

# Edible insects have the potential to reconnect the agri-food chains - from 'farm to fork' and beyond

## 01 farmed insects not only reduce the dependency on imported sources of protein - they generate local products, using local underutilised resources;

European insect producers are already contributing to the development of a more Circular Economy by selecting substrates from local partners in a small geographical area. Through these partnerships, producers maintain an active network - connecting agricultural and food-producing areas from rural and urban regions.

## 02 insect farms aim at diminishing the burden of food waste - in line with the waste hierarchy;

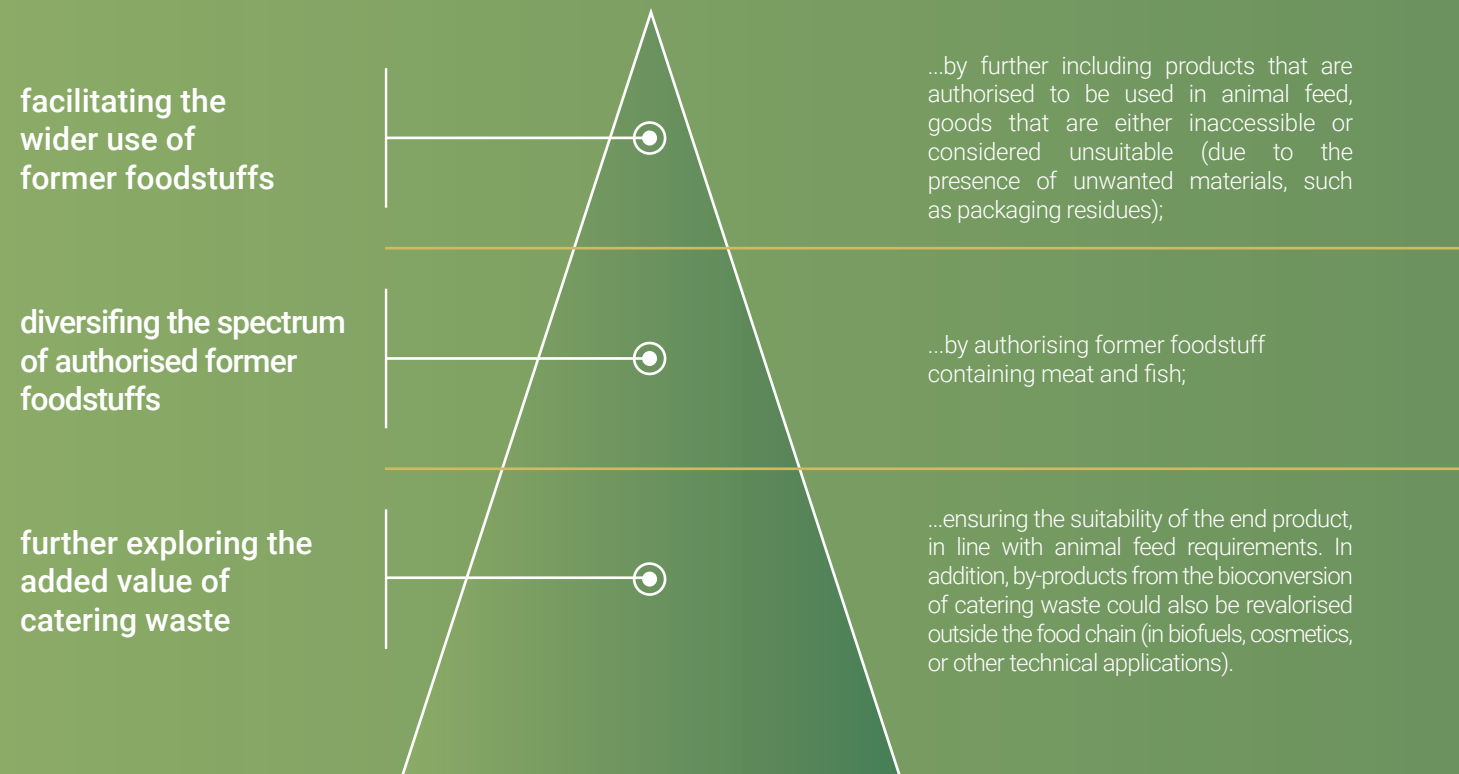
Insect farming contributes to tackling the challenge of food waste by feeding insects with co-products from the agri-food industries and with resources which are currently not being used and not or no longer destined for human consumption, such as the so-called 'former foodstuff'.

## 03 insects are highly versatile, feeding on a wide spectrum of products - thus, by optimising the use of former foodstuffs as animal feed, insects can safely upcycle materials that are not suitable for poultry, swine or ruminant species.

Considering the growing demand for meat, generated primarily by the growing population, optimising the use of limited resources remains imperative. With 3 million tonnes of insect protein (IPIFF forecast for 2030) produced in Europe, fewer imports of high-protein feed materials would be needed and the expansion of agricultural land outside the EU would be minimised, saving an area **the size of Belgium**.



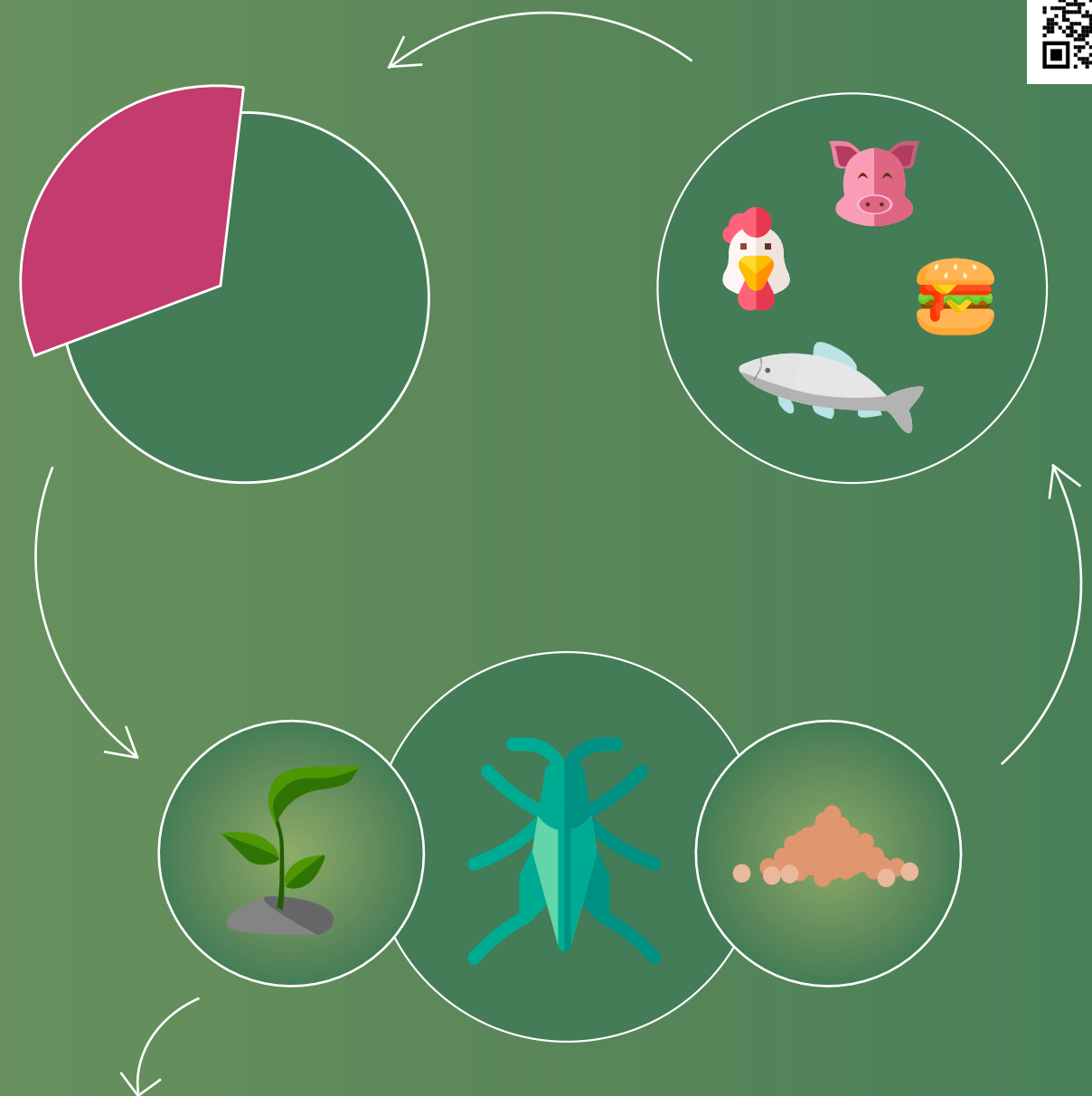
The European insect sector is committed to reducing EU's food waste burden. In order to maximise the circularity potential of insects, IPIFF aims at...



# Connecting local agricultural supply chains through insect farming

Out of the 90 million tonnes of food wasted annually in the EU, **circa 1/3 could be safely upcycled through insect bioconversion**

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By-products from insect farming activities, such as insect frass, could play a key role in providing local solutions to improving soil fertility.

...the land application of insect frass is consistent with circular economy's principles, by reintroducing valuable materials into the food production chain - as alternative to linear models that would end with its disposal - while offering sustainable solutions to European farmers and / or gardeners'.

Source: IPIFF Contribution Paper on Frass



# Insect farmers unrivalled in resource efficiency

Up to **90 million tonnes of food is wasted** every year in the EU, half of which is generated at production and/or processing stage. Being highly versatile and efficient, **insects can biotransform** many of these materials (before they become 'waste') into a wide range of **higher-value products and ingredients** - that can further be included into the food and feed chains. Their value-added goes beyond that of an alternative feed ingredient. The lower FCR of insects **confirms their efficacy**, but also their ability to concentrate **lower value materials into ingredients of superior quality**, such as proteins and lipids - in line with the natural nutritional needs of aquaculture, poultry or swine animals. Contributing to EU's target to **halve food waste by 2030**, insects have the potential to become resource-efficiency champions - upcycling products that generate costs and GHGs emissions into sustainable feed ingredients that will reduce the necessity to increase EU's imports of proteins.

...the main principle of the 'Farm to Fork' is to shorten as much as possible the entire agri-food chain...

Janusz Wojciechowski, EU Agriculture Commissioner

Enhancing circularity throughout the agri-food chains is key to reducing losses - the sustainability of our food system will be enhanced if farmers are given the opportunity to use biomass residues and new feed products in order to feed their animals. In line with the waste hierarchy of insect farming (see IPIFF Vision Paper, page 10), upcycling such streams will also prevent competition with products already used as animal feed.

...when seen from an environmental point of view, valorising unused or underused substrates, such as certain organic side-streams, should be explored further.

Arnold van Huis, Wageningen University

The authorisation of new substrates in insect farming can provide former foodstuff processors with new and interesting opportunities. We could envision a bold new partnership where former foodstuff processors become a trusted supplier of safe nutrients to the insect farming sector, just as we currently are for other livestock farm systems. Both our sectors are unmistakably part of a sustainable food system through our circular economy qualities. Our visions and philosophies are in harmony with the Commission's 'Farm to Fork' Strategy ambitions.

Paul Featherstone, European Former Foodstuff Processors Association (EFFPA) President

# Unleashing the potential of the European insect sector

Facilitating the wider use of former foodstuffs in insect farming has the potential to generate up to 5 million tonnes of insect protein by 2030

Source: IPIFF Vision Paper

IPIFF members estimate that up to 20 million tonnes of materials from food-producing industries (such as agri-food by-products or former foodstuffs containing meat and fish) could be upcycled in total, with other several million tonnes being suitable for technical applications. While the authorisation of former foodstuffs containing meat and fish as a substrate for insect farming is expected in the near future, a considerable share of products intended for human consumption that could be converted into animal feed is currently downcycled (incinerated or landfilled) due to the presence of certain unwanted materials, such as packaging residues.

There is growing scientific evidence around the potential of insects to eliminate or excrete unwanted materials (such as packaging residues which cannot be technically removed) found in products that are no longer suitable for human consumption. Therefore, ...

- a. ...if insects' bioconversion of products containing packaging materials respects the standards for animal feed, such ingredients could be further incorporated in the diet of animals - reducing the risks associated with the presence of such unwanted materials;
- b. ...if the transformation of packaging materials is not complete and the criteria for animal feed are not respected, the insect-based ingredients could be used for technical applications.

A wide range of valuable products from the food industry - that are not any longer suitable for human consumption - cannot be incorporated into the feed chains because they might contain certain unwanted materials, such as packaging residues. Their financial competitiveness is affected by additional processing steps - such as mechanical transformation, followed by sieving or other separation methods. Yet, not even the most advanced processing steps cannot guarantee the complete absence of such unwanted materials. Therefore, a high share of the former foodstuffs never end up in the feed chains - being downcycled or wasted.



...chemical additives, such as HBCD (a common flame retardant), can have significant environmental and health impacts. We demonstrated that total HBCD does not bioaccumulate in polystyrene-degrading mealworms, but is instead egested in the frass where it likely concentrated in the residual polystyrene.

Source: Brandon et al., 2019 - Stanford University