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Industrial forest plantations in Uganda: Local adjacent community perspectives

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ABSTRACT

Industrial forest plantations are both hailed and vilified for their socio-economic effects on local communities. As such, we posed the following questions: (1) what opportunities do industrial forest plantations bring to local communities? and (2) what benefits are lost with the establishment of industrial forest plantations?

Households neighboring industrial forest plantations in five villages of mid-western Uganda were surveyed. A large majority of the respondents (92.6%) stated that they had benefited from forest plantations, while a minority (7.4%) stated they did not. Fuelwood and employment were the most mentioned benefits. Approximately 47.9% of respondents stated that they had lost certain benefits due to the establishment of industrial forest plantations, while 52.1% stated they lost no benefits. Occupation, the number of people in a household and the length of residence in the area influenced responses on whether participants had lost certain benefits.

Access to land was the most mentioned (82.2%) benefit lost due to industrial forest plantations. The study supports the notion that industrial forest plantations can provide certain benefits in the initial years of establishment but may also deny local communities historically established customary access and user land rights. Local livelihoods should be integrated into forest plantations management plans.

KEYWORDS

Forest adjacent communities; forest plantations; land rights; livelihoods

Introduction

Governments around the world are increasing their support for industrial forest plantations (Gerber, 2011). This increase is partly because most natural forests can no longer sustainably supply wood quantities commensurate to the aggregate demand (Sedjo, 2001). Industrial forest plantations are henceforth perceived as a solution in providing stable wood supply (Bull et al., 2006; Whiteman, Brown, & Brown, 1999). Moreover, harvesting of timber from natural forests is becoming restricted in various parts of the world for biodiversity conservation; therefore, forest plantations are recognized as a reliable source of timber to sustain the increasing demand due to population increase (Fox, 2000).

There is also a growing trend where by forest plantations are perceived useful in reducing pressure on natural forests (Bull et al., 2006; Sedjo & Botkin, 1997), enhancing carbon stocks and conservation of biodiversity (Hartley, 2002; Winjum & Schroeder, 1997). Some nations also consider industrial forest plantations useful in providing socio-economic benefits such as jobs, income for the local communities and

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government revenue through taxes and levies (Charnley, 2006), and improvement of livelihoods (Bull et al., 2006).

The enthusiasm for industrial forest plantations has resulted in a significant increase in planted forests between 2010 and 2015; in fact, planted forest area increased from 168 Million hectares to 278 Million hectares globally over this time period (Keenan et al., 2015), with a dramatic increase in Africa (Lyons & Westoby, 2014). It is anticipated that Africa will most likely be the World's leading region for industrial forest plantations by 2022 (Kröger, 2013).

Industrial forest plantations are both hailed and vilified for their socio-economic impacts on local communities (Schirmer & Tonts, 2003). In her review paper on the role of industrial forest plantations on local communities, Charnley (2006) concluded that they often bring about loss of customary rights to resource access, result in rural displacement and socioeconomic decline, and exacerbate the existing political and economic marginalization of certain members of these communities.

Similarly, Heaton (2006) asserts that industrial forest plantations can result in the displacement of local people from arable land and thus impact their livelihoods. Other authors (Corson, MacDonald, & Neimark, 2013; Kröger, 2013) contend that forest plantations only benefit local elites and multinational companies, making the local communities worse off due to lost livelihood opportunities, while Gerber (2011) suggests that they are associated with conflicts due to corporate control over land and the denial of local ecosystem use due to the replacement of the land with monocultures of the most economically viable tree species. Forest plantations have also been attributed as a source of deforestation and biodiversity loss that denies local communities access to forest ecosystem services (Nahuelhual, Carmona, Lara, Echeverría, & González, 2012).

Despite all existing negative views on the impacts of industrial forest plantations, some studies have shown positive outcomes on local livelihoods. For instance, Mead (2005) observed that they are important for woodfuel production through the utilization of residues. They also provide raw materials for wood processing industries such as pulp for paper, timber, furniture, construction, and panel products (Carle, Vuorinen, & Del Lungo, 2002). Industrial forest plantations can contribute to both economic development and the flow of finances among local communities (Wright, DiNicola, & Gaitan, 2000).

The perceptions on the interplay of industrial forest plantations and local livelihoods are to a great degree, still ambiguous considering the divergent views in the literature (Paquette & Messier, 2010). The current study therefore aimed at determining the extent to which the aforementioned narratives on industrial forest plantations are reflected in Uganda. According to the Global Forest Resources Assessment 2015 report, forest plantations in Uganda have increased from 34,000 ha in 1990 to about 60,000 ha by 2015, and area under forest plantation is increasing at 2.3% annually (FAO, 2015).

Industrial forest plantations are expected to supplement the supply of wood from natural forests. Direct incentives such as grants for large-scale industrial wood plantation development and the leasing of state-owned land (forest reserves) to private planters have been implemented since 2000 when the forestry sector underwent structural and functional re-alignment to increase the acreage of forest plantations in the country (GoU, 2002; Turyahabwe & Banana, 2008). As such the current study was guided by the following research questions: What opportunities are derived from industrial forest

plantations by adjacent local communities? What benefits are lost by adjacent local communities after the establishment of industrial forest plantations?

In this context, an "industrial forest plantation" is defined as any area of land cultivated and planted with trees of either introduced or indigenous species through intensive practices such as the use of inputs to produce trees meeting a minimum area of 0.5 ha, a tree crown cover of 10%, and/or a total height of trees above 5 m to satisfy direct and indirect human consumption needs (Borges, Diaz-Balteiro, McDill, & Rodriguez, 2014; FAO, 2015). We envisage that the current study will generate new insights on the industrial forest plantation and livelihood nexus in developing countries where industrial forest plantation development is still emerging.

Overview of industrial forest plantations in Uganda

Industrial forest plantations in Uganda were first established in the south-western part of the country during the mid-1940s by the British colonial administrators. This area was preferred for growing exotic species such as *Cupressus lusitanica* Mill. due to its characteristic habitat preference for cool temperatures and high altitude. Forest Plantations were later established in other areas such as the north-west and mid-west regions of the country, which had been declared previously reserved for plantation establishment by the colonial administrators. The existing forestry policy of the time prioritized timber production for export which was the underlying rationale for forest plantation establishment.

When Uganda became independent, the Forest Department acquired financial and technical support from Norway to establish more forest plantations in state-owned land formally referred to as central forest reserves in Uganda and by 1970 an estimated 13,000 ha had been established (Kaboggoza, 2011). This support was later withdrawn due to the breakdown of law and order and the subsequent turmoil that the country went through in the 1970s to the mid-1980s. Most of the plantations that had been established by the colonial administrators and the Forest Department with support from Norway were not well managed. Routine silvicultural operations were not implemented and this led to low timber productivity (Turyahabwe & Banana, 2008).

In 2001, a new forestry policy was formulated and supported by legislation in 2003 to facilitate its implementation. Both the National Forestry Policy (2001) and National Forestry and Tree Planting Act (2003) had provisions that promoted the inclusion of the private sector as critical in the development of forest plantation in Uganda. The Act provided tree and forest tenure security as an incentive for private investment in forestry (GoU, 2001, 2003). The policy also provided for government and other actors in the forestry sector to provide fiscal incentives to encourage private forest investment in Uganda. Other strategies to promote private forest investment included: strengthening legal agreements between government and private investors for use of the Forest Reserves and reviewing forest and tree tenure rules to encourage development of commercial forest plantations. Other strategies were: establishing financing mechanisms and developing improved seed sources and planting stock, and promoting their commercial production and distribution, and improving access to market information and technical collaboration in industrial forest plantations

In order to operationalize the aspirations of the policy, a forest plan was formulated in 2002 and then recently revised in 2013. The revised Forest Plan recognizes the role of

government agencies, such as the National Forestry Authority, in providing forest land to private investors for the establishment of industrial forest plantations as well as forest out-grower schemes in areas surrounding forest plantations on state-owned land (GoU, 2013). Grants such as the Sawlog Production Grant Scheme (SPGS) have been established to support private forest investors interested in timber tree production at large scale. The target is to have 150,000 ha of industrial forest plantations established by 2025 (NFA, 2006).

The scheme recently acquired more financial support from the European Commission for the third phase (EC, 2014). The rationale for providing increased financial incentives is to establish plantations that will supplement the supply of timber and other wood products from natural forests (Jacovelli, 2009) in addition to increasing rural incomes through commercial tree planting by private investors and local communities in Uganda (EC, 2014).

The most common species currently being grown are exotic species such as *Eucalyptus grandis* W. Hill, Eucalyptus clones from South Africa, *Pinus caribaea* Morelet, *Pinus oocarpa* Schiede ex Schltdl., and *Cupressus lusitanica* Mill. A few hard wood species are being attempted at a small scale such as *Maesopsis eminni* Engl. (native species) and *Tectona grandis* L.f (introduced species). Forest plantations are perceived by responsible agencies in the forestry sector as critical in creating local employment, overall economic growth, reducing pressure on existing natural forests and providing raw materials for industrial development (Roof, Coutinhoa, & Byabashaija, 2001; Turyahabwe & Banana, 2008).

Study area and methods

The current study focused on industrial forest plantations established in the Hoima district within the Bujaawe Central Forest Reserve (4869 ha) and adjacent villages. This reserve was selected because it is representative of forest reserves where industrial forest plantations are being established by both small- and large-scale planters with a potential to affect many rural people because the reserve boundaries border many villages with populations that have unique socio-economic and demographic characteristics thus being suitable for comparative analysis. Bujaawe central forest reserve is located about 23 km west of Hoima town (Latitude:1°31'54.26"; Longitude: 31°11'50.21"; altitude 1079 m.a.s.l). Bujaawe Forest Reserve was designated as a reserve in the 1930s for plantation development and is one of the reserves that was leased out by the National Forestry Authority (state Agency mandated to manage all central forest reserves) to multiple local companies to establish industrial forest plantations for periods ranging between 40 and 50 years. Individuals, small- and large-scale companies that are all owned by Ugandans who are not from the villages adjacent to the reserve are the majority plantation owners in Bujaawe central forest reserve. The area under individuals from local adjacent communities within the forest reserve is less than 1% of the total area.

Under this lease arrangement, forest plantation investors pay an annual rent of 9000shs/ha ($2.5 per hectare) and ensure that they adhere to the provisions in the National Forestry and Tree Planting Act, (2003), and the Guidelines for Forest Establishment in Central Forest Reserves (National Forestry Authority Official, personal communication, 14 September 2016). The rights to the tree resources belong to the plantation owners in accordance to the National Forestry and Tree Planting Act of 2003 (GoU, 2003).

Forest plantation establishment in Bujaawe Central Forest Reserve started in 2006, and only commercially viable tree species (Eucalyptus and Pine species) were planted by different investors who acquired leases over different blocks of the reserve. Other investors have also acquired land in the neighboring villages to establish forest plantations, while others have expanded their plantations by purchasing privately owned land.

The population density is about 250 persons per sq. km with most residents clustered along trading centers and major roads. The communities are dominated by Banyoro who are the native ethnic group, but other communities such as Baganda, Lugbara Acholi, Alur, Madi, Bakiga, and other permanently or temporary settled immigrant communities such as the Lendu and Okebu from the Democratic Republic of Congo are found in this area.

Customary land tenure system is the most common, and the land market is informal. Customary land tenure is one of the tenure systems provided for in the Land Act (1998) which is characterized by local customary rules, norms, and practices which are limited in their operation to a particular description or class of persons within a specific area. The class of persons can be a family, clan, village, or traditional institution. It provides for communal ownership and use of land and ownership of parcels of land that are recognized as subdivisions and the land is owned in perpetuity. Most of the land in this area is owned as private customary with very little left as communal customary land in this area. Private customary implies that individuals have permanent inheritable rights over the parcels assigned to them under their family, clan, or traditional institution, while communal customary land is where individuals of an identifiable group have usufruct rights over land and the ownership rights are held by an established customary institution such as clan, family or community.

Most members of the community are of low literacy level, derive their livelihoods from subsistence agriculture with no mechanization and input use and the household incomes are relatively low with most people perceived poor by the local standards (Area local political representatives, personal communication, 14 January 2015).

Sampling procedure

The study was conducted in five different villages adjacent to industrial forest plantations in the Bujaawe Central Forest Reserve and neighboring private lands following an initial survey in the Hoima district of, mid-western, Uganda. The local council chairpersons of the adjacent villages indicated that there were 131 households that lived in the five selected villages.

We targeted having a sample of 100 households (to have a confidence interval of 95% and margin error of 5%) from the 131 households that lived across the five villages. Twenty households were selected randomly from each village using a village roster of households that lived adjacent to a forest plantation either in the Bujaawe Central Forest Reserve and/or neighboring private lands that was provided by the local council chairpersons. A household was categorized as adjacent to a forest plantation if it was within a radius of 1 km from the reserve or any industrial forest plantation within the village selected for the study. A total of 94 households participated, while the other six were not at their premises by the time we carried out the survey. We interviewed the Head of the Household and in situations where he/she was missing, the spouse was the next

alternative. The head of the Household was preferred because the questions in the questionnaire required responses from an individual who makes major decisions in the household.

Data collection and analysis tools

Data were collected using questionnaires in the months of January and February 2015 from the villages of Kamugole, Kyakakweise, Bukerenge, Nyabihukuru, and Nyakabingo. Key informant interviews were conducted with employees of the companies investing in forest plantations as well as local political leaders to check for consistence of the data collected through questionnaires (Appendix) and socio-economic and demographic status of the area. Some officials from the National Forestry Authority were also interviewed to get information on the processes of acquiring leases in the central forest reserve for industrial forest plantation establishment.

A host of descriptive statistics such as frequencies and percentages, and chi-square tests were applied to determine whether there was any association between socio-economic and demographic traits of the respondents and their perceptions on the role of industrial forest plantations on the local livelihoods of adjacent local communities. Chi-square tests were done when the grand total of observed frequencies in the contingency table exceeded 5 (Fowler, Cohen, & Jarvis, 2008). Logistic regression was applied on responses that demonstrated Bernoullli distribution. All tests were done in SPSS with significance accepted at an alpha threshold of 0.05.

Results

Benefits derived from industrial forest plantations by adjacent local communities

A large majority of the respondents (92.6%) stated that they had benefited from industrial forest plantations, whereas 7.4% said they had not benefitted. The most mentioned benefits that accrued from industrial forest plantations were firewood (64%) and employment (61.6%). Other benefits are detailed in Table 1.

The socio-economic and demographic characteristics of the respondents were not significantly associated with the benefit responses from industrial forest plantations.

Benefits lost by adjacent local communities with establishment of industrial forest plantations

Approximately 47.9% of the respondents stated that they had lost certain benefits due to establishment of industrial forest plantations in their areas, while 52.1% mentioned that they had not lost any benefits. Most (88.9%) of those who lost some benefit mentioned

Table 1. Benefits acquired from industrial forest plantations.

Benefit	Frequency	Percentage
Building poles	18	20.9
Firewood	55	64
Thatch grass	12	14
Grazing	3	3.5
Timber	5	5.8
Employment	53	61.6
Land for crop production (Taungya system)	15	17.4

Note. Source: Authors.

Table 2. Benefits lost by adjacent local communities with establishment of industrial forest plantations.

Lost benefit	Frequency	Percentage
Land for crop production	37	88.9
Access to grazing land	1	2.2
Access to water points	1	2.2
Access to wildlife viewing	1	2.2
Access to pick domestic requirements	5	11.1
Hunting	1	2.2
Producing charcoal	2	4.4

Note. Source: Authors.

that they had lost land that they have historically accessed due to the establishment of industrial forest plantations in their area. Other benefits lost are shown in Table 2.

Logistic regression analysis showed that the number of people in a household, the occupation, and time/length of period one lived in the area all significantly influenced the response on whether they had lost certain benefits or not. Age, education level, sex, marital status, and income levels did not influence responses on lost benefits.

The odds that someone would respond affirmatively to the question of whether there were benefits lost reduced with the increase in number of members in the household (coefficient = −0.14, p = 0.048). In other words, the households with a relatively high number of members were less likely to state that they had lost benefits by the establishment of industrial forest plantations. The probability of a respondent stating that he/she had lost benefits due to forest plantation establishment increased if the respondent's main occupation was not farming but other occupations such as trading, employment in civil service, and forest plantations (coefficient = 0.595, p = 0.01). The chances that one responded that he/she had lost benefits reduced with increase in number of years one had lived in the area (coefficient = –0.548, p = 0.049).

Discussion

Opportunities derived from industrial forest plantations by adjacent local communities

The findings from the current study challenge the common notion that local adjacent communities marginally benefit from the establishment of forest plantations as reviewed by Charnley (2006).

It was found that local community members receive fuelwood and are employed by forest owners for various operations of forest plantation management. This is contrary to what was found in Kacung and Bukaleba central forest reserves that have been planted by a Norwegian registered forest company called Green resources where local adjacent communities were perceived as villains by the management and prohibited to access the forests for any products including fuelwood (Lyons & Westoby, 2014) and what was reported by Jindal, Swallow, and Kerr (2008) that local people are not allowed to harvest any non-timber forest products from industrial forest plantations in Uganda. Fuelwood is a resource that plantation owners in Bujaawe central forest reserve are willing to give away to local communities mainly because of a lack of a reliable market for early thinnings in Uganda. Plantation owners also allow local communities to pick dry wood or cleared vegetation during site preparation as fuelwood (Corewoods forest plantation manager,

personal communication, 20 January 2015). The findings corroborate Mead (2005) who contends that industrial forest plantations have a significant impact on woodfuel production through the utilization of residues. This observation may, however, change as the forests plantations mature to a point where there are less residues to offer as fuelwood or when the market for early thinnings expands in the study area.

Employment may have been mentioned as a benefit from forest plantations because most plantation owners are still implementing initial establishment procedures and tending operations, which are both labor intensive (District forest officer, personal communication, 20 February 2015). Eucalyptus and pine species are the major tree species currently grown in Uganda for industrial forest plantations, and they are both labor demanding during establishment and tending. This finding deviates from Schirmer and Tonts (2003), who suggest that employment derived from industrial forest plantations is mainly for non-residents.

The findings further challenge the argument that industrial forest plantations do not provide employment opportunities to local communities because owners use improved and efficient technology in their operations (Bull et al., 2006). These results show that in developing countries where most operations are still labor intensive, and moreover that investors are planting species that require numerous silvicultural operations; as such, according to these observations, industrial forest plantations can still provide employment opportunities to the local communities (Williams, Nettle, & Petheram, 2003).

This circumstance may, however, change in the future as the plantations mature and require less labor, as argued by Turnbull (1999) or if investors apply better technology in their operations that is not labor intensive. In their studies, Williams et al. (2003) reported that in Australia job opportunities associated to industrial forest plantations which is an important benefit of forest plantations were only available in the initial establishment and management operations. Similarly modern technologies were found to limit participation of African Americans in forest plantation operations in Alabama, USA (Bliss & Bailey, 2005).

It is essential that studies intending to determine the role of industrial forest plantations on addressing livelihoods needs and demands compare results during the initial years of establishment with results from when plantations are fully mature. Doing so will be necessary to ascertain how local communities participate in and benefit from the entire value chain of industrial forest plantations.

Benefits lost by adjacent local communities with establishment of industrial forest plantations

The debate on whether industrial forest plantations may cause a loss of opportunities and resources for local communities is still inconclusive (Bull et al., 2006; Paquette & Messier, 2010). Public views tend to vary from one locality to another (Williams et al., 2003), and the type of tree planting and scale (Schirmer & Tonts, 2003).

The findings from the current study showed that a loss of land for crop production was the most mentioned harmful effect of industrial forest plantations. Similar observations were made by Gerber (2011) in his review of conflicts over industrial tree plantations in the global South. This has also been found by Lyons and Westoby (2014) who reported that local adjacent communities had lost their customary rights over land in Bukaleba and Kacung central forest reserves in Uganda, thus making it difficult for them to achieve sustainable livelihoods (Lyons, Richards, & Westoby, 2014)

Our findings also further support the assertion of authors (Charnley, 2006, Heaton, 2006) who posit that industrial forest plantations can result in local communities losing their customary rights over access to lands with natural ecosystems (as these lands are converted into forest plantations). For instance, in the current study, local communities lost the opportunity to graze and water their livestock when the forest reserve was leased to private tree planters or private land sold to individuals investing in the industrial forest plantations. Hunting, charcoal production, and crop-based agriculture were all benefits that the local communities lost due to the development of industrial forest plantations. The findings also corroborate Kröger (2014) who argues that forest plantations reduce available land for local people.

Benefit loss was linked to the number of people in a household, the occupation, and time/length of period one lived in the area. It is therefore important that when preparing management plans for the forest plantations the community should not be perceived to be homogenous when designing strategies for mitigating benefit loss associated with plantation development. Vulnerability to loss of benefits due to industrial forest plantation varies with the aforementioned socio-demographic characteristics of the households. It is therefore important to assess the dependency of local communities on any land that they have been accessing irrespective of the legal status before it is converted to industrial forest plantations as doing so may prevent the jeopardizing of their livelihood strategies.

Conclusion

The views on the role of industrial forest plantations on local communities' livelihoods are mixed and not totally negative as presented by some authors. There are opportunities that are associated with the development of industrial forest plantations, such as increased employment and fuelwood availability.

However, there is no guarantee that forest companies will continue to offer employment opportunities when the plantations have matured, when there is affordable technology to substitute human labor, and/or when they start growing species that do not need as much human labor. Fuelwood may currently be available for the local communities from silvicultural residues/slash, such as thinnings, but there is no guarantee that forest owners will continue doing so freely in the event that there is a reliable and fair market.

The study has confirmed that development of industrial forest plantations on both state-owned and private land can deny local communities access to land resources over which they have customary rights due to the restrictions that forest owners and responsible agencies enforce. This circumstance may escalate tensions and conflicts between plantation owners and local communities. It is therefore imperative for forest plantation investors and responsible state agencies to be aware of the potential threats from industrial forest plantations to local livelihoods during the planning processes. Policies and measures that minimize negative impacts of industrial forest plantations on livelihoods, especially access to land resources, ought to be considered explicitly.

Deliberate efforts to formulate strategies for the local communities to harness benefits from the entire value chain of industrial forest plantations should be integrated in the forest management plans if sustainable forest management tenets are to be achieved.

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Appendix

QUESTIONNAIRE

Household Questionnaire No: . . ..

I am . . .., from Makerere University conducting a study on understanding Local adjacent community perspectives on industrial forest plantations in this area. The information given will be kept with high confidentiality. The data collected is only for the purpose of research. I kindly request you to participate in this exercise by providing information on the following questions.

SOCIO-DEMOGRAPHIC DATA

1) Ethnic group

(a) Munyoro ☐ (b) Alur ☐ (c) Mukiga ☐ (d) Munyankole ☐

(e) Other (specify).....

2) Age

a) 20-31 b) 32-41 c) 42-51 d) 52-62 e) 62+

3) Level of education (a) None ☐ (b) Primary ☐ (c) secondary ☐ (d) Tertiary ☐

4) Sex (a) female ☐ (b) Male ☐

5) Marital status

(a) Single ☐ (b) Married ☐ (c) Widow/widower ☐ (d) Separated ☐

6) How many people live in your household?.....

7) What is your main occupation?

(a) Farmer ☐ (b) Trader ☐ (c) company employee ☐ (d) Civil servant ☐

(e) Plantation owner ☐ (f) others (specify).....

8) Period lived in the area

(a) 1-5 years ☐ (b) 6-10 years ☐ (c) 11-15 ☐ (d) 16-20 ☐ (e) >20 years ☐

9) Income per year

(a) ≤50,000 ☐ (b) 60,000-100,000 ☐ (c) 110,000-500,000 ☐ (d) ≥ 500,000 ☐

B. ATTITUDES OF THE LOCAL COMMUNITY TOWARDS INDUSTRIAL FOREST PLANTATIONS

☐ ☐

1. Do you find having industrial forest plantations within your area of any importance?

(i) Yes ☐ (ii) No ☐ (iii) I do not know ☐

2. Give reasons for your answer

(i) .....

(ii) .....

(iii).....

(iv).....

(v) .....

C. BENEFITS DERIVED FROM INDUSTRIAL FOREST PLANTATIONS

(1) Do you have any benefits you get from any industrial forest plantations within your area?

(a) Yes ☐ (b) No ☐

(2) If yes, List them

(i) .....

(ii) .....

(iii).....

(iv).....

(v) .....

D. BENEFITS LOST FROM INDUSTRIAL FOREST PLANTATIONS

3. Are there any benefits that you lost when the current forest plantations were established in the forest reserve within your area?

(a) Yes ☐ (b) No ☐

4. If yes, list them

(i) .....

(ii) .....

(iii).....

(iv).....

(v) .....

THANKS FOR YOUR PARTICIPATION