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Soil characterization and land suitability evaluation of major soils towards food sufficiency in Cagayan valley, Philippines

Martin A A Jr, V Dumrique and M C Madrid Isabela State University, Philippines

Scientific land evaluations are important to properly identify an appropriate land use. Suitability analysis allows identification of the main limiting factors for the agricultural production and enables decision makers to develop crop management technologies able to increase productivity of the land. This study aimed to develop a GIS-based approach for land use suitability assessment which will assist farmers and land use planners to identify areas with physical constraints for a range of nominated land uses. Using the basic soil information obtained from field survey and laboratory analysis and matched with the growth and production requirements of the crop, the suitability of major agricultural soils for eleven main crops was assessed as per FAO land evaluation. Different land quality parameters, viz. soil texture, depth, erosion, slope, flooding and coarse fragments under various land units were evaluated for the crops. Soil suitability maps were prepared using Arc GIS software. From the 911,167 hectares considered agricultural soils, 39.53% were considered moderate to suitable, 47.30% are marginal and 13.16% with severe limitations. Lowland area covering 18.47% is suitable for rice cultivation and moderate to 33.49%. About 17.38% are suitable for upland rice and corn, 13.39% is considered moderate for upland rice while 43.90% for corn. For the minor crops, 18.27% for coconut, 18.15% for tobacco and cassava, 17.38% is suitable for fruit crops, sugarcane, and peanut. Based on current state of knowledge and available technology, moderately suitable areas can be transformed to highly suitable status through the adoption of appropriate soil management and improvement practices. This can further ensure that a sufficient volume of agricultural products can be produced.

jhun_6273@yahoo.com