

AGROFORESTRY SYSTEMS: AN ALTERNATIVE FOR AGROECOLOGICAL PRODUCTION AND AGROECOLOGY TOOLS AT THE UNIVERSITY OF AZORES.

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Abstract

Agroforestry systems have assumed increasing importance in the occupation of the territory of mainland Portugal in recent decades. These are systems that concern areas occupied by different forest species associated with plant and/or animal production activities. And why not introduce this system in the fruiticulture sector in the Azores, when there are an ecological perspective, aiming not only to maximize production, but to optimize the total agroecosystem, including its sociocultural, economic, technical and ecological components. While this production system is being initiated in the Azores, the University of the Azores works with agricultural science students researches natural and sustainable resources in agriculture like seaweed, *Aloes vera*, food waste, ashes, animal manure, algae, phytoplankton, to encourage students to make choices that do not harm the environment and to improve agricultural production.

Key word: *Sustainability, agricultural sciences, crop production, natural resources*

INTRODUCTION

The increase in the world's population and the resulting demand for food has caused enormous pressure on the planet's natural resources. Globalization and the market economy have made raw materials for animal feed accessible and easily transactable and even listed on international stock exchanges. However, this unbridled demand for raw materials worldwide, associated with the depletion of the planet's resources and climate change, increasingly leads citizens and governments to support more sustainable agriculture and a reduction in the "ecological footprint" of the food

that is produced (VAN DER PLOEG 2009).

The Azores Archipelago (Portugal) has unique soil and climate characteristics that allow the production of a wide diversity of crops. The islands are made up of soil suitable for agriculture and occupy around 17% of the island territory. The socioeconomic and structural situation of the Autonomous Region of the Azores, aggravated by its great remoteness, insularity, small surface area, difficult terrain and climate and its economic dependence on a small number of products, seriously affects its development. In this context, to overcome the difficulties inherent to an outermost region and maintain the

profitability of agricultural and livestock farms in the Azores, it has been very dependent on “aid” from the European Union for almost three decades (DENTINHO, 2020).

Azorean fruit farming consists of fruit species to be presented based on aspects such as production tradition, the fact that they are already installed and developing in the Region and the potential for increased production, both in terms of exploration area and in quantities produced. This list aims to ensure that local production, on the one hand, increases exports and, on the other, achieves self-consumption, thus reducing fruit imports. The fruit species are as follows: banana, pineapple, citrus fruit, apple and pear and other pomes, custard apple, avocado pear, passion fruit, plum, chestnut, fig, guava and araçá, medlar, hood tomato (*Physalis*), kiwi, red fruits (raspberry, blackberry, currant, blueberries and pomegranate), coffee, papaya, English tomato (tamarill), persimmon, prickly pear, walnut, olive and lychee (PROFRUTA 2019).

And why not produce these fruits in a sustainable production way? For some time now, almost all of us have been reading, listening, talking and giving our opinions about Agroecology. The resulting guidelines have been very positive, because the reference to Agroecology reminds us of an agriculture that is less aggressive to the environment, which promotes social inclusion and provides better economic conditions for farmers in our state. Not only this, but we have also linked Agroecology to the offer of “clean”, ecological products, free from chemical residues, as opposed to those characteristic of the Green Revolution. Therefore, Agroecology brings us the idea and expectation of a new agriculture, capable of doing good for men and the environment as a whole,

moving us away from the dominant orientation of agriculture intensive in capital, energy and non-renewable natural resources, aggressive to the environment, exclusionary from a social point of view and causing economic dependence (CAPORAL; COSTABEBER 2001).

Although the conventional or industrial agricultural model has provided significant increases in crop productivity and formed “apparently” profitable systems, it has been severely questioned because it is associated with a series of ecological and socio-environmental problems. Among the most relevant are the growing dependence on fossil fuels and low energy efficiency; the degradation of natural resources, contamination of food and the environment; the increasing use of pesticides (insecticides, herbicides, fungicides) and chemical fertilizers; the negative impact on the health of farmers and consumers; genetic erosion (loss of landraces); decrease in biodiversity with the simplification of agroecosystems; the loss of farmers’ traditional techniques, culture and knowledge; and, finally, the increase in exodus and rural poverty (SARANDON, 2009)

The Agroecology approach defined by Altieri (1995) highlights the importance of redesign as a fundamental principle, in addition to agrobiodiversity, pointing out four basic components of a sustainable agroecosystem: (1) the use of vegetation cover; (2) regular supply of organic matter in the soil to promote biotic activities; (3) mechanisms associated with the nutrient cycle such as rotations, integrated agriculture (intercropping) and the use of legumes, and (4) pest regulation through biological control and biodiversity and natural enemies (OELOFSE et al., 2011).

MATERIALS AND METHODS

This case report was developed at the University of the Azores, on the island of Terceira, at the Faculty of

Agricultural and Environmental Sciences, Portugal.

RESULTS AND DISCUSSIONS

Agroforestry systems are a good alternative for fruit production because, also known as agroforestry, they are a set of planting and plant management methods that combine different species on the same land, providing harvests at different stages, which brings benefits to the soil and the entire ecosystem in contact with the plantation. The association of two types of plants, such as grasses and trees, can now be considered an agroforestry system, although much greater complexity can be achieved, with few or even 30 different species in a single agroforestry (WILLER, H.; YUSSEFI, 2008).

In the AZORES, more specifically on the third island, only two producers

were found who work in the agroforestry system, however, these few farmers are hopeful about the results. While there is no effective work with agroforestry systems. The University of the Azores, in the Agronomy Degree in Agricultural Sciences, investigates with its students agroecological tools that can be used by local farmers as an alternative to commercial products, thus offering the producer an economical and sustainable option.

Students investigated the use of ash, forest residues, seaweed, feed waste and even the use of phytoplankton in promoting the productivity of many crops.

CONCLUSIONS

Despite there are not effective agroforestry, on the Terceira island, students can see agroecology in different forms, and the students see in

practice the benefits of agroecology used in agriculture and are open-minded to another option for Azorean agricultural production.

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