Original thinking... applied

Contribution of insects to a circular economy

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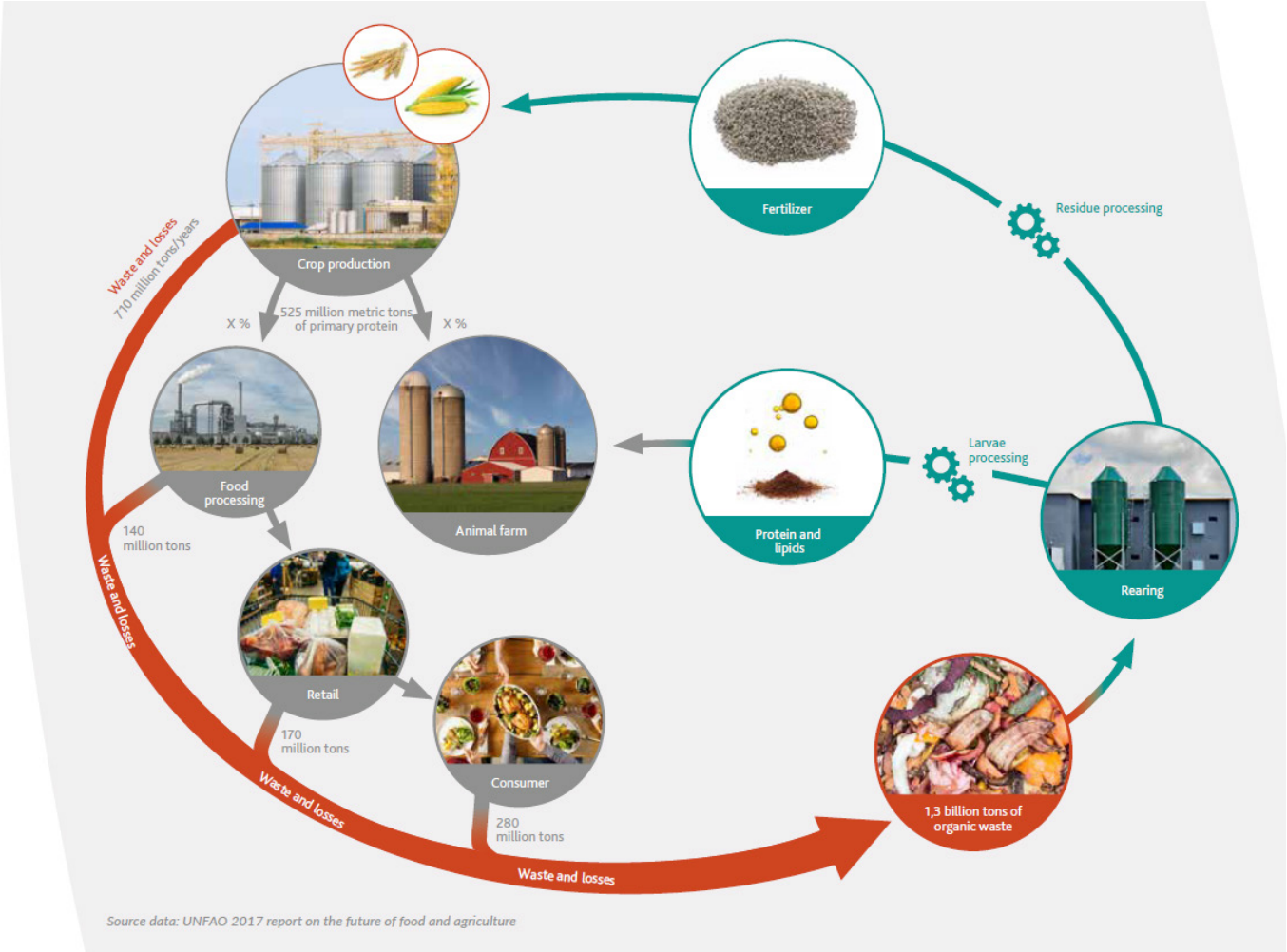
Insects can feed and develop on a diverse range of organic materials, but how can this contribute to a circular economy? Research on the use of some insect species, particularly fly species, to reduce the volume of animal manures began several decades ago. However, there has been renewed and increased interest in this area over the past decade as the value of the products that can be produced by the insects has been recognised.

Depending on the species and life stage, insects can have a very high protein content. The growing global population coupled with a change in dietary patterns, with increasing consumption of meat and fish, requires that a sustainable protein source for livestock is made available. Insects are a good source of protein and this can be incorporated in animal feed for monogastric animals and fish. In the EU currently protein derived from insects is only permitted for use in aquaculture feed and there is a list of insect species that can be used and the feedstock on which the insects can be reared is also regulated. In other countries insect derived protein has also been approved for use in feed for poultry and pigs.

One of the most widely researched insects is the black soldier fly (*Hermetia illucens*). This species can feed on a wide range of feedstocks and develop rapidly. The larvae have a high protein content, with an amino acid profile and digestibility suited to a range of animals. Other products can also be extracted from the black soldier fly larvae including lipids, which can be used in animal feed, as industrial lubricants or converted to biodiesel, and chitin, which can be converted to chitosan with a range of industrial uses. In addition, any remaining feedstock and frass from the insects has potential as a soil improver or fertiliser. Therefore, all outputs from the process have a use whilst reducing the volume of materials that would normally have little or no alternative use. In this way insect bioconversion can contribute to the circular economy.



Fera has been conducting research to investigate the potential of insects as a source of protein in animal feed for nearly a decade. One of these projects was funded by the European Commission under the 7th Framework Programme. This project, known as PROteINSECT, was coordinated by Fera with eleven additional partners from across Europe, Africa (Ghana and Mali) and China. Fera has conducted research on insect rearing systems and on the nutritional profile and safety of the insect products. The PROteINSECT project attracted significant attention from many stakeholders (insect producers, animal feed specialists, animal producers, regulatory authorities etc). Data generated by the project was provided to EFSA for evaluation in the Scientific Opinion on the use of insects as food and animal feed. Fera has also chaired the Task and Finish Group on insect Biomass, which has raised the profile of insect bioconversion in the UK. Currently we are working with a range of stakeholders interested in insect bioconversion for a variety of uses.

For further information please go to: **www.fera.co.uk/industrial-insect-services**

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