

Is it the Agri-Food System Adequated to Our Present Needs?

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Introduction

Recently, foods demands have implied a hard combination of expanding croplands and then intensifying crop production. This scenario will not change in the future due to the increment of deforestation, diminishing supplies of arable land will require increased use of agrochemicals (pesticides and fertilizers), agriculture mechanization, irrigation, novel or genetically modified crop varieties and multiple cropping cycles [1].

Intensive agriculture offers more food, while numerous ecosystems have been impaired due it conversion to croplands, emissions of the greenhouse gas nitrous oxide (N₂O) and nitrate leaching to ground and surface waters [2].

Agriculture is estimated to contribute 84% of Brazil anthropogenic nitrous oxide emissions and 66% of global nitrous oxide emissions [3].

In others countries such as France, the agricultural landscape has changed significantly since 1950's. The growing demand for resources has implied a hard agricultural exploitation with land use modification, drainage of wetland areas, intense grazing and use of large quantities of pesticides, all of which have negatively impacted on biodiversity by transforming the landscape, making it unsuitable for certain species. The need for high agricultural productivity resulted in the transformation of small fields into large open fields at expense of environment [4,5].

This commentary review the available evidence regarding the negative both environmental and social consequences of the present industrialization model of food production.

The problem

Sustainability paradigm, not only minimizes environmental impacts but also use sustainability as the strategy to raise productivity, improve livelihoods and build resilience and Earth system stability, must met the dramatic rise in food requirements from a world population of nearly 10 billion by 2050. All of these change, is further enhanced by changing our dietary patterns [4].

Intensification of agriculture has led a considerable negative environment impacts, such as increases in reactive nitrogen (N) over-supply, eutrophication of land and water bodies, greenhouse gas (GHC) emissions, biodiversity losses, and intensive use of pesticides, though has increased food availability for an increasing human population [6].

Although the great quantities of fertilizers supplied the agricultural land, more than 50% of the added N is commonly lost through leaching denitrification and volatilization, causing serious water-bodies environmental contamination and by contributing to greenhouse emission [7].

The change towards intensive agriculture has led to an increase in the use of pesticides. In addition, legacy pesticides, such as organochlorines are still present in the environment [8].

Pesticides are used worldwide in agricultural and residential applications. They are used in large quantities and spread over large surface areas. Their benefits derive from their ability to interrupt biological systems and they are often lethal to their target organism. Therein lies their potential danger. In the case of pesticides residues in food stuffs, constitute the main source of exposure for animal and human organisms. The need for prevention of adverse outcomes is demonstrated by the fact that pesticides residues may lead to important diseases and then, constitute the main risk factor for the human health. Organophosphates have been associated with chronic neurological symptoms such as impaired memory, impaired fine motor skills control, OP-induced delayed neuropathy (OPIDN) and have been implicated in Parkinson disease, diabetes and certain types of cancer [9-11].

Epidemiologic studies have raised the possibility that some pesticide compounds induce the neuro degenerative disease amyotrophic lateral sclerosis (ALS), though the available evidence is not entirely consistent [12].

By another hand, there has been significantly less attention given to the other end of the food production line. Many foods products consumed in high-incomes countries are produced in low- and middle- income countries [2].

The solution

For all before exposed on a new paradigm for agricultural development is required. The task is how to produce more food, but efficiency.

Agroecology and organic food production are holistic approaches and then can be original proposal for achieving this task, increasing efficiency in production and resources use. Also is important to considerer reducing consumption of animal products and food wastage.

Unfortunately, organic agriculture are not efficient systems which require larger land areas to produce the same food products with respect to the conventional production systems [1].

However, the future tendency is to consider the agroecosystem, that can be perceived as sustainable, which implies both stable and resilient, capable of maintaining constant levels of crop-productivity without increasing anthropogenic inputs, mainly fertilizers and pesticides and reducing environmental stresses. This system properties refer not only to ecological aspects but also to socio-economic issues [4].

Potential solutions include optimizing legume management, recycling nutrients from various organic wastes and increasing nutrient use efficiency [2].

A 100% conversion to organic than for conventional agriculture would lead to reduced impacts for a range of other environmental indicators such as fertilizer application or manure management, as well as per area soil erosion, deforestation pressure and water use [13,14].

Food consumption patterns also play a key role for sustainable agriculture with significant reductions of food-competing feed use, livestock, product quantities and food wastage. It is necessary to reduce the high demand for animal products and their impact on diets, which implies a strategies for more sustainable food systems, making a better use of natural resources, positive impact on environment and the human health aspects, also. [15,16].

Circular economy concepts in opposite to a market economic model, should be the norm with new technologies more efficient and "clean", to fully utilize non-food outputs and recycle agricultural, food and human waste [2,17].

Agriculture is the key to attaining the United Nations Sustainable Development Goals of eradicating hunger and securing food for a growing world population [5].

In conclusion, the actual agri-food system is inadequated to our present needs, because is not fit for purpose; it is not provide sufficient and healthy food in both developed and developing countries. Hence, radical reviewing of the mechanisms from production and consumption, re-enforcing both policy and legislation.

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