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LETTER

Moving beyond the opposition of diverse knowledge systems for food security and nutrition

Nathanaël PINGAULT[1], Patrick CARON[1, 2], Alicia KOLMANS[3], Stefanie LEMKE[4], Carol KALAFATIC[4], Sabine ZIKELI[5], Ann WATERS-BAYER[6], Carolin CALLENIUS[3], QIN Yong-jun[1, 7]

[1] *High Level Panel of Experts, Committee on World Food Security, Food and Agriculture Orgnization of the United Nations, Rome 00153, Italy*

[2] *Université de Montpellier, Montpellier 34090, France*

[3] *Research Center Global Food Security and Ecosystems, University of Hohenheim, Stuttgart 70599, Germany*

[4] *Centre for Agroecology, Water and Resilience, Coventry University, CV8 3LG Coventry, UK*

[5] *Center for Organic Farming, University of Hohenheim, Stuttgart 70593, Germany*

[6] *Agrecol Association, Guggenhausen 88379, Germany*

[7] *Shanxi Academy of Agricutural Sciences, Taiyuan 030031, P.R.China*

Abstract

Food Security and Nutrition (FSN) is influenced by diverse and complex factors, and therefore requires a holistic approach to agriculture and food systems plus integration of knowledge from diverse sources in science and society. Using the results of a colloquium held at the University of Hohenheim (Germany) in September 2016 leading up to the recent High Level Panel of Experts (HLPE) Note on Critical and Emerging Issues for Food Security and Nutrition, this article underlines the role of research and innovation as a social and political process and draws attention to neglected types of knowledge. It illustrates the potential of knowledge co-production and co-innovation to transform food systems in order to achieve the Sustainable Development Goals.

Keywords: food security, nutrition, innovation, Sustainable Development Goals

As illustrated by the High Level Panel of Experts on Food Security and Nutrition of the UN Committee on World Food Security (HLPE) in its previous publications (http://www.fao.org/cfs/cfs-hlpe/reports/en/), Food Security and Nutrition (FSN) is a complex and multifaceted issue that requires a holistic, participatory and transdisciplinary approach to transform food systems at different scales, as well as the integration of different forms of knowledge.

The concept of co-production of knowledge, in particular the deliberate engagement of non-academic actors in the process of producing scientific knowledge, needs to be made more concrete in terms of what this approach really means and how the integration of diverse sources of knowledge can become reality.

Conducting research is, in itself, a social and political process. The problems researchers choose to address or ignore, as well as the concepts and methods for doing

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Correspondence QIN Yong-jun, E-mail: yongjun.qin@fao.org

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so, may support the interests of particular groups, while neglecting those of others. The way researchers treat the knowledge of traditional and local actors may either further empower them by acknowledging and valuing their knowledge or disempower them by conveying that their knowledge is of little value.

Yet, farmers, Indigenous Peoples and other local actors often continue to be largely excluded from framing research and co-producing knowledge directly relevant to them. Even though research institutions are increasingly promoting the engagement of non-academic actors in the process of generating scientific knowledge, scientists usually retain the lead in the production of knowledge, and actor involvement is restricted to ensuring that research questions are relevant to societal needs and that scientific outputs are applied. Within this logic, private actors are often engaged as partners because they are regarded as potential implementers of researchers' inventions. As a consequence, already influential actors might be strengthened, while others overshadowed. In order to leverage transformation toward FSN, more attention should be given to structural power inequalities between actors, including among those involved in the research. Encouragingly, a critical reflection on patterns of knowledge production and innovation for FSN has progressively become an important element of the international debate in the past decade.

The International Assessment of Agricultural Knowledge, Science and Technology for Development explicitly questioned the role of knowledge and technology for agricultural change (IAASTD 2009). It called for the integration of different sources of knowledge to revitalize food and agricultural systems. It stressed that local actors and communities should have a more prominent role in the knowledge-generation process. The HLPE, in its previous publications, highlighted the critical importance of improving FSN for all, as both a necessary condition and a cross-cutting challenge to achieve the 2030 Agenda and called for a radical transformation of agriculture and food systems. Knowledge and technology are acknowledged as essential for such a transformation to happen (HLPE 2017).

Yet, two diverging narratives have developed regarding the role of knowledge for development. On the one hand, the digital and big-data revolution, and breakthroughs in many fields of science such as genetic engineering and medicine, have amplified the promise of technology-driven improvements, following the Green Revolution model. On the other hand, public mistrust in scientific outputs and their use has increased, with controversies in FSN issues being especially pronounced and generating many debates. One of the most emblematic debates relates to genetically modified organisms and includes issues such as ownership of living resources through patenting, power imbalance in agricultural supply chains, and assessment of long-term impacts on human health and the environment. Moving beyond the opposition between these two narratives, we call for a better integration of different knowledge systems.

The adoption of the 2030 Agenda as our global common roadmap aligns with a potential breakthrough in knowledge mobilisation. Not only the nature of the knowledge produced needs to change, but also the way it is produced, combined, distributed and exchanged. There is no "silver-bullet" solution: the needed transformations must be context specific. Empirical knowledge systems have collected large amounts of context-specific information resulting from continuous interactions over generations within a specific socio-ecosystem. Therefore, the needed transformations should build on a strengthened partnership between scientists and local actors in food systems, a strengthened dialogue between science and local, empirical knowledge systems too often neglected.

A review of several cases of farmer-led research together with formal scientists revealed remarkable positive impacts in terms of FSN, ecological sustainability and economic empowerment. For example, in Philippines, since 1985, MASIPAG ("Farmer-scientist partnership for agricultural development") farmers have collected over 1000 traditional rice varieties and, in experiments on almost 200 farms, developed another 1 000 site-adapted varieties, e.g., for flood or drought resistance or salt tolerance. The yields of MASIPAG organic farmers using their self-bred varieties were higher than yields from conventional rice farming in the area, and the much greater varietal diversity provided better yield security under varying climatic conditions (Waters-Bayer *et al*. 2015).

The complementarity of indigenous knowledge and science can also be very helpful to address the challenges of climate change. In 2011, the Association of World Reindeer Herders, the International Centre for Reindeer Husbandry and the Sámi University College established the University of the Arctic EALÁT Institute for Circumpolar Reindeer Husbandry. This institutional data- and knowledge-sharing network enabled horizontal knowledge exchange among reindeer herders for autonomous learning, strengthening community-level adaptation to climate-change impacts and engaging Sámi youth in scientific research (Oskal *et al*. 2009; Nakashima *et al*. 2012; Risvoll and Hovelsrud 2016; Sheremata *et al*. 2016).

In Germany, the "Leitbetriebe Ökologischer Landbau in NRW" (a network of farmers and researchers in North-Rhine-Westphalia) or the "Verbund Ökologische Praxisforschung" (a research-related association of the three most influential organic farmer associations in Germany) are two examples of farmer–scientist networks co-producing knowledge on organic farming through a participatory approach in

which the farmer is an "active actor and a driving force for innovation" (Vogt 1999; VÖP 2017).

In conclusion, promoting research for FSN and sustainable development that explicitly responds to location-specific political and societal needs requires involving a wider range of actors, including non-academic actors, into the process of framing and implementing research. The integration of different types of knowledge, from all actors, will facilitate the cross-fertilisation of ideas, enable co-ownership of the research process and of its results, and stimulate innovation. This implies challenging and overcoming unequal power relations between scientific and other knowledge systems. It also requires time and long-term funding of research initiatives, including innovative funding mechanisms.

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