ADB
ASIAN DEVELOPMENT BANK

THE ADB CIRCULAR ECONOMY WORKING GROUP WEBINAR SERIES 2023

ADB CEWG WEBINAR SESSION # 19

Closing the loop on food waste with insect bioconversion

28th September, 2023

FOOD WASTE - WHAT A WASTE!

Only 2% of the nutritional value in our food is recycled

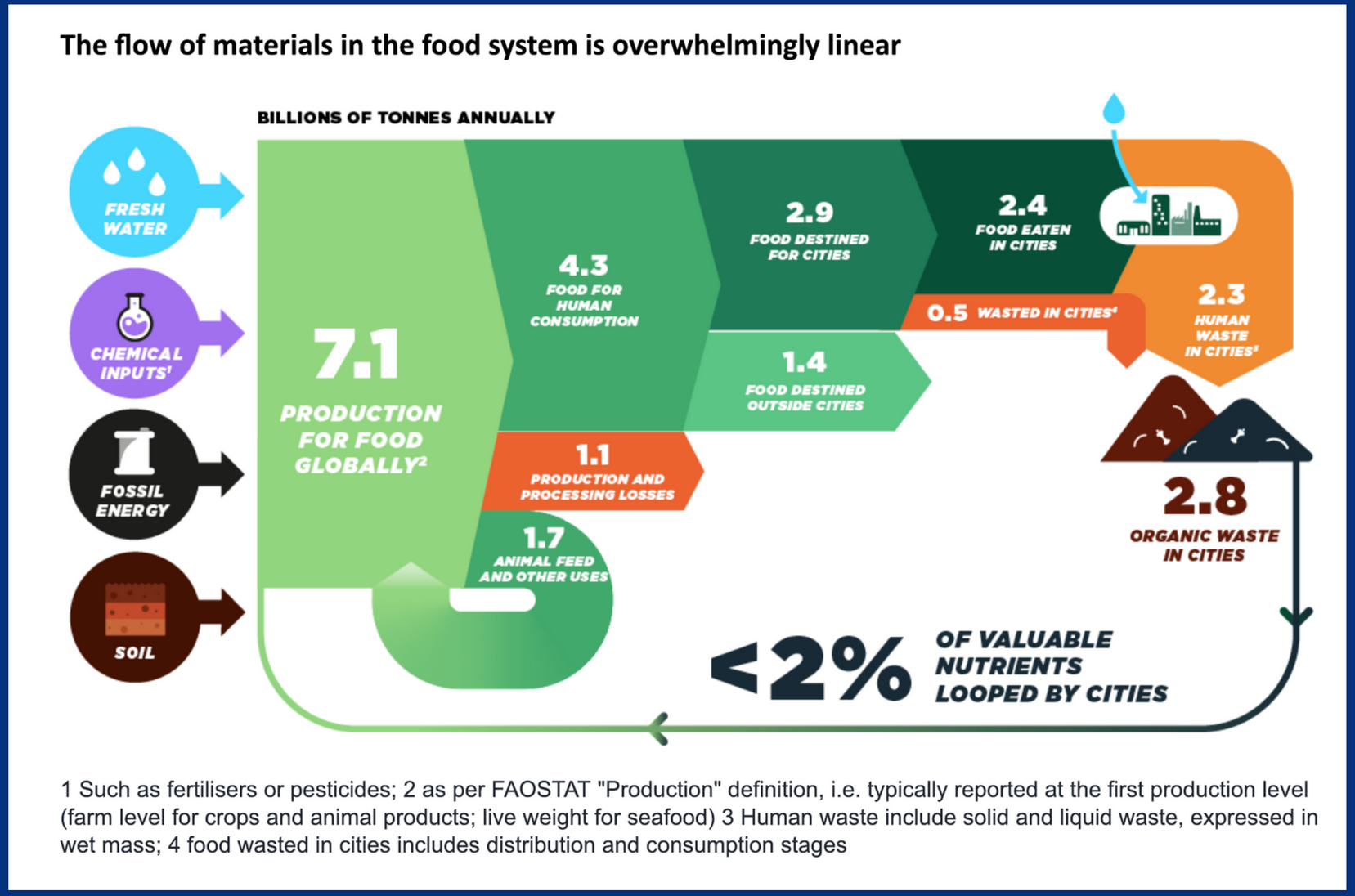

Image: Ellen MacArthur Foundation

Better Data

Better Solutions

Better Policy

FOOD WASTE - CURRENT RESPONSES

Landfill

Composting

Combustion

Feedstock

Biogas/fuel

Sewer

INSECT BIOCONVERSION - NATURE'S WAY

Food & Other Organic Waste

Black Soldier Fly Larvae

Livestock & Aquaculture Feed

Frass (fertiliser)

Growers

CASE STUDY - MYANMAR

Maximising utilisation of Natural Capital

Local market waste

Education

Demonstration

Chicken Farm
Self-sufficiency / income

Community Capacity Building

Community Engaged Research: PHILIPPINES 2016-2018

Local market waste

Education

Training: Waste Treatment & Insects

Chicken, Tilapia, Vegetables, Rice
Self-Sufficiency / Income

Community Capacity Building

From Lab to Garage, to ~$1.6B Industry

Vietnam, 2013
$30M Series B

Indonesia, 2013
Research Station, $1M 2023

Malaysia, 2020
$34M in 6 rounds
$20M from Sumitomo, 2022

Netherlands, 2009
$126M in 6 rounds

France, 2011
$625M Series D

Finland, 2022, $1.8M

Beneficial Insects --> Services & Products (Value)

Circular bio-Economy

ENABLER.

Recovery of Nutrients & Energy.

Regeneration of SOILS.

Reduce METHANE.

Remove CO2.

Protein + fats & oils + fertilizer + chitin

Livelihood

Green Jobs

Resource Security

vs

Diseases

Wars

Weather

Natural Services

Natural Products

SDGs

BENEFITS OF INSECT BIOCONVERSION:

FOOD SECURITY

100 kg WASTE (dm)
10kg PROTEIN +
20 kg FERTILIZER
2 weeks

47 X LESS GHG vs windrow composting.** Avoids Methane!

Direct GHGe: 96 g CO_2/kg waste
CH_4 & N_2O = 0.38 kg CO_2eq/TON waste*

RENEWABLE ENERGY OPPORTUNITY.

GWP 100kg dried larvae = 6.7 kg CO_2eq
{Electricity for drying the larvae ~70%} **

DISEASE CONTROL

-99.9% Reduction of Salmonella & E.coli.
SUPPRESS HOUSEFLIES

Livestock

Higher survival
More Meat, Eggs Fish

2.5 to 5x INCREASE Vegetable Yields***

SOIL REGENERATION

CARBON Drawdown.

*Lalander et al 2019, 2022 **Mertenat et al 2018 ***Nugroho et al 2023

SUSTAINABLE DEVELOPMENT GOALS

SDGs **directly** affected by insects for food & feed

SDGs **indirectly** affected by insects for food & feed

Other

Edible Insects and Sustainable Development Goals
https://doi.org/10.3390/insects12060557

ADB & INSECTS as a NATURE-BASED SOLUTION

	SOLID WASTE MANAGEMENT	CLIMATE ACTION	GREEN ECONOMY	BLUE ECONOMY	ACTIONS
	50 % of MSW diverted from landfills in megacities	Avoided emissions 47x less methane	Livelihood & jobs Create SMEs, Industry	Alternative protein for animal feed (vs fish meal)	Evaluate Safety
	SIDS Saves landfill space on small islands	Carbon sequestration (insect biomass, chitin, +biochar)	Food security & Nutrition.	Reduce Eutrophication (organic fertiliser).	Green Finance
	Sanitation & Health (Vermin, flies, roaches, pathogens	Reduced Air Pollution (e.g. avoid open dumping & burning)	Regeneration of degraded soils & land.	Bioplastics for Fishing Gear	Education
Potential Application	Composting - Mongolia, Pacific Islands - Nauru	Biochar - Thailand, Nepal, etc	Reforestation, Upland Farming Thailand, Laos,	Land based aquaculture - Thailand, Vietnam, Philippines	Market Development

QUESTIONS

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