



Food and Agriculture Organization
of the United Nations

By **Lucie Pluschke**,
Water-Energy-Food
Nexus Officer at FAO

FAO, the Nexus and sustainable agriculture

3rd Task Force Meeting on the Water-Energy-
Food-Ecosystems Nexus
27-29 April 2015 in Geneva

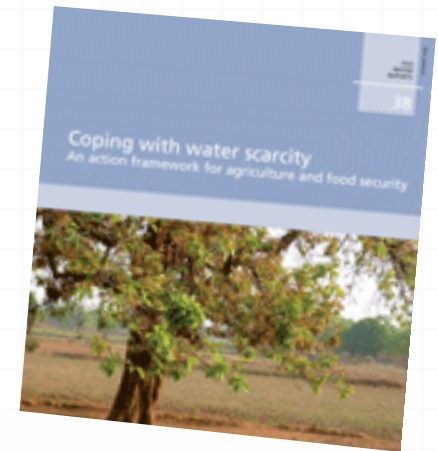
Time to reflect on what we have done so far on the Water-Energy-Food Nexus...

- 0 Engaged in **global discussions** at conferences, seminars and other events
- 0 Developed **concept note** and the beginnings of some **methodological approaches**
- 0 Worked with UNECE on the **transboundary Nexus assessments** in the Sava River and the Syr Darya
- 0 Collaborated with GIZ and the League of Arab States on **regional Nexus dialogue**
- 0 *In preparation, case studies and focused discussion* on Nexus implications of a specific technology; or within a given geographic scope

What emerged from this...

- 0 A Nexus assessment does not make sense anywhere and in any form and shape.
- 0 Thinking, talking and implementing the Nexus seems to make most sense when it comes to:
 - Resource use optimization at a technical/ practical level;
 - Conflict resolution and dialogue at a political/ higher level.
- 0 Focus on the *process* of thinking, talking and deciding on water, energy and food-related matters – in order to get to any meaningful results.

The Nexus in the bigger context



Building a common vision for
sustainable food and agriculture

PRINCIPLES AND APPROACHES



MASSCOTE
Mapping System and Services for Canal Operation Techniques

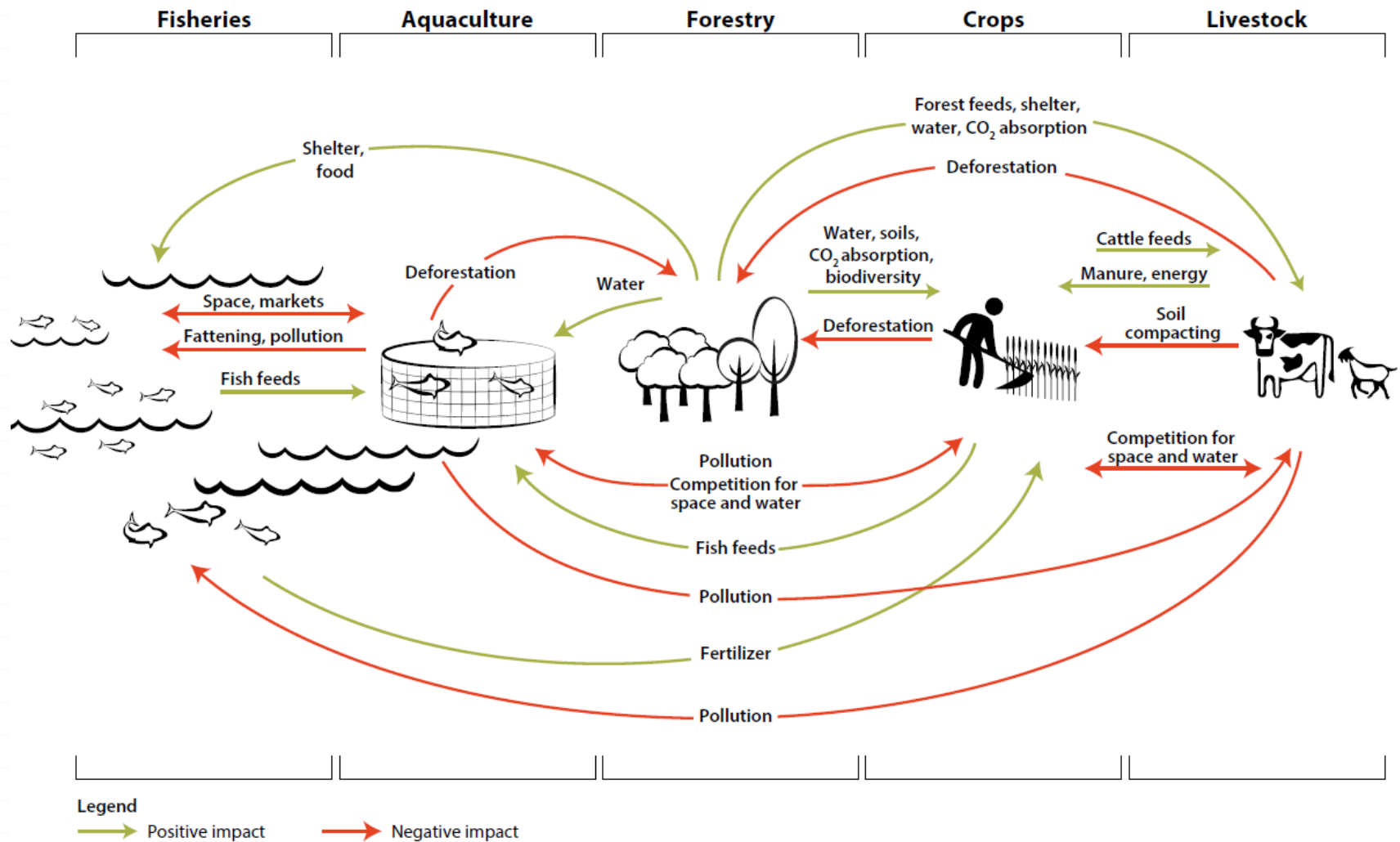


SUSTAINABLE
ENERGY FOR ALL

Selected FAO Approaches and Frameworks

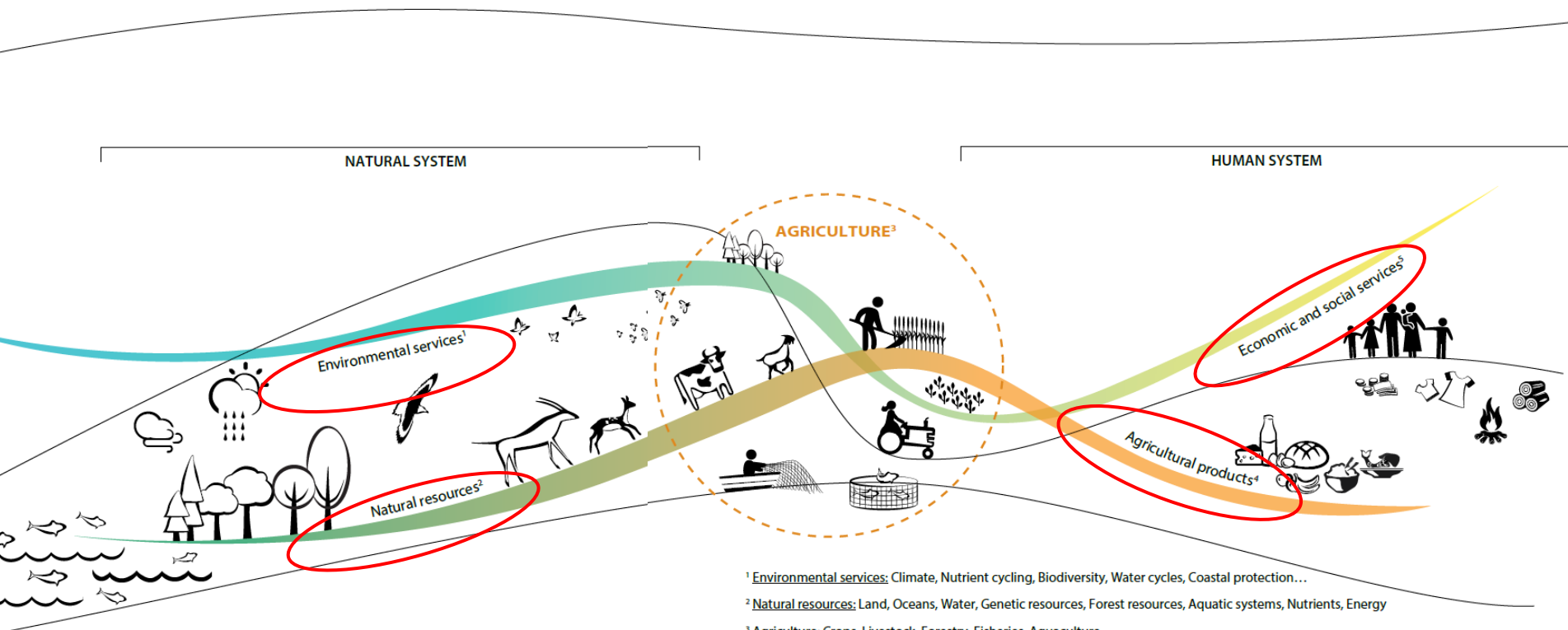
		SECTORAL APPROACHES				
CROSS-SECTORAL AND THEMATIC APPROACHES	Crops	Livestock	Forestry	Fisheries	Aquaculture	
	Save and Grow: Sustainable Crop Production Intensification	Global Agenda for Sustainable Livestock	Sustainable Forest Management (SFM)	Code of Conduct for Responsible Fisheries (CCRF) Ecosystem Approach to Fisheries (EAF)	Ecosystem Approach to Aquaculture (EAA)	
	<ul style="list-style-type: none">• Conservation and Sustainable Use of Biodiversity and Genetic Resources• Energy-Smart Food for People and Climate (ESF)• Sustainable diets• Resilient livelihoods• Climate Smart Agriculture (CSA) and FAO-Adapt• Coping with water scarcity• Global Soil Partnership (GSP)• Sustainable Land Management (SLM)• Landscape initiative (<i>in development</i>)					

Synergies and Conflicts among Agricultural Sub-Sectors



What is sustainable agriculture?

The conceptual framework



¹ Environmental services: Climate, Nutrient cycling, Biodiversity, Water cycles, Coastal protection...

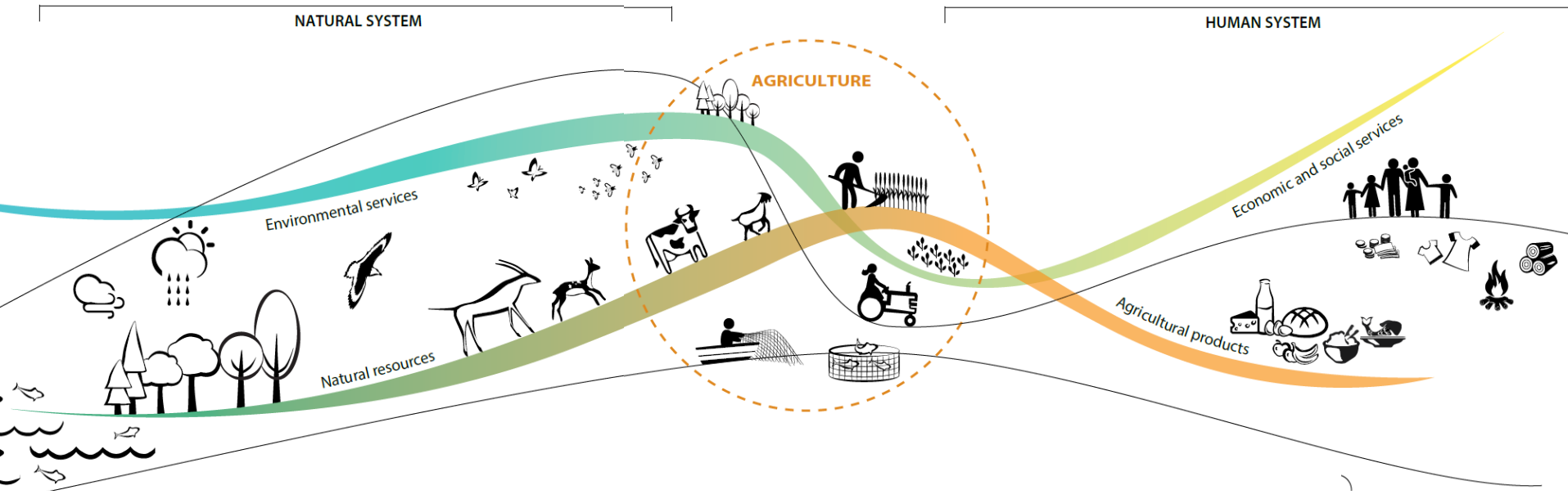
² Natural resources: Land, Oceans, Water, Genetic resources, Forest resources, Aquatic systems, Nutrients, Energy

³ Agriculture: Crops, Livestock, Forestry, Fisheries, Aquaculture

⁴ Agricultural products: Food, Feed, Fiber, Fuel

⁵ Economic and social services: Growth, Poverty reduction, Employment, Stability, Health and nutrition

The Five Principles of Sustainable Agriculture



Building on ongoing initiatives



High Impact Opportunity on the Water-Energy-Food Nexus led by FAO and BMZ

- 0 Regional policy dialogues
- 0 Promotion of integrated food-energy systems
- 0 Powering Energy in Agriculture Grand Challenge (USAID)



Regional Water Scarcity Initiative in the Near East and North Africa

- 0 Strategic planning and policies
- 0 Improving water management efficiency and productivity in major agricultural systems and in the food chain
- 0 Managing the water supply through reuse and recycling of unconventional waters

The Nexus in a specific context

Entry-point for analysis and discussions

Topic	Nexus Dimension
Groundwater management	Overextraction of groundwater resources for irrigation, using diesel/ electricity/ solar-powered pumps
Irrigation modernization	Water and energy use efficiency vis-à-vis economic viability of large-scale irrigation systems
Intensification of livestock production	On-farm waste management for bioenergy production (“closed-loop”)

The Nexus in a specific context

Topic	Nexus Dimension	Nexus Indicators	
		Context	Impacts
Groundwater management	Overextraction of groundwater resources for irrigation, using diesel/ electricity/ solar-powered pumps	<p><i>Groundwater withdrawal</i></p> <ul style="list-style-type: none"> Renewable groundwater resources per capita Groundwater withdrawal rate Percentage of groundwater allocated to agriculture/ other uses Area under groundwater irrigation Number of groundwater structures for agriculture 	<p><i>Change in groundwater levels and groundwater quality</i></p> <ul style="list-style-type: none"> Change in groundwater levels in both shallow and deep aquifers over time Change in salinity levels and selected water quality indicators over time
		<p><i>Energy consumption</i></p> <ul style="list-style-type: none"> Agricultural fossil fuel/ electricity consumption (GkWh) Diesel/ solar/ electricity operated groundwater pumps compared to total mechanised groundwater structures Diesel/ electricity price index 	<p><i>Energy pricing</i></p> <ul style="list-style-type: none"> Electricity subsidy (\$/ha) of groundwater irrigated area and per consumer over time Capital, O&M and disposal costs for solar pumping system <p><i>Importance of groundwater to agricultural production</i></p> <ul style="list-style-type: none"> Contribution of groundwater irrigation to agricultural GDP compared to surface water Net agricultural profit after electricity subsidy (farm/ national level) Working hours saved due to access to irrigation/ cost of operating pumps <p><i>Greenhouse gas emissions</i></p> <ul style="list-style-type: none"> GHG emissions from groundwater pumping for irrigation (electric/ diesel pumps, MtCO₂e)

In conclusion...

- 0 Integrate Nexus thinking in broader processes about sustainable development and natural resources management**
- 0 Focused interventions on specific technological, managerial or operational issue**
 - Development of case studies