RETASTE Conference Abstracts
Vol. 1 RETASTE-TFM-81
Athens, Greece, 6-8 May, 2021

GIS-based Model for Assessing New Suitable By-products for Renewable Energy Production Within the Context of Circular Bio-economy

Roberta Selvaggi and Francesca Valenti

Department of Agriculture, Food and Environment, University of Catania, Via Santa Sofia, Catania, Italy

Abstract

Biogas production from biomass by anaerobic digestion has developed significantly in the last years. In this field the use of agro-industrial wastes and by-products has been put forward to produce biomethane in a more sustainable way. In this context the processed fruit and vegetable and the related waste production represent a suitable resource for producing biofuel as a new frontier within the context of circular economy. Given the uncertainty of data related to biomass quantities, this research aims at filling the gap in the knowledge of the production and yield of these by-products useful as biomasses for energy uses in those territorial areas where biomethane sector is still developing. This aim is relevant to plan the sustainable development of biomethane sector regarding environmental protection in terms of reduction of both soil degradation for dedicated energy crops and greenhouse gas emissions derived from biomasses logistic supply, as well as the re-use and valorisation of the agro-industrial by-products that become resources. On this basis, a GIS-based model was developed and applied to Sicily region, by investigating the specific regulatory framework as well as analysing descriptive statistics. QGis software, was used since it is a valuable decision support tool suitable to collect, organise, analyse, and localise geographical data. The results of the GIS analyses allowed to carry out the localisation of the highest productive territorial areas and highlighted where fruit and vegetable wastes are highly located. In this regard, about 7 million of Nm^3/ton of biogas could be produced by reusing only the fruit and vegetables residues coming from the three considered most representative Sicilian wholesale markets. Finally, the regulatory framework was analysed since could play a key role for supporting or inhibiting the utilisation of the considered biomass.

Keywords: Renewable energy, Agricultural-waste, recycling, valorisation, biomethane, GIS, green economy, circular economy, bioresource policy

Acknowledgments: This research was carried out within the project entitled "Sostenibilità dell' agricoltura e dell' industria agro-alimentare Mediterranea" – Programma Operativo Nazionale (PON) FSE – FESR “Research and Innovation 2014–2020, D.D. 407/2018 “Attraction and Mobility (AIM) – Proposal: A1M1848200, CUP: E64I19002440007 supported by Italian Ministry of

Education, University and Research (MIUR).