From agricultural science to “biological economies”?

INTRODUCTION

The development of New Zealand as a people, a blend of cultures, a nation and an economy owes much to the unique constellation of land- and water-based resources, social values and ecological change within production landscapes that we refer to as “biological economies”. The exploitation of these biological economies has altered over the course of New Zealand’s history, but, since the Second World War (WW2), the successful allegiance between scientific research and production-oriented farming practices has profoundly changed the productive capacity of New Zealand’s agricultural landscapes. New Zealand’s post-WW2 history benefited from a particular set of economic, trading, environmental and social conditions and priorities and, through their development, enabled the emergence of a modern, developed nation. The continuing importance of New Zealand’s biological economies has been most recently articulated both by Federated Farmers in their 2008 General Election Manifesto and by the Ministry of Agriculture and Forestry (MAF) in its briefing to its new minister. Both organisations recognise the tensions that are becoming apparent in New Zealand’s rural economy, society and
landscapes as new priorities emerge and challenge old verities. MAF (2008), in quite unequivocal terms, argues that we are at the start of a transformation in the biological economies that will drive New Zealand’s future well-being. The precise character of that transformation is unknowable, but it will, in the first instance, expose the production systems which have developed over the last century to more deeply and explicitly framed consumer priorities concerning issues such as environmental sustainability, increased public access to the countryside and the protection of rural resources upon which recreation depends. At stake here is New Zealand’s continuing competitive advantage, because that advantage is no longer defined solely through low-cost production. However, our ability to rethink the future shape of New Zealand’s biological economies is hampered by the artificial division of complex agricultural ecologies into separate analytical spheres. Other contributors to recent discussions in this Journal have identified the importance of integrating social and ecological dynamics and the necessity of transdisciplinarity (Rosin et al. 2008). We take this further by arguing that such insights about the future of agriculture (and related uses of rural and coastal land and water) must be informed by a full recognition of a wider set of explanatory contexts.

THE ARGUMENT

There are two steps in our argument. The first is that research into agricultural questions and associated regulatory interventions and funding streams should be informed by both biological dynamics and social values, and in particular to the ways in which these impact upon each other in the production of economic values. We argue for a new ecology of New Zealand agriculture and contend that it is this that will enable New Zealand based agri-food investors, and the communities and nation that depend on them, to continue to be at the forefront of innovative agriculture internationally.

The second step is that we should move beyond thinking of “agriculture” (meaning “agri-business”) as New Zealand’s dominant rural land use. This primacy manifests itself in the older politics of national development in New Zealand, the cultural positioning of pastoralism as the unquestioned norm for New Zealand land use, as well as in the approaches of generations of natural scientists producing specific kinds of knowledge that was deployed in rural New Zealand. The urgent need to create more complexity, depth and connectedness between agriculture and other dynamics is central to the notion of biological economies. Once agriculture and agricultural productivity are removed from the centre of discussions of how New Zealand can make a living from biological activity, a range of consequences emerge:

- economic activity in rural areas can be characterised in a much broader range of ways, including not only agri-, horti-, viti- and silvi-cultures, but also incorporating activities such as fishing and marine farming, tourism, recreation, hospitality, nature and heritage conservation, residential subdivision, secondary processing of primary products, energy production, infrastructure development and using rural landscapes as settings for the making of various visual media such as films, product/service advertising, and photography.

- the production of knowledge about biological economies is conditioned by a great range of influences, including: the creation of wealth/profit; employment patterns; trade policy and practice; natural resource use and management; conflicting interests; governance processes; climate; nature conservation; ecological and agricultural science; the production of food, fibre, energy and tourism; concerns about landscape, heritage and recreation; and migration and counter-urbanisation.

- methodologically this implies that biological economies are not suitable subjects for narrow empirical experiment; rather, their study demands reconnection of the many processes and dynamics that our disciplines and approaches have previously been so careful to pick apart.

To elaborate why it is important to make the transition from “agricultural science” to “biological economies”, it is next necessary to review the external and internal dynamics that have changed New Zealand primary production over the last 15–20 years and now frame its potential. Externally, a number of transformations have taken place in the linkage between land-based industries in New Zealand and global food and fibre economies. These have transformed the kinds of product, production system, market positioning, governance systems and cultural designation of New Zealand’s biologically generated export products in ways that we are only just starting to understand. Internally, the traditional privileges accorded to the primary sector are new subject to forms of contest and scrutiny, in part drawing from a growing recognition of the ecological costs of dramatically changing forms
of land use. The long-term political legitimacy of landscape transformation is being replaced by a new phase of conflict between primary production, and the ecological dynamics of tolerance, stress and resilience operating in production landscapes. Also important are growing demands from often urban residents for increased access to rural areas for recreation and the protection of landscapes and ecological processes which underpin their activities.

These external and internal dynamics have not been brought into alignment in either research or policy processes. They have not been addressed at the same time or in the same place, nor have their interrelations been examined. The default setting for agriculture science has been tightly disciplinary, production-oriented and blind to the social and economic contexts within which agriculture is embedded. But we now live in a more globally connected world and such issues in many places are being seen in the same framework. We need to respond in a more nuanced way and place the interplay of these dynamics at the centre of our thinking about the potential of the biological economies operating in and through New Zealand.

Bringing these matters together makes it clear why our commitment to existing frameworks and practices is holding us back. This demands a new way of framing debates about the long-term sustainability of the New Zealand countryside. We have to move beyond the type of agriculture science, with its specialised, fractured points of focus, that has dominated research about primary production for over 80 years, and instead find a new way of asking questions to enable us to understand the linked dynamics shaping biological economies.

The transformation of trade and market linkages

In the 1970s, the stable regime of external trade relations that had underpinned New Zealand’s agricultural development for a century moved into crisis. A guaranteed market in the United Kingdom for key exports had resulted in a pattern of land-use intensification, underpinned by agricultural science, directed at increasing the volume and extent of farming activity in New Zealand. Without market penalties for oversupply, and little need to add value through branding of food and fibre exports, a narrow approach to agriculture was underpinned by political consensus about the centrality of grassland-based primary production to New Zealand’s economy and society. Despite the attempts of the Muldoon government to shore up these patterns, the crisis emerged in its fullest form with the neoliberal restructuring of the politics, infrastructure and external linkages of primary production exporting in the years after 1984 (Le Heron & Pawson 1996).

The changes that restructuring unleashed have often been understood in terms of “agricultural intensification” at the ecological level (Parliamentary Commissioner for the Environment 2004). The pattern on the ground has been more complex and uneven, with intensification of activity in some sectors and areas, but with major changes to land use in others. The spread of intensive dairy farming as well as viticulture and horticulture in some places has been mirrored by declines in sheep numbers, as well as a range of amenity developments, recreation, tourism, and conservation initiatives (Perkins 2006). At the same time, as traditional structures of state support and regulation were rolled back—including the “single desk” producer boards for key export commodities—new governance forms emerged to fill the gap. This became most noticeable in New Zealand with the steady emergence in the 1990s of new private sector derived forms of audit and quality assurance in the governance of agricultural export chains (Le Heron 2003; Hatanaka et al. 2005). This new “audit culture” facing agricultural exporters began to operate in strong synergy with particular forms of nationally-derived market access requirements emerging from the final stages of global GATT/WTO negotiations, as well as from the increased assertion of retailer power (Fulponi 2006; Campbell & Le Heron 2007).

Put together, national market access requirements and emerging private sector governance over food qualities create a compelling new set of challenges for food and fibre exporters. Exporters interviewed as part of the “Greening Food” research programme as long ago as the early 1990s reported that they were facing a new set of political and economic challenges (Campbell 2004). This pointed to the replacement of an old agricultural politics by a new form. The “old” politics was based on the ability to capture the maximum share of export revenues onshore in New Zealand. It resulted in conflicts over the price of labour and of land, and relied on the ability of producers to exert collective control over prices from processors and/or exporters. Processors and exporters sought to capture efficiencies through the scale and cost of facilities and infrastructure. In contrast, the “new” politics resides in the dynamics of offshore market linkages, market access and retailer requirements. These depend on the production and
management of increasingly elaborated sets of “values” and “qualities” around export products themselves. Put simply, this is a shift from engaging with a set of political pressures residing at the point of production in New Zealand to engaging with the emerging politics of global supply chains and market access (Rosin 2008). The key to survival shifted from “how to gain a premium off your product” to “how to gain access to the premium market” (Campbell & Rosin 2008; Caroline Saunders pers. comm. 2008).

The new social and ecological politics of production and consumption in the countryside

In parallel with these market and governance changes, changes in the socio-political and ecological environments within New Zealand in which agricultural production is embedded have been influential. The primary industries have experienced a dramatic cultural repositioning as the pastoral hegemony has ebbed away. Few would now subscribe to the view of Bruce Levy, the former Director of the Grasslands Division of the DSIR that, “the glorious truth” is that “more and better grass, more and more stock [is] the country’s surest and soundest economic goal” (Levy 1970). The diversification of economic activities has resulted in multiple and potentially contradictory land uses. The new primary industries of the 1970s and 1980s, like horticulture and wine, did not rely on animals. At the same time, new industries from outside primary production, like an emergent tourism industry have dramatically changed the way in which landscapes are both economically and socially valued.

These changes have been accompanied by contests over legitimate uses of land and water. Such contests often took shape around key ecological sites of tension, for instance the Dirty Dairying campaign spearheaded by Fish and Game NZ. The resulting Clean Streams Accord is a powerful symbol of the contested nature of the contemporary agricultural countryside. This is not just an urban/rural tension. Even inside the traditional pastoral industries, tensions have emerged around the acceptability of the conversion of sheep and beef landscapes into dairying.

There are ongoing tensions around water use in dry provinces, tenure review in the high country, settlement of land grievances with Maori, the siting of wind turbines on valued landscapes, and the implications of the deployment of climate change mitigation strategies in different industries in New Zealand. Each may be different, but they represent a broader truth: that the previous primacy of pastoral-based rural development is now a thing of the past. This is not to say that farming no longer plays a pivotal role in the social organisation of the countryside. Rather, it is that many farmers now find themselves inhabiting the same space as new rural amenity migrants (Hall 2006) and engaging in more than farming to make a living (Robertson et al. 2008). Employment in the countryside now involves a more diverse range of land- and water-based activities alongside tourism and other non-traditional ways of using the rural landscape. There are now many ways of being a good farmer in New Zealand. We have multiple cultural styles and strategies for farming and none of them holds the kind of uncontested hegemony that pastoral farming held in the 20th century.

These changes do not exist in isolation from the new market linkages, industries and governance forms discussed in the previous section. Such dynamics are even more pronounced in high-value markets like Europe where the contested politics of the countryside have been elaborated into an entire policy framework around post-productivism and “multi-functional” rural landscapes (Wilson 2007). A shift in consumer sentiment towards “ethical consumerism” where attributes such as animal welfare and environmental sustainability are increasingly seen as components of “food” and “food quality” (Clarke et al. 2007), concerns about the safety of food produced under intensive regimes and even the desire to protect the cultural values in foods represent a set of challenges to exporters wishing to sell to European markets. For example, European consumers increasingly display a preference for a more pasture-based version of dairy production (driven partly by animal welfare concerns) and so intensive United States dairy producers and exporters face problems in this regard. New Zealand’s dairy industry, on the other hand, has benefited from its emphasis on pasture-based production.

Implications for research

What are the implications of these external and internal changes for the range of research on and about agriculture and its changing context? Recent debates on the ecological dynamics of agriculture have focused on issues raised by the resilience paradigm for understanding sustainability (Milestad & Darnhofer 2003; Allison & Hobbs 2004; Walker & Salt 2006). The resilience paradigm strongly argues against the traditional separation of research into sub-specialities and disciplines that artificially demarcate
processes and systems that are, by their very nature, intricately interwoven (Walker et al. 2004; Folke 2006). Traditionally, however, agricultural science has concentrated on specific components of production biologies (such as animal or pasture productivity) or specific problems in production landscapes (like soil erosion). Ecological science tended to focus instead on “natural” landscapes and species. This separation has always been as artificial as trying to separate kea and lambs in the high country (Scrivener 2007). However, having established the need to integrate knowledge about the processes and systems that underpin agricultural ecologies, recent ecological theory takes an important further step in arguing that these can only be understood as social and political ecologies.

Seen in this light, two methodological points arise. First, it is not defensible to separate a new social politics around biologically based industries in rural landscapes from the ecological processes and dynamics that have emerged in key terrains of conflict around issues like water quality and access, nutrient flows, energy costs in food systems, biodiversity, greenhouse gas emissions and, looking forward, the sequestering and trading of carbon from soil and woody vegetation. Second, it would be equally unwise to advocate the opposite; that is for the highlighting of social dynamics without recognising their intrinsic embedding within parallel non-social processes and ecologies. The reintegration of these dynamics shapes the commitments of our approach to understanding biological economies. Understanding the changing external linkages of the biologically-based industries is essential for uncovering what is driving much recent change in these industries. Yet, the intertwined social and ecological dynamics that emerge within New Zealand (and beyond, as is evidenced by debates about climate change) both enable and constrain the potentials of future land use, industries, societies and ecologies.

In light of this discussion, it is important that we make the challenging transition from fractured science-centred engagements with agriculture to the multiple processes and approaches within biological economies. The central issues driving economic change in the countryside are not emerging from local New Zealand rural areas, but from new politics, new ecological dynamics, new social demands and dramatically transformed external linkages (Woods 2007; McCarthy 2008). The issues that currently inhabit the periphery of agricultural science—like market access (including food miles, carbon footprinting, new residue-free crop management requirements), rural/urban tensions over land use (like the Clean Streams Accord, conflicts over access to water and recreational settings, wind turbines, and residential subdivision in iconic landscapes) and critical ecologies (energy flows, biofuels, shifting wider landscape ecologies)—must be drawn together to redefine the kinds of knowledge that are needed to underpin the future sustainability of New Zealand’s biological economies.

CONCLUSION

In the past, agricultural research has been reductionist, technical, dominated by “hard” science and strongly focused on the point of production, contributing to a linear logic of association between different disciplines and the hard boundaries between them. Agricultural science has been seen as foundational, with ecology and social science granted consequential but subordinate voices. This system of knowledge emerged out of a particular context (both domestic and international) that contributed to biological economies framed by the imperative of productivity gains. The existing political economic conditions rewarded the achievements of increased efficiencies in commodity production. However, continuing to solely rely on this system of knowledge is ill-considered as we attempt to answer the looming question of how New Zealand can and should make a living out of new biological economies framed by relationships and priorities which place less emphasis on productivity and more on the environmental and social impacts of production. This question presents an imperative and also an opportunity. Avoiding it and continuing with the status quo restricts our ability to bring together and integrate the multiple fields of knowledge and knowledge producers that will underpin the New Zealand’s future biological economies. For example, we must move beyond thinking about agriculture as our sole source of rural economic production to include the values created by other rural land uses and activities like tourism, recreation and amenity residence. Widening our thinking in such ways exposes a broader array of options for income generation in a globalising world.

Research groups overseas are already discovering and employing novel approaches to the ideas we advance in this paper. But New Zealand maintains certain advantages and can assume leadership in creating knowledge appropriate to current global
conditions. Principal among these advantages is our capacity to get representatives of diverse groups together in the same room—and to launch the sort of dialogue represented by recent discussions in this journal. Even this preliminary engagement, however, shows where New Zealand can do so much more and better. Under the Building Research Capability in the Social Sciences (BRCSS) banner (which transcends the universities and disciplines) we have been able to weave industry-policy-academic links that have not been hampered by institutional hurdles. This work will inevitably lead to new priorities and investment allocations. A successful and viable response from the research community rests on twin imperatives: innovative research programmes (into other areas of the value chain, and reintegrating blue skies and applied research) and, of equal importance, the linking of these to the production of different knowledge in different ways and in different sites. Our curricula, our pedagogy in universities, our Crown Research Institute resources and our consultancies must be much more creatively mobilised and flexibly recombined as we seek to shape New Zealand’s future biological economies.

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