SUSTAINABLE MANAGEMENT OF INORGANIC WASTE IN HORTICULTURAL SECTOR:

NEW APPROACH FOR IMPLEMENTING A BIOECONOMY

FARMING SYSTEM IN ALMERÍA (S. SPAIN)



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Introduction, objectives and method

REINWASTE (REmanufacture the food supply chain by testing INNovative solutions for zero inorganic WASTE) is an INTERREG-MED proyect which aim is to bring a concrete contribution to the reduction of inorganic waste, favouring the adoption of greener innovative concepts by agriculture&food industry, According to a initial analysis combining advanced tech-solutions (from EU R&D projects, R&I centres) with real companies' requirements, it will test them within 3 value chains (IT_diary; ES_horticulture; FR_Meat). In this poster the first results obtained in relation to the protected horticulture are exposed.

Almería province is in the southeast of Spain, on the Mediterranean coast and concentrates 30.456 hectares of greenhouses, with a production of 3,286,385 tons of horticultural products in the 2016-2017 crop year, with an average of 10.79 kg/m².

Data gathered in this study is based on documentary review of empirical studies and reports. In addition to the above and based on expert knowledge and informal interviews performed in 2018, a typology is made, and the waste produced in the primary sector and some innovative practices to reduce these waste is performed.



Landscape of the main greenhouse cropping of Almería: The "Plastic See"

Main Results

Analysis of the Processing Steps

Statistic Data

1.- Maintenance or renovation of agricultural infrastructures. Structure of greenhouses; Irrigation systems; Replacement of covers; Maintenance of ventilation systems.

2.- Preventive plant health measures. Physical barriers in the soil, chromotropic plates or pheromones.

3.- Sowing or transplanting. Plants are directly sowed in the soil or in specialised nurseries. Seedlings are transported in



Function	Weight		Volume	
	(Tm)	%	(m3)	(%)
Greenhouses	39,215	42	49,798	40
Substrates	1,219	1	1,598	1
Water storage	576	1	730	1
Disinfection	21,061	23	24,066	19
Shading	10	0	10	0
Transplanting	1,937	2	547	0
Tunnels	2,259	2	2,429	2
Padding	4,900	5	5,065	4
Supporting	6,448	7	1,763	
system				1
Irrigation	4,967	5	20,760	17
Plant protection	4,034	4	17,333	14
Pollination	2,469	3	26	0
Harvesting	4,076	4	215	0
Total	93,170	100	124,340	100

trays of seedbeds with plastic cases in cars (in occasions protected with a plastic film)

5.- Plant health treatments and fertilisation.

Inputs are bought in the inputs store and then stored according to the legislation in force in order to manage them in accordance with the SIGFITO indications derived from regulations. Some fertilizers supplying companies may not be included in the SIGFITO management system.

6.- Pruning, defoliation and Fruit thinning. Pruning and defoliation processes need to take especial prophylaxis measures such as the use of gloves and cutting tools

4.- Biological control.

boxes.

Auxiliary insects are transported to inputs warehouses or farms in plastic packagings kept inside refrigerated porexpan

Detail of the roof of a greenhouse Almeria type: plastic between wires

7.- Harvesting. This process produces a

great flow of plastic and wood material

8.- Crop removal Biodegradable Raffia; Reused plastic raffia; Plastic Raffia.

9.- Plant training systems. These systems use plastic and metallic by-products such as: raffia, clips, staples, hooks and complex training systems. Exceptionally, they are separated when crops are removed.

Table 1. Annual distribution of waste grouped by the function that they develop in the farms of Almeria. Produced by the authors.

Material	Weight	Volume		
	(Tm)	(%)	(m3)	(%)
HD polyethylene	33,539	36	74,764	32
LD Polyethylene	9,165	10	130,899	54
Metal	36,921	40	27,968	12
EVA	700	1	761	0
Polypropylene	4,813	5	2,373	1
Polystyrene	1,430	2	95	0
PVC	140	0	112	0
Mixed©	438	0	1,872	1
Mixed	2,917	3	428	0
Wood	284	0	231	0
Latex ⁽¹⁾	58	0	647	0
Concrete	288	0	169	0
Rockwool	768	1	1,097	0
Coconut fibre	452	0	502	0
Sand	67	0	56	0
Total	91,977	100	241,973	10

⁽¹⁾ Gloves used in harvesting.

Table 2. Estimation of the residual materials produced in 35,000 has of intensive farming. Produced by the authors.

10.- Soil disinfection:

Plastics are needed for solarisation and chemical disinfection. It is difficult to manage plastics as they usually contain dust and sand. Disinfectants packings are included in the SIGFITO system.

Innovative practices to reduce inorganic waste

- Natural Compostable String
- Cellulose-rayon biodegradable string
- Synthetic second generation oil
- White compostable clip
- Long lasting plastic cover
- Biodegradable string of jute fibre
- Natural Compostable Chromotropic Trap
- Black biodegradable mulching plastic
- Biodegradable and compostable clips
- Fine plastic rolls for flowpack

We thank the European Commission for its support in the REINWASTE project implementation co-funded by the European Regional Development Fund.