**Organic Agriculture in the 21st Century**

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**Implications**

With only 1% of global agricultural land in organic production (Willer & Lernoud 2015), and with its multiple sustainability benefits, organic agriculture can contribute a larger share in feeding the world. Although organic agriculture has an untapped potential role in global food and ecosystem security, no one farming system alone will safely feed the planet. Rather, a blend of organic and other innovative farming systems, including agroforestry, integrated farming, conservation agriculture, mixed crop/livestock, and still undiscovered systems, will be needed for future global food and ecosystem security. Significant barriers exist to adopting these systems, however, and a diversity of policy instruments will be required to facilitate their development and implementation. Moreover, realizing food and ecosystem security requires more than just achieving sustainable farming systems worldwide. We need to reduce food waste, improve food distribution and access, stabilize the human population, eliminate the conversion of food into fuel, and change consumption patterns towards a more plant-based diet.

**Conference track:** 1. Tuning up sustainable organic production

**Background and objectives**

Organic agriculture has a history of being contentious and is considered by some as an inefficient approach to food production (Pickett 2013). Skeptics argue that organic agriculture relies on more land to produce the same amount of food as conventional agriculture and that adopting organic agriculture on too large a scale could potentially threaten the world’s forests, wetlands, and grasslands (Emsley 2001, Trewavas 2001). Yet the number of organic farms, the extent of organically farmed land, the amount of research funding devoted to organic farming, and the market size for organic foods have steadily increased (Willer & Lernoud 2015). Moreover, recent international reports recognize organic agriculture as an innovative farming system that balances multiple sustainability goals and will be of increasing importance in global food and ecosystem security (IAASTD 2009, De Schutter 2010, National Research Council 2010). Here, the objective is to compare the performance of organic and conventional farming in light of four key sustainability metrics: productivity, environmental impact, economic viability, and social wellbeing.

**Key results and discussion**

The performance of organic farming systems in the context of four major sustainability metrics indicates that they better balance multiple sustainability goals than their conventional counterparts. Based on present evidence, although organic farming systems produce lower yields compared with conventional agriculture, they are more profitable and environmentally friendly, and deliver equal or more nutritious foods with less to no pesticide residues. In addition, initial evidence indicates that organic agriculture is better at enhancing the delivery of ecosystem services, other than yield, as well as some social sustainability benefits. In general, these results reported in Reganold & Wachter (2016) are similar to findings by Seufert & Ramankutty (2017).

Equal adherence to all four sustainability goals of production, environment, economics, and social wellbeing does not limit but encourages farmers and researchers to innovate. The challenge facing policymakers is to create an enabling environment for scaling-up organic and other innovative farming systems to move towards truly sustainable production systems. This is no small task, but the consequences for food and ecosystem security could not be bigger. To make this happen will require mobilizing the full arsenal of effective policies, scientific and socioeconomic advances, farmer ingenuity, and public engagement.

**How work was carried out?**

According to a US National Academy of Sciences report (National Research Council 2010), any farm, be it organic, conventional, integrated, or other, can only be deemed sustainable if it produces adequate amounts of high-quality food, enhances the natural-resource base and environment, is financially viable, and contributes to the wellbeing of farmers and their communities. With the rise of organic farming, especially in the past two decades, hundreds of research studies comparing different aspects of organic and conventional farming systems have been published. Based on the recent paper by Reganold & Wachter (2016), here 40 years of scientific studies comparing organic and conventional farming are reviewed and assessed in the context of these four major sustainability metrics: production, environment, economics, and social wellbeing. Much of the analyses relies on data that have been synthesized in published meta-analyses and reviews of sustainability metrics, such as crop yield, energy efficiency, and financial performance.

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