Co-funded by the European Union

SSPICEIT!
Sustainability Skills Program for International Catering operators and Entrepreneurs through Integrated Training

SSPICE IT! – Sustainability Skills Program for International Catering operators and Entrepreneurs through Integrated Training

SSPICE IT! project is co-funded by the European Commission within the Erasmus+ programme.

Città metropolitana di Roma Capitale · POUR LA SOLIDARITÉ European think & do tank · CIPFP CAMINO DE SANTIAGO ESCUELA DE HOSTELERÍA & TURISMO DE LA RIOJA · Escola Profissional AMAR TERRA VERDE · AKMI · WORK'S · iED · CAPITALE LAVORO

Submodule n°11: The Selection of Sustainable Production Systems

THEMATIC AREA	How to create a sustainable supply chain
SUB AREA OF REFERENCE	*Sustainable Food*
HOURS	4

LEARNING OBJECTIVES

1. **Understand the various components of sustainability in relation with the production systems and be able to identify sustainable producers**
2. **Understand the impact of food on environment and know which ingredients have the highest environmental, but also economic and social impact**

LEARNING ACTIVITIES

Theoretical	Practical
✓ Main impacts of the food system on the environment ✓ Selection of more sustainable production systems and foods ✓ Construction of networks of local producers	✓ How to evaluate the sustainability of a production system ✓ How to reduce one's water consumption ✓ How to evaluate the impact of food on the environment and choose sustainable suppliers ✓ How to create a network of local producers

Co-funded by the European Union

CONTENT

Co-funded by the European Union

SUBMODULE 11: The Selection of Sustainable Production Systems

Agriculture and climate change are characterised by a 'vicious circle' of cause-effect: agricultural activity produces significant volumes of greenhouse gases, the main cause of climate change, but at the same time suffers the negative impacts - in terms of productivity and food security - of climate change.

The threat that expected climate change over the coming decades poses to the stability of the world food system, due to the increasing demand for food to feed an ever-growing population, short-term variability of food supply and new food trends is severe and very concrete. It is clear that producing enough food for everyone is a necessary condition, but it is not sufficient for food security. **It is necessary to create more sustainable food systems, which produce more with less damage to the environment and less impact on the climate system**. There can be no food production systems that go against the dynamic balance of nature.

At the same time, agriculture is the sector where virtuous paths to a concrete contribution to the reduction of global warming can be activated the most. Certainly, the possibility of more efficient use of agricultural resources, agrifood processing and technological solutions will be fundamental, but equally strategic will be to act on the social system and lifestyles.

Since all food and production systems do not have the same impact on the planet and the people living on it, it is important first of all to understand what kind of impact they have. We will therefore in this chapter analyse the interaction between production systems and water, soil, biodiversity and people. We will then define a check-list to help us select the more sustainable production systems.

Co-funded by the European Union

1. Water

Among the elements that make up matter, one of the most precious to the planet is water. Two-thirds of the planet is covered in water (oceans, seas, lakes and rivers) and the portion of the earth's surface where we find water is called the hydrosphere. The set of its transformations and dynamics on the earth's surface is generally referred to as the water cycle.

It is fundamental to understand the importance of water for humans, the environment and all the living beings on the Earth, in order to start to respect this precious resource, that risks to become more and more rare.

In fact, today, 97% of water is in the sea and the oceans and salted. Only 3% of water is fresh; but 80% of freshwater is frozen in polar ice caps and mountain glaciers. Only 20% of freshwater is available in underground aquifers and in surface rivers and lakes. And some of it is not drinkable due to pollution.

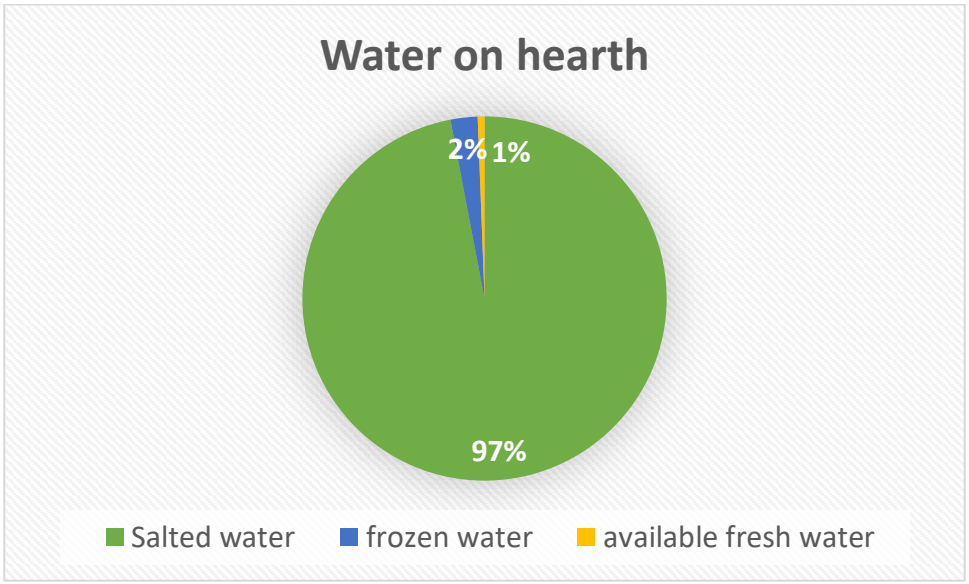


Figure n.1: Typology of water present on hearth (Green School, 2023)

Everything we use, wear, buy, sell and eat requires water to be produced, and all of this is measured through the **WATER FOOT PRINT**. The water footprint measures the amount of water used to produce each of the goods and services we use. It can be

Co-funded by the European Union

measured for a single process, like growing rice, for a product, like a pair of jeans, for the fuel we put in our car, or for an entire multinational corporation.

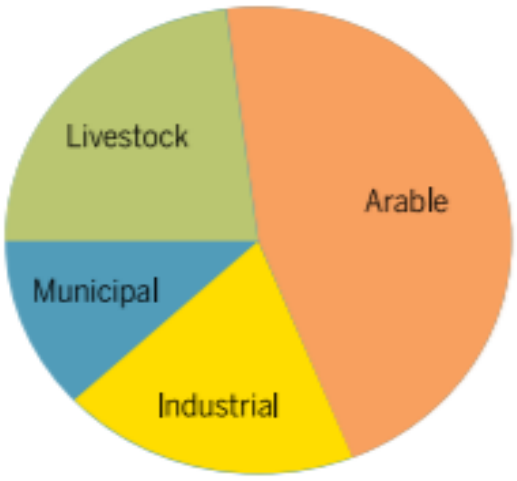
More specifically, the water footprint of a product is made up of three components, colour coded, among which we distinguish the water footprint:

- ✓ **green**, referring to rainwater consumed;
- ✓ **blue**, referring to the volume of surface and groundwater consumed as a result of the production of the product;
- ✓ **grey**, referring to the volume of fresh water necessary to assimilate the load of pollutants.

Agriculture is a major user of freshwater. Irrigated crops, livestock, fisheries, aquaculture and forestry account for approximately 70% of total freshwater withdrawals globally and over 90% in most least developed countries.

Moreover, water plays a cardinal role in all aspects of food systems, not only production, but also processing, preparation, consumption and, to some extent, distribution.

When analysing the water footprint of the agriculture, we can see that **meat-based diets have a larger water footprint than Plant Based diets.** This means that from a freshwater resource it is more efficient to obtain calories, proteins and fats through plant products than animal products.



Co-funded by
the European Union

Figure n.2: The percentage of global freshwater withdrawals (out of the total of 4001 km^2/year) used in agriculture for arable land (directly), livestock (of which the majority is used to grow crops to feed animals), industry and energy, and in the municipal and domestic sectors. (Godfray et al., 2018)

What about you? Do you pay attention to how much water do you use?

Some tips to reduce you water consumption in your everyday life:

- ✓ *shut off faucets when not in use*
- ✓ *repair leaking faucets to prevent domestic water consumption*
- ✓ *install breakers to reduce water inflow*
- ✓ *use washing machines or dishwashers at full load to minimize washing*
- ✓ *reuse water from cooking vegetables, for example, to make a vegetable broth*
- ✓ *reuse water from air conditioners for ironing or watering plants*
- ✓ *water plants in the evening hours or for large gardens use drip systems*
- ✓ *prefer showering to bathing*
- ✓ *pay attention to running water even when washing fruits and vegetables*

2. Soil

Soil is a fundamental, non-renewable natural resource that provides vital goods and services for various ecosystems and for human life itself. Soils are essential to produce crops, feed, fibre, fuel. They filter and purify dozens of thousands of kilometres of water per year. As one of the most important carbon sinks, soils help regulate emissions of carbon dioxide and other greenhouse gases. **Sustainable Soil Management (SSM) is an integral part of global sustainable land management as well as the basis for poverty alleviation and agricultural and rural development to promote food security and improved nutrition**.

Adopting sustainable soil management practices is a valuable tool for adapting to climate change and embarking on a path to safeguard key ecosystem services and biodiversity.

About 33% of the world's soils are moderately or severely degraded due, for example, to unsustainable management practices. It is estimated that about 75 billion tonnes of arable soils are lost every year, which costs about USD 400 billion per year in lost agricultural production. This loss also significantly reduces the capacity of the soil to store and cycle carbon, nutrients and water.

In 2015, the FAO (Food and Agriculture Organisation) set a number of targets, including those dedicated to restoring degraded soils. Growing concerns about the state of the

Co-funded by the European Union

world's soils led to the establishment of the Global Soil Partnership (GSP), which therefore decided to develop Voluntary Guidelines to promote sustainable global soil management based on science.

The GSP recommends to **avoid land use change**, such as deforestation and improper conversion from grazing to cultivated land, **to maintain vegetation cover to protect against erosion**, to **reduce vehicle traffic and grazing intensity**, and to **ensure crop rotation**. Another topic important for GSP is the **optimisation of organic resources** in the soil. Improved soil fertility can be achieved through conservation practices such as the use of crop rotation with leguminous crops, fertilisation with crop and animal residues, and green manure with cover crops. Finally, GSP reminds in its guidelines that soils are one of the largest reservoirs of biodiversity on the planet.

3. Biodiversity

The sustainability of food, from an environmental point of view, is connected to the efficient use of resources and the preservation of biodiversity.
Biodiversity is a very important concept, which can explain how we have become what we are today after millennia: the interaction between many species, the cooperation between these animal and plant species, and everything that allows us to survive as a species.

There is an extraordinary variety of life forms on Earth, for example in tropical rainforests, coral reefs, grasslands, temperate forests, oceans, wetlands, islands, mountains, nature reserves, and even urban areas with parks and gardens.
A species-rich environment is able to adapt to environmental changes and disturbances, such as climate change or epidemics. Moreover, healthy ecosystems, such as forests and wetlands, act as important carbon sinks, helping to mitigate the effects of climate change.

Over the years, **biodiversity has decreased** in terms of availability of types of fruit and vegetables. For example, while 100 years ago we had 400 varieties of tomatoes, today we only have 80. While we had 500 varieties of lettuce, now we have 36.
The reduction of biodiversity has many implications:

- **Threat to food availability, diet diversity and disease resistance** of agricultural crops;
- **Reduction of certain phytonutrient substances** that can be found in the different varieties; with a standardised production we tend to assume always the same ones;
- **Loss of local varieties**: specific varieties are requested by large retailers (that guarantee certain dimensions, taste and final product) and producers are forced to buy seeds and raw material to respect these requests, abandoning local varieties;
- **Increase in the use of pesticides and other substances** to grow varieties

Co-funded by
the European Union

that are not local (but imported for economic reasons) and therefore less adapted to the local climate and soil.

To counter biodiversity loss, each of us can contribute by joining green initiatives and adopting a more sustainable lifestyle, but a variety of strategies must also be put in place both globally and locally. Direct actions (such as creating protected natural areas with the aim of preserving landscapes, flora, fauna and marine environments) and indirect actions (such as controlling emissions of pollutants, protecting water quality and reducing consumption and waste) are essential.

4. The economic and social sustainability

Sustainability concerns the **three dimensions of the environment: social environment, economic environment and obviously the environmental matrices**.

In particular, as outlined in the Agenda 2030, the following development axes must be followed:

- Economic sustainability: ensuring economic efficiency and income for businesses while respecting the ecosystem;
- Environmental Sustainability: ensuring the availability and quality of natural resources in order to combat environmental degradation;
- Social Sustainability: ensuring quality of life, safety and services for citizens.

The 'operational' interpretation of the concept of sustainability is multifunctional and includes:

- ✓ environmental objectives: management and conservation of natural resources
- ✓ social objectives: fairness and equal opportunities for economic sectors, between social groups, between men and women
- ✓ economic objectives: efficiency and profitability of agricultural production

So food sustainability does not only mean quality food, but food produced in compliance with these three objectives.

These three areas encompass various aspects of modern life and production capacity, highlighting the human-driven nature of our world, where culture plays a central role. Feasibility, in this context, refers to the practical contributions individuals can make within society or productive systems. Therefore, when discussing sustainable development, the focus should shift to asking 'sustainable for whom?' rather than merely addressing development itself.

Co-funded by the European Union

5. Check-list for the identification of sustainable production systems

Considering all the above, the first step to guarantee the sustainability of your kitchen is the selection of your food and producers.

We share here an example of check list that you can use to evaluate the impact of the farm on the environment (social environment, economic environment and environmental matrices) and how sustainable it is. Similar check list can be developed for breeders and other production systems.

DATE OF THE EVALUATION	.....
PRODUCER / PRODUCTION SITE	....

What typologies of products are grown? .....
Does it adopt a traceability system for its products? Yes / No Which one? .....
What crops are scheduled to be grown this year? .....
Does it have a Crop Rotation Plan? Yes / No

Co-funded by the European Union

If yes which one? .....
What is its method of production? □ conventional □ organic □ integrated pest management

What are the agronomic characteristics of the farm? □ Field crops □ Greenhouse crops □ Above-ground crops
What method is used to irrigate plants? □ Submersion □ Rainwater harvesting □ Micro irrigation □ Pivot
For harvesting, does the farm use regular labour ? □ Yes □ Yes, but through the use of agencies □ Illegal workforce

Co-funded by the European Union

Exercise: Our water consumption	
Pre-requisites	/
Time	1 hour + presentation
Tools	SSPICE IT! Manual, PC or smartphones, internet connection, printer
Objectives	1. Reflect on the use of water resources and how we should use it in a smart way, even in our own daily use

Instructions

This exercise should be realised, when possible, in group.

1. Gather information on water consumption, using also the references indicated in this manual, and analyse your own water consumption
2. Draft short texts highlighting the consequences of mismanagement of water resources and suggesting ways to improve your water footprint
3. Make posters or Power Point files, inserting these texts and images previously printed or downloaded
4. Present your work to the other groups, expressing also personal considerations

Co-funded by the European Union

EXTRAS

1. Glossary

- **CAP:** Common agricultural policy supports farmers and ensures Europe's food security. The CAP is a common policy for all EU countries, managed and financed at European level with resources from the EU budget.

- **Farm to Fork (F2F):** The Farm to Fork Strategy (F2F) is the ten-year plan developed by the European Commission to guide the transition to a fair, healthy and environmentally friendly food system.

- **MEC: Minimum Environmental Criteria (MEC)** are environmental requirements established for the various phases of the purchasing process, aimed at identifying the best product, service or design solution in environmental terms, throughout its life-cycle, taking account of availability on the market.

- **MAI**: **Mediterranean Adequacy Index (MAI), whose function is to express the degree of adherence of a meal to the Mediterranean Diet. It does this by comparing the calories, therefore the energy, provided by the different classes of foods present in the dish we consume.**

- **PNRR:** the National Recovery and Rehabilitation Plan (PNRR) is the program by which the government intends to manage the funds of the Next Generation EU. It is the instrument of economic recovery introduced by the European Union to heal the losses caused by the pandemic

- **GSP:** Global Soil Partnership. A globally recognized mechanism established in 2012 with the mission of promoting sustainable soil management and ensuring productive soils towards Food Security

2. Acknowledgments

This module has been written by Loreta Grande and Andrea Palmieri, with the support of the SSPICE IT! Team in Italy and Portugal.

3. Bibliography

- International Fund for Agricultural Development (IFAD), https://www.ifad.org/en/

Co-funded by the European Union

- United Nations Regional Information Centre for Western Europe (UNRIC), *Agenda 2030*, https://unric.org/en/united-nations-sustainable-development-goals/

- Water footprint network, https://www.waterfootprint.org/

- Ecosystems, *A Global Assessment of the Water Footprint of Farm Animal Products*, https://www.waterfootprint.org/resources/multimediahub/Mekonnen-Hoekstra-2012-WaterFootprintFarmAnimalProducts_4.pdf

- European (EC) , *Farm to Fork strategy*, https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en

- European Commission (EC), *The common agriculture policy at a glance*, https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-glance_en

- European Council of the European Council, *Results of the European Council, 23-24 June 2022 on Food security,*

https://www.consilium.europa.eu/en/meetings/european-council/2022/06/23-24/

- Global Footprint Network, *Ecological Footprint Calculator*, https://www.footprintcalculator.org/home/en

- Fischler C., *L'Homnivore. Le goût, la cuisine et le corps*, Paris, Odile Jacob, 1990.

- Damasio A.R., *Descartes' Error: Emotion, Reason, and the Human Brain*, Putnam, 1994; revised Penguin edition, 2005

- Piccinni A., *Drogati di cibo*, Giunti, 2012

Co-funded by the European Union