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Beyond Classical Approaches

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SUITABILITY OF PLANT SPECIES FOR AGROFORESTRY PROGRAM AT SRI AMAN, SARAWAK

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ABSTRACT

Agroforestry is an integrated approach of using the interactive benefits from combining agricultural and forestry technologies for creation of more diverse, productive, profitable, and sustainable land-use systems. However still less information are available on the suitable plant species for agroforestry program in Sarawak. This study was conducted in order to determine the suitable plant species for agroforestry program based on the consideration of climatic and edaphic factors of the study site. During the last 20 years, the study site received the average annual rainfall, monthly temperature, and relative humidity of 3,334 mm/yr, 26.5°C, and 85.3%, respectively. The soils in the study area were strongly acidic with pH (H_2O) of less than 5, even at surface soil (0-10 cm). The soils total C, total N and organic matter content were low. Based on plant-climatic-soil conditions, there are 32 most suitable vegetables species, 26 annual/perennial plant species, and 22 forestry plant species that could be selected as alternative plants on agroforestry program. Majority of the selected plants includes species from family Fabaceae (Leguminosae). In general, most selected plants can be grown well at area with annual rainfall, temperature, and relative humidity were 500-4000 mm/yr, 20-30°C, and 70-90%, respectively. Most plants that grow very well in soil between pH 4.0-7.0 also grow best in well-aerated soil. Agroforestry program is one of effective way to rehabilitate and manage degraded/critical land. Therefore, selection of the appropriate plant species is vital for the success of agroforestry program.

Keywords: Climatic factor, edaphic factor, selecting plant species, and agroforestry.

INTRODUCTION

According to the World Agroforestry Centre, agroforestry is a collective name for land use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. The integration can be either in a spatial mixture or in a temporal sequence. There are normally both ecological and economic interactions between woody and non-woody components in agroforestry (Clarke and Thaman, 1993). Buck et al. (1999) stated agroforestry practice, the cultivation of trees or other woody plants with crops or pasture for multiple benefits, can contribute substantially to advancing a sustainable agriculture through its influence on ecological and social processes.

Agroforestry projects are encouraged today for similar reasons as well as to meet local demand for forest products, to bring grass-fern "wastelands" to greater productive use, and to reduce the adverse environmental effects of rapid deforestation (Clarke and Thaman, 1993). Environmental variable directly and indirectly influence every aspect of plant growth and development (Nakasone and Paull, 1998). The climatic limits for each plant type can obviously only reflect the limited current knowledge of each type's distribution and the environmental factors restricting it (Solomon and Shugart, 1993). Climatic factors such as temperature, solar radiation, and moisture supply play an important role in crop production. Similarly, soil physical, chemical, and biological properties are directly related to crop productivity (Fageria et al., 1997).

SFMP (1999) explained two factors support site species matching were site factor and vegetation factor. Site factor was influenced by climatic factor, physiographic factor, edaphics factor, and biotic factor. Harris (1992) stated selecting plants that will adapt well to their intended site and will fulfill their intended landscape function is extremely important to the success of a planting and the ease with which it can be maintained.

This study was conducted in order to determine the suitable plant species for