Estimation of the above ground biomass of *Arundinaria alpina*: Kenyan indigenous bamboo

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1. Introduction

Kenya is one of the developing countries. This country has faced the problem of forest resources use increasing. They have tried to overcome this issue by tree plantation and alternative species using [1]. However, the exotic species *Prosopis juliflorais* the plant that introduced from South America to Western Kenya since 1960s has shown the obviously characteristics of disturb the native vegetation since 1990s[2]. To prevent such problems, we have to suggest the forest producing by indigenous species. There is an indigenous bamboo *Arundinaria alpina* on the high land; over 2000m altitude in Kenya. Local citizen have used this bamboo for their livelihood. However, the bamboo management by local farmers has not discovered by the basic survey. In Kenya, there are the forest stations that have been set in each county, and they have managed by Kenya Forest Service. Local citizen are able to use Pelies ; common land for local farmers group in the forest station, however they cannot enter the other protected area as Conservation Forest in the forest station[3]. This study's purpose is to estimate the above ground biomass in two kind of bamboo forests; Pelies and Conservation Forest in Kamae where the indigenous bamboo grows to discuss about the way of the sustainable bamboo management.

2. Methods

This study uses three type's survey method; Bamboo forest mapping, forest plot recording, sample logging. In Bamboo mapping, recorded the areas of bamboo forest in the Conservation Forest to estimate the total bamboo area in GIS map. In forest plot recording, set the 10×10m square plots in bamboo forest in Conservation Forest and Pelies; each 5plots and 2 plots to record all culm's DBH (cm) ; Diameter of Breast Height and each locations. In sample logging, logged 50 bamboo trees from the bamboo forest in Conservation Forest to record each length, diameter of inside DBH and each 1m separated fresh weight of culm, branch and leaf from the ground. After that, some samples of each part the bamboos are dried to record the dry weight.

3. Result and Discussion

The result shows the allometric correlation between above ground biomass (AGB) in indigenous bamboo in Kamae and DBH as $DW_t=0.2929e^{0.5726DBH}$($R^2=0.7204$). AGB of bamboo forest in the Conservation Forest is estimated as 39.73t/ha. AGB of bamboo forest in the Pelies is 23.61t/ha, it is 42% lower than the Conservation Forest. That correlation has estimated the total AGB in the Kamae's Conservation Forest is 467.34t.The bamboo density in the bamboo forest in Conservation Forest is 19,980culms/ha. In the Pelies's bamboo forest is 15,200culmss/ha, it is 20% lower than the Conservation Forest. In the Conservation Forest, the DBH distribution by numbers seems like one peek ; top of 3.0≦DBH＜3.5cm, on the other hand, 2.5≦DBH＜5cm's culms are lacking in Pelies's data. It says, local farmers use 2.5≦DBH＜5cmDBH's culms basically. It shows present, local farmers remain 60% AGB in bamboo resources of Pelies. To consider about local farmers sustainable bamboo management, it is necessary to make obvious the rate of bamboo short's propagation and the amount of annual net primary production.

References 1) FAO,(2010),FAO Report
2) JOFCA,(2012),The report of Utilization of Forest and Tree for Poverty Reduction
3) Kenya Forest Service, (2011), Report on National Forest Resource Mapping and Capacity development for The Republic of Kenya