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Food for thought: food systems, livestock futures and animal health

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Abstract

Global food security, livestock production and animal health are inextricably bound. However, our focus on the future tends to disaggregate food and health into largely separate domains. Indeed, much foresight work is either food systems or health-based with little overlap in terms of predictions or narratives. Work on animal health is no exception. Part of the problem is the fundamental misunderstanding of the role, nature and impact of the modern futures tool kit. Here, I outline three key issues in futures research ranging from methodological confusion over the application of scenarios to the failure to effectively integrate multiple methodologies to the gap between the need for more evidence and power and control over futures processes. At its core, however, a better understanding of the narrative and worldview framing much of the futures work in animal health is required to enhance the value and impact of such exercises.

Keywords: animal health and climate change, global food systems, futures toolkit, scenarios, forecasting, visioning

Introduction

In 1789, Thomas Malthus predicted that continued growth in human population would eventually outstrip the capacity of the Earth's natural life support systems. He predicted there would be mass famine (Sharpless, 1995). In recent years, concerns about global food security have returned with a vengeance, despite the improvements in agricultural productivity from developments in plant, agricultural and veterinary science following the industrial revolution.

A combination of population growth, rising incomes and international trade has unleashed global demand for meat and dairy products (Thornton, 2010; Schmitz *et al.*, 2012). FAO–OECD projections suggest a 25% increase in fresh dairy products will occur in 2010–2020. Other sources indicate that average annual, *per capita* meat consumption in high-income countries almost doubled between 1990 and 2002, from approximately 25 to 94 kg person^{-1} year^{-1} (World Resources Institute, 2012). Booming Chinese meat consumption, up from 3.8 to 52.4 kg person^{-1} year^{-1} over the same period, is expected to continue and has reorganized the trade in soybeans between China and South America (Lee *et al.*, 2012). Looking beyond the short and medium term horizon, it is easy to feel daunted by the projected growth demands for meat and dairy and the wider implications of not meeting or indeed meeting these projections. Mass starvation on the one side and environmental catastrophe on the other! However, the implications of meeting these projections on animal health and disease emergence/re-emergence are often ignored or even under-estimated.

Indeed, concerns about meeting these projections tend to focus on the wider implications of continued increases in meat and milk production in an era of increasing global connectivity and rapid urbanization. These include animal welfare and human health, deforestation and desertification (e.g. often attributed to the grazing and overgrazing of beef cattle), the concentration of power by supermarkets in the food value chain and the demise of smallholder farming and subsistence crops. Livestock-related greenhouse gas emissions (especially methane) raise further concerns about vicious synergies among global climate change, food security and farming in a globalized

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world (Herrero *et al.*, 2011). Understanding the role and implication of livestock disease on these forces are often lost.

Responsibility to the future used to be solely dependent on accurate knowledge about the future. In today's globally interconnected and more complex world, relying on an ability to know the future and the use of conventional approaches to policy involving forecast-based planning, have been found wanting. Instead we are struggling to appreciate non-linear and emergent changes and engage with irreducible uncertainty (Wilkinson *et al.* 2009; UK Foresight, 2010). Alternative futures provide offer a way to see the how different policy narratives are framing the present situation (Freibauer *et al.*, 2011). However, who decides and on what basis what is 'long term' and which future(s) need to be considered in the present? Can we learn *with* futures and act on futures that are plausible and preferable, rather waiting for conclusive evidence *about* the future?

Mastering the modern futures toolkit

The modern futures toolkit has been developed to address these questions (Allen *et al.*, 2001). Foresight practices recognize that the future is not neutral but has become the playing field of power (WRR, 2001). Public policy outcomes pivot on the ability to anticipate and cope with sudden and unpredictable changes (Sanderson, 2009). Learning with futures is not a navel gazing exercise focused on harnessing imaginative thinking about what might happen, but a grounded and deliberative process that clarifies the choices and decisions to be made and reveals and tests assumptions about the future that would otherwise remain implicit.

This toolkit comprises many different tools – scenarios, forecasts and visions – with individual strengths and limitations. However, despite its existence for over 60 years and a new wealth in global foresight initiative and future studies, there is poverty in mastery of this toolkit. Clearly the aim is to directly contribute to the creation of a better, more sustainable future and not simply to support risk management processes and reactive adaptation. Such a lack of command over these tools is evident in several forms.

First, scenarios are often confused as a product of quant-based modelling but their real value is as prospective sense-making devices, Wright (2005). In contrast to linear extrapolations and the use of probability to guide focus, scenarios describe possible futures. In doing so, scenarios encourage attention to the concept of plausibility and aspects of uncertainty in terms of what is knowable, unknown and unknowable as well as the role of ambiguity, ignorance and group think in social processes. Scenarios aim at revealing and testing assumptions about the future that shape and impact today's strategic agenda. As such, scenarios are not forecasts but reframing devices, aimed at revealing and testing deeply held assumptions about the future that would otherwise remain implicit (Wilkinson and Ramírez, 2010).

Second, is a failure to relate multiple methods, i.e. it is not a question of scenarios versus visions versus model-based forecasts but rather how to combine these methods to frame and inform a forward-looking policy agenda that avoids the traps of historical determinism.

Third, is the 'implementation' gap. There is a misguided assumption that the challenge of the future is the deficit of knowledge and that uncertainty can be reduced by more rigorous and evidence-based foresight studies. As the future becomes the playing field of power, the challenge of producing actionable foresight rests critically on the client: who will use foresight and for what purposes?

The confusion of scenarios as sophisticated forecasting devices is evident for example in the recent paper on global livestock disease dynamics by Perry *et al.* (2011). The authors noted that an 'imperfect ability to detect and report disease hinders assessment of trends' and go on to suggest three overarching sets of scenarios of animal disease dynamics. These sets of scenarios are, in effect, trajectories based on the extrapolation of a limited set of accepted drivers of change rather than 'scenarios' in the sense of ways to reveal, frame and reframe the varied discourses on global livestock and engages with irreducible uncertainty.

At its core, policy-relevant assumptions tend to focus on the scales and dimensions of the challenge and system of concern and which time horizon (2, 5, 20, 50 years) is considered legitimate. These decisions, in turn, determine which sources of authority are validated by foresight studies and without scrutiny of such assumptions, there can be an unintentional or deliberate colonization of the future, i.e. promotion of more powerful vested interests and exclusion of alternative interests and contradictory perspectives.

Another critical issue: whose view of the future counts? Futures work produces narratives. Moreover, narratives reflect different worldviews, i.e. coherent sets of assumptions and principles about how the world works. Therefore, the production of a narrative, in effect, acts like a filter and selects key drivers of change that reinforce its perspective. Good scenario work harnesses the role of intuitive inquiry and storytelling to enable less familiar drivers of change to be considered as relevant. The emphasis on plausible storylines (clear, internally consistent, etc.) enables alternative futures to be considered in parallel and the tendency to dismiss weaker signals or exercise judgment on the basis of less familiar or less comfortable future outcomes may be avoided.

Nevertheless, futures reports, while often combining rigorous analysis and creative thinking, cannot by themselves catalyze and sustain the multitude of actions implied in the large scale and systemic transitions needed to effectively address today's significant challenges.

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Investment in foresight production – whether derived from models, scenarios, visioning or a combination of methods – needs to be matched by investment in consumption, i.e. using the insights developed in such studies to inform policy and decision making.

This is not as straightforward a process as it may appear. Foresight can challenge conventional wisdom and be perceived as threatening to dominant sources of power and authority. Scenario work, done well, delivers less comfortable forms of knowledge, i.e. futures that might happen whether we want them to or not, and implies that there is value in managing disagreement as an asset. Visioning, unless tempered by disciplined back casting, can be dismissed as unrealistic dreaming.

A further challenge is the lack of an effective body of theory to guide and evaluate effectiveness. How are foresight studies used and by whom and for what purposes and when do full benefits manifest? How can the quality of anticipatory knowledge be determined if the value-add is not in terms of accuracy of prediction but rather improved anticipation and pr-emptive transformation?

Explanations of how scenarios 'work' have been offered from different fields, e.g. socio-ecology, management science, organizational studies, but no there is limited grounded theory of scenarios is yet available (Wilkinson, 2009). Similarly, there is no clear evidence or theory to guide the effective use of visioning and forecasting studies.

Looking forward

The global political economy is in flux and links between livestock farming, food poverty, energy security, animal health and disease in a resource constrained, climate changed world is hard to predict but the opportunity of learning with alternative futures to create a better future can help us face up to less comfortable and unfamiliar developments. Scenarios offer reframing devices that can be used to test and challenge projected forecasts and help avoid wishful thinking by linking grand visions to present day possibilities. As the future of framing re-emerges as the playing field of power, the potential for values conflicts and framing contests is set to increase due to the high decision stakes and irreducible uncertainties involved.

In recent decades, worldviews based on three different myths (economic, scientific and ecological) have dominated policy making in national and international fora, Smith School (2012). Where the 'scientific' frame seeks truth through absolutes, conversely, the 'economic' frame views growth as absolute and the 'ecological' frame tends to view the health of the system with primacy. Within the field of animal health research, worldviews tend to cross all three of these frames. A large body of work has focused on, and still focuses on, the creation of predictive disease models. Such research implicitly supports the 'scientific' frame. Alternately, a large body of work on animal health and climate change has been driven by the economic impact of emerging/re-emerging diseases from the Global South to the North (Heffernan *et al.*, 2012). Finally, the inter-relationship between health and disease components at the systems level is emerging as a 'new' field of study (Heffernan, 2013). However, in recent decades it is clear that the emergence of zoonotic disease threats have not closely followed the above script. For example, it may be argued that the emergence of Highly Pathogenic Avian Influenza contingent with our limited ability to control the disease, challenge many comfortable assumptions in relation to the application of scientific knowledge, the spill-over of economic impacts and our understanding of fear-based, consumerism and even the role of the media in such emerging threats (see Heffernan *et al.*, 2011). Other global disease threats are likely to bring additional challenges. A continued focus on evidence-based forecasting and planning is not likely to elucidate or prepare us for these novel challenges. Thus, it may be argued that greater attention needs to be paid to these deeper, framing assumptions in foresight studies focused on animal health.

Conclusions

In the coming decades, it is not unfathomable that the emergence and re-emergence of livestock disease will continue to command global attention. Moreover predicting what disease and where will create the next lethal global spillover is likely to be the focus of researchers for decades to come. However, it is likely that our ability to first confront and second to deconstruct the dominant narratives of animal health will be as important as any scientific breakthrough regarding pandemic or panzootic control. As such, the futures toolkit should be part of every veterinary school's core curriculum. Enhanced mastery of the modern futures toolkit will contribute to more shared and systemic understanding of global animal health challenges. Furthermore, this toolkit will help to avoid the type of 'blind spot' forecast-based thinking that currently dominates the global animal health debate.

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