Chapter 2

Concepts and realities in agricultural research: sustainable consumption

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Introduction

It is increasingly evident that approaching agricultural growth not taking the limits of ecosystems into consideration has reached critical levels of environmental impact and that costs of environmental service losses are no longer bearable (Ecosystems..., 2005; Kitzes et al., 2008). Agriculture can negatively affect the environmental balance by inefficiently using natural resources and/or by using them (water, soil and air) as receptors for pollutants and contaminants. These facts are economically defined as negative externalities because they are not taken into consideration by the markets and, therefore, their costs are not part of product prices (Dobbs; Pretty, 2004; Moss, 2008).

Agricultural activities, like any other human activity, are potential environmental pollutants. Therefore, they must include environmental management as a routine in order to maintain and preserve natural resources. Nowadays, there is information, knowledge, and technologies to reduce potential negative impacts and mitigate their effects. Therefore, agricultural research is already contributing and will continue to contribute to sustainable agricultural activities in the future.

Knowledge-inducing sustainable consumption

As well as advances in knowledge, there are other advances that must be agreed upon by all agents involved in food production in order to achieve a sustainable future faster. These challenges involve the understanding of concepts and realities often not understood by all. According to Pretty (2008), the lack of knowledge and management are the main obstacles for the establishment of sustainable agriculture. During the transition period from conventional to more sustainable systems, farmers should experiment more and therefore will be subject to the costs of making mistakes.

There is no research that reveals the information quality and the society's perceptions on the concept of sustainable development, but considering the way

the concept is addressed by consumers, it can be said that the lack of information reaches a significant part of these people, resulting in distortions of the concept and its application in the productive processes.

The concept of sustainable development appears for the first time in the Report of the World Commission on Environment and Development (1987). In *Our Common Future*, published in 1987, resulting from the work done by this committee, it can be read that:

> Our report [...] is not a prediction of ever increasing environmental decay, poverty and hardship in an ever more polluted world among ever decreasing resources. We see instead the possibility for a new era of economic growth, one that must be based on policies that sustain and expand the environmental resource base. And we believe such growth to be absolutely essential to relieve the great poverty that is deepening in much of the developing world.

Analyzing the paragraph and our reality, we can state that the world is more polluted and with less environmental resources available; economic growth took place with no attention to natural resources preservation and conservation and poverty mitigation. There has been an economic rise of thousands of people in developing countries, not because of a social issue, but rather to increase the base of potential consumers without caring for the basic conditions for their quality of life (education, healthcare, housing, etc.).

In *Our Common Future* (World Commission on Environment and Development, 1987, p. 57), the bases for sustainable development are:

- A political system that secures effective citizen participation in decision making.
- An economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis.
- A social system that provide for solutions for the tensions arising from disharmonious development.
- A production system that respects the obligation to preserve the ecological base for development.
- A technological system that can search continuously for new solutions.

- An international system that encourages sustainable patterns of trade and finance.
- An administrative system that is flexible and has the capacity for self-correction.

In Brazil, poverty and social inequality are still significant and made worse due to class prejudice; literacy for all and quality education are long-term goals yet to be achieved; corruption, violence and slavery-like working conditions are day-to-day themes; land tenure and land reform are issues of little interest to governments and to a large part of society. Countless national characteristics attest that we are still far from having a sustainable consumption or production, and therefore we must act in the present to secure the future.

Taking into consideration the concept of sustainable development and its premises and the Brazilian and world situations, it can be stated that we are still far off from the long-awaited sustainability. The first step towards it is to know its real meaning.

Water and agriculture: water resources as foundation for food production

Even though Brazil has large reserves of fresh water, including the majority of the world's largest aquifer – the Guarani Aquifer, the country is subject to non-homogeneous water distribution in space and throughout the year. Additionally, population concentration and water demand vary. Income distribution, water management, the amount of investments in infrastructure and human resources and other socioeconomic aspects may also impact water resources availability. These natural and social differences have been responsible for water scarcity events in the country.

It is a challenge for agriculture to demonstrate to Brazilian society that the production of the food it consumes can occur under water conservation practices in terms of quantity and quality. Having information, from the simplest ones, such as the water volume used to produce a kilogram of soy or beef, to the most complex ones, such as the water limits of a certain farm, region and country, will determine the safety and the water independence for productions, society and the country. It is worth highlighting that it is not enough to have only the information, for these must be worked to generate knowledge, which will lead to

water resources management. Therefore, extreme events, such as droughts, will have a smaller impact on our production, markets and society.

Agriculture agents know the importance of water for their activities, but this knowledge has not been translated into management, actions, programs, etc., that seek use efficiency and resource management. It is still very difficult to answer how efficient and productive (in terms of water) a certain food is. Measuring water consumption to produce a kilogram of fertilizer, seed, corn or milk should be an increasingly routine practice, since it will be an increasingly common question of Brazilian society. Food production is composed of several consumptions along its production chain. Managing these various consumptions, detecting points of water inefficiency, relating consumption to quantitative and qualitative availability, and finally proposing actions that aim at sustainable water use is a complex act, depending on the use of different methods.

Final considerations

The myth that technology can solve all environmental problems resulting from human activities persists. This blind faith in technology is defined here as techno-idolatry,

> [...] the belief that the use of technology is the best option that can mitigate all negative environmental impacts that an activity can cause. It should be emphasized that, in this concept, technology is understood exclusively as an artifact that can be acquired only at the expense of financial resources, such as machines, products, etc. This is a limited use of the word. (Palhares, 2015, our translation).

The World Bank's recent report, Digital Dividends (Digital..., 2016), reveals that, despite advances in technology, the world has not been able to solve many of its structural problems. Digital technologies have the potential to promote development through three mechanisms: inclusion, efficiency and innovation. However, by crossing living conditions data with information on access to new media, it is clear that their ability to promote structural change does not necessarily correspond to this potential. The study data show that changes in productivity growth, fight against inequality, and democratic governance are still global challenges. Technology is and will always be an efficient and effective tool that must never be ignored, but overcoming environmental, social and

economic challenges will come from new scientific and social approaches based on theoretical and action frameworks of changing human behavior patterns and actions (Digital..., 2016).

Many are the likely paths to agricultural sustainability. This implies that there is no single configuration of technologies, practices and environmental management that is more widely applicable than the other. Agricultural sustainability insists on the need to adapt production specificities to the circumstances of different production systems (Pretty, 2008).

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