SHORT POLICY BRIEF

Addressing Socio-Economic and Ethical Considerations in Biotechnology Governance: The Potential of a New Politics of Care

Fern Wickson[1] · Christopher Preston[2] ·
Rosa Binimelis[1,3] · Amaranta Herrero[1] ·
Sarah Hartley[4] · Rachel Wynberg[5] · Brian Wynne[6]

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Abstract There is a growing demand to incorporate social, economic and ethical considerations into biotechnology governance. However, there is currently little guidance available for understanding what this means or how it should be done. A framework of care-based ethics and politics can capture many of the concerns maintaining a persistent socio-political conflict over biotechnologies and provide a novel way to incorporate such considerations into regulatory assessments. A care-based approach to ethics and politics has six key defining features. These include: 1) a relational worldview, 2) an emphasis on the importance of context, 3) a recognition of the significance of dependence, 4) an analysis of power, including a particular concern for those most vulnerable, 5) a granting of weight to the significance of affect, and 6) an acknowledgment of an important role for narrative. This policy brief provides an overview of these defining features, illustrates how they can appear in a real world example and provides a list of guiding questions for assessing these features and advancing a politics of care in the governance of biotechnology.

✉ Fern Wickson
    fern.wickson@genok.no

1   Society, Ecology and Ethics Department, GenØk Centre for Biosafety, Siva Innovation Center, Postboks 6418, 9294 Tromsø, Norway

2   Department of Philosophy, University of Montana, Missoula, MT 59812, USA

3   Environment and Food Department, Faculty of Sciences and Technology, University of Vic—Central University of Catalonia, c/ de la Laura, 13, 08500 Vic, Spain

4   University of Exeter Business School, Streatham Court, University of Exeter, Rennes Drive, Exeter EX4 4PU, UK

5   Department of Environmental and Geographical Science, University of Cape Town, Private Bag X3, Rondebosch 7701, South Africa

6   Department of Sociology, Lancaster University, LA14YN, Lancaster, UK

There is a growing demand to incorporate social, economic and ethical considerations into biotechnology governance. However, there is currently little guidance available for understanding what this means or how it should be done. A framework of care-based ethics and politics can capture many of the concerns maintaining a persistent socio-political conflict over biotechnologies and provide a novel way to incorporate such considerations into regulatory assessment and policy making.

Why do We Need a Politics of Care for Biotechnology Governance?

Agricultural biotechnology has been a source of social and environmental conflict for decades. Existing governance institutions relying on traditional processes of scientific risk assessment have failed to address the sources of the persistent and deeply polarized conflict (Pavone et al. 2011). This includes concerns relating to the concentration of ownership and power in agri-food systems, clashing visions of desirable futures, and limited trust in regulatory systems and available science. Finding new ways to approach biotechnology governance that can adequately account for the issues generating this conflict is now urgently required as the field is rapidly expanding through new tools for genome editing, synthetic biology, and the digitalisation of biological information.

In an attempt to better address the sources of conflict, an increasing number of countries now aim to incorporate socio-economic and ethical considerations in their appraisal of new biotechnologies (Binimelis and Myhr 2016). The importance of these considerations is also gaining traction at regional and international levels. For example, the European Directive 2015/412 now allows member states to restrict the cultivation of GM crops based on 'non-scientific' concerns, and the Cartagena Protocol on Biosafety has developed a framework for conceptual clarity on socio-economic considerations.

New biotechnologies can profoundly transform social arrangements, ecological systems and material structures. They can also shape public and political discourses, and affect the distribution of knowledge and skills. Any assessment of social, economic and ethical impacts therefore requires regulators to consider biotechnologies as much more than isolated technologies. They need to recognise the wide range of social, cultural and political relations that are intertwined in these technologies (Herrero et al. 2015). Practical experience and guidance on more holistic and integrative assessment approaches is limited and current approaches face significant challenges. These include how to: a) sufficiently identify and assess the wide range of relevant socio-economic and ethical impacts; b) employ appropriate appraisal methods beyond narrow risk and economic cost/benefit analyses, and c) evaluate the wider social, cultural and political context within which biotechnology development and use occurs and consider shifts in this during the appraisal process.

In order to provide useful guidance to address these challenges, new conceptual and evaluative frameworks are needed. This policy brief summarises an approach based on care ethics and politics that can provide a new lens through which to assess this rapidly changing technology in the public interest (Preston and Wickson 2016). This approach can capture many of the salient concerns causing socio-political conflict and be developed into guiding questions for assessing social, economic and ethical impacts.

A politics of care approach to biotechnology governance can therefore be directly used to guide the assessment of socio-economic and ethical considerations in those countries where this is already required or permitted within formal regulatory systems. Here the framework can

be a particularly useful way to conceptualise the relevant issues beyond the typical economic frames of analysis. In cases where an appraisal of socio-economic considerations is not already an important component of regulatory assessment, a politics of care can highlight why significant reconceptualisation and reconfiguration of expert-led scientific risk assessment is required to address its limitations and reposition it as only one part of a multi-faceted appraisal process capable of incorporating a range of relevant concerns and diverse forms of knowledge. Furthermore, while we present this framework as a concrete way to conceptualise and approach the assessment of socio-economic considerations in practices of regulation, we also see it as a useful tool for governance more generally. This is because the defining features of a politics of care can not only expand the scope for risk assessment and regulation, but can also inform the policies and practices guiding and shaping research and innovation more broadly.

What are the Defining Features of a Politics of Care?

A care-based approach to ethics and politics (as originally developed within feminist scholarship) can be identified as having at least six key defining features. These include: 1) a *relational worldview*, 2) an emphasis on the importance of *context*, 3) a recognition of the significance of *dependence*, 4) an analysis of *power*, including a particular concern for those most *vulnerable*, 5) a granting of weight to the significance of *affect*, and 6) an acknowledgment of an important role for *narrative*.

1.   Relational Worldview

A politics of care adopts a relational worldview, which emphasises the interconnected nature of the world and prioritises the relationships between entities. This can be between individuals in a community, between different organisms and ecosystems, between society and the environment or indeed between society and technology. A politics of care approach emphasises the relevance of analysing any shift or rupture in relationships brought about by new technologies. It also stresses the importance of sustaining and maintaining healthy relationships within social and ecological communities.

2.   Context

A politics of care approach recognises that context matters. Different individuals communities, settings and situations have their own unique characteristics and particularities. Understanding the specifics of a concrete situation is a shift away from generalised forms of assessment that assume uniformity across different contexts. This leads to an understanding that assessments may legitimately vary across different social, ecological and political contexts. It also requires taking account of the particular individuals, groups, and places that are likely to be affected by a technology and including different actors in assessment processes. Furthermore, sensitivity to context requires that technologies are not only assessed on an individual basis and that the way a technology represents and advances a certain trajectory over space and time is also evaluated.

3.   Dependence

The emphasis on dependence within care-based approaches to ethics and politics stems from a recognition that there are often asymmetries and significant differences between those engaged in a relationship. Although relations of dependence are not necessarily negative, emphasis on relations of dependence encourages particular consideration to be given to what these dependencies are and how they may change or become amplified through the development and introduction of new technologies. A focus on the (changing) nature of relations of dependence through the development and use of new technologies allows questions to be asked about whether these relationships are caring, nurturing and empowering or extractive, destructive and limiting.

4.   Power & Vulnerability

A care-based ethics and politics also pays specific attention to the distribution of power, and particularly any abuses, inequalities or imbalances that may exist. This links to a concern for the most vulnerable actors (human or otherwise) within a particular network of relations. It is important to ask how the distribution of power (e.g. through money, status or more invisible means) can support, burden or disadvantage particular actors, especially the most vulnerable. Some imbalances in power are not necessarily seen as bad and some may not be eradicable. However, within a politics of care, the question of how power is distributed and exerted to exclude or suppress certain actors, voices and viewpoints is seen as an important issue requiring special attention and assessment.

5.   Affect

A politics of care recognises that emotion plays a significant role in people's decision-making, including in science, and that action can be legitimately informed and motivated by affect in addition to reason. Care-based approaches therefore place significant importance on the role of affect and emotion in decision-making and its impacts. This does not mean that reason is excluded, but rather that the key role that affect plays in the reality of people's lives is recognised, acknowledged and granted legitimacy during decision-making processes. Affect may be more qualitative than other factors typically considered during regulatory assessment, but it is no less significant and important to take account of. This is especially relevant given the role that emotion plays in the development of biotechnology and associated social and political conflicts.

6.   Narrative

A politics of care also embraces the useful role that narrative can play for communicating different understandings of the world, the connections that exist between people, events, beliefs and decisions, and the lived experiences of particular stakeholders. Narrative is also an important way in which people define and communicate their identity within collectives and make sense of the challenges in their lives. Within a politics of care, narrative is recognised as valuable for the way in which it can draw attention to particularity and context, as well as encourage the consideration and assessment of alternatives. Recognising the importance of narrative also helps to grant individuals the power to tell and control their own stories.

Box 1: The features of a politics of care illustrated through a true story and real world example

John is an organic maize farmer. He lives in a country that allows the cultivation of genetically modified maize but has no public registry of where such crops are grown and no legislative requirements for ensuring this. There is a high demand for organic maize in the area, but very little local supply. Despite the high demand and extra premiums he can receive as an organic farmer, John is becoming increasingly hesitant to grow organic maize due to fears of GM contamination, and indeed, many other farmers he knows have already given up. He has tried to find out which of his neighbors grow GM maize, but he knows that some of them are worried about the negative image GMOs have and lie about what they are planting, which means he no longer trusts them. In order to try and avoid GM contamination through cross-pollination, he delays sowing his maize seed by up to 10 weeks until all of his neighbors have sown. Delaying the planting means that he has to use short-cycle varieties, however since he also needs organic seeds, he is left with little choice of varieties and therefore knows that he may have to accept lower yields. Due to the low level of organic maize production in the area and the lack of institutional support, John also faces an increasing problem with finding the necessary infrastructure. Companies that dry maize are not interested in processing his grain because they have to maintain separate production lines for GM and organic maize and this implies additional cleaning and storage costs for them. Therefore, in maize areas with high concentration of GM maize, there are no dryers available for organic farmers, despite the face that they depend on the availability of this infrastructure to make their living. John also has to pass the necessary controls performed by the body that regulates organic farming to show that his harvest is GM free. Unfortunately John's organic crop was contaminated this year and he had to sell his crop to the conventional animal feed company for significantly less than he would have received for certified organic grain. This situation means that he did not receive higher premiums as compensation for the additional resources he invested in trying to produce organic maize. John pursues organic farming not just because he thinks he can earn more money farming this way, but because he believes that it is important for maintaining a healthy soil and environment for the future. He is both sad and angry that the cultivation of GM maize in his region is making it impossible for him to continue his life as an organic maize farmer.

How might a Politics of Care be Implemented and What Does It Offer Biotechnology Governance?

Having proposed a concrete framework for a politics of care as a way to conceptualise and incorporate relevant socio-economic and ethical considerations into biotechnology governance, it is important to note that its implementation inherently calls for deliberation, negotiation and a redistribution of power. For a politics of care to truly permeate biotechnology governance, it will first be necessary for scientific risk assessment to reimagine its place within a more multifaceted form of assessment so that the considerations of care can carry the same

weight in regulatory decision-making. Furthermore, knowledge on the relevant issues and questions of a politics of care will have to be gleaned through not only the integration of natural and social sciences together with the humanities, but also through the active involvement of diverse stakeholders and affected parties. At the very least, this will require multi-disciplinary and multi-stakeholder assessment committees with a broadened mandate and transparent and publicly accessible processes concerning their nomination, operation and review. There will also need to be dedicated efforts to harvest empirical knowledge on the issues at stake and to creatively incorporate diverse perspectives.

Adopting a care-centred focus can support the development of a more multifaceted approach to governance by offering policy makers, assessors and other stakeholders a concrete framework to help identify and articulate critical concerns. Table 1 provides an overview of some of the exploratory and evaluative questions that could be asked for each of the key features for this purpose. These questions could highlight where dedicated research may be required and flag where significant socio-economic and ethical considerations require enhanced attention.

Incorporating socio-economic and ethical considerations into biotechnology governance demands a more multifaceted and holistic approach than has historically been pursued. This extended scope and reorientation of interest is required at the level of both policy making and regulatory assessment. This includes: a) moving beyond assessing a technology's risks to

Table 1 Guiding Questions to Advance a Politics of Care in Biotechnology Governance

Relations	*How may social and ecological relationships shift if this technology is introduced?* *How have interconnections within socio-ecological communities been considered in the development of this technology?* *Can the development, introduction or use of this technology create significant ruptures in social or ecological relationships?*
Context	*What are the important particularities of this context (e.g. what is the unique history, ecology and culture of this place, what specific actors or groups will be affected by the technology)?* *How may the impacts and those affected differ across the different contexts of use?* *Are the particularities of different contexts of introduction (e.g. the different ecologies, economies, cultures and people) being adequately accounted for in the assessment process?*
Dependence	*Where are there relations of dependence (e.g. people dependent on each other, on companies, on infrastructure, on ecological processes etc.), and how may these change due to the technology?* *What is the nature of the relations of dependence in play (e.g. are they experienced as nurturing and empowering or extractive and destructive for those involved)?* *Does the development and use of this technology exacerbate dependencies?*
Power	*How does the development, deployment and use of this technology affect the distribution of power and control (e.g. are any actors/groups favored or granted more power over others, how will the technology affect the level of control the impacted actors have over their own future)?* *Who are the most vulnerable actors (both human and non-human) and what measures are in place to prevent abuses towards them?* *Will this technology lead to a concentration of power?*
Affect	*Does the development, introduction or use of this technology evoke strong emotions among those impacted by the technology?* *How is affect appearing and being handled in the scientific/technological development, in the public debate, and in the assessment process?* *Is the role of affect being granted a legitimate role in decision-making processes or are the affective dimensions of this technological change being downplayed?*
Narratives	*What are the narratives being told by those promoting and those contesting this technology?* *What worldviews, values, assumptions and beliefs are being expressed in these different stories?* *What alternative visions, strategies and technologies do the different stories reveal as available and important for the assessment process?* *Are certain narratives being suppressed, dismissed or excluded?*

human health and the environment to also ask other types of relevant questions; b) expanding beyond case-by-case assessments to also consider the overarching trajectories being pursued, the potential cumulative impacts involved, and the available alternatives; and c) opening up the terms and modes of governance to be more inclusive, deliberative and reflexive. Expanding governance in these ways requires new conceptual frameworks, assessment methods and institutional cultures, and not least of all, the political will to change. However, what is clear is that the conflict over biotechnologies will neither shift nor disappear unless approaches to its governance change to more adequately account for the issues of concern.

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