PROJECT REPORT

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BIOPHYSICAL INTERACTIONS AND ECONOMIC ANALYSIS OF TREE MEDICINAL PLANTS INTERCROPPED WITH BATAI (*Paraserianthes falcataria*) IN SABAH

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ABSTRACT

This study was conducted at ex-stumping forest area under FMU 17B, Tangkulap-Pinangah Forest Reserve that managed by Maxland Forest Plantation Berhad. A Randomized Completely Block Design (RCBD) was used. In this study, there were four (4) medicinal plants cultivated intercrops with *Paraserianthes falcataria* (also known as *Albizia falcataria*) namely *Cymbopogon nardus* (Serai Wangi), *Ocimum basilicum* (Selasih), *Curcuma domestica* (Kunyit) and *Plantago major* (Ekor Anjing) in order to compare four (4) medicinal plants growth and yields intercropped with legume tree *(P. falcataria*) in ex-stumping forest area, to evaluate growth and yield differences of three medicinal plants through two of the primary drivers of growth: soil fertility and foliar nutrient, and to assess the economic performance of four (4) medicinal plants legume tree (*P. falcataria*). Chicken dung was applied every six months within one and half year. Biophysical parameters measured during the period of study were leaf area meter index (LAI), height, leaf biomass for harvesting. In terms of soil fertility, the soil and foliar samples taken for nutrient analysis such as Total N, Available P, Exchangeable K, Mg, Ca and as well as CEC after fertilization especially in ex-stumping forest area. After primary data collected, economic analysis carried out for assessing the profitability from the intercropped model like Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR) as well as Land Equivalent Ratio (LER). Intercropping of selected medicinal plants with *P. falcataria* is potentially in ex-stumping forest area through biophysical interactions and economic analysis. Biophysical interaction can be monitored through soil fertility and foliar nutrition content. Legume tree like *P. falcataria* and organic application can help the soil to restructure the condition so that can be cultivated after damaged by harvesting, machines compaction or human activities. The role of legume cover tree also plays a significant role to trap the N and fixing from atmosphere so that can convert to form that plant can absorb. In economic view, it can be concluded that all the intercropping models were given a better benefit to the company compare to mono-cropping activity

ABSTRAK

Kajian ini telah dijalankan di kawasan bekas matau balak di FMU 17B, Hutan Simpan Tangkulap-Pinangah yang diurus oleh Maxland Forest Plantation Berhad. Rekabentuk Rawak Blok Penuh (RCBD) telah digunakan dalam kajian ini. Dalam kajian ini, empat (4) tumbuhan ubatan dipilih dan ditanam secara selingan (intercropping) dengan Paraserianthes falcataria (dahulu dikenali sebagai Albizia falcataria) iaitu *Cymbopogon nardus* (Serai Wangi), *Ocimum basilicum* (Selasih), *Curcuma domestica* (Kunyit) and *Plantago major* (Ekor Anjing) untuk membandingkan pertumbuhan dan hasil empat (4) tumbuhan ubatan yang ditanam secara selinan dengan pokok legume (P. falcataria) di kawasan bekas matau hutan, menilai perbezaan pertumbuhan dan hasil empat (4) herba melalui dua (2) kekunci utama pertumbuhan: kesuburan tanah dan nutrisi daun, dan juga menilai prestasi ekonomi terhadap empat (4) herba dengan pokok legum (P. falcataria). Baja tahi ayam digunakan setiap enam (6) bulan dalam tempoh satu setengah tahun. Parameter bio-fizikal yang diukur semasa kajian adalah indeks keluasan daun (LAI), ketinggian, biojisim daun untuk hasil tuaian. Dari segi kesuburan tanah pula, sampel tanah dan daun diambil untuk analisis nutrient seperti Jumlah N, Kedapatan P, Pertukaran K, Mg, Ca serta CEC selepas pembajaan terutamanya di kawasan matau hutan. Selepas data primer diperolehi, analisis ekonomi dijalankan bagi menaksir kebolehuntungan daripada model tanaman selingan seperti Nilai Kini Bersih (NPV), Kadar Pulangan Dalaman (IRR), Nisbah Untung-Rugi (BCR) serta Nisbah Persamaan Tanah (LER). Tanaman selingan menggunakan herba terpilih dengan P. falcataria adalah berpotensi di kawasan bekas matau balak melalui interaksi biofizikal dan analisis ekonomi. Interaksi biofizikal boleh dipantau melalui kesuburan tanah dan analisis kandungan nutrient. Pokok legume seperti P. falcataria dan penggunaan bahan organic boleh membantu untuk menstruktur semula keadaan tanah supaya ia boleh ditanam selepas mengalami kerosakan akibat pengekstrakan, mampatan mesin atau aktiviti-aktiviti manusia. fungsi pokok penutup bumi juga memainkan peranan yang sangat penting untuk menahan N dan mengikat dari atmosfera supaya dapat menukarkan bentuk yang boleh diserap oleh tumbuhan. Dari sudut ekonomi, ia dapat disimpulkan bahawa semua model tanaman selingan yang dikaji telah memberikan manfaat kepada syarikat berbanding aktitiviti tanaman tunggal.