

Mapping the status of paddy production system using GIS technique for developing the decision support system in Kamburupitiya Divisional Secretariat Division

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Abstract

The demand of rice will increase at 1.1 % per year in Sri Lanka and the rice production should grow at the rate of 2.9% per year to fulfill this demand. GIS (Geographic Information System) has been known as a powerful tool to understand spatial data analysis and this tool is recently applied to agricultural sector as well. This technique can be applied to paddy sector also in order to increase the paddy production through proper information management.

An extensive field survey was conducted to collect soil samples throughout the Kamburupitiya Divisional Secretariat Division. Soil samples were collected from 77 sampling sites at a depth of 5-20 cm and GPS locations were recorded. Machinery information related to Paddy production was collected using questionnaire survey. Information related to yield was collected from the Agrarian Services centers. pH values of Soil samples were measured using a pH meter. Soil Organic Carbon and Nitrogen were analyzed using Walkley and Black rapid titration method and Kjeldhal method respectively. Distribution map of pH and organic carbon were prepared by applying interpolating methods in GIS. ArcView GIS software was used for the spatial analysis and mapping.

Results of the study revealed that Soil Organic Carbon percentage ranged from 0.27 % to 3.64%. Soil pH ranged from 3.06 to 7.3. Soil Nitrogen content was very low and it ranged from 0.021% to 0.235%. The Land Area with Suitable pH and Organic Carbon for paddy crop were estimated as 3936.9 ha and 791.9 ha respectively. Four major groups of varieties were found and many of those were limited to some GN divisions. Yield per unit area varied from 1111.3 to 4769kg/ha/year. Paddy Lands are cultivated under the Major Irrigation, Minor Irrigation and Rain fall. Major Irrigations are limited to the middle part of the DS Division. Minor Irrigations are limited to the Western part of the DS Division. Flood effected Paddy lands are found in the Western Part.

Two wheel Tractors, Four wheel Tractors, Threshers, Harvesters, Sprayers and Rice Mills are the mainly used machineries. Considerable numbers of above machineries are present but the distribution is poor.

Keywords: GIS, Information Mapping, GPS, Paddy, Mechanization