

System Development for the Collection and Transport of Agricultural and Agro-Industrial Residues for Animal Feed Production

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Keywords: agro-industrial waste, animal feed, Decision Support System
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In Crete, more than 1,000,000 tons of biomass are produced annually, the majority of which are now improperly disposed of (at the least) while they could be used to produce animal feed. Biomass acceptable for animal feed units will be the main focus of the support system. Due to a variety of factors, including their physiochemical properties, their seasonal production, and their dispersion in a large and mountainous landscape, their collection and exploitation were not financially sustainable. The main objective of the Decision Support System (DSS) is to collect, analyze, and evaluate data in order to develop a plan that would enable the collection of biomass—agricultural and agro-industrial waste that is currently not utilized or collected on the island of Crete—and its conversion into animal feed in a way that is both environmentally and financially beneficial. Agricultural and agro-industrial waste contain bioactive compounds, that could be utilized as feed components, acceptable ingredients in feed production units. The challenge of DSS will be to meet the animal nutritional demands, to alter their dietary habits and at the same time to decrease the amounts of bio-waste that end in landfills. The DSS system integrates all gathered geographic datasets and will be able to dynamically communicate the information to assist the investors' decisions about the production of animal feed units. The inherent features of GIS are utilized by DSS tools, improving analytical capabilities and significantly supporting stakeholders in their decision-making. DSS can be quite useful in obtaining the most important information required for better decisions.

Classical and modern mathematical approaches will be explored to solve the optimization problem in DSS tool. Data such as transport time, availability of residues will be confirmed by random field tests with vehicles simulating speeds and characteristics of commercial transport vehicles.

ACKNOWLEDGMENTS

This research is co-funded within the Partnership Agreement for the Development Framework 2014-2020 by European Union and Greek national funds, through the Operational Program Competitiveness, Entrepreneurship, and Innovation (project No. code ΓΤ2CL-0374321).