

IMPROVING SOIL HEALTH AND WATER QUALITY WITHIN THE...



AGRI-FOOD CHAIN

by Dr Camila Bibiano

The Agri-Food Chain

The agri-food system embraces the entire food production process from agricultural practices until distribution and consumption. Multiple sectors such as crops, livestock, forestry, aquaculture, and fisheries build this large chain, which is responsible for a large part of any country's economy. **Shannon ABC** works with a variety of sectors involved in this chain including plant biotechnology, crop management, environmental and ecological impact, food development and nutraceuticals, among others.

This system is continuously evolving, from ancient agricultural practices to modern food industry techniques and production. The mechanical and industrial revolution brought an extended product variety and large scale production and the modern lifestyle encouraged consumption.

With the pressure caused by accelerated demand and commercial perspectives, this chain grows every day. However, many practices from farming to product packing and distribution, affect soil-water ecosystems and are responsible for causing major degradation and contamination.

What else ?

Speak to us at Shannon ABC if you are interested in learning more about how we can support you with your:

- Farming Practices-page 2
- Food Industry and Consumption -page 3
- Soil and Water Usage -page 4
- Food Sustainability and Circular Economy-Page 5
- Organic Waste Management- Page 6
- More information and Access-Page 7


 Photo: <https://www.canva.com/>

 Photo: <https://www.canva.com/>

 Photo: <https://www.canva.com/>

Farming Practices

The agri-food chain is one of the biggest water and energy consumption sectors. Therefore, it is important that all personnel and companies involved in this chain be responsible for building a more conscious management of soil-water resources, preserving their health and quality.

In agricultural primary production, some practices that are considered to contribute to soil degradation and water contamination include:

- **Mechanical plough and Tillage:** Soil degradation by erosion of minerals and other components; decrease of soil organic carbon and soil-microbiota.
- **Synthetic fertilizer overapplication:** causing soil salinity, soil biodiversity and organic carbon loss, as well as water contamination by leaching.
- **Pesticide application:** decreasing population of beneficial organisms such as bees, water contamination and harming aquatic creatures and mammals.
- **Irrigation:** misuse and overuse of water.


 Photo: <https://www.canva.com/>

Food Industry & Consumption Activities

Practices in the food industrial sector contribute to high levels of energy consumption and gas emissions, water misuse and pollution, organic waste generation among other factors that directly and indirectly affect soil health and water quality.



Photo: <https://www.canva.com/>

Agri-Food and Connected Sectors

The sectors that work in parallel and are connected to the agri-food chain such as transport and chemical industry for agricultural inputs, also affect soil and water ecosystems. Greenhouse gas emissions and climate change, directly affect the agri-food system, with impacts such as flood and drought.



Photo: <https://www.canva.com/>

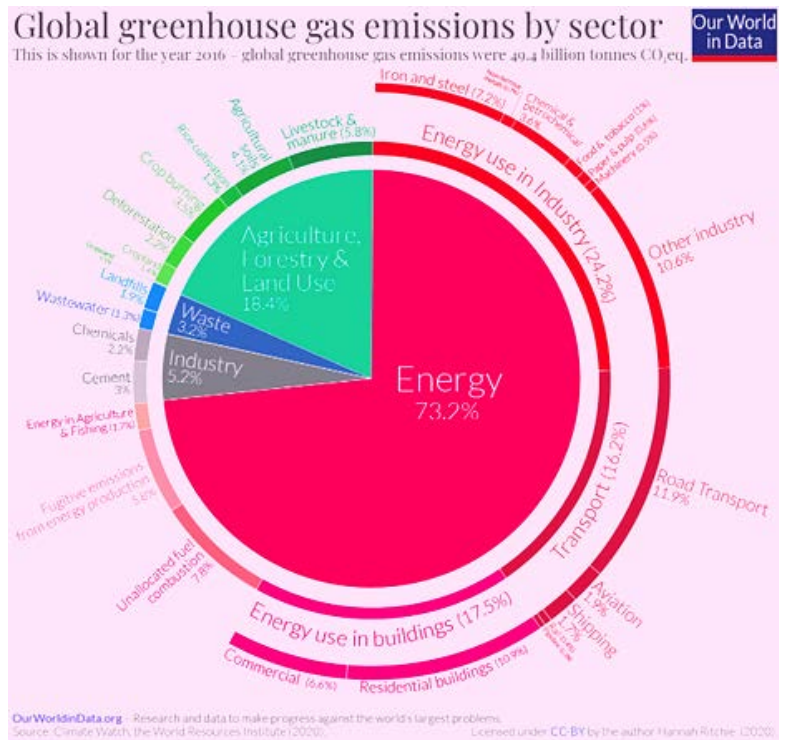
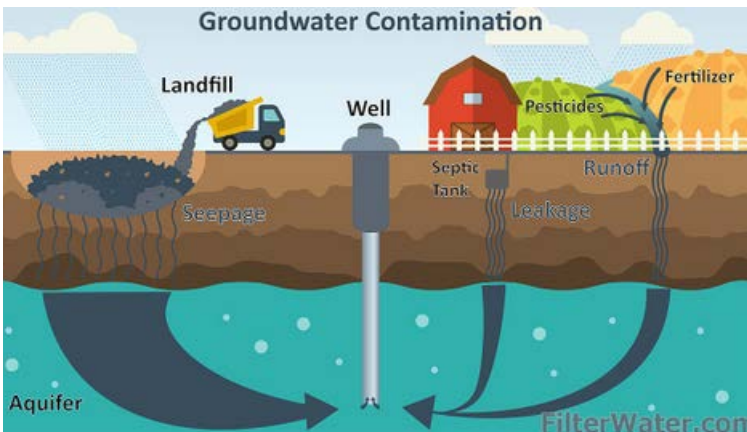


Photo: <https://OurWorldData.org/>

Soil and Water Use

Both soil and water are affected by activities that happen throughout the entire agri-food chain, from initial production practices to consumption and waste production.



<https://www.filterwater.com/>

Soil and water systems are directly inter-related. The soil's health plays an important role in the fresh and groundwater quality (water that is responsible for supplying 35% of human consumption).

Activities such as the use of synthetic chemicals for crop production, animals litter and landfills, all affect soil and water health and quality, as well as biodiversity within these ecosystems.



Photo: <https://www.canva.com/>

Soil salinization and fertility loss.

Food Sustainability & Circular Economy

Food sustainability and the circular economy have their foundation in green production, minimizing harm and stimulating the preservation of biodiversity.

Some practices that support these concepts include:

- low environmental impact and sustainable farming practices.
- reuse, recycle and reprocessing of organic waste.
- measures to avoid contamination.



Photo: <https://www.canva.com/>



ec.europa.eu/food/horizontal-topics/farm-fork-strategy

How can soil health and water quality be improved in the Agri-Food chain ?

One way to improve soil-water ecosystems is to improve the management of **ORGANIC WASTE**, considered one of the biggest challenges in the agri-food chain.



Photo: <https://www.canva.com/>



Photo: <https://www.canva.com/>



Photo: <https://www.canva.com/>

Organic Waste

REUSING, RECYCLING AND REPROCESSING ORGANIC WASTE.

With the application of some technologies and research, *smart organic waste management* can return materials to the agri-food chain, remodeling environmental impact and public health matters. Furthermore, bringing value to this "waste" and putting it back in the chain **expands the economic sector and increases company revenue.**

The applicability of organic waste is diverse. It is based on recovering valuable compounds and nutrients, thus this material can be reapplied in many forms such as:

- Compounds for nutraceutical, cosmetic, pharmaceutical, and cleaning products;
- Fibre for other sectors such as textile and construction;
- Animal Feed;
- **Fertiliser application.**

Organic Fertilisers

The reprocessing and reuse of the organic waste for fertiliser applications is one of the promising approaches that supports circular economy goals.

Some examples of organic material that can be applied for fertilising purposes include:

- Spent brewer's grain,
- Mushroom compost,
- Seaweed extract,
- Food residues -digestate (anaerobic digestion)
- Manures


 Photo: <https://www.canva.com/>

 Photo: <https://www.canva.com/>

 Photo: <https://www.canva.com/>

 Photo: <https://www.canva.com/>

Shannon ABC has supported many companies in investigating opportunities for their by-products, supporting a circular economy model, helping in the transitional changes and leading to product valorization and commercial expansions.

Contact us for more information :



<https://www.shannonabc.ie/>



Dr Camila Bibiano
RESEARCH SCIENTIST
Camila.Bibiano@lit.ie
+353 87 244 8038
+353 (061) 293164

Dr Tim Yeomans
CENTRE MANAGER
tim.yeomans@mtu.ie
+ 353 (0) 861060843
+ 353 66 714 4217
+ 353 61 293 577

Links- Bibliography for Access

- <https://www.fao.org/home/en>
- <https://www.ec.europa.eu/food/horizontal-topics/farm-fork-strategy>
- <https://sdgs.un.org/goals>
- <https://www.filterwater.com/>
- <https://ourworldindata.org/>