



## Viewpoint

## Enhancing innovation in agriculture at the policy level: The potential contribution of Technology Assessment

Frank M. Vanclay<sup>a,\*</sup>, A. Wendy Russell<sup>b</sup>, Julie Kimber<sup>c</sup>

<sup>a</sup> Department of Cultural Geography, University of Groningen, The Netherlands

<sup>b</sup> Centre for the Public Awareness of Science, Australian National University, Canberra, ACT, Australia

<sup>c</sup> Tasmanian Institute of Agricultural Research, University of Tasmania, Australia

## ARTICLE INFO

## Article history:

Received 28 February 2011

Received in revised form 1 July 2012

Accepted 5 August 2012

## Keywords:

Technology Assessment

Innovation

Adoption

Technology governance

Agricultural policy

Sustainability

## ABSTRACT

Technology Assessment (TA) is an applied process that considers the societal implications of technological change in order to influence policy to improve technology governance. TA has considerable potential to enhance innovation in agriculture and to assist agricultural industries in becoming more efficient, more sustainable and more socially acceptable. Innovation in agriculture is not only about what happens at the farm level, there needs to be innovation all along the value chain, including at the policy level in agribusiness and government. In assessing innovation at multiple levels, this paper demonstrates the potential of TA to assist government and industry to make sound decisions relating to which new technologies to endorse, what regulation may be required, and how social concerns can be addressed.

© 2012 Elsevier Ltd. All rights reserved.

## Introduction

The purpose of this paper is to introduce the concept of Technology Assessment (TA) – a concept well established in various places around the world (Decker and Ladikas, 2004) – to people working in the area of innovation and adoption in agriculture. We also seek to emphasise that the concept of innovation is not only relevant at the farm level, but should also be applied to overarching policy frameworks. There is no doubt that agricultural sustainability – in social, environmental as well as in economic terms – requires ongoing innovation by farmers, but it also requires innovation at other points in commodity and value chains, including in the ways in which agriculture, and new technologies in agriculture, are regulated and governed (Bruce, 2002; Salleh, 2006).

Innovation, which broadly refers to the use of new ideas to improve ways of doing things, is relevant at the policy level in two primary ways. First, there are new ideas about regulation and governance that can be taken up. The policy level is no different to any other level in the value chain in that invention and discovery about how to do things better does occur, and in that these new ways should be implemented. Secondly, the overarching policy

framework may have a profound effect on innovation at points lower down the value chain. Policy can encourage and facilitate the adoption of new ideas and practices, and it can also impede adoption and innovation (Carruthers and Vanclay, 2012).

This paper argues that Technology Assessment is an important policy tool in contributing to good technology governance. Technology governance refers to how technological developments are managed in a society. Governance stems from political decisions, but should be underpinned by foresight and visioning, assessment and regulatory processes; and participatory and preferably deliberative activities, which inform those decisions. Most governments regulate technologies perceived as being dangerous to health or to the environment. The underlying tenet of this paper is that, like all planned interventions (João et al., 2011; Esteves et al., 2012), technological innovation should be managed to reduce social harm and to enhance social benefit as well.

We define Technology Assessment as “an applied process that considers the societal implications of technological change in order to influence policy to improve technology governance” (Russell et al., 2010, p. 109). Unlike many OECD countries where TA is well-established, Australia has not had a formal technology assessment process or agency, although it does have a fragmented approach to managing new technology (Russell et al., 2011). We believe that a strong case exists for a systematic approach to considering the social consequences of new technology and in having a formalised TA process to assist in technology governance (Russell et al., 2010, 2011). A similar call is being made for re-establishing TA in the

\* Corresponding author at: Department of Cultural Geography, Faculty of Spatial Sciences, University of Groningen, PO Box 800, 9700AV Groningen, The Netherlands. Tel.: +31 503638657; fax: +31 503633901.

E-mail address: [frank.vanclay@rug.nl](mailto:frank.vanclay@rug.nl) (F.M. Vanclay).

United States, where arguably TA began (Erikson, 2010; Sclove, 2010).

### Innovation at all points in the value chain

Adoption and innovation are complex social processes that are often over-simplified by innovation researchers (van de Ven, 1986; Vanclay, 2004a; Pannell et al., 2006). Change in practice can also occur through informal as well as formal means, and the origin of change may very well be within an individual or family farm business (or commercial enterprise) and not necessarily as a result of some external invention or intervention. Because of the diversity of farmers and the existence of discrete styles of farming, new practices or technologies are rarely universally applicable (Howden and Vanclay, 2000; Mesiti and Vanclay, 2006; Vanclay et al., 2006). As Vanclay has stated in several places, there is no such thing as a barrier to adoption, there are only legitimate reasons for non-adoption, and non-adoption will often make sense from the perspective of the non-adopting farmer (see Vanclay, 1992, 2004a; Vanclay and Lawrence, 1994, 1995). While not contradicting this social analysis of adoption at the level of the individual farmer, the purpose of this paper is to consider innovation at a wider scale and/or at a higher level. In fact, recognition of the social nature of innovation is relevant at all levels, and an understanding of innovation at multiple levels and integrated across the value chain requires an approach that focuses on the social context rather than considering innovation in a mechanistic way.

Innovation researchers have tended to examine the experience of innovation only at certain points in the value chain. Those researchers working within a management context have tended to consider innovation at the firm level (van de Ven, 1986). Rural sociologists and agricultural extension researchers interested in adoption in agriculture have tended to look at innovation at the level of the farmer (Lockie et al., 1995; Abadi Ghadim and Pannell, 1999; Guerin, 1999; Vanclay, 2003a, 2004a; Pannell et al., 2006). However, innovation can and does occur at all points along the value chain, including, for example:

- Research scientists and research organisations (i.e. research).
- Individuals and organisations involved in commercialising research findings (i.e. development).
- Individuals and organisations involved in extending research findings, including input suppliers and agricultural consultants (i.e. extension).
- Farmers as individuals and as members of family farm businesses.
- Processors/distributors/wholesalers.
- Retailers.
- Consumers (end-users) (as individuals).
- Consumers as organised consumer/end-user groups.
- Individuals as organised special interest groups (e.g. environmental NGOs, citizen groups).
- Politicians as representatives of the community.
- Government regulatory authorities.
- The overarching policy framework.

Thinking about a new technology such as a genetically modified crop for example, innovation has to occur at all points along the value chain for the innovation to be implemented. Thus before implementation can occur, seed companies have to develop and market the GM seed, regulatory approval has to be given, community acceptance (at least tacit) must be provided, farmers need to switch crops, harvesting contractors and other agricultural infrastructure providers (transport companies, ports, etc.) have to agree to handle GM crops, and markets need to accept the product. The innovation does not have to occur simultaneously at these

different points, but must be perceived as being likely to occur within a commercially viable timeframe for the risk capital to be ventured on product development and/or for the whole value chain to be successful. Adoption will only occur (or at least persist) if there is significant approval at each point in the value chain and the likelihood of regulatory, institutional and social support.

One of the conundrums in innovation research relates to its definition. An innovation is typically defined along the lines of “an idea, practice, or object which is perceived to be new by an individual or other unit of adoption” (Rogers, 1995, p. 12), irrespective of whether it has been in use for some time elsewhere. What is critical in defining something as innovative is the novelty of the concept to the user. Thus everyone is innovative and an ‘innovator’ with respect to something, because no one ever always does everything consistently the same over time. Confusion arises because of the social approval given to those who are among the first to innovate (the early adopters). Thus, there is confusion between the stage in the process of the diffusion of innovations, and the process of adoption by an individual.

This issue becomes important because there is what might be called ‘innovation gatekeepers’. Sometimes the delay between a technology being invented and its uptake by the public could be many years or even decades. This may not be because of a lack of innovative capacity on behalf of farmers or other members of the public, but because of delays created by the various gatekeepers. These gatekeepers include government regulatory bodies (with delays caused by approval processes), as well as governments themselves with elected representatives believing that they are acting on behalf of the community, or their constituency at least. The concerns of community groups may lead to political action or advocacy, which might ultimately affect the decisions of politicians and/or regulatory agencies. Similarly, the perception by an R&D organisation or commercial company that the public may not accept a new technology could also lead to their decision to delay its introduction.

A large part of the problem is that innovations tend to be studied at singular levels in isolation (i.e. the points of invention of technologies, commercialisation, regulation, and adoption by end-users). There is also a tendency to assess innovation in technocratic terms, rather than as a social process. Even when adoption behaviour is considered as a key aspect of innovation, e.g. in relation to farmers, the broader social context of farmers’ values and norms is often not taken into account. Given all these problems, there is an obvious need to study innovation throughout the value chain and in a broad social context, and to seek to integrate the flow of innovations. This would require information flow and dialogue between levels. Such integration would potentially lead not only to a more efficient process overall without the delays described above; but also to constructive improvements of technologies and technology settings, leading to better outcomes.

### Social issues associated with new technologies

New technologies, or further developments of existing technologies, can have profound social impact, both in terms of ‘corporeal’ impacts on people, and in terms of creating concern, fear and anxiety, which are in themselves real impacts (see Vanclay, 2002, 2012). How new technologies are managed and governed, and particularly how community concerns are addressed in that process, has a large bearing on the social impacts that are experienced. The notion we are promoting in this paper is that the more

Download English Version:

<https://daneshyari.com/en/article/93097>

Download Persian Version:

<https://daneshyari.com/article/93097>

[Daneshyari.com](https://daneshyari.com)