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Genetic engineering in agriculture: New approaches for risk management through sustainability reporting

Philip J. Vergragt^{a,b,*}, Halina Szejnwald Brown^c

^a MIT, Center for Technology, Policy, and Industrial Development, Cambridge, MA, USA

^b Tellus Institute, Boston, MA, USA

^c Environmental Science and Policy, Clark University, Worcester, MA, USA

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Abstract

Genetically modified crops and foodstuff have been highly controversial for environmental, health, and ethical reasons. The controversies have been worldwide, but most prominent in the European Union, for reasons that include distrust of the regulatory authorities, scientists and technocratic decision making. An informal moratorium in the EU came recently to an end, without solving the underlying problems. In response to the criticisms, the European governments have attempted to improve the risk assessment methods and their scientific basis, and to tailor public policies to the growing demand for transparency, accountability, and public participation.

This paper proposes a novel approach to including the public in evaluating the impacts of food and agricultural biotechnology and present and future applications modeled after the growing practice of sustainability reporting by companies. The most visible among those, Global Reporting Initiative (GRI), when implemented properly, includes a wide range of stakeholders, including the financial institutions, companies, NGOs and the civil society, in an interactive multi-stakeholder discourse and collaboration. The reporting exercise would open the discussion about the R&D around new GMO products, and could mitigate potential adverse effects in an early stage (Constructive Technology Assessment). We specifically propose initiating a broadly based societal initiative aimed at developing of a new sectoral supplement of GRI Guidelines, specifically designed for the food and agricultural biotechnology sector.

This approach can be conceptualized as experimentation on a small scale with a multitude of stakeholders involved (Bounded Socio-Technical Experiment or BSTE) which is an effective venue for higher-order learning among participants. Sustainability reports and BSTEs have been so far applied in limited cases, none of which included highly controversial technologies such as biotechnology; they need further elaboration and testing to

* Corresponding author.

E-mail addresses: pvergragt@tellus.org (P.J. Vergragt), hbrown@clarku.edu (H.S. Brown).

become possibly highly effective concepts and tools for mitigating conflicts on the societal implications of emerging technologies, and to lead to better public policies and greater social trust.

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1. Introduction

Genetically modified organisms (GMOs) have been introduced in the agricultural system and on the market of consumer goods in the last 10–20 years, initially in the USA but also increasingly in developing countries. Since the discovery of genetic engineering, with its potential to modify DNA of living organisms, discussion and controversy have been abundant [1,2] both cited in [3]. Europe has witnessed a particularly strong resistance to the introduction of GMOs in agriculture and for consumer food products, both from consumers, national governments and from the EU. The public objections had numerous causes, including the concerns about the risk assessment, the ethics and equity issues, power relations and the mistrust of technocrats and public authorities. The resistance in Asia, Latin America and North America has been generally weaker than in Europe, although some authors have voiced scathing criticism of the US governments and the industrial lobby for abusing famine in Africa to foster the spread of GM food to developing countries [4].

In response to the criticism, the European governments have attempted to improve the risk assessment methods and its scientific basis, and to tailor public policies to the growing demand for transparency, accountability, and public participation. Much less progress has occurred to date in the actual articulation of these ideas: the form which such public participation might take; how it would contribute to greater transparency and accountability; and how it would contribute to more effective and legitimate public policies.

In this paper, we contribute to clarifying these poorly elaborated concepts. Starting with the assumption that discourse and public engagement are indeed positive and necessary for solving the GMO controversy, we argue that the growing practice of voluntary sustainability reporting by companies can serve to enhance a discourse, including the widest possible range of participants, some of whom have been until now kept outside the debate; and that a multi-stakeholder discourse so created enhances societal participation in the strategic corporate decisions regarding the research and development trajectories for agricultural GMOs – constructive technology assessment – and elevates the idea of social accountability and social responsibility of producers of GMOs.

2. GMOs in agriculture and food: risks, public perceptions and regulation

In food biotechnology, genetic modification techniques have been most extensively applied to enhance enzyme production by microorganisms used in food manufacture [5]. In agriculture, the focus has been mostly on producing genetically modified crops that are resistant to insects, viral pathogens, and commonly used herbicides, such as Monsanto's Roundup [5,6,7]. Experiments are also under way to produce crops with enhanced nutritional and health benefits ('functional foods' and 'nutriceuticals'), and with the capacity to produce pharmaceuticals ("pharming"). The metaphor of 'crops becoming factories,

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