



BSF Recycling Solution

From waste to feed and
fertilizers

Presentation made by Waste Eco
Solution.



The Black Soldier Fly Recycling Project:

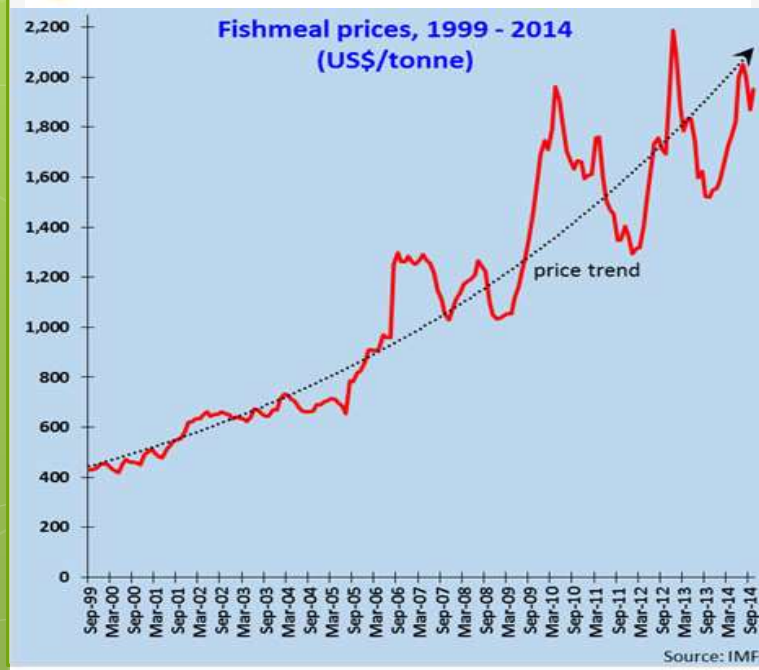
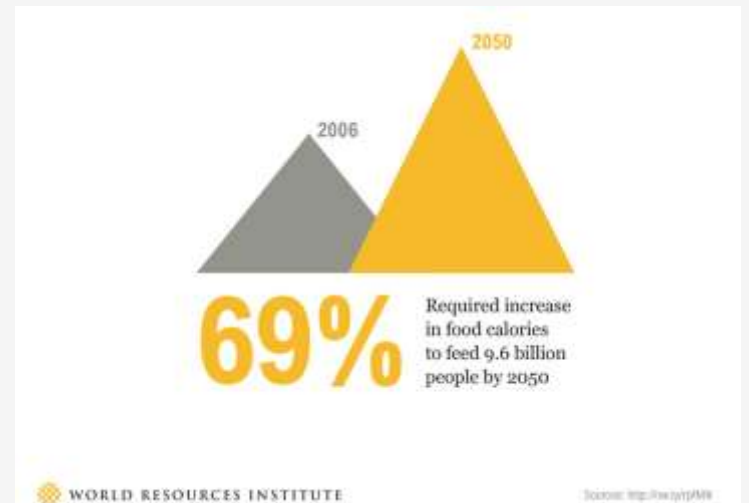


- Insect-meal production is aimed to take place in Vientiane, based on availability of a large and affordable waste stream from the Beer Lao factory on one hand, and on the other, the growing needs from the local market (Laos/ Thailand/Vietnam), for a sustainable source of protein and organic fertilizer.

At stake:

- World population will increase to 9 billion by 2050
- Demand In food calories will rise by 69%
- Protein demand for human consumption will double
- Price of animal protein meal for feed industry is shooting up
- Feed industry is looking for alternatives

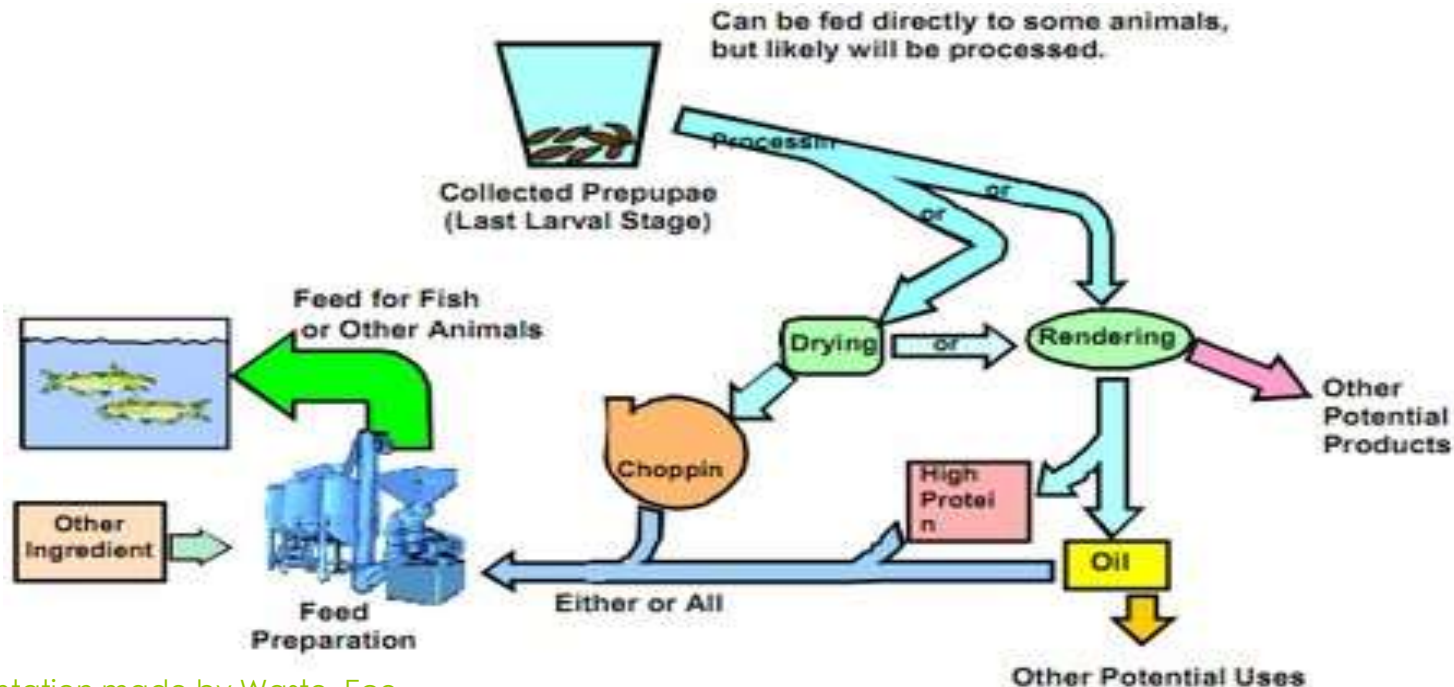
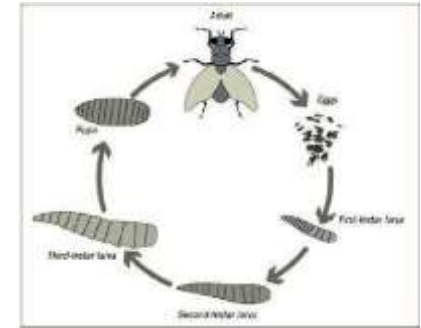
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How it works

- Within a 10d growing cycle from hatching eggs to pre-Pupae, BSF Larvae will transform 1Mt of organic waste into 200kg of fresh Larvae, that can be used fresh as a feed complement or be further processed into a high protein meal. 100 kg (dried) of organic fertilizer will also be collected at the end of the process.





Lao Agritech Solution Ltd:

- In October 2015, a decision was taken between partners to create the company Lao Agritech Solution Ltd, and invest in a BSF Experimental Platform (1Mt waste /d - Operational today)
- First results are very encouraging since they confirm our capacity to produce sufficient volume of BSF eggs, show a good conversion ratio and quality of final product.
- They also highlight big challenges in terms of environment control, foot print, and flux management.
- Our next step is to build up an industrial prototype that will handle 50T/d of waste.

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The Products:

Dried Larvae

Product Specifications



Dried Larvae Product

Description:	A dry ($\leq 10\%$ moisture), whole or milled product, derived from larvae of the Black Soldier Fly (<i>Hermetia illucens</i>). No stabilizers, preservatives or other additives are added.
Intended use:	A source of crude protein and fat for use as a feed ingredient for pet foods, aquaculture and poultry production.
Chemical Analysis:	Protein: 40% (min guaranteed 34%) Fat: 40% (min guaranteed 32%) Ash: 7 to 8% (max 10%) Carbohydrates: 10% (max 15%) Energy: 2,200 kJ/100g
Physical Standards:	Color Light: Medium tan Texture: Free flowing dried larvae (whole) or free flowing powder (ground) Odour: No foreign odours Moisture: 5 to 10% (w/w)
Microbiology:	Total Plate Count: $\leq 100,000$ cfu/g Yeast: ≤ 1000 cfu/g Mould: ≤ 1000 cfu/g E.coli: Negative/25 g Salmonella: Negative/25 g
Storage:	The product is to be stored in a cool dry area.
Target Species:	Salmonids: Max. 15% of total protein in diet Tilapia: Max. 30% (dm) of "as fed" diet Catfish: Max. 30% (dm) of "as fed" diet Poultry: Max. 30% (dm) of "as fed" diet

Maggot Meal

Product Specifications



Description:	A dry, powder product derived from larvae of the Black Soldier Fly (<i>Hermetia illucens</i>).
Intended use:	A source of crude protein and fat for use as a feed ingredient in aquaculture, poultry feed, and other animal feed.
Chemical Analysis:	Protein: 60% Fat: 15 % Ash: 10 % Carbohydrates: 15% Energy: 1,800 to 2,200 kJ/100g
Physical Standards:	Colour: Light to tan Texture: Free flowing powder Odour: No foreign odours Moisture: 8-10%
Storage:	The product is to be stored in a cool dry area.

The Products:



Organic Fertilizer

- An important by-product of our activity is an organic Fertilizer (Larvae dejection-Organic Matter Min 80%)
- Our experimental platform can produce between 100 and 200kg per day (Product comes out at 35% to 40% humidity, that can be dried below 10%)
- At Full scale, we will have a daily output of 5 to 7 Tones.



Fertilizer Type	Fertilizer NPK Analysis (%) DW Basis			% Available of Total		
	Total N	Available P ₂ O ₅	Soluble K ₂ O	Total N	Available P ₂ O ₅	Soluble K ₂ O
ENF	4.66	2.40	3.00	34	85	100



Our Challenges

- Scaling up to industrial size is the biggest of our challenges.
 - The technology we use is innovative. There are very few industrial size set up in the world, and no sharing of information.
 - We are applying for financial support from EU Research and Innovation department to help us building our industrial Prototype.
- Our product being also very new, another big challenge is to assess our market.
 - Here we hope to use the output of our BSF Experimental Platform, and proximity with local farms and actors of Lao Organic market to test and get a feedback on our products.

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Who we are:

Waste Eco Solution Cp.,Ltd (WASECO)

- WASECO is a Singapore company, aiming to develop green and innovative waste management solutions.
- They are 3 Major share holder in WASECO:
 - Mathieu Vassal. Entrepreneur living in Laos, lately involved in Lao feed Industry, he is the one who spotted the BSF opportunity and initiated the project
 - Tamim Bouganmi, Head of Lao Industrial Solution," (Brings high tech solutions to Lao market) . Tamim as been running business in Laos for more than 25 years, he is the "how to do" guy, with a very "hands on " approach on challenges linked with Industrialisation, in Laos .
 - ENTOFOOD Ltd. They are the "insect rearing experts" (with 5 years of pilot activity on BSF in Malaysia) They bring the project the technology so we can have sufficient and healthy insect population to recycle our waste stream



Born2B Agritech Ltd

- B2B Agritech is a Lao company, specialized in recycling Spent Grains from Beer Brewery, Plastic and aluminum.
- B2B has an exclusivity contract with beer Lao Group, to handle 100% of their spent grains.



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