Sustainable Agri-food Production Through Insects: The ADVAGROMED project´s circular economy Approach

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OBJECTIVE Innovative and holistic food systems based on circular economy + agro-ecological practices to increase the resilience of small to medium size farms

Using Insects




SERIDA
Servicio Regional de Investigación y Desarrollo Agroalimentario

PRIMA PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA
GOBIERNO DE ESPAÑA · MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES
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BioINSouth
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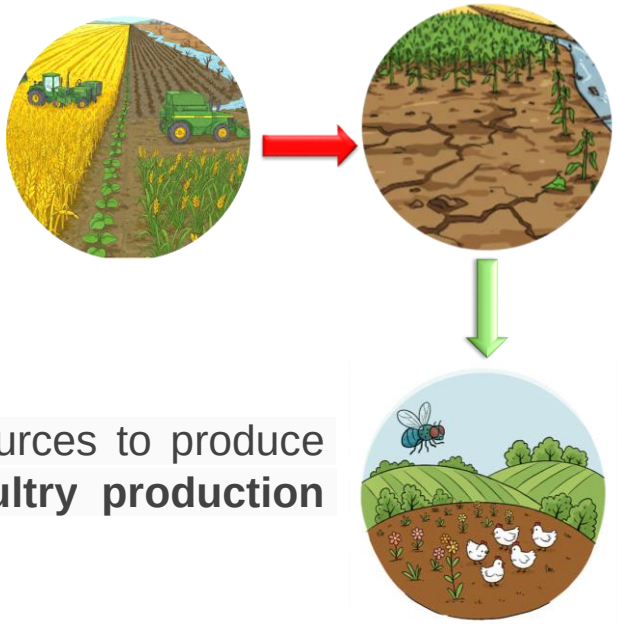
The Challenge

Agricultural **intensification** is accelerating **biodiversity loss**, **degrading soil health**, **and increasing dependency on chemical inputs and imported feed**. Smallholder farmers face economic vulnerability, climate stress, and limited access to sustainable practices.



The Vision

Circular agroecological farming uses agricultural **by-products** as high-value resources to produce **insect larvae** and **frass**. It connects insect rearing with **local crops and poultry production** to boost farm sustainability, biodiversity, and resilience in Mediterranean.

The Innovation

- **Insects as Bioconverters**:
Black soldier fly reared on local agri-wastes

- **Insect frass & chicken manure as Biofertilisers**:
  - ↑ microbial diversity & soil fertility
  - ↓ chemical inputs

- **Larvae as Feed**:
  - ↑ Production, animal health, product value
  - ↓ feed imports

The Consortium

Italy

UNIVERSITA DEGLI STUDI DI TORINO

Consiglio Nazionale delle Ricerche ISPA
ISTITUTO DI SCIENZE DELLE PRODUZIONI ALIMENTARI

Greece

UNIVERSITY OF THESSALY

Portugal

ENTOGREEN

Germany

DIL German Institute of Food Technologies

Morocco

جامعة السلطان مولاي سليمان
Université Sultan Moulay Slimane

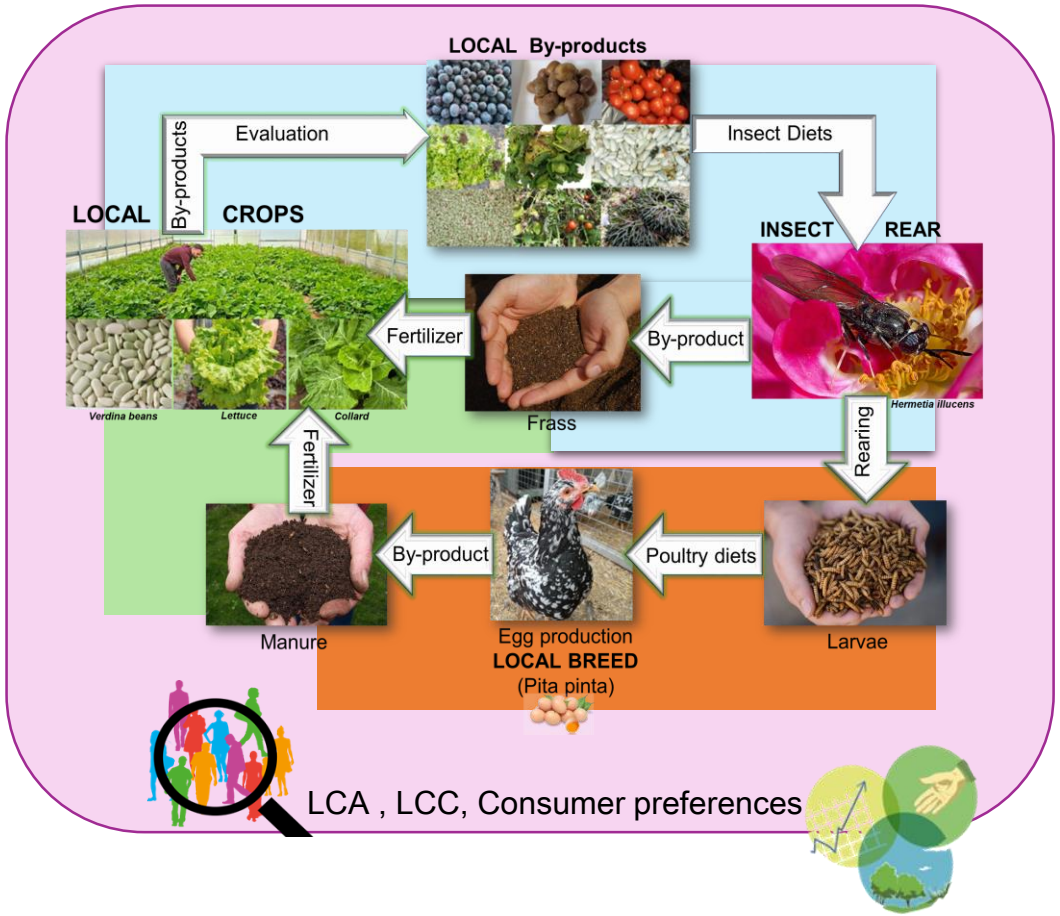
The Workpackages

1. By-product evaluation, availability & storage
   Insect diets and rearing, frass production

2. Poultry feeding, production, health & wellfare
   Manure production

3. Bean, collard & lettuce production, soil health

4. Environmental (LCA) and economic (LCC) impacts
   Consumer acceptance of novel farming systems



Key results

Agri-food by-products in Asturias to feed insect larvae

Identified 24 by-products + other sources from different sectors: fruits, horticulture, beans, cereals, cider, animal feed, algae
The availability of resources is limited
Small insect rearing in multifunctional farms
Support from cooperatives
Larvae and frass are affected by the characteristics of by-products

Animal production, health and wellfare

Feed imports can be partially replaced
Similar egg quality and physico-chemical characteristics
Unaffected health and wellfare with new diets
Manure characteristics is influenced by chicken diet

Plant production and soil health

Mineral fertilizers can be partially replaced by organic ones
Different crops different responses –
Crop species dependent fertilization strategies
Soil responses to fertilizers take time and depend on fertilizer

CONCLUSIONS

- Local by-products have high potential for insect rearing BUT they have to be adapted to local socioecological conditions
- Locally produced larvae can partially replace imported feedstufs for poultry production
- Increased farm self-sufficiency is possible BUT farmers and cooperatives need help
- Locally produced fertilizers (manure and frass) could partially replace mineral ones
- Fertilization strategies must attend crop specific needs
- Product quality (both eggs and vegetables) can be maintanied with alternative estrategi
- Consumer knowledge and acceptance of new products based from insect rearing is still limited
- Rural and urban population knowledge and opinions about egg production vary
- The global sustainability of these alternative and interconnected production systems is still uncertian