Feasibility Study for a Long-Term Reforestation Project in Eluai Village, Monduli District, Tanzania

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Abstract:

We assess the need and desire for an alternative way to generate income which would preserve the environment instead of harming it. Informants told us that the quality of the environment had changed because of increasing erosion, a lack of rain and water sources, a reduction in livestock numbers, an increase in the number of farms, rapid deforestation and increased poverty. Without trees, the important symbiotic relationship between the Maasai and their environment would be destroyed. It would become necessary for the Maasai to leave their homeland and move to the cities. Local residents saw tree planting as the solution to this problem. In this study, we have shown that there is a great need as well as a great desire for a village wide reforestation project. A project of this kind would include civic education, training, and the development of local tree nurseries. Maasai people share an important relationship with their environment and a balance must be created between tree harvesting and tree planting if villagers want to live a sustainable lifestyle now and in the future.

Introduction

Maasai pastoralists represent the highest degree of pastoral specialization in the Eastern-Sudanic region of East Africa (Spear and Waller 1993: 62). Maasai peoples, however, also combine livestock herding with other economic activities such as cultivation, trade, and gathering. Because of their dependence on natural resources to sustain livestock and human populations (such as natural watering sites, grazing areas, agricultural land, and drought reserves), many Maasai groups that historically depended on community grazing structures and local, opportunistic agriculture suffered

economically when they were forced onto smaller parcels of settled land. This conflict arose as colonial, and later local governments began instituting land reform programs that transformed Maasai lands in Kenya and Tanzania into group ranches, privatized settler farms, national parks, game reserves, and hunting areas (Fratkin 1997, Leader-Williams 1996, Spear and Waller 1993). In 1911, Maasai lands in Kenya were reduced by 60 percent when the British evicted them to make room for settler ranches, subsequently confining them to present day Kajiado and Narok districts (Fratkin 1997: 243). Maasai lands were further enclosed to allow for the creation of game parks, including Amboseli, Nairobi, and Masai Mara in Kenya and Ngorongoro/Serengeti in Tanzania (Fratkin 1997: 243). Ndagala (1992: 41) states that "the colonial and post-colonial eviction of the pastoralists from some of their best grazing lands was rationalized to protect the wildlife." The transfer of these lands has served to enclose many pastoral and semi agricultural groups onto parcels of lands that are not suitable for either semi-nomadic pastoralism or agriculture at a sustainable level.

After independence, Tanzania implemented a socialist policy of villagization, a program to promote sustainability, development, and nationalism. In Maasai areas, this meant that people were physically resettled into *bomas,* a circular cluster of homes. The *bomas,* which were formerly kin settlements, were now "neighborly groupings of individual families." In 1976 (Ndagala 1982), the government officially resettled the Maasai in Monduli and gave them a maximum of three acres of land to farm. Whereas the Maasai previously thought of grazing fields as a community resource (Ndagala 1992), each family now owned its own plot of land. In the shift to a more sedentary lifestyle, the Maasai in Monduli Juu became "agro-pastoralists": they cultivated both maize and beans

and kept extensive herds of livestock. In this sense, they became more closely related to *ilmeek,* outsiders or non-Maasai, (Galaty 1981; Hodgson 1999) whom they had formerly despised because they did not value grass, a significant source of life for pastoralists (Galaty 1981:4). In the words of one woman in Eluai, "There used to be so many cows that the grass would not reach the door of the house; now there is (unused) grass everywhere."

This subsequently placed the Maasai at odds with their environment, both culturally and economically. "In responding to the question on what difficulties faced a man with little or no livestock….such a person was unable to obtain sufficient food….he has no cash to buy grains….he cannot obtain enough clothing….let alone put up a good house…..if unmarried he may not get a wife for lack of livestock…" (Ndagala 1982:36). Thus, the privatization of land ultimately increased the relative poverty of those living in Eluai and led to a more individualistic view of maintaining the environment. Instead of protecting the communal character of grazing lands, those who cultivated farms destroyed grass; an act seen as an aggression against *Engai (*Galaty 1981:4). Trees, which were formerly regarded as objects of refuge, ritual, and healing, became capital to be owned and used or sold in the same way livestock once was, by whoever held the land they grew on.

It is important to note the relationship between pastoralists and trees prior to villagization. Trees are not only important for daily household uses, such as firewood and house construction, but are vital elements of medicine. Certain roots, seeds, bark, and leaves are ingredients necessary for the creation of treatments used in *olpul* (Elleman 1996; Burford 2002). The Maasai also retain a policy of environmental protection called

Enjomare for special healing sites, such as *olpul,* where tree-cutting is forbidden. These are communal lands, used by all and protected by cultural law. But other forest areas, unprotected by cultural law, have shrunk at an alarming rate; woodland area has visibly decreased in area in the last year alone.

This year, 2005, has been unusually dry. The first round of crops died from lack of rain; the second batch that people in Eluai planted did not yield good quality maize and in some cases none at all. In addition, a tick-born disease, cerebral encephalitis, has increased in the area and ravaged herds. These two factors, especially in an area where people are cultivating and raising livestock solely for subsistence, have increased poverty levels in Eluai. The establishment of a more sedentary (urban) environment has also created negative opportunities for pastoral women, such as the illegal low status job of making charcoal (Fratkin 1997: 247). Women with little or no livestock to sell, searching for some way to feed their children, resign themselves to making and distributing charcoal.

The process of making charcoal is laborious. Trees must be cut, buried, and left to burn. The charcoal is then collected and carried by donkey to Monduli Chini, a four hour walk from Eluai, in the middle of the night, through dangerous forest areas inhabited by elephants, leopards, hyenas, and lions. In addition to depleting Eluai of its resources and wildlife habitat, the approximately six dollars that women make from each tree is little profit relative to the labor and risk that the charcoal-making process entails.

With the survey we conducted in Eluai in June of 2005, we hope to assess the need and desire for an alternative way to generate income which would preserve the environment instead of harming it. The questions focused on people's observations about

their environment, what they would like to see in the future, which trees they find most useful, and their experience with tree-planting and possible participation in a tree-planting program.

Methods

Over the course of a week we interviewed 16 residents in Eluai village, Monduli Juu, concentrating mainly in the highlands area of the village, where charcoal production is more widespread. We interviewed 8 men and 8 women, 31% of who were under 35 and 69% of who were over 35, creating a fairly even subject demographic.

Our interviews were highly structured, which allowed for the accumulation of clear-cut data. (See Appendix A for survey questions) The majority were yes/no or single-word answer questions, with a few open-ended answers. We expected to find that given the rate of deforestation, the general population would lack education about the importance of trees and active reforestation programs. We also suspected that poorer families would be more interested in tree planting, and that women would be more interested in tree planting than men.

Study Site

Monduli District is located in the Arusha region of northern Tanzania, adjacent to the Kenyan border and is dominated by the Monduli Mountains. Mt. Monduli, at 2,660 meters, is one of the smallest mountains in the Great Rift Valley, although its diversity, both in plants and wildlife, matches that of the famed Ngorongoro Crater. Monduli Juu is a ward within Monduli District, which encompasses four villages, namely Emariete,

Eluai, Enguiki, and Mfereji. Our survey was conducted in Eluai Village. The village's residents comprise approximately 2,900 persons who are dispersed over an extensive area of more than 55,000 square kilometers. This area begins at the Emariete/Eluai village border and ends at the entrance to Engaruka, near Lake Magadi at the bottom of the Rift Valley Basin (Site map located in Appendix 2).

The landscape is diverse in its forms. Dry montane forest dominates on the mountain slopes. As you descend the mountain, there is a gradual gradation of vegetation into grassy glades and seasonally inundated valleys. Within these inundated valleys there are areas of semi-evergreen bush land and savannah. These areas support large numbers of grazing livestock. In the thicket and woodland areas near the conjuncture of Emariete and Eluai, there is a large reservoir. At higher altitudes, the environment supports mountain hardwoods with dense canopy cover and alpine meadows. These alpine meadows are steep and rocky, therefore making them unsuitable for any type of agriculture. However, they are frequently used for goat and sheep grazing. Between both forested areas lies land cleared for agriculture by villagers. Forest areas also contain a number of natural mountain springs which offer year round watering sources to local residents. Rainfall reaches an average of 750-1000 mm per year in the woodlands and 1200-1500 mm per year in forested areas.

Households, or *bomas*, are typically spaced one half to one kilometer apart, with some *bomas* as far as ten kilometers from the next. Residents are primarily Maasai but over the years have intermixed with the Waarusha and Waswahili ethnic groups from surrounding communities through marriage or employment. Seventy percent of the people living in Eluai own between two and five acres of farmland and practice active

cultivation from October until May. Animal husbandry, however, is still the dominant practice, and markets are held every Saturday to assist livestock owners in the buying and selling of local stock.

Results

A total of sixteen people were interviewed in Eluai, comprised of eight women and eight men. All are ethnically Maasai and residents of Eluai village. A copy of the survey can be found in Appendix A.

31% of respondents said that there is enough natural woodland in the village to meet the present needs of the village. 69%, however, disagreed, saying that there is not enough. When asked if the current wood supply would be enough for future generations, 69% replied that it will not be sufficient. 31% of respondents stated that the woodland would be sufficient for future generations. Of those who answered positively, all were women under the age of thirty five. Considering that women are the ones who make daily trips to the forest to collect firewood, we were surprised to find that they did not recognize a decline in wood supply.

When asked about their current supply of building poles from local forests, only 37.5% stated that there was enough for the present time, while 62.5% said there was not enough because the trees had died out or been used up in recent years. One woman commented on the recent lack of building poles, saying, "People have started to build permanent houses and fence in their farms. If you think about the future, there will be nothing left." 87.5% of individuals agreed, saying there would certainly not be enough building poles for future generations if villagers continued to rapidly exploit current

resources. One individual declared that the forest would re-grow on its own, implying that there would be plenty of building poles for the future. However, she also noted that many houses have started to fall down and if people want to replace weak poles there will not be enough for everyone else.

Only 25% of people interviewed had ever planted trees. One man purchased six exotic species last year, and planted them in his *boma*. Four of those planted died, and the rest were eaten by goats. Another woman planted two trees one to two years ago, and one died. She also collected some seeds from *Oltiakule* Forest and planted them in her *boma*. All of them survived. Another couple purchased a number of eucalyptus trees from town ten years ago, most of which were eaten by goats; none survived. One of the two had experience planting trees: as a girl, she had planted trees at Emariete primary school. Finally, the husband of an *Elderito* woman planted an unknown number of trees nearly forty years ago near *En'kang Ole Marti.*

When questioned further, it was revealed that 75% of residents' parents and close relatives had never planted trees. Three individuals, representing 18.5% of the sample, said that their parents had indeed at one time attempted tree planting. Most of those trees, however, had failed.

Olea europea, locally known as *Olorien*, was the preferred species for firewood. It is an excellent firewood species because it burns slowly, produces small amounts of smoke, and is used to clean calabashes and to preserve milk.

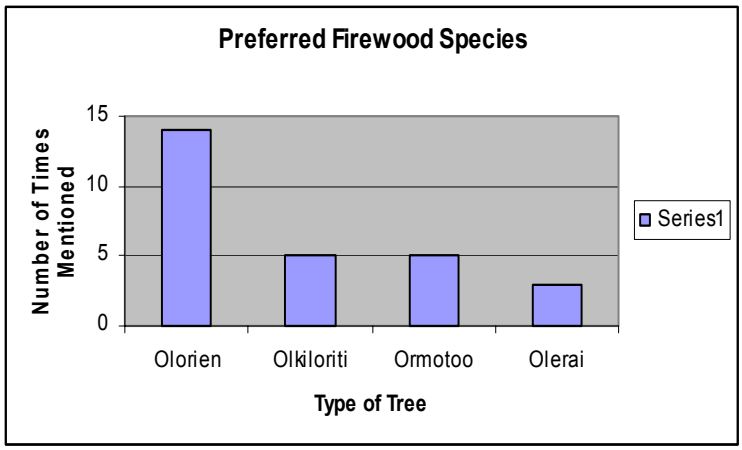

Fig. 1: Preferred Firewood Species

Olkiloriti was the second most preferred species for firewood. Also known as *Acacia nilotica*, *Olkiloriti* provides food, fodder, oils, resins and gums, and medicine all over East Africa (Kokwaro 1994: 158). Culturally, it is used in the following ways: the bark is used in tea daily to protect health and well-being; the bark and roots are used as a malaria prophylaxis; the roots are boiled and used to clean the uterus and dispel unwanted pregnancies; the roots clean the stomach and aid in digestion; the roots are also used as a stimulant by warriors before they go out on cattle raids (or more recently in ceremonies) to increase bravado and decrease fear.

Dombeya kirkii was the third most commonly used tree for firewood. *Dombeya sp.* or *Ormotoo* is also used as a general health tonic and as a seasonal fruit source. It is a mid grade wood and is easy to harvest for firewood.

Olerai, or *Acacia kirkii,* is another species commonly used as firewood. *Olerai* is an excellent soil stabilizer and is often used in erosion prevention projects. It is also used as a food plant: the bark can be peeled off to reveal the core cambium, which can be chewed to relieve thirst. The roots and bark are also used medicinally. In recent years, the tree has been used in charcoal production.

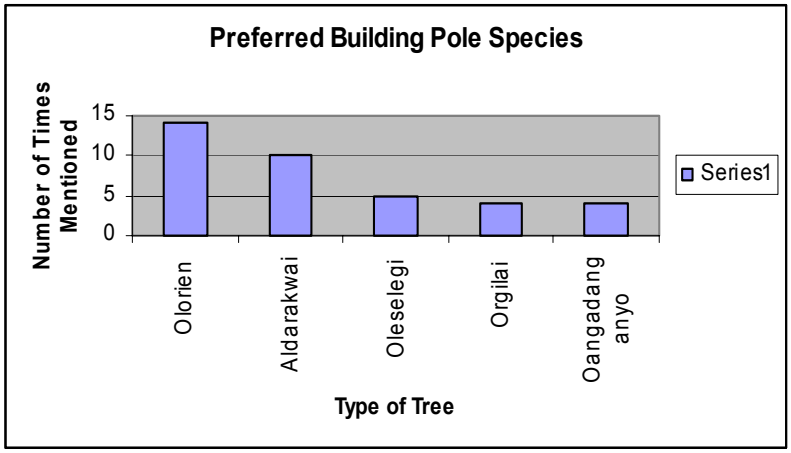

Fig. 2: Preferred Type of Tree for Building

In terms of trees used for building poles**,** *Olorien***,** or *Olea europea spp. africana,* was again the most preferred species. As a hardwood, the wood is strong and termite resistant, meaning that a house built with *Olorien* can stand for ten years or more without replacing its structural poles. Because the Maasai are no longer moving from place to place to find pasture for their livestock, they need strong, long-lasting wood to build permanent housing. *Olorien* is also a tree that is only found in mountain areas, so a preference for *Olorien* also shows an upward movement of Maasai from the Rift Valley Basin to places where the land is more suitable for agriculture.

Aldarakwai or *Juniperus procerus* was the second most preferred species for building. Another hardwood species, *Aldarakwai* is good for building because it is strong and termite resistant. *Aldarakwai* is no longer available in Monduli Juu because all available trees were cut down during the last ten years to use for building, ceremonies, blessings, and firewood. The few specimens that are left in Eluai Village are protected under local cultural law. If anyone is found cutting down *Aldarakwai,* they can be reprimanded by the elders and fined.

Oleselegi, Orgilai, and *Olodong'anayo* were also mentioned by at least 33 % of informants as important building pole species. These species are only found in forested areas in the mountains of Eluai Village. Preference for these species also therefore indicates that Maasai who were formerly living in the lowland areas of Eluai have moved to the upper areas of Eluai where the land is more suitable for agriculture. Elders who had lived in the lowland areas of Engaruka also reported using different species of trees for building when they resettled to Eluai during the late 1970's. *Orgilai* is also commonly used in charcoal production.

We asked informants if the forest had increased or decreased during the last ten years. 93.75% of informants said that the forest had decreased in size. Of those who answered differently, one woman said that the forest had increased because she associated the growth of agriculture with the growth of the woodland. Clearly, the forest has decreased to the extent that most people have noticed a marked change in its size and capacity. The forest in Oltiakule and Olekitayamunyi was once connected by thick bush land, but is now separated by open space. The bush land disappeared due to overgrazing by goats and sheep during the "agriculture boom" of the 1980's.

People gave many other reasons to explain why the reduction of forested areas in Eluai during the last 10-20 years was a major socio-ecological problem. Informants told us that the quality of the environment had changed because of increasing erosion, a lack of rain and water sources, reduction in livestock numbers, reduction in grassland, an increase in the number of farms, warmer weather, rapid deforestation, and increased poverty. All of these reasons indicate that villagers are concerned about the environment and want to live in a place where resources are available in the future. If water, grass, and

good land are not available, people will become poorer and their quality of life will be reduced.

Because local residents saw planting trees as one answer to the problems listed above, we asked them to explain what kind of benefits they could get from planting trees. Most people responded that trees bring rain, shade, firewood, and building poles. Others said that trees improve the quality of the air and prevent desertification, provide medicine and fruit, building and protection, blessings, good wind and weather, and help to preserve the beauty of the environment. Trees also provide food and fodder for animals. Trees can be farmed and sold for money. One man said that "As a child grows, she will find that her new forest has grown, and it will help her in her life." Therefore it can be said that Maasai peoples do not see a world without trees.

Most people did not see any difficulty in planting trees in their community. Some said that it would be difficult only because of a lack of nearby water sources. Others said that many people might be afraid to plant trees because they do not know how to take care of them. One person was afraid that if trees were planted in his *boma,* they would be eaten by goats and sheep. But overall, people said that planting trees is simple, and they would be happy to plant trees in their *bomas.*

We also asked people if they thought men or women would like to plant trees. 56.25% of people said that both men and women liked planting trees. However, 37.5 % of people said that men would prefer planting trees more than women. Only one woman said that women would be more interested in planting trees than men.

Finally, we asked informants if they thought rich or poor people had more interest in planting trees. A majority of people said that both rich and poor peoples had an interest

in planting trees. Only 25% of people said that rich people would have more interest in tree planting than poor people. The reason given was that poor people are more dependent on the environment for their survival, whereas rich people can purchase the things they need because they have more livestock to sell for cash.

Discussion

Historically, Maasai peoples throughout Kenya and Tanzania always lived in harmony with their environment. They grazed their herds throughout the African savanna without hunting ruminant migrants and held a deep respect for the natural environment. With the introduction of socialism and villagization in the mid 1970's, the Maasai became agro-pastoralists, which significantly changed their relationship with the land. Instead of depending on strictly pastoral resources, such as open grazing fields and semi-arid bush lands filled with wild plant foods, medicines, and fodder, they began to rely primarily on cultivated fields and market-purchased items as more and more people moved out of the bush and into settled communities.

Cultivation requires one to clear the land of all pastoral resources. Grass, which was once the most important feature of the landscape, is cut and burned to make way for farms. Because many Maasai in Eluai village lacked a place to graze their cattle, sheep, and goats when more and more farms were created, they moved their livestock into the forests and thick bush lands of the mountainside. This not only quickly deforested small patches of land along the rim of the mountain, but also encouraged the spread of tick-borne illnesses, which decimated herds. All of these factors led to a greater dependence on cultivated fields as livestock numbers fell and people became hungry.

Movement into settled communities also changed the way people built their houses. The Maasai did not have experience in building modern style houses. In the past, Maasai built their houses with bushes, shrubs, and small trees. To build a permanent house today, they must cut down large trees. New house designs also require men to take an active part in house building, which was until recently strictly a women's job. Now, men and women build their houses together. The building of larger, more permanent homesteads has increased the Maasai people's dependence on woodland resources in Monduli Juu. If people continue to rapidly exploit current resources, there will not be enough building poles for future generations. People will also start to cut down trees that were once prized for their social or cultural value and use them for building.

Woodland resources are also currently being depleted through illegal tree harvesting for charcoal production. In another study conducted by Andy Glossner and Kitumusote in April 2005, we found that charcoal production is directly linked to the increase in overall poverty of village residents, due primarily to the shift from pastoralism to agro-pastoralism in the process of sedentarizing. Because agriculture is an unreliable subsistence strategy in areas where there is unpredictable rainfall, agro-pastoral Maasai have begun to use tree harvesting and the sale of charcoal as a subsistence strategy when farms fail and they cannot sell their livestock for food.

Without trees, the important symbiotic relationship between the Maasai and their environment will be destroyed. It will become necessary for the Maasai to leave their homeland and move to the cities. The biggest problem with this movement is that most Maasai people do not know about city life, do not have modern education, and do not know about modern medicine. How will they find their way in the city without

knowledge of what it means to live in a city? For those who do not know about life outside of the village and are already too old to learn, the village is home. The solution is to preserve the sanctity of the village, meaning its trees and therefore local resources, for the elders as well as the youth.

In general, residents of Eluai village indicated that they would like to participate in a formal tree planting/reforestation program in their village. People were very aware of the socio-ecological implications of deforestation and saw tree planting as the solution to many of the economic problems discussed above. Residents said that trees bring rain, shade, firewood, and building poles. Others said that they improve the quality of the air and prevent desertification; provide medicine and food, building and protection, blessings, and good wind and weather; and help to preserve the beauty of the environment.

Most importantly, people named important species for planting and were aware of which species grow quickly. According to our assessment, the most important species to plant are: *Olea europea, Juniperus procerus, Acacia nilotica, Acacia kirkii, Maytenus senegalensis, Acacia drepanolubium,* and *Vepris simplicifolia.* These species are most commonly used for building and firewood, while some are more recently being used in charcoal production. Because we cannot force people to stop illegal tree harvesting for charcoal production, we see the need to plant species that are specifically identified as charcoal species as well as building and/ or firewood species in order to balance out the use of tree resources.

Residents who had planted trees in the past had always planted inside of their individual *bomas*. There is obviously a great need for tree planting in individual

homesteads, but we believe there should also be a village wide civic education campaign to increase awareness about the importance of planting trees in village commons. People also need to plant trees in their farms and inside of erosion channels and gullies to help prevent severe destruction of fertile soils in the area.

Within this civic education campaign, we also need to pay close attention to facilitating women's involvement in reforestation. Most people we talked to said that men would want to plant more than women. We do not think this is because women do not want to be involved in these kinds of activities, but because they tend to lack rights in terms of family decision making within Maasai culture. Educating men about the importance of women's involvement in development activities may be one way to increase women's participation in reforestation initiatives.

Overall, people did not see any difficulty in planting trees in their community. The only two concerns that were raised were lack of water and education. Civic education and the development of local nurseries is one solution to these concerns. A second solution is to build rain harvesting systems in nursery settings to allow for easy care of seedlings. Of course, one would ultimately hope for irrigation and water pipes to be laid in Eluai village in the near future to assist not only in tree planting but to alleviate the severe water shortage in the area.

In conclusion, we have shown that there is a great need as well as a great desire for a village wide reforestation project. A project of this kind would include civic education, training, and the development of local tree nurseries. Maasai people share an important relationship with their environment and a balance must be created between tree harvesting and tree planting if villagers want to live a sustainable lifestyle now and in the

future. Our hope is that a large scale reforestation project will create awareness among the Maasai people of Monduli Juu and encourage a deep respect for the environment that can be shared and cultivated for years to come.

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Appendix A

Survey of Feelings and Attitudes about Trees and Tree Growing

1. Would you say that there is enough natural woodland around your village to meet the present needs for firewood?

2. Would you say that there is sufficient wood for the future generations?

3. Is there a sufficient supply of poles for building for building from the natural woodlands for the present time?

4. Will the supply be enough for future generations?

5. Has anyone in your household ever planted trees? If yes, tree planting was done by who:

    a. Men
    b. Women
    c. Children
    d. All

    Year 1st tree was planted:
    Place of planting tree:
    Types of trees planted:

Usually quite a few trees die, only some survive. About what percentage of those you planted survived?

Where did you get the seedlings?

6. Did your parents or close relatives plant trees? If so, where and what kind of trees?

7. What kind of wood do you like best for firewood? Name three types.

8. What kind of wood is best for building poles?

9. Thinking back over the last ten years, would you say that the natural woodland has increased or decreased?

10. Do you think there have been any major changes in the quality of the environment apart from this? For example, decreased fertility, pastureland, wild vegetables, erosion/gully, rainfall, tsetse, drying up of streams, etc.

11. What do you think are the main benefits of planting trees? For example, firewood, poles, sale of timber, environmental protection, shade, fruit, etc.

12. What do you think are the main difficulties in planting trees, based on experience in this village or other villages that you know about?

13. Who is generally more interested in planting trees? Men or women? Would you say that richer or poorer people had more interest in planting trees?

14. Are there any other comments you would like to make about village tree planting for our report?