a guide to present and future decision making in relation to CFM's activities.

There is a need to use energy saving stoves both in towns and in the rural areas. Where as in the latter areas, the three stone stoves should be modernized by building the stones high covered with soil which accumulates heat; using less firewood. The technology is simple and appropriate to the rural poor. In the urban areas, ceramic stoves should be used. The stove forms a practical and effective solution to excessive fuel consumption.

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