



*Decision Support Systems for Agriculture
and Agribusiness*

A Geographic Information Systems-Based Decision Support System for Solid Waste Recovery and Utilization in Tuguegarao City, Cagayan, Philippines

Junel B. Guzman

Associate professor department of agricultural engineering
cagayan state university, philippines
email add: jbgcsueng@gmail.com

ABSTRACT

A Decision Support System (DSS) was developed to analyze and simulate the solid waste flow of Tuguegarao City using Geographic Information Systems and Stella modeling software. It was parameterized using data and information on population, per capita waste generation, average annual growth rates of population and solid waste composition in order to predict the volume of waste generated, compostable, recyclable, collected, uncollected waste and compost under three waste management system scenarios.

Tuguegarao City with a population of 67,207 for the urban barangay and 58,326 for the rural barangays generated a total of 1,012 m³ of household solid waste weekly in 2007, equivalent to a rate of 0.5 kg/cap/day and 0.42 kg/cap/day for urban and rural barangay, respectively. The commercial establishments, institutions and market generated at a rate of 384 m³, 209 m³ and 122 m³ of solid waste weekly or an equivalent total waste generation at a rate of 1,745 m³/wk.

The weekly solid waste composition was: 279 m³ (16%) paper, 105 m³ (6%) plastic container, 70 m³ (4%) metal, 70 m³ (4%) and glass 279 m³ (16%) as recyclable waste; yard waste, 506 m³ (29%) food waste, 122 m³ (7%) other organics as compostable waste; 209 m³ (12%) other plastics, 70 m³ (4%) inert, 17 m³ (1%) hazardous waste and 17 m³ (1%) special waste as residual waste.

Simulation results revealed that a decision to compost market waste (Scenario A) could result to waste conversion from 92 m³/wk to 237 m³/wk by year 2015 and by recycling institutional waste (Scenario B) could result to waste recovery from 171 m³/wk to 225 m³/wk by year 2015. Processing all generated compostable and recyclable waste (Scenario C) could recover 92 m³/wk to 1002 m³/wk of compostables and 171 m³/wk to 617 m³/wk of recyclables by year 2015.

To maximize the recovery and utilization of solid waste generated and to address the environmentally unacceptable burning and disposal of voluminous waste, solid waste management option for the city, Scenario C is recommended, provided that generators in all sectors will cooperate and adequate composting facilities will be made available.