Land Use Changes in Aluth Divulwewa Subwatershed and Emergence of Agrowells based Agroforestry

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Abstract

Poor distribution of rainfall and scarcity of irrigation water are the main barriers to maintain the agricultural productivity, in the Dry Zone of Sri Lanka. Therefore, farmers have constructed agrowells in the low lying areas of uplands to tap the shallow ground water to overcome this constrain. This agrowell based strategy has given highly positive results even creating perennial based cropping systems. The main objective of this study was to identify the impact of agrowell based agricultural systems and their significance in terms of creating agroforestry characteristics.

Field investigations for this study was conducted in 20 agro well based agricultural lands, purposively selected, out of the total of 68 in the "Aluth Divulwewa Subwatershed" in the Yan Oya Watershed. Data was collected using map interpretations, arial photograph analysis, field mapping, questionnaire survey, interviews and in depth field surveying techniques. The collected data was analyzed using qualitative and quantitative methods including LER value and canopy cover mapping.

Aluth Divulwewa subwatershed is a naturally rich ground water area, because of two mountain ranges situated in the Eastern and the Western boundaries. All farmers have constructed their agrowells in the vicinity of small tanks or near dry streams. These wells shows a mean depth of 8m and a mean diameter of 7m About 65% of agro wells indicate an average water depth of 2-3 m during the dry months.

As a result of this, fallow cultivation system (i.e. chena) have decreased down to 22% from 30% between 1994-2004. About 95% of farmers have abandoned the fallow cultivation system and all farmers have established live fences and dry field system for water conservation. About 90 % of lands have recorded the Land Equivalent Ratio (LER) over 1. These farmers have introduced 27 new tree species and canopy cover has increased up to 41.5 % from 7.9% due to the construction of agrowells.

The original landscape has changed in response to these interventions and the central point of this newly emerged cropping pattern is the agro well. These new cropping pattern can be described as "irrigated (continuous) annual cropping and perennial cultivation system with woody trees".

The composition, characteristics, stratifications, and spatial arrangements of these lands, represent the characteristics of agroforestry (Nair, 1993). Further the potential for the extraction of shallow ground water and expansion of the "agro well based agroforestry" in the Dry Zone and Intermediate Zone of Sri Lanka, also discussed.