An integrative approach to urban agriculture. The methodological framework of the FEW-meter project

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WHAT IS FEW-meter?

The FEW–meter – an integrative model to measure and improve urban agriculture, shifting it towards cicular urban metabolism

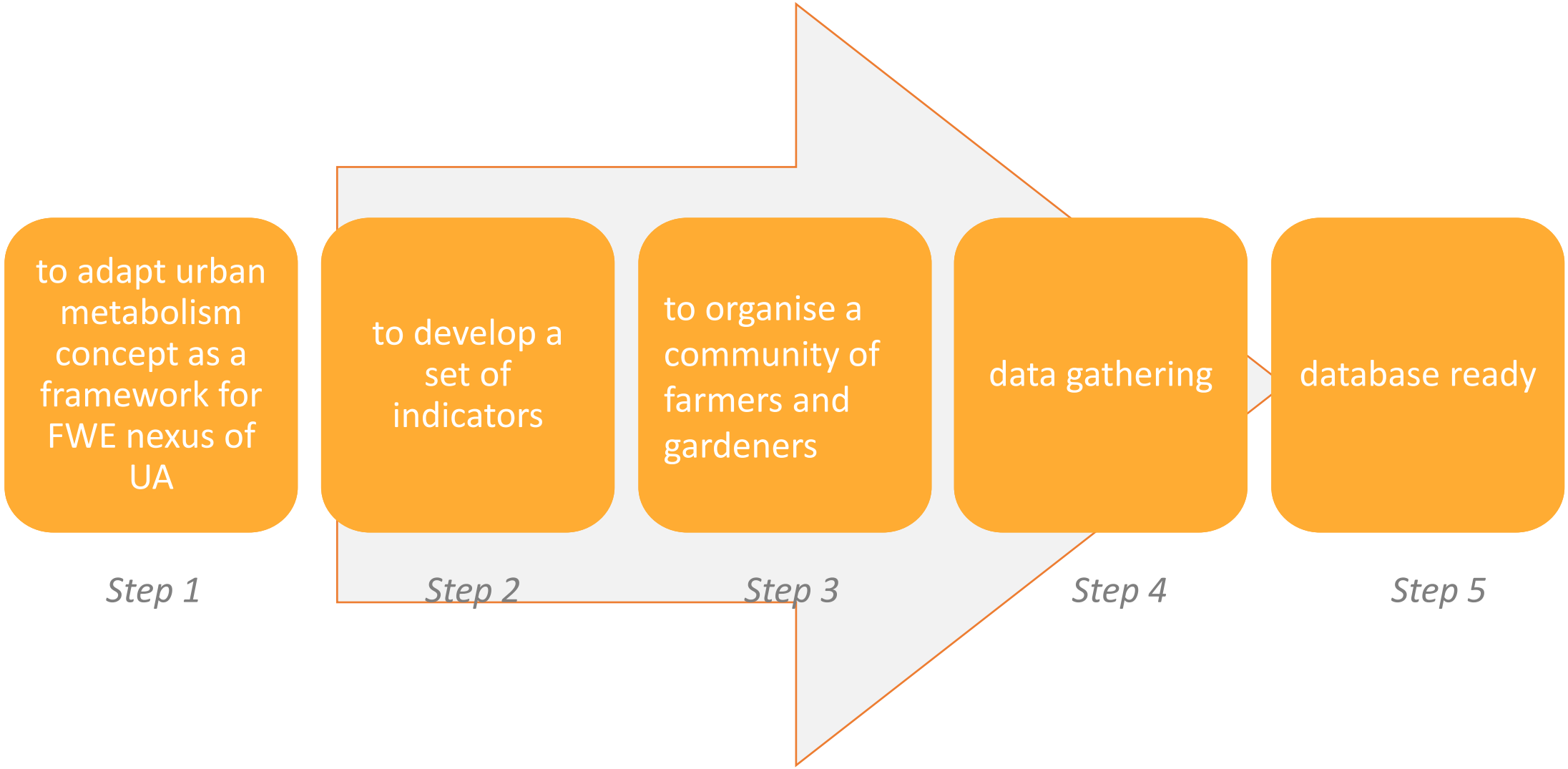
The project aims to develop a comprehensive system which will help us understand Urban Agriculture from Food-Water-Energy Nexus perspective, and will help urban farmers to enable improving the efficiency of their farms in terms of the FEW nexus.

We called the system FEW–meter (Food – Energy – Water meter)

PROJECT GOALS

- to measure production efficiency of diverse types of UA
- to measure social benefits of gardening, from FEW (Food-Energy-Water) to FEWP (Food-Energy-Water-People)
- to model flows of energy, water and other resources through an urban farm, using a methodology based on urban metabolism, and then scaling on the city
- to increase knowledge about the possible health risk due to soil quality
- the co-creation of the FEW-meter with urban farmers

WORKFLOW


to adapt urban metabolism concept as a framework for FWE nexus of UA
to develop a set of indicators
to organise a community of farmers and gardeners
data gathering
database ready
Step 1
Step 2
Step 3
Step 4
Step 5

Step 1 RESEARCH FRAMEWORK

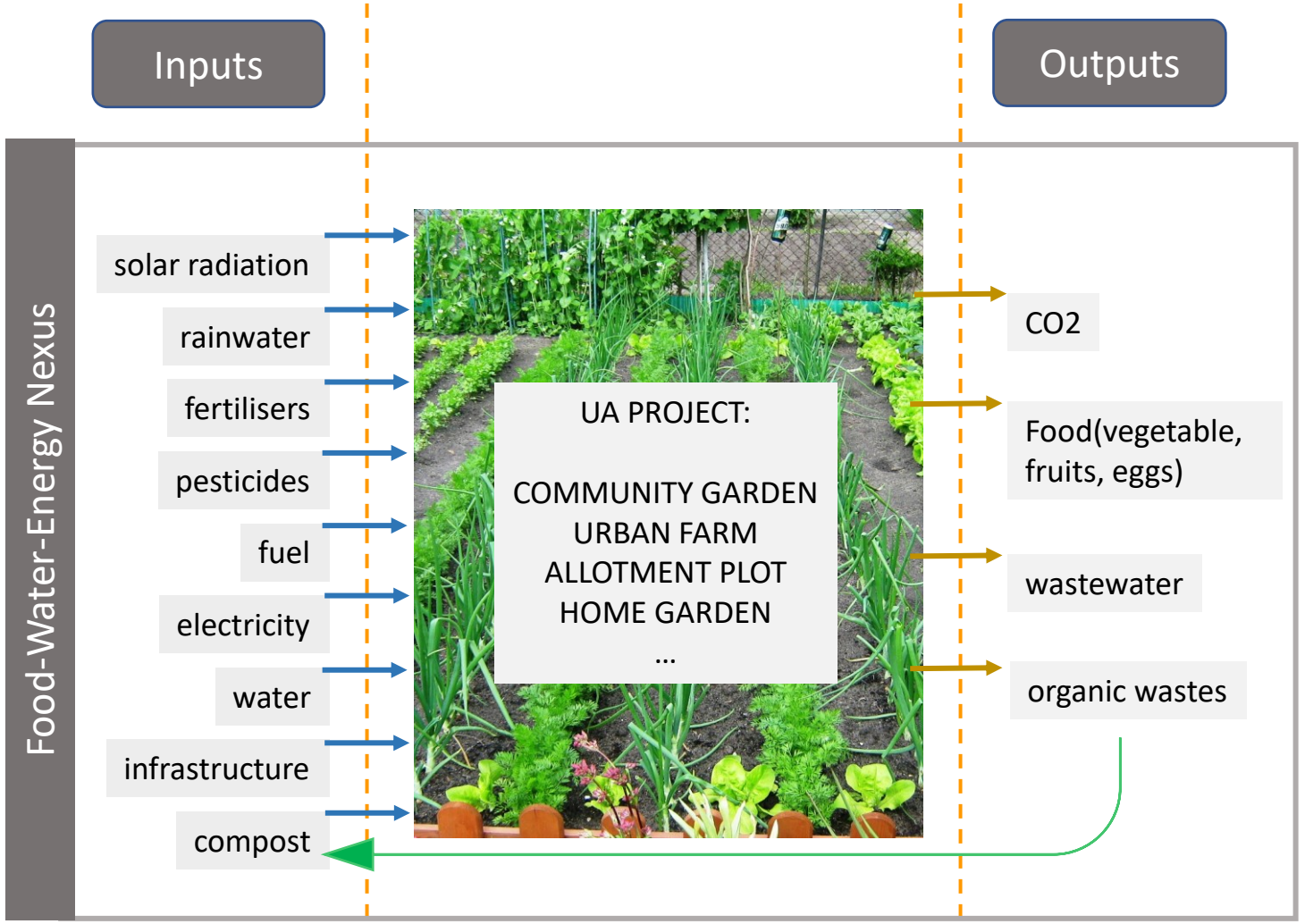
Inputs

- solar radiation
- rainwater
- fertilisers
- pesticides
- fuel
- electricity
- water
- infrastructure
- compost

Outputs

- CO2
- Food(vegetable, fruits, eggs)
- wastewater
- organic wastes

Step 1 RESEARCH FRAMEWORK



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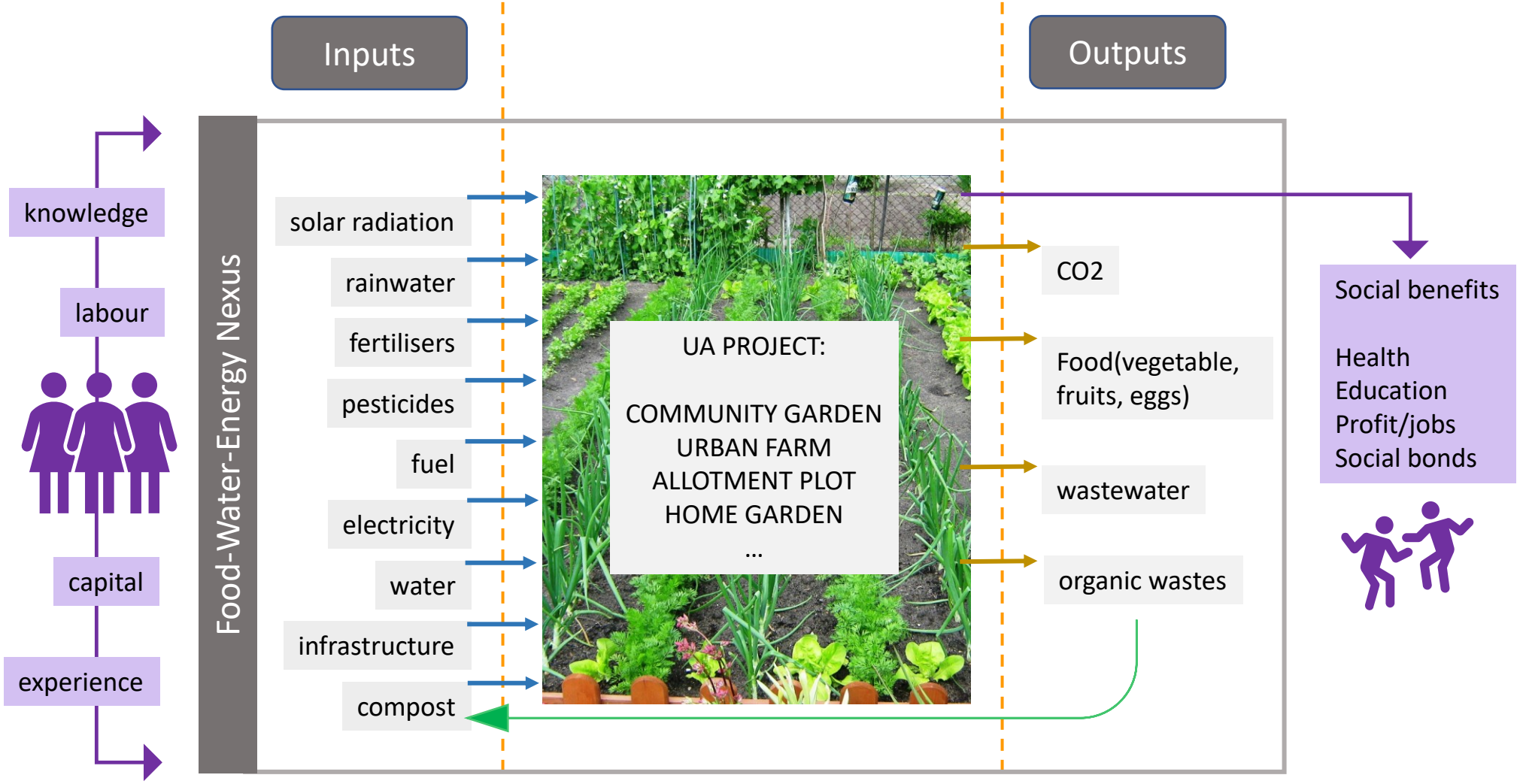

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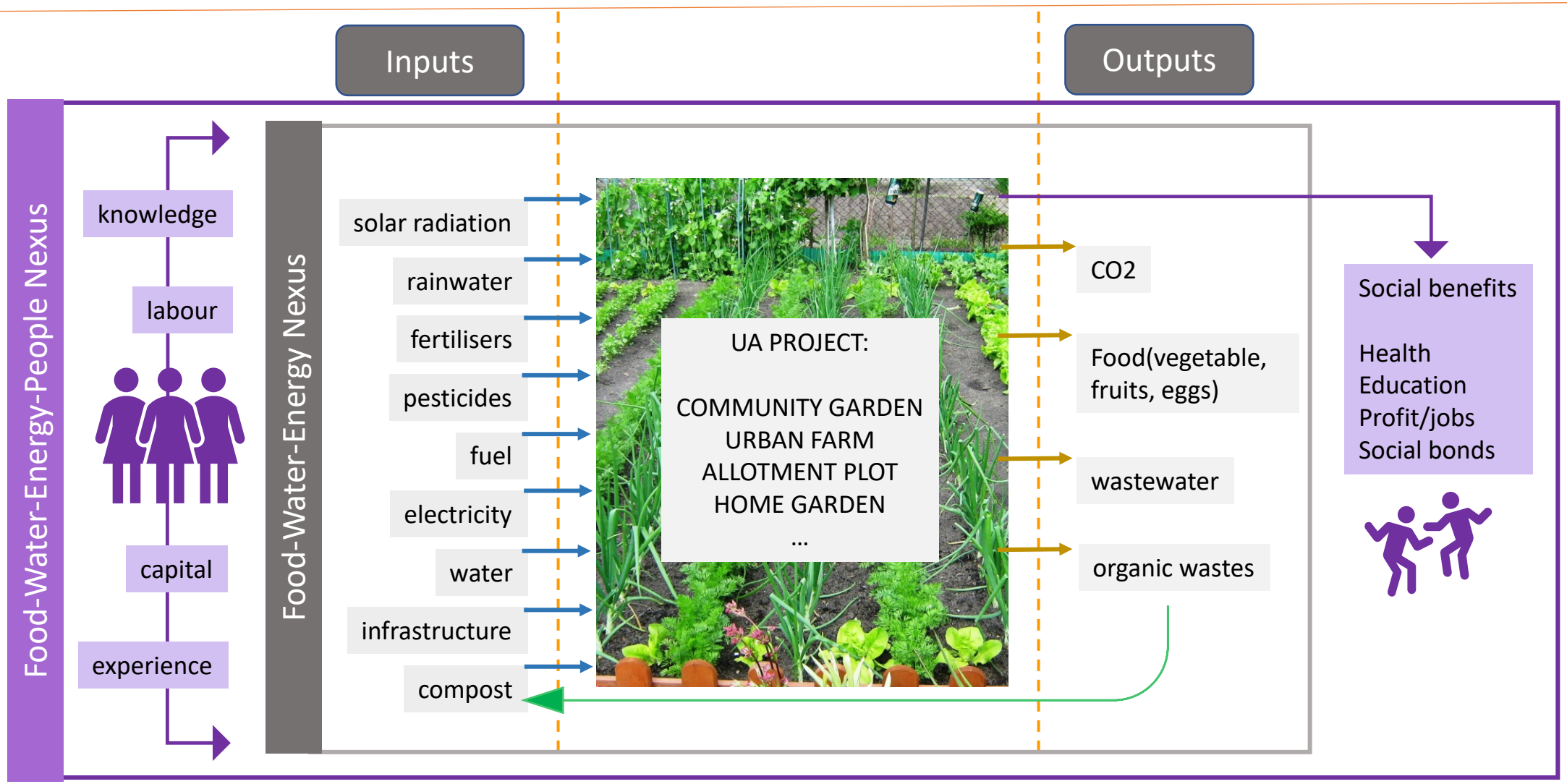


Step 2 SET OF INDICATORS

INPUTS

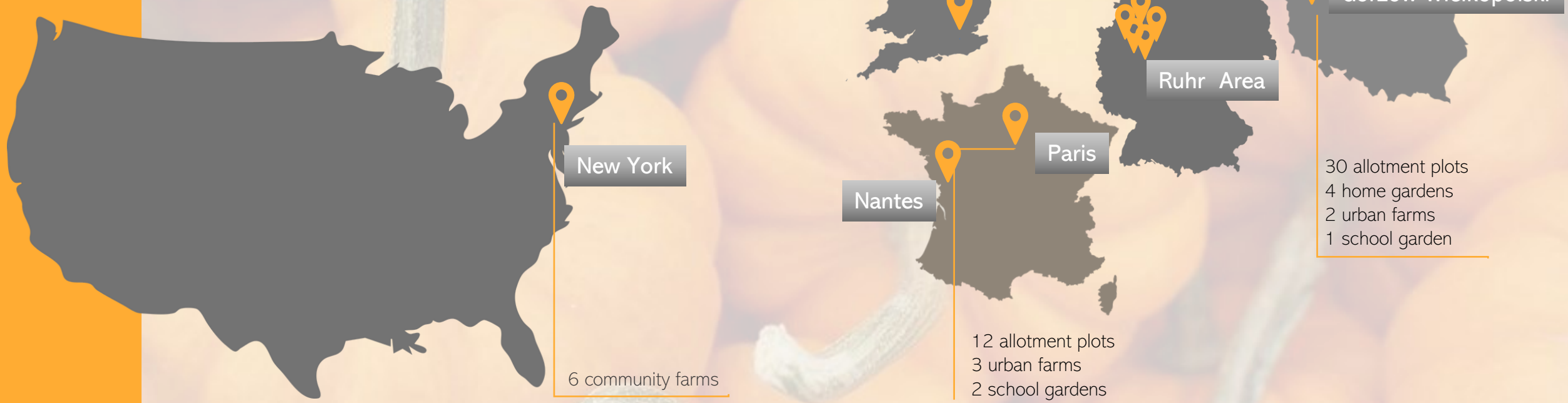
CATEGORY	INDICATOR	UNIT
Water (irrigation)	Water (municipal)	L
	Water (groundwater)	L
	Water (rainwater harvest)	L
Energy	Electricity	kWh
	Renewable energy production	kWh
	Fuel	L and type
	Trips to garden	km/week and mode of transport
	Trips to deliver food	km/week; mode of transport and fuel
Supplies	Fertiliser	kg and type
	Herbicide	kg and type
	Pest control / Insecticide	kg and type
	Compost produced locally	kg
	Animal feed	kg and type
Infrastructure	Inventory of timber, metal, plastic, glass used for fencing, raised beds, poly-tunnels, irrigation, greenhouses and sheds/ reused, recycled, new	weight x each material
Land	area for cultivation	m^2
	area of the project	m^2
People	Socio-demographic profile of farmers and gardeners	Age, employment, salary, education etc.
	Ecological awareness	Types of activities
	labour	Hours spent gardening,

Step 2 SET OF INDICATORS

	CATEGORY		INDICATOR	UNIT
OUTPUTS	Food (crops)		Harvest per crop	kg
			Destination per crop	(e.g. farmer, friend, sold, uneaten, charity…)
			Cost per crop	Local currency
	Wastes		Green wastes	L
	Soil Health		Soil toxicity (e.g. heavy metals)	ppm, mg/kg
			Soil composition (e.g. organic matter, nutrients…)	%, mg/kg
	People	Social	Educational activities	Type and N of events and participants divided by age group (under 12 / 12-18 / 19-64/above 64)
			Community activities	Type and N of events and participants divided by age group (under 12 / 12-18 / 19-64/above 64)
		Health and wellbeing	Physical and mental health	Hours spent gardening, motivations for gardening (Likert scale), Moods (Likert scale)
			Diets	Increase in fruit and veg consumption; increase in number meals prepared at home etc (Likert scale)
		Economy	Average salary (local currency/year) of FTE paid employees	Local currency
			Staff	N and FTE of farmers, people and volunteers

FOOD ENERGY WATER
METER

Step 3 OUR CASE STUDIES



Sustainable Urbanisation Global Initiative (SUGI)
FOOD-WATER-ENERGY NEXUS

URBAN EUROPE

BELMONT FORUM

European Commission

Step 4 DATA TO COLLECT

TYPE OF DATA	COLLECTION METHOD
• Water consumption, fertilisers and pesticides use, electricity and fuel use, harvested vegetables and fruits • Trips to garden, delivery transport	gardener's diary
• Garden infrastructure	garden form
• Social data (e.g. motivations, benefits, eating behaviour)	questionnaire
• City data for scaling (e.g. LULC data, DTM, water consumption, electricity consumption, gas consumption)	public databases
• UA policies	analysis of exsisting documents and legal acts, interviews with policy-makers

Step 5 DATABASE

ANALYSING DATA

We started to analyze the data in line with the project's objectives,
using various research methods.
We will share the results of the project with:

ACADEMIA	URBAN GARDENERS AND FARMERS COMMUNITY	POLICY-MAKERS
Through publications in scientific journals and at the conferences	Through workshops, the project webpage and social media	Through workshops and recommendations

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The FEW-meter Team is grateful for your attention!

Find us on: www.fewmeter.org The FEW-meter