



MAKERERE UNIVERSITY

SCHOOL OF FORESTRY, ENVIRONMENT AND GEOGRAPHICAL SCIENCES

**RECRUITMENT AND VOLUME INCREMENT OF SELECTED INDIGENOUS TREE
SPECIES IN MABIRA FOREST RESERVE, CENTRAL UGANDA**

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ABSTRACT

An assessment of recruitment and volume increment of selected indigenous tree species was conducted in Mabira Forest Reserve. The aim was to guide determination of sustainable harvesting quota and harvesting cycles under a polycyclic harvesting system. The specific objectives were to assess recruitment levels of selected indigenous tree species; to determine their growth rates and to determine sustainable harvesting intensities. Data collection was based on individual tree counts and diameter (dbh) measurements carried out in 2001 and 2010 from 10 Permanent Sample Plots (PSPs). A utilizable volume model ($V = -4.4 + 28g$) derived from curvilinear volume and basal area relationship of sample tree height and dbh measurements was used to estimate volume from dbh measurements of trees whose heights had not been measured. The results show a net annual species increment of 3.5%/yr attributed to a higher annual species recruitment level of 7.3%/yr compared to lower annual mortality level of -3.8% /yr. By far, *Celtis mildbraedii* has the highest annual recruitment levels of 1.7%/yr followed by *Funtumia elastica* and *Trilepisium madagascariense* with 1.2%/yr. The lowest is 0.01%/yr recorded for *Monodora myristica*, *Lovoa trichiliodes* and *Entandrophragma cylindricum*. Average growth rate of 0.8 cm/yr (in terms of dbh increment) has been determined from 196 trees representing 64 species. Fast growing species with average growth rate of 1.8cm/yr include *Monodora myriastica*, *Lovoa trichiliodes*, *Ficus Mucoso*, *Ficus exasperata*, *Celtis zenkeri*, *Albizia zygia*, *Antiaris toxicaria* and *Trilepisium madagascariense*. Slow growing species with average growth rates of 0.2 cm/yr include *Phyllanthus discoideus*, *Funtumia africana*, *Lasiodiscus mildbraedii*, and *Celtis wightii*. The Mean Annual Increment (MAI) was 14m³/ha/yr determined from 892 trees. *Celtis mildbraedii* had the highest annual volume increment (4.32m³/ha/yr) while the lowest (<0.001 m³/ha/yr) was recorded for *Harrisonia occidentalis*, *Tabernaemontana holostii* and *Parkia filicoidea*. Further analysis of volume increment in relation to felling intensity show that volume increment of 0.5-0.35 m³/ha/yr and felling intensities of 14-15 m³/ha are sustainable with an Annual Allowable Cut (AAC) of 9,800 m³/yr and 7,350 m³/yr respectively under polycyclic felling cycles between 30 and 40 years. From such volume increment and harvesting intensities, a harvesting intensity of 14-15 m³/ha and longer felling cycles of up to 75 and 90 years is proposed in order to ensure sustainable harvesting that can enhance restoration of Mabira forest ecosystem under polycyclic harvesting system.