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Optimized Cropping Calendar and Land Suitability for Maize through GIS and Crop Modelling

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Abstract : This paper reports an optimized cropping calendar and land suitability for maize in North Cotabato derived from modeling crop productivity over time and space. Using Quantum GIS, eight representative soil types and 0.3o x 0.3o climate grids shapefiles were intersected to form thirty two pedoclimatic zones within the boundaries of the province. Surveys were done to ascertain crop performance and phenological properties on field. Based on these surveys, crop parameters were calibrated specific for a variety of maize. Soil properties and climatic data (daily precipitation, maximum and minimum temperatures) from pedoclimatic zones were loaded to the FAO Aquacrop Water Productivity Model along with the crop properties from field surveys to simulate yield from 1980 to 2010. The average yield per month was computed to come up with the month of planting having the highest and lowest probable yield in a year assuming that all lands were planted with maize. The yield attributes were visualized in the Quantum GIS environment. The study revealed that optimal cropping patterns varied across North Cotabato. Highest probable yield (8000 kg/ha) can be obtained when maize is planted on May and September (sandy clay-loam soils) in the northern part of the province while the lowest probable yield (1000 kg/ha) can be obtained when maize is planted on January, February and March (clay loam soils) at the northern part of the province. Yields are simulated on the basis of varieties currently planted by farmers of North Cotabato. The resulting maps suggest where and when maize is most suitable to achieve high yields. There is a need to ground truth and validate the cropping calendar on field.

Keywords : aquacrop, quantum GIS, maize, cropping calendar, water productivity
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