Hungry for innovation in a world of food: Pathways from GM crops to agroecology

David Quist, Jack A. Heinemann, Anne Myhr, Iulie Aslaksen, Silvio Funtowicz

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Innovation

- **“new ways of doing things” ethical dimension?**
- **What are the current framings and incentives that drive innovation policy and hence the outcomes of innovation?**
- Innovation as economic competitiveness - often the types of innovation that can be controlled by intellectual property (IP) instruments are rewarded, and those innovation that do not often get left out the innovation support system.

Innovation

- What counts as innovation?
  - Direction: Which innovation pathways? For what goals? How do these choices impact other choices?
  - Distribution: Who benefits? Who bear the costs?
  - Diversity: How much – and what types of innovations are needed?

Agriculture

– **Recall that the dominant agricultural landscape on earth is the small (<2 ha) plot farmed by poor and subsistence farmers.** This type of farming is characterized by **low-input, low intensive agriculture reliant on a diversity of crops and animals to produce a nutritious and varied diet.**

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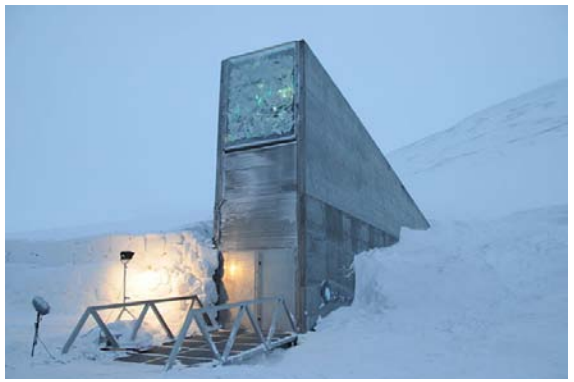
– **<u>Agriculture is</u> multifunctional.** Agriculture is not just a way to produce food; for many, it is how they produce their own access to sufficient calories and nutrients; it is a pathway out of poverty, builds the means accessing medical care and education, supports rural livelihood.

Agriculture



What kinds of innovation pathways support sustainable, locally relevant agriculture that increases food security?

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Agricultural innovations

Top-down and bottom-up pathways to agricultural innovation

- We contrast two innovation pathways to agriculture that we term “**top-down**” and “**bottom-up**” approaches **and weigh their relative opportunities and costs for agricultural development, particularly to address issues of food security for the world’s poor and undernourished.**

Top down innovation as GM crops

- Tends to centralise R&D, creates technological and research lock-ins for certain kinds of innovation at the expense of others.

- Top-down innovation tends to produce “black-box” products: those that are resistant to further innovation either because of their technologic complexity or legal restrictions.

- We have found that GM crops as a top-down approach will fail to increase food security because the existing incentives and framings of agricultural innovation prioritize concentration and control of innovations potential, reduce choice for other farming practices, exacerbate existing dependencies on external inputs that undermine sustainability and agroecosystem resiliency – and local knowledge on how to farm.

Bottom up innovation as agroecology

- In contrast, the **bottom-up** innovations tend to produce systems-based solutions that **fit into the social and cultural practices of the local context**. Here innovation potential **does not stop with at the user** as the passive recipient of a technology, but often starts with the active integration of local needs and knowledge into the innovation.

- We use agroecology as an example of a bottom up approach that focuses on the entire agroecosystem and utilizes ecologically-driven practices in food production, by leveraging agrobiodiversity and other natural systems properties that can increase sustainability and increased system resilience to unpredictable changes. Beneficial for securing resource availability (e.g. water, soil/nutrients), buffer against changes to climate, and augment ecosystem services. Emphasis is farmer participation - experimentation and education.

- And these approaches **have been shown to work on a large scale.**

Conclusions

1. What our analysis has found is that innovation in agriculture as framed by the dominant market economies of developed countries, GM crops in particular, **will not deliver global food security, undermines sustainable agricultural development in all countries, and stifles the kinds of innovations that have been proven to contribute positively to food security and sustainability.**

Our analysis demonstrates that innovation policies and goals must change in order to fast-track promising agricultural practices and technologies (including biotechnologies) for sustainable intensification, such as agroecological science.

Conclusions

2. Both “top-down” and “bottom-up” approaches will have their roles to play, but getting them in the right mix and order is critical to ensure their benefits and risks are more evenly distributed.

Both approaches will need to better involve the participation of a larger group of actors to ensure they meet broader societal needs, in an institutional context that supports goals such as the MDGs.

Conclusions

3. Rebalancing innovation towards the public good will require that innovation frameworks focus not only on scientific and technological developments, but also on the interlinked institutional, organisational and social changes as well.

This will require a radical shift on how we think about and perform innovations in the future, where business as usual– is simply no longer an option.

The late lesson is an old lesson for innovation: ?

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The late lesson, or old lesson, to be heeded here is that if one follows the top-down, technologically oriented, approaches to innovation, the desired outcomes for addressing food insecurity will not be achieved. As

Top down approaches will most likely fail to deliver on the large promises of food security and alleviation of poverty, mainly because these approaches exacerbate existing unsustainabilities within predominant approaches to agriculture that started from the “green revolution” and continue with the use of GM crops.

Key messages for future action

- Products that yield sustainable, socially constructive innovation must be promoted by **changing how innovation is defined, and who is invited at the table to define it.**

- This may be achieved through active engagement with the very institutions that define innovation, and produce policies that use existing resources, such as subsidies and research funds, as incentives that work towards (societally meaningful innovation, i.e. “responsible innovation”).

- Follow up and support for the implementation of outcomes from the SCAR reports 2011/2012 in the EU and IAASTD report, internationally.