

## **The ethics of innovation in agriculture: Inclusivity and Reflexivity**

Kristal Jones, Research Associate, National Socio-Environmental Synthesis Center, University of Maryland, USA

### **Introduction**

Innovation has become a buzzword in the realm of international development over the past decade. Major funders such as the United State Agency for International Development (USAID) and United Nations Children's Fund (UNICEF) support 'innovation labs', where resources and expertise are focused on asking new research questions that build on past successes and failures. Non-governmental organisations around the world facilitate and emphasise local innovations to meet local needs, in an effort to generate new ideas that are appropriate and relevant to specific places (Keny-Guyer, 2013). These and other approaches to innovation in international development are influenced by the private enterprise model of start-up firms in the information technology sector, where innovation is seen to be a collaborative process that is constantly working to adapt and improve existing things, systems and ideas. As Fabian and Fabricant (2014) highlight, however, the orientation toward creative destruction in technology innovation, where change is constant and "failing quickly" yields further innovation, does not reflect the ethical and practical realities of research and programming in international development, where human well-being is at stake.

Innovation in agriculture refers to the goals or priorities of a research or development programme, and how they are achieved (Korthals, 2008). Norman Borlaug, often called the father of the Green Revolution described the innovation process that generated new varieties as "neither a stroke of luck nor an accident of nature." Instead, "two decades of aggressive research" on Mexican wheat varieties and how they could contribute to increased food production in Pakistan and India generated an innovation process in which "huge quantities of seed had been imported from distant lands and grown successfully in their new home" (Borlaug, 1970). The research priorities, to increase yields of staple grains, and the research process, the application of technology and the scientific method to the identification and breeding of genes in new varieties, were interconnected and influenced by the many people (mostly agricultural scientists with PhDs) who contributed to the innovation, as well as by the context (population growth and hunger) within which the innovation occurred.

### **Which values and ethics should drive innovation?**

Innovation in international development can easily be framed as being a neutral and necessary fact of life; if there are problems in the world, we need to make changes and come up with ideas to address them. The social acceptability and desirability of specific innovation priorities and processes are then evaluated based on their ability to address these problems. However, because innovation is a dynamic process oriented toward the creation of new things, systems and ideas, individuals and institutions must constantly make decisions about which innovation priorities they value, and which innovation processes they consider ethical (Korthals, 2008). Overarching issues are often made explicit in the mission statements and chosen issues of non-governmental and international organisations, where human rights, food security or maternal health are prominently featured. There is often a lack of awareness or transparency, however, about which

values are used to assess possible priorities and goals within these issues. More profoundly, there is often not an articulation of the ethics that guide the innovation processes of a given project or organisation. Through being non-explicit, many projects end up with unintended and unexpected negative social and ecological impacts.

Whose values and which ethics should drive innovation in agriculture? These questions preoccupy many contemporary discussions about international agricultural research and development, as the use of biotechnology, modern production techniques and commodity markets has increased (Kinderlerer, 2011). The impacts of the Green Revolution, for example, have been analysed through a comparative lens that identifies the values that drove the research priorities and processes. Evenson and Gollin (2003) argue that because the goal of Green Revolution innovations was to increase economic and production efficiency in key agricultural crops, and because the process was oriented around formal scientific methods and the development of input markets, certain types of people benefitted more from the innovations than others. Large-scale farmers, those with access to cash and credit to purchase the new seeds and fertilisers, and those who had knowledge or training in ‘modern’ agricultural production techniques could take advantage. Small-scale farmers, without access to enough land, cash or credit to make it economically feasible to buy inputs and those who were not interested in or able to apply the high-intensity, standardised production techniques, were largely excluded from the benefits. Overall food production increased and global hunger decreased throughout the 1970s and 1980s, due in part to Green Revolution innovations. Simultaneously, fertiliser use increased, leading to long-term negative impacts on soil and water quality in some parts of the world.

### **Ethics of innovation in agriculture**

In contrast to the experimental innovation that occurs in private enterprise, innovation in international development that addresses human needs requires an ethic of innovation that can anticipate and minimise negative social impacts from innovation. Attention to the positive and negative, expected and unexpected impacts of innovations in agriculture is doubly important because of the interconnected human and environmental dimensions of agricultural production systems. Innovation priorities and the values used to identify them must therefore take into account both social needs and ecological realities. The innovation process must also engage with the complexity of human-environment interactions in agricultural production systems. The ethics of innovation in agriculture, then, should reflect and further refine the more general innovation frameworks in international development that emphasise collaboration, iterative learning and systems thinking (UNICEF, 2014; Keny-Guyer, 2013). The UNICEF (2014) ‘Principles for Innovation and Technology in Development’ provide an ethical foundation for innovation in international development that recognises the responsibility that comes with seeking change in human systems. The principles emphasise and value collaboration, transparency and the incorporation of the voices of all those who will be affected by the innovation process or outcomes. Systems thinking, as a means to engage with complexity and iterative learning, is also emphasised as necessary to maximise positive impacts of innovation. In short, an ethic of innovation for development requires foundational commitments to inclusivity and reflexivity.

There are several distinct and interconnected orientations toward an ethic of innovation in agriculture that reflect and refine these two basic ethical principles of inclusivity and reflexivity. *Participatory approaches* to agricultural development and change, which emerged in the 1970s

as a place-based response to large-scale, acontextual development approaches, works to identify the values and priorities of the people for whom development is ostensibly working. Chambers (1974), along with many more practitioners, scientists and officials who followed, developed a framework that puts people and their values first, and that works to include and engage as many contrasting voices and priorities as is feasible. By including the voices and values of non-experts in the innovation process, participatory agricultural development links to a related ethic of innovation in agriculture that recognises and prioritises *indigenous knowledge*. Richards (1985) and others have defined indigenous knowledge as deriving from ecological particularities, in contrast to scientific knowledge, derived from universals.

Initially, the participatory and indigenous knowledge ethics of innovation in agriculture were positioned in direct contrast to the scaled-up Green Revolution approach to agricultural development. However, the principles of inclusivity and reflexivity inherent in ethical innovation in agriculture have pushed many applied researchers and practitioners to evolve over the past 40 years, generating updated frameworks for innovation in agriculture. Richards (2010) and others, for example, have recently articulated an approach they call *technography*, which uses an iterative and adaptive learning process to facilitate innovation in technology development and tacit knowledge of the user. As the complex social and ecological systems within which agricultural production occurs continue to change, these and other approaches to innovation for agricultural development will continue to adapt and emerge. Ethical approaches to innovation in agriculture must, however, remain committed to an ethic of inclusivity and reflexivity as a foundation for innovation priorities and processes.

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