

# BOOK REVIEW

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Heinemann, Jack 2009. *Hope Not Hype. The Future of Agriculture Guided by the International Assessment of Agricultural Knowledge, Science and Technology for Development*. Third World Network, Malaysia.

The current crisis in agriculture and food systems has brought us to a crossroad. A culmination of the environmental, oil, financial and food price crises has provided the impetus to engage in broad debate over the future of agriculture and food systems, including a debate regarding the role of science and technological innovations in shaping this future. What will be the outcome of these debates? Will we see a tinkering at the edges of productivist agri-food systems, limping into the future via a series of technological-fixes? Alternatively, will we see a transformation of agriculture and food systems via the expansion of agro-ecological and organic farming systems? Jack Heinemann argues in his recent book that the future direction of agriculture and food systems should be guided by the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD: <http://www.agassessment.org/>). In 'Hope not Hype', Heinemann focuses explicitly on the science in the Assessment related to modern biotechnology – an area that has been at the centre of controversy related to the IAASTD (demonstrated in Syngenta's 'walk out' of the process and CropLife International's rejection of the Assessment Report). On the basis of the science presented in the Assessment, Heinemann calls for a radical shift in agriculture and food systems; including the centralisation of agro-ecology and organic agriculture, farmer participation and a significant increase in research and development (R & D) investment for alternative agricultures.

For those readers of the *Journal of Organic Systems* unfamiliar with the IAASTD, or the Assessment as Heinemann refers to it; it was the culmination of over 400 scientists from around the world (including the editors, at that time, of JOS). The Assessment offered an evaluation of science and technology as it was applied to agriculture and food systems. The Assessment was approved at the 2002 World Summit on Sustainable Development in South Africa, and received support from the United Nations and other intergovernmental and international organisations. It was financially supported by the OECD and included stakeholders from both high-income and low-income countries – though Scoones (2009) has critiqued the IAASTD's effectiveness in delivering on its goals of participatory and inclusive engagement, especially related to the inclusion of voices from the low-income countries. Heinemann's evaluation of the peer-reviewed science points to the human health and environmental problems associated with modern biotechnologies, the largely undelivered promises related to modern biotechnologies (including promises related to increased yields and reduced pesticide use), and the extension of a privatised agricultural model that leaves non-privatised and therefore less profitable 'orphan' system and crops to be neglected and/or abandoned in terms of R & D investment and support.

'Hope not Hype' is presented in eight chapters, including a Preface and Afterword. Heinemann begins by differentiating traditional and modern biotechnology. Traditional biotechnology can be taken to include "any intentional human manipulation of biological factors for some purpose" (p.5), and may include nitrogen fixing cover crops, integrated pest management, the use of chemical herbicides and pesticides, and the selection of land races. In contrast, modern biotechnology refers to "manipulations that result in unlikely or naturally unprecedented combinations of genetic material, such as DNA, or RNA, or any activity that releases genetic material from its normal physiological constraints inside a cell or virus and then returns it to an organism" (p. 6). The most obvious example is genetic modification (GM). Heinemann notes at least three attributes of modern biotechnologies that differentiate them from traditional biotechnologies, and which strike at the heart of concerns related to their application across agriculture and food systems: (1) they produce new and novel organisms, and with unknown human and environmental health impacts; (2) they are protected by international biosafety laws and regulations, offering substantial economic returns via Intellectual Property Rights to patent holders; and (3) they have attracted significant R & D investment, dwarfing investment in other technologies, especially appropriate technologies that would be more relevant to smallholders in low-income countries.

In light of the health, safety, legal and environmental problems associated with modern biotechnologies, alongside their failure to deliver on claims related to yield and pesticide use, a suite of other technologies and approaches are widely recognised as being more appropriate in building socially and environmentally sustainable, and food secure, agri-food systems. The science presented in the Assessment demonstrates that agro-ecology and organic agriculture can be competitive with, and in many instances surpass, the productivity of conventional and GM-based agricultural systems. Heinemann cites evidence from a University

of Michigan study that concluded: “agro-ecological agriculture (including organic methods) may be capable of feeding the world and re-building depleted agricultural lands in time” (p. 85). He also drew from scientific sources that demonstrated it will be necessary to engage a diversity of approaches to address the complex environmental, economic and social crises: “making agriculture more productive under times of impending climatic change and other challenges, while simultaneously reducing its ecological costs, will require multiple rather than ‘one size fits all’ approaches” (p. 86). The Assessment also found that modern biotechnologies have failed in their relevance for poor and subsistence farmers; those most vulnerable in the face of growing food insecurity. On the basis of this science, Heinemann provides a number of recommendations to support the expansion of agro-ecological and organic agriculture: redress the balance in funding between GM and agro-ecological research; establish workable policies for farmer participation in research and innovation; and eliminate subsidies for agriculture intended for export.

For those interested in the future of agriculture and food systems, the Assessment represents a profoundly important document; presenting, as it does, a detailed critique of productivist agriculture, and the high-tech and capital intensive science and technological innovations that underpin it. Heinemann’s book, ‘Hope not Hype’, makes an important contribution in making transparent the science on which the Assessment was based. ‘Hope not Hype’ presents often complex and inaccessible scientific knowledge claims in a comprehensive and easily understood way, and in so doing, presents a call to radically re-think the role of science and technology in shaping the future of agriculture and food systems.

While an important and significant document, the IAASTD is not without critique. Amongst criticisms directed at the Assessment include concerns regarding its effectiveness in engaging with diverse stakeholders, including voices from low-income countries, as well as the gaps in its analysis – for example, it had little to say about nanotechnologies and molecular biology, two fields which are set to radically alter agriculture and food systems, and offered little gender analysis, despite the profound importance of gender in shaping access to land, labour, extension services and agricultural technologies. ‘Hope not Hype’ would benefit by acknowledging these, and other gaps, in the Assessment.

Overall, ‘Hope not Hype’ will be a very useful resource for policy and decision makers in government, R & D institutions, as well as scientists, teachers, farmers and the broader public. Indeed, by highlighting scientific knowledge claims in a broadly acceptable way, Heinemann is contributing towards building public understanding, or what Toumey (2006) has referred to as the public’s ‘technological literacy’. Technological literacy will be a precursor to the democratic development of new technologies, and will play a vital step in ensuring a democratic debate about the future of agriculture and food.

## References

- Scoones, I. 2009. The politics of global assessments: the case of the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD). *The Journal of Peasant Studies*. 36(3): 547-571.
- Toumey, C. 2006. Building nanoliteracy in the university and beyond. *Nature Biotechnology*. 24: 721-722.