

Event

Many breakthrough agricultural technologies and bioproducts flowing from publicly-supported research stall because of regulatory bottlenecks. Complicated, complex, networked regulatory systems create gaps, overlaps and inconsistencies. For Canadians to get their money's worth from investment in science R&D, new products need to be evaluated and accepted or rejected as quickly and efficiently as possible.

Significance

Given the array of crops-based innovations that have been and are planned to flow from research, there are going to be challenges in regulating these new technologies and applications.¹

Analysis

The advent of knowledge-based economies has raised new concerns about who is in charge of governing the economy. In the knowledge economy, the key asset is the ability to innovate – the facility to develop, adopt and adapt new ideas, products, and organizational structures by combining existing ideas, products and structures in new ways. Ultimately, this process involves the identification, assembly and use of disparate types of information and knowledge through a wide range of social governing systems. Finding the right tools to effectively govern in this environment is difficult because these knowledge networks are pluriform (diverse), self-referential, asymmetrically interdependent and dynamic, and consequently do not share the same goals, operating styles, skills, worldviews, incentives and priorities.²

The complex nature of transformative change leads to much more extensive innovation processes, which involve a much wider array of actors. Translating an invention into a socially embedded innovation involves a complex web of principals, agents, promoters and regulators on the supply side and middlemen, marketers and consumers on the demand side. Constructing new markets for new products or services is seldom straightforward or simple. Transformative changes thus mobilize a much wider range of actors, many who have never before expressed concerns or interest in change.³

Traditionally, theories have focused on explaining the causes and consequences of choosing particular policy tools to tackle relatively simple policy problems. In response to the increasing complexity of a number of policy fields, recent theoretical developments have tried to characterize entire policy regimes comprising multiple policy goals and a mix of policy tools designed to achieve these goals.⁴ Within a policy sector, policy regimes may have different goals with respect to different issues: policy regimes can be classified as promotional, permissive, precautionary or preventive⁵ or distinguished between restrictive and permissive policy designs.⁶ Moreover, while transformative change will mobilize a wider range of actors in a more complex set of relationships, the fundamental distinction between the policy network engaged in policy design and the larger policy community impacted by the choice of goals and tools is likely to remain valid in spite of the different terms used to capture the distinction. If so, the theoretical distinction between the appropriate tools needed to *coordinate* the activities of the policy network and those needed to *communicate* between the network and the larger policy community and attentive publics will continue to apply.

Conclusion

New models, methods and metrics of regulatory assessment and development are needed to address the rising complexity of regulatory processes designed to handle the risks of transformative agri-food and bioproduct innovation.

¹ Graff, G., D. Zilberman and A. Bennet. 2009. The contraction of agbiotech product quality innovation. *Nature Biotechnology* 27:702–704.

² Salamon, L. and O. Elliot (eds). 2002. *The Tools of Government: A Guide to New Governance*, Oxford: Oxford University Press.

³ Phillips, P. 2007. *Governing transformative technological innovation: Who's in charge?* Cheltenham: Edward Elgar.

⁴ Howlett, M. and J. Rayner. 2006. Globalization and governance capacity: Explaining divergence in national forest programs as instances of “next-generation” regulation in Canada and Europe. *Governance*. 19:251-75.

⁵ Paarlberg, R.L. 2000. Governing the GM crop revolution. *Policy Choices for Developing Countries*. Washington, DC: IFPRI.

⁶ Montpetit, E., Rothmayr C. and F. Varone. 2005. Institutional vulnerability to social constructions: Federalism, target populations, and policy designs for assisted reproductive technology in six democracies. *Comparative Political Studies* 38:119-42.