

# Innovative feeds for *Oreochromis niloticus* reared in aquaponic systems



I. Tucciarone, G. Secci, G. Parisi  
Department of Agriculture Food Environment and Forestry (DAGRI), University of Florence.

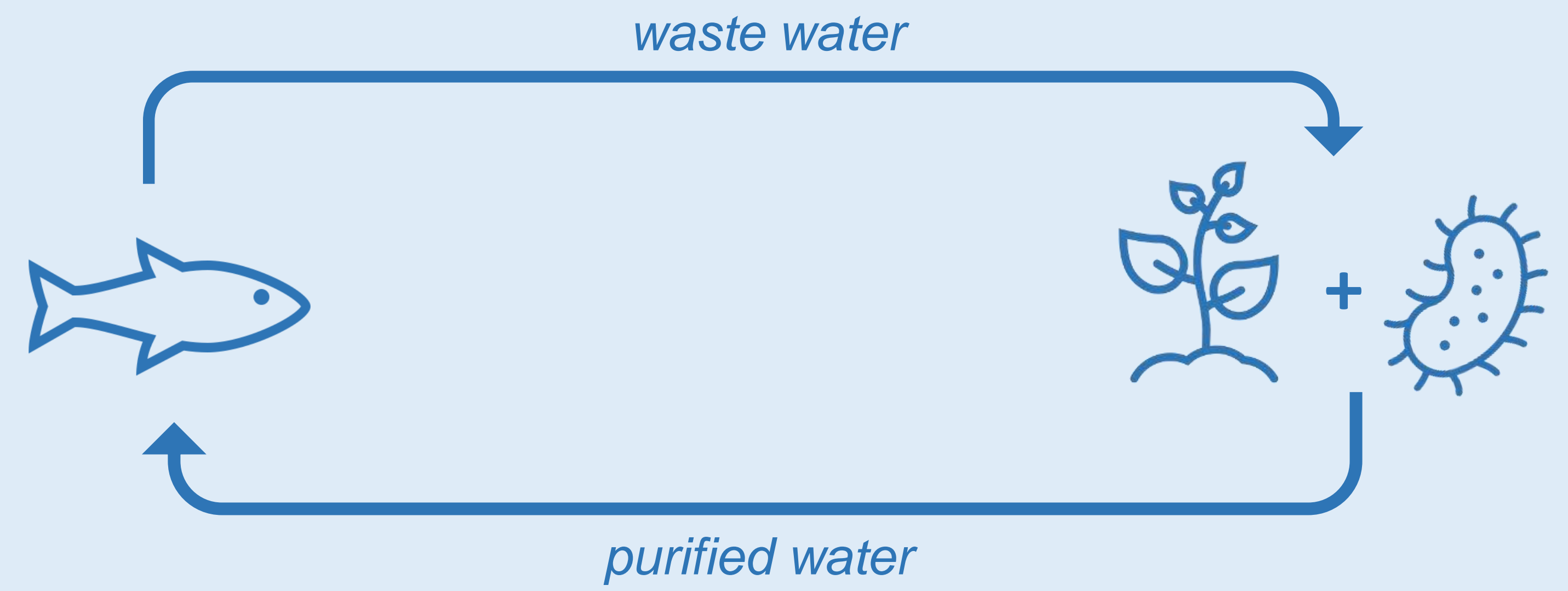


UNIVERSITÀ DEGLI STUDI FIRENZE  
DAGRI  
DIPARTIMENTO DI SCIENZE TECNOLOGICHE AGARIE ALIMENTARI, AMBIENTALI E FORESTALI

## INTRODUCTION

### Aquaponic systems

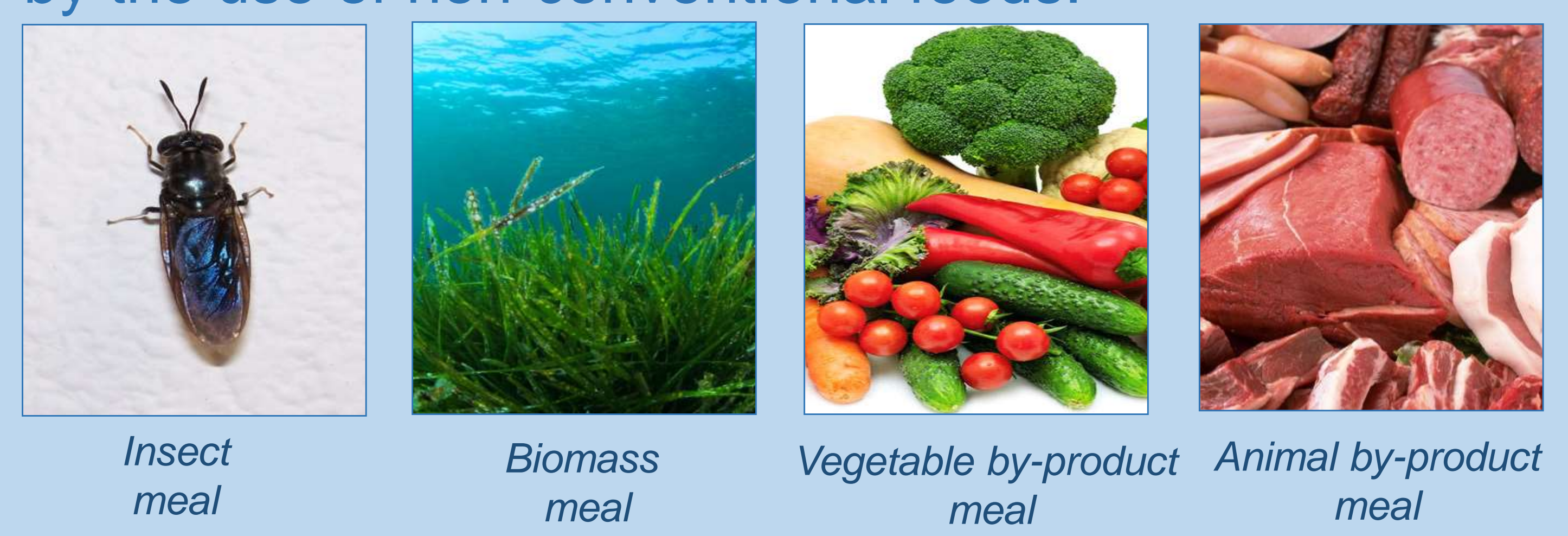
- resemble a natural biological cycle:
- ❖ minimising both plant and fish farm inputs
  - ❖ reducing soil and water utilisation.



However, even in this virtuous system, **feed** is required. In this regard, the economic and environmental impacts of feed ingredients are well known, so that research is increasingly investigating **innovative, environmentally friendly feeds** as viable substitutes.

## OBJECTIVES

1. Highlight the existence of a positive impact on the chemical and physical characteristics of **fish**, given by the use of non-conventional feeds:



2. Evaluate the effects that unconventional feeds could have on the quality of the **waste** created by the fish (uneaten feed, faeces, excretions)
3. Evaluate the impact that fish waste would consequently have on water quality
4. Evaluate the quality of the **plant** obtained.



## EXPECTED RESULTS

### ENVIRONMENTAL IMPACT

The use of waste from other food chains (vegetable and animal waste) will **limit** the significant environmental impact associated with their disposal.



Fillets rich in **PUFA-n3, phenolic compounds** (excellent antioxidants) and with a **high protein content**.

### FISH QUALITY

**Beneficial results for both fish quality and environment!**

## MATERIALS AND METHODS

### Experimental design

- ❑ **Feed:** *Hermetia illucens* meal, *Arthrospira platensis* meal, Vegetable by-product meal, Poultry by-product meal
- ❑ **Fish:** *Oreochromis niloticus* (Nile tilapia)
- ❑ **Plant:** *Ocimum basilicum* (basil)

### Analyses

	<ul style="list-style-type: none"> <li>• Crude protein</li> <li>• Total lipids</li> </ul>	<ul style="list-style-type: none"> <li>• Amino acid profile</li> <li>• Chitin</li> </ul>	
<ul style="list-style-type: none"> <li>• Total length</li> <li>• Total weight</li> <li>• Color</li> <li>• pH</li> <li>• Texture</li> <li>• WHC</li> </ul>	<b>Physical</b>	<ul style="list-style-type: none"> <li>• Crude protein</li> <li>• Total lipids</li> <li>• Amino acid profile</li> <li>• Fatty acid profile</li> <li>• Mineral profile</li> </ul>	<b>Chemical</b> 
	<ul style="list-style-type: none"> <li>• Electric conductivity</li> <li>• pH</li> <li>• Redox potential</li> <li>• Dissolved oxygen</li> </ul>	<ul style="list-style-type: none"> <li>• Temperature</li> <li>• Nitrogen and phosphate compounds</li> </ul>	
<ul style="list-style-type: none"> <li>• Total weight</li> <li>• Humidity</li> <li>• Total phenolic content</li> </ul>	<ul style="list-style-type: none"> <li>• Elemental composition of biomass (carbon, nitrogen, phosphorus)</li> </ul>		