Food and Agriculture Organization of the United Nations

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FAO report analyses how automation in agriculture is helping to transform agri-food systems

The State of Food and Agriculture 2022 (SOFA) also addresses the potential impact of this technological change on job displacement and unemployment.

November 02, 2022, Santiago, Chile- Automation in the early stages of the food supply chain can support sustainable and inclusive productivity gains in agri-food systems and contribute to achieve the Sustainable Development Goals, says the latest report by the Food and Agriculture Organization of the United Nations (FAO) on The State of Food and Agriculture 2022 (SOFA).

The report states that agriculture automation, including using tractors or artificial intelligence, can increase productivity and resilience, improve product quality and resource efficiency, reduce human labor and labor shortages, improve

environmental sustainability, and facilitate climate change adaptation and mitigation.

The report analyzes 27 case studies on the use of technology at different stages of development and identifies the various barriers that may impede its application, especially by small-scale producers. Based on this analysis, the publication suggests policies to ensure that agricultural automation is inclusive and contributes to sustainable and resilient agri-food systems.

However, the report also analyzes that the adoption of new technologies, access to which still tends to be limited, can also deepen inequalities, especially if it remains inaccessible to smallholders and other marginalized groups, such as youth and women.

Finally, the SOFA addresses the widespread concern about the potential negative impacts of labor-saving technological change in terms of job displacement and unemployment. While it concludes that such fears are overblown, it recognizes that automation in agriculture can lead to unemployment where rural labor is abundant, and wages are low.

"FAO is convinced that without technological progress and increased productivity, it is not possible to lift hundreds of millions of people out of poverty, hunger, food insecurity and malnutrition," FAO Director-General QU Dongyu wrote in the report's foreword. "What matters is how the automation process is carried out in practice, not whether it occurs or not. We must ensure that automation is carried out inclusively and promotes sustainability."

Uneven progress around the world

Motorized mechanization has been an important form of automation in agricultural production and a key component of a global transformation. However, its adoption has been uneven in different parts of the world. One example is the available statistics on the number of tractors per 1,000 hectares of arable land worldwide, which show the uneven progress towards mechanization in different regions of the world.

Latin America and the Caribbean has shown considerable progress in mechanization, driven by farming system evolution, structural transformation, and urbanization. The number of tractors per 1000 hectares of arable land almost tripled from 5 in the 1960s to 14 in the 2000s.

The SOFA reports that in the region, it was private actors that drove agricultural mechanization. However, governments also played a key role, creating an enabling environment for mechanization, for example, through public programs developed by governments in Argentina, Costa Rica, Ecuador, and Peru, which provided access to credit at low-interest rates and tax exemptions. In addition, several countries, such as Peru, exempted agricultural machinery from import duties.

Policy recommendations

The general principle of the policy recommendations offered in the report centers on the idea of responsible technological change. This involves anticipating the impacts of technologies on productivity, resilience and sustainability while focusing on marginalized and vulnerable groups.

The key here is to create an enabling environment that requires a range of policy instruments to work together coherently. These include legislation and regulation, infrastructure, institutional arrangements, education and training, research and development, and support for private innovation processes.

Efforts to reduce the uneven spread of automation should include inclusive investments involving producers, manufacturers, and service providers, with particular attention to women and youth, to further develop technologies and adapt them to the needs of end users.

In addition, investments and other policy actions designed to promote responsible agricultural automation should be based on context-specific conditions, such as the state of connectivity, challenges related to knowledge and skills, adequacy of infrastructure, and inequality in access. Even biophysical, topographical, and climatic conditions play a role. For example, small machinery and even manual equipment can benefit smallholders in hilly terrain.