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### LATEST NEWS

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## Reflections on the innovation process in agriculture

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According to projections, the global population is expected to reach nearly 10 billion by 2050 (Population, 1950 to 2100). This demographic shift will have far-reaching effects on life on Earth, transforming lifestyles, needs, and consumption patterns—particularly driving a significant increase in food demand. In this context, one of the main challenges for agricultural systems will be to boost productivity to meet growing demands while simultaneously reducing negative environmental impacts. This challenge is encapsulated in the concept of sustainable intensification: increasing agricultural yields and profitability per unit of space and time without degrading soil and water resources or compromising ecosystem integrity. It involves improving yields relative to inputs such as energy, water, and nutrients while minimizing the ecological footprint.

Agricultural research plays a key role in achieving this goal. It is a dynamic and constantly evolving field that produces innovations supporting sustainable intensification. However, not all innovations successfully reach their intended users. A major barrier is often the weak connection between the research sector — where innovations are developed — and the agricultural sector — where they should be applied. Bridging this gap requires the emergence of intermediary figures who can facilitate the transfer of innovation from theory to practice. This role involves identifying and interpreting the specific needs of farmers, then sourcing and adapting relevant innovations accordingly. These intermediaries work from the ground up, analysing local needs and challenges across the supply chain to ensure that innovation is rooted in real-world demands.

One of the main obstacles to innovation transfer is the high average age of farmers, who are often less inclined to adopt new techniques and technologies. This is especially evident in small, family-run farms, where a traditional mindset prevails and technical or digital skills are limited. For this reason, it is essential to focus on transferring mature, well-validated technologies—minimizing farmers' scepticism and resistance. Innovation must be clearly understood and accepted by agricultural technicians, who can assess its economic feasibility and practical value. The older age of farmers not only hinders the introduction of innovations, but

also affects discussions on innovation in general, as older farmers tend to favor established methods over exploring new agricultural practices.

Engaging younger generations is, therefore, essential to opening the agricultural sector to research and innovation. These newer farmers are often more open to change and can be examples of the benefits and impacts of adopting new practices, encouraging broader acceptance among more traditional communities. Another barrier is the generally low level of education among older farmers, which contributes to limited adoption of digital tools and platforms designed to support knowledge and innovation transfer.

Farm size also plays a significant role in the adoption of innovation. Small, family-run farms often face substantial difficulties implementing technical and mechanical innovations due to high initial costs. These farms may also struggle to access loans and grants necessary to finance innovation. Moreover, small businesses often lack access to up-to-date information: while larger, well-structured companies can hire consultants or maintain trained internal staff, managers of small farms are typically burdened with both fieldwork and administrative tasks, leaving little time for training and staying informed.

Additionally, farmers often have confusion about what innovation entails. It is frequently mistaken for novelty or the use of advanced technologies already available on the market. As a result, innovation is often pursued only when external funding becomes available, rather than being integrated into a long-term strategic vision. However, not all innovations require significant investments—some involve adopting new cultivars, implementing specific cultivation techniques, or using free digital tools.

Therefore, continuous training is essential for all farmers, including older ones. In a sector as fast-evolving as agriculture, adopting innovations—such as precision farming or data management systems—can significantly enhance efficiency and productivity, while also reducing workload and improving social, economic, and environmental sustainability. At the same time, encouraging generational renewal is key to overcoming the barriers posed by aging and low education levels.

Public policies should be strengthened to support small agricultural businesses in addressing these challenges. This includes promoting innovation, providing technical and financial assistance, and improving access to collaborative networks and up-to-date knowledge.

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