



## Development of the VegSyst-DSS web-based decision support system for vegetable crops to manage irrigation and N fertilization and to calculate the C and N footprints

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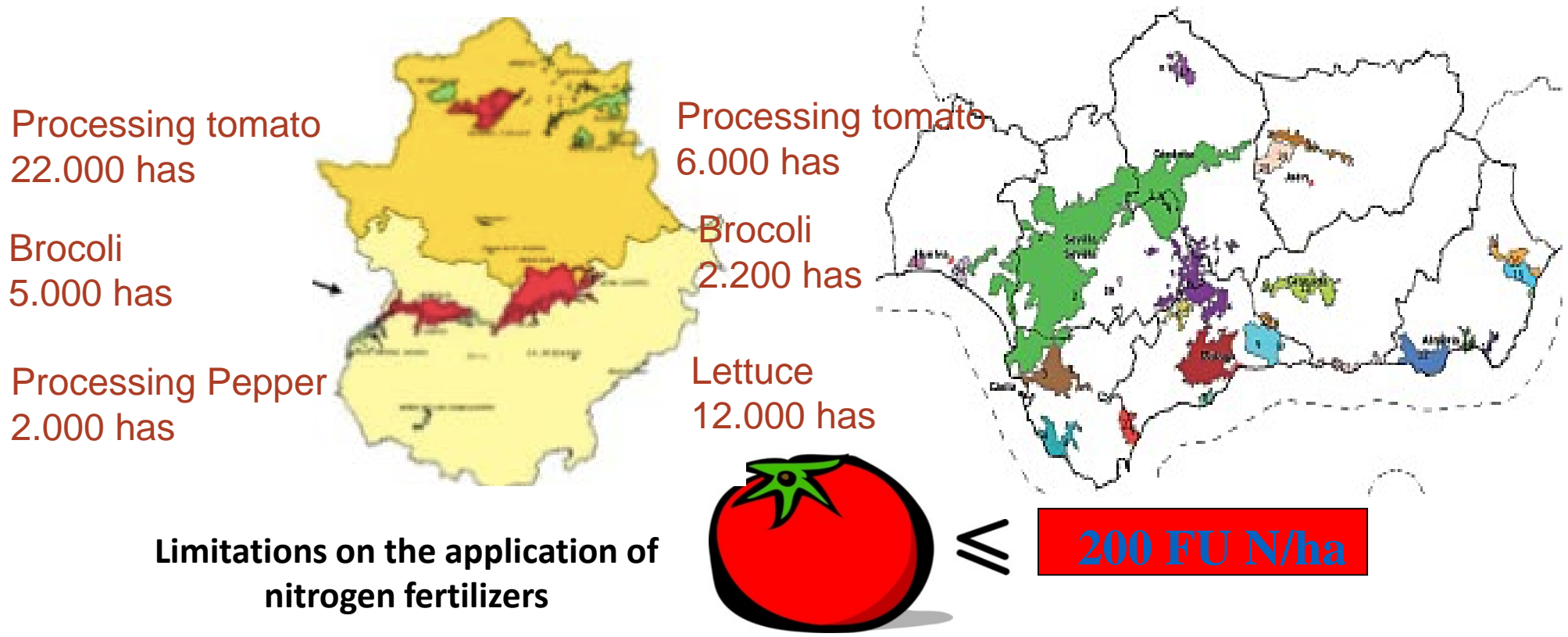
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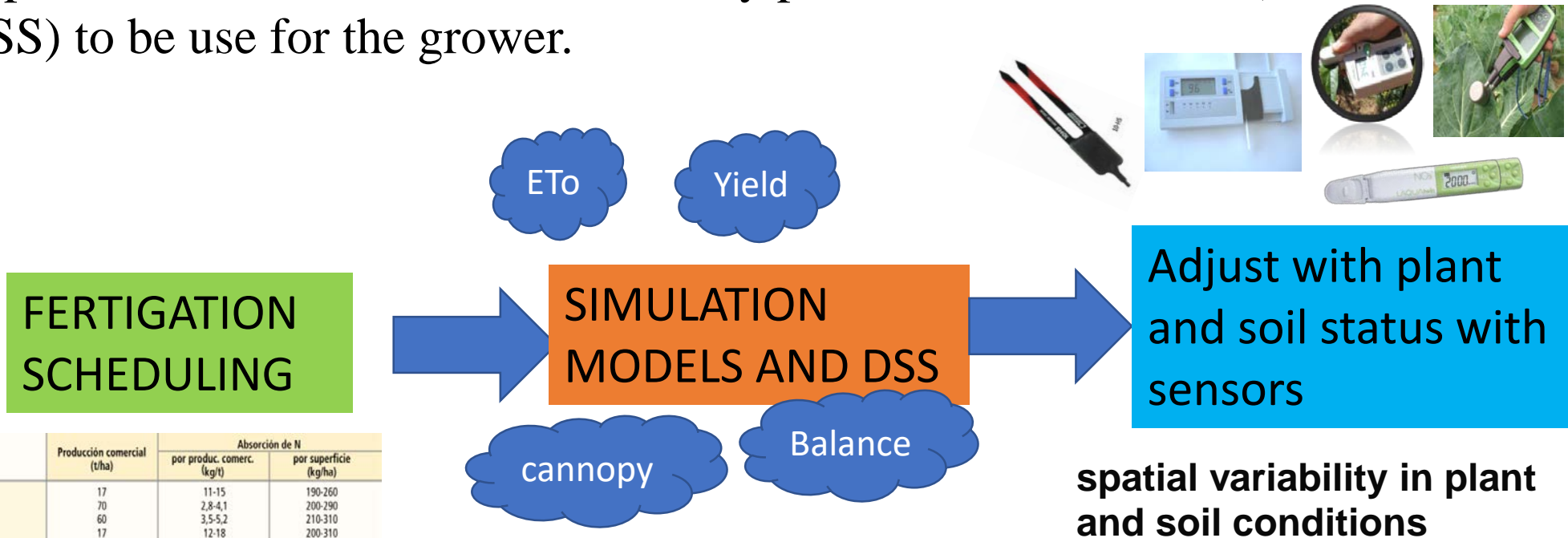
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The vegetable production, both outdoors and in greenhouse, represents one of the major agricultural sectors in Spain (200.828 ha)

## Vulnerable zones to agricultural nitrate contamination (European directive 91/676/CEE)

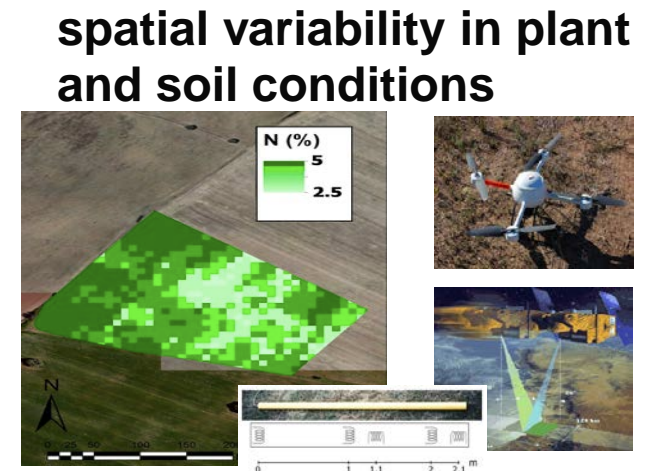


The use of fertilization recommendation systems is very important in order to improve the fertilization. It is necessary provide different tools (sensors and DSS) to be use for the grower.



	Producción comercial (t/ha)	Absorción de N	
		por produc. comerc. (kg/t)	por superficie (kg/ha)
Alcachofa	17	11-15	190-260
Apio	70	2,8-4,1	200-290
Berenjena	60	3,5-5,2	210-310
Brócoli	17	12-18	200-310
Calabacín	25	3-4	75-100
Cebolla	65	2,1-2,5	140-160
Col	50	3,8-4,2	190-210
Col china	65	2,7-3,5	180-230
Coliflor	30	7,5-8,5	220-250
Espinaca	25	4,5-5,2	110-130
Guisantes	4	25-30	100-120
Judías verdes	14	8-12	110-170

Variable rate Fertigation



## SIMULATION MODELS AND DSS <http://www.ual.es/GruposInv/nitrogeno/VegSyst-DSS.shtml> [Almeria University Crop Nitrogen and Irrigation Lab](#)

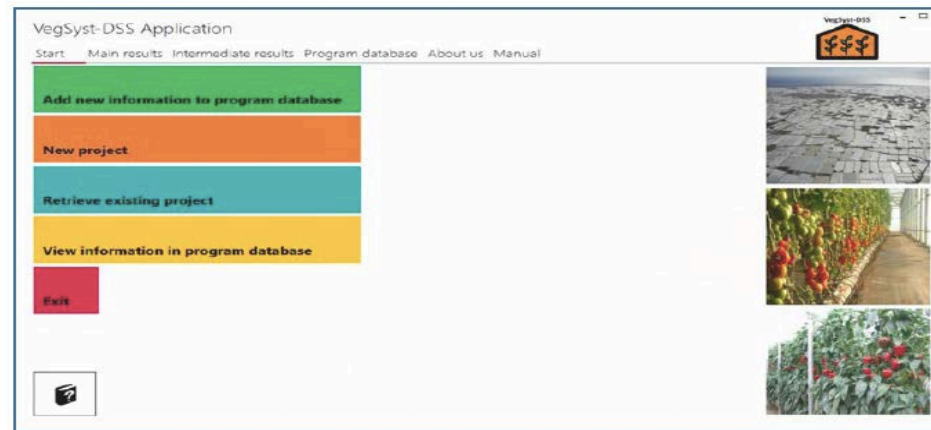
GesCon

VegSyst-DSS

EU\_Rotate-N

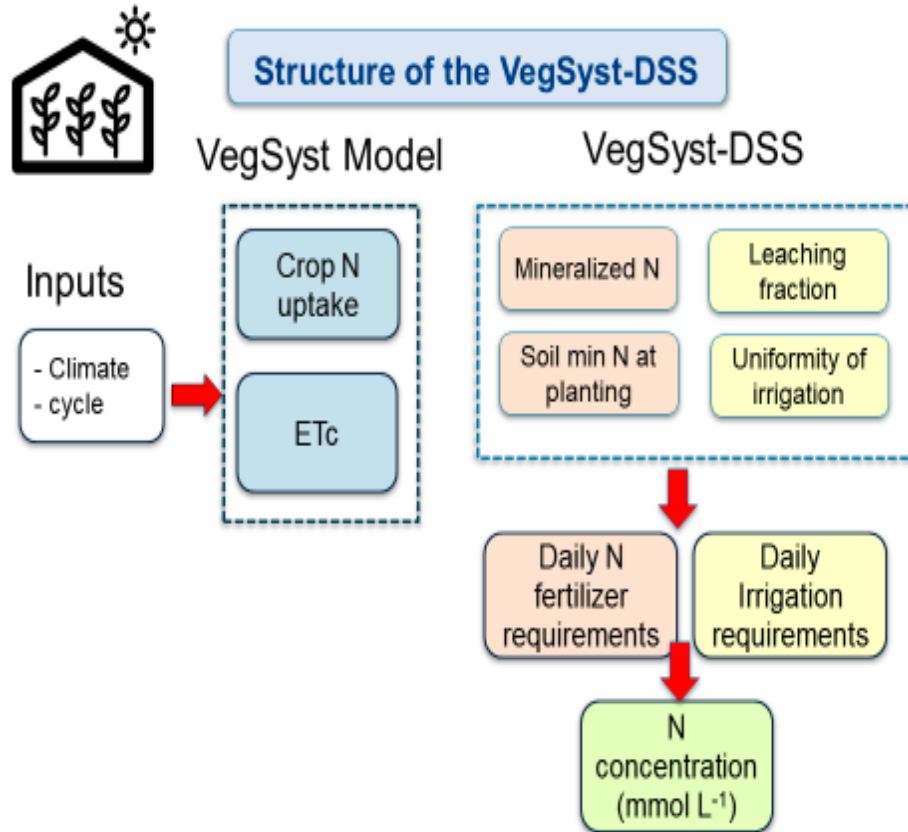
FertigationModel

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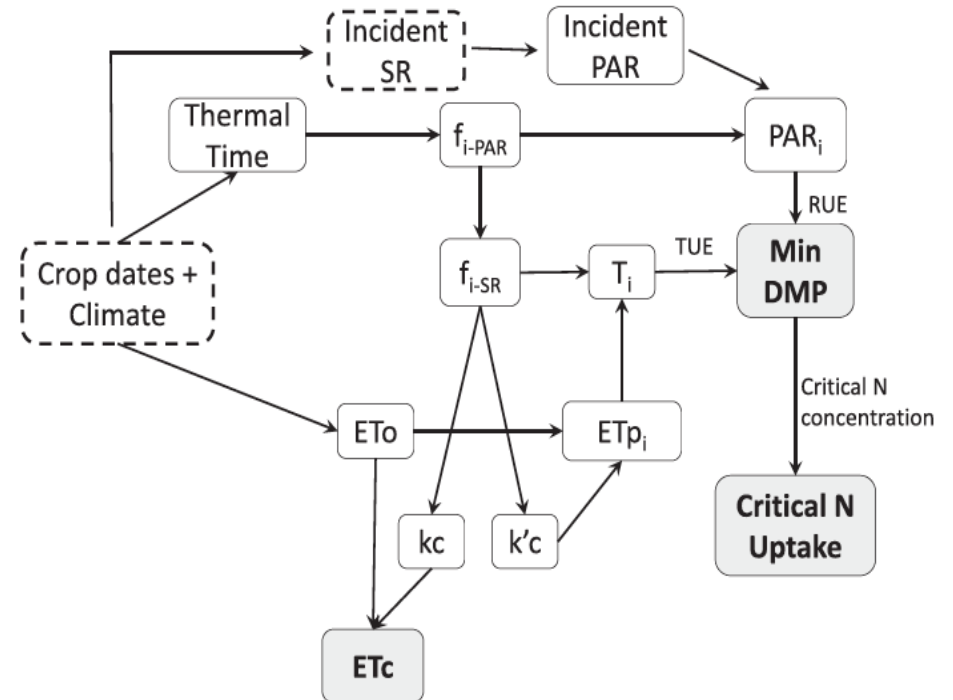
VegSyst-DSS is a decision support system (DSS) to make recommendations of daily irrigation volumes, daily amount of fertilizer N, and the N concentration in nutrient solutions applied by fertigation for vegetable crops grown in Mediterranean greenhouses

## INDOORS



Gallardo et al., 2016

## OUTDOORS



Gimenez et al., 2019

**To integrate Crop model, real-time weather data, soil and plant sensor monitoring techniques and footprint calculations in a new versión of the decision support system VegSyst-DSS to make recommendations of irrigation and nutrients applications based on the crop demand in outdoor and greenhouse vegetable crops.**

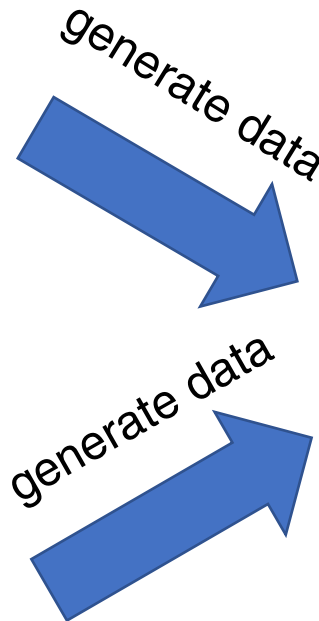


## SUBPROJECT 1

Evaluation of a new version of the VegSyst-DSS web-based system in outdoors lettuce and broccoli crops to manage irrigation and N fertilization and **implementation of the C and N footprints in the DSS**

## SUBPROJECT 3

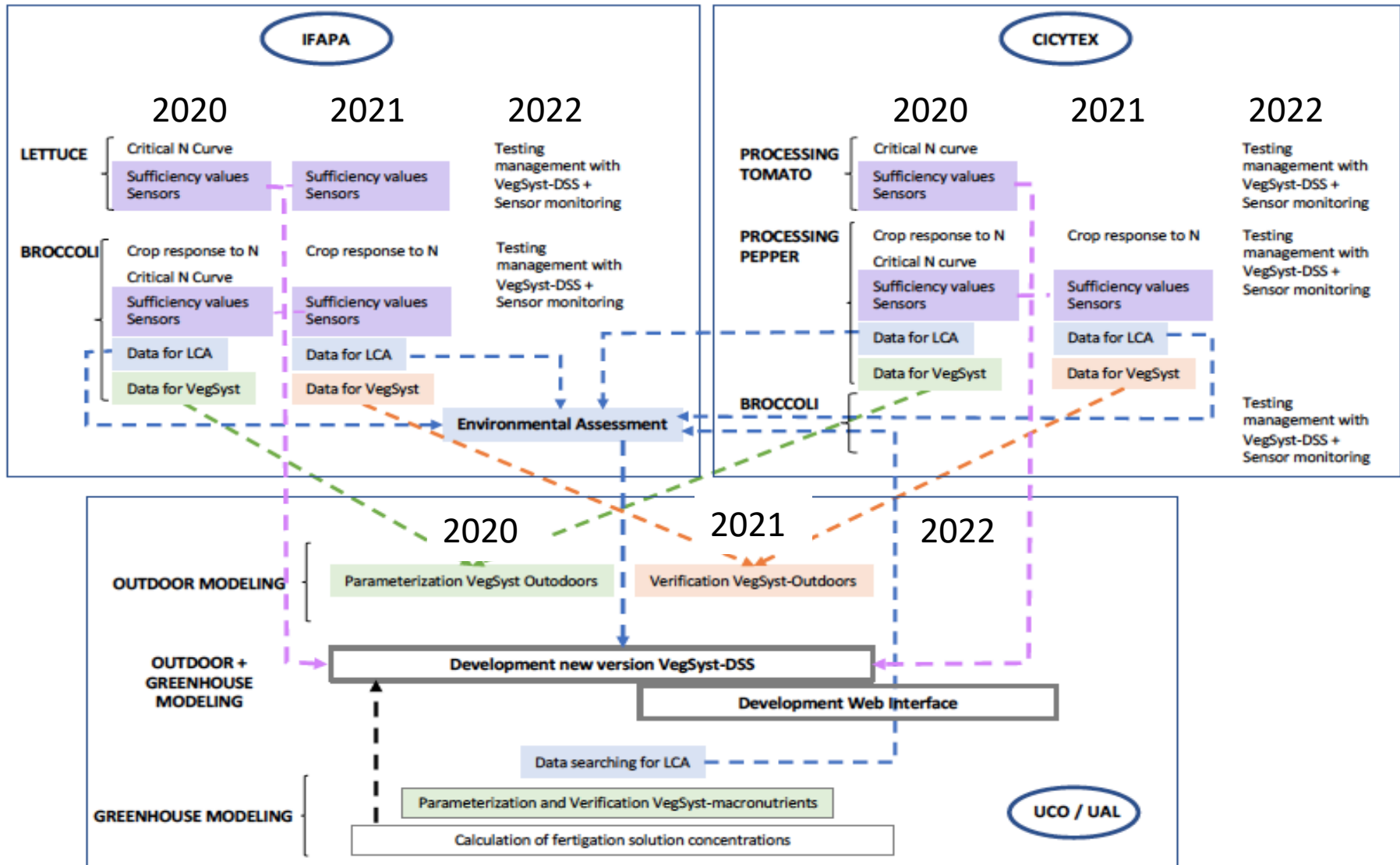
New VegSyst-DSS web-based system calibration in outdoors broccoli, processing tomato and pepper crops to manage irrigation and N fertilization. **Evaluation in commercial plots**



## MODELING

### SUBPROJECT 2

**Development of a new version of the VegSyst-DSS** web-based to manage irrigation and N in vegetable crops  
Parameterized and verified to estimate the uptake of main macronutrient apart from N (P, K, Ca, Mg y S)





**To get practical information about optimum N dose** in processing tomato and pepper, Lettuce and brócoli

**To get the critical N curve**, as it is an input to simulate minimum crop N uptake with the VegSyst model

To generate the required **field data to parameterize** and verify the VegSyst model in processing pepper and Lettuce.

To get the sufficiency values to **make recommendations** with low cost, easy to use sensors of soil water and crop N status

To get a validated procedure to **adjust crop coefficients** to the real field crop development using continuous soil moisture measurements.

To demonstrate the usefulness of the **new version of VegSyst-DSS supported with corrective sensor monitoring of soil moisture and crop N status**, to make real-time recommendations of fertigation management in processing pepper and tomato, Lettuce and broccoli

FIRST RESULTS WILL BE PRESENTING IN  
2020 IN EUVRIN MEETING

## ACKNOWLEDGEMENTS

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