

Chapter 2

Demands and opportunities for sustainable growth

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Introduction

The promotion of sustained economic growth and the generation of decent work, central points of SDG 8, are directly related. Economic growth occurs due to an increase in the total volume of goods and services produced in an economy, through a positive variation of productive capacity, in order to meet human needs. In turn, one of the main variables that characterize the economic growth process is the employment level. Sustainable economic growth is associated with caring for social and environmental issues for current and future generations. Thus, for economic growth to occur in a sustainable way, it is necessary to create conditions that allow people to have quality jobs and stimulate the economy, without damaging the environment.

Projections for 2050 show a world population around 10 billion inhabitants (World..., 2017) so food production becomes critical – and strategic – especially for Brazil, which has the potential to become a major producer and food supplier. In this context, there is the challenge of maintaining sustainable per capita economic growth, i.e., in proportion to socioeconomic development, especially labor.

The role of agriculture for sustainable growth

Brazilian agricultural production has the challenge of keeping to develop, in order to meet the demands of food, fiber, energy and other raw materials for both the green chemistry and process industries, and to generate surpluses for export, in order to contribute to global food and energy security. However, it is necessary that meeting current demands does not jeopardize future generations.

Dealing with this challenge requires professional qualification linked to the entrepreneurship culture, in order to take better advantage of the opportunities

that the new business dynamics, both urban and agricultural, have made available (Buainain et al., 2014).

Technological changes have been taking place at an ever-faster pace. This fact signals a huge challenge for rural extension and technical assistance, which need to decode the knowledge generated by the research or by the farmers themselves into technologies that most rural producers can adopt on their different conditions.

Throughout this modernization process of Brazilian agriculture, in some situations, the passive differences between agricultural production and the environmental and social issues persist, leading to efforts to advance sustainability. These liabilities mainly concern the following problems: a) low efficiency in the use of global resources, leading to inefficiency of production processes, reflecting on production costs and final consumer prices, also reducing the supply of these resources, which, if better used, would be input to other productive processes; b) non-conscious consumption, i.e., not identifying items such as the origin of the product, the way it is produced and what inputs were used, focusing (here, the final consumer of the good or service) rather on the "paid price" than in the sustainability of the production process; c) lack of an effective national plan for sustainable economic growth aimed at minimizing environmental damage, coupled with positive socioeconomic impacts.

Another important point now is the exit of process elimination of those producers who have been marginalized by technological revolutions, regardless their scale of production. Alves et al. (2012) illustrate it by indicating the concentration of agricultural product (income) in proportionally few establishments. About 500,000 properties, out of approximately 5.2 million, accounted for 87% gross income of the sector. In addition, in 2030, Brazilian rural population will probably decrease to about 10% of the total population (Indicadores..., 2011). This demographic scenario has direct effects on the production characteristics, which will need to be more automated and mechanized to accommodate population aging and increase labor productivity. This new population profile will require special attention to production models and their impacts on social and environmental dimensions, in addition to economic and nutritional issues (Buainain et al., 2014).

This demographic trend in several regions (aging and steady migration of rural population to cities) points out that the labor availability for work in agriculture tends to become increasingly scarce. In addition, with the intensification of climatic changes, the planting conditions, such as temperature, precipitation,

soil humidity, will require more accuracy in the conduct of various agricultural practices.

Despite the success of Brazilian agriculture, the adoption of modern technologies still affects a limited contingent of producers. A more productive inclusion requires greater investment and innovative strategies in the creation and transfer of knowledge and technology. Above all, this will help the most vulnerable producers to participate in this growth path.

Among other factors, mechanization and automation will play a role in the coming decades in response to population aging (World..., 2013); to the migration from rural areas to cities and the reduced or insufficient contingent of young labor in the field; as well as to education limitations in several countries (as in Brazil). These processes together contribute to the shortage of skilled workers in the field. Increasing both the supply and the adoption of these technologies in rural areas are a decisive factor in increasing the productivity of work in the field (Contini et al., 2010), besides making agriculture more attractive to young people compared to the offered, or expected options in the urban area. Research and innovation systems should be prepared to respond to more multidisciplinary agriculture and to the challenge of young labor force migration to the cities.

The multifaceted characteristic of Brazilian agriculture (food safety, bioenergy, climate changes, green chemistry, rural development, international trade agreements, among others), with information processed faster and challenges that do not respect national borders (pests, diseases, climate changes, among others), reinforces the dependence on knowledge, technology and innovations. All these facts highlight the urgency of a broad effort to technology transfer and rural extension, so as to allow greater inclusion of technological and productive innovations in the field.

An inexorable fact is that the agricultural sector will be increasingly pressured to broaden efficiency in the use of fertilizers, agrochemicals and other inputs and resources, especially water. It is necessary to produce more, with an optimal level of inputs utilization, or produce the same quantity with a lower level of inputs.

The quest for continuous improvement of productivity and efficiency of economies should consider increasing formalization (and empowerment) of micro and small enterprises, always focusing on decent employment of human capital.

Final considerations

Therefore, research and innovation companies on agriculture have the potential to contribute to job generation and economic growth without harming future generations. Embrapa plays an important role in this process, contributing to the agriculture sector in general, through technological solutions, training and/or support to public policies formulation. The results of these contributions can be materialized through productivity, quality, and value-added gain, or solutions to the sector problems, among other factors.

It is important to remember that agriculture also contributes to the generation of urban jobs, such as suppliers of machinery and inputs in the logistics, agroindustry and marketing sectors. Therefore, by supporting productive activities, agricultural research activates the multiplier effects throughout the economy. In addition, this potential goes beyond the generation of traditional agricultural jobs. The new interactions that take place in innovation systems, marked by the involvement of diverse actors, as well as by innovation in products and processes, entrepreneurship and creativity and, mainly, by intensive use of Information and Communication Technologies, take the results of agricultural research farther away, generating jobs in many sectors.

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