



Addressing Tipping Points for a Precarious Future

Timothy O'Riordan and Timothy Lenton

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In the first eight months of 2012 the price of fish oil rose from \$1500 to \$2000 per tonne, and fish meal from \$1300 to \$1700 per tonne (Neate 2012: 33). The causes connect across space and society. Storms off the Peruvian coast reduced anchovy populations; diversion of drought-diminished corn output in the USA in favour of ethanol production (required by climate change mitigation rules) left a huge gap in animal feed supplies; and a surge in Omega 3 pills usage amongst wealthy health-conscious consumers across the world combined to guarantee high prices for oily fish products. It is not surprising that financial investment firms took an interest in anchovy fishery companies, and that the lucrative prospect of rising prices of farmed fish and beef was also of interest to speculators. Neate (2012: 33) also explores the impact of warming seawater on farmed salmon growth, probably one outcome of global climate change. Balmier waters have increased the metabolisms of the salmon, leading to more demand for fish meal and lower prices as stocks increase. Consequently consumers are acquiring a taste for what was previously considered a luxury, but also a basis of bodily and mental health.

As Tim Lang and John Ingram explore in this Part, the food industry is both global and predatory. It makes sincere reference to sustainability, as we see from the commentary by Thomas Lingard (6.8), but at its heart it is unsustainable. The former Government Chief Scientist, John Beddington (2009), likened the combination of a 33 per cent rise in population, a 50 per cent growth in energy and food requirements, and a 30 per cent increase in water usage as producing the 'perfect storm' of what we termed in our introductory chapter as 'combinational tipping points'.

We believe that there is a powerful mutually propulsive set of forces - lying between a changing climate, aided in part by increasing agriculturally (p.78) based emissions of nitrous oxides and methane; urbanization with over 60 per cent of the world's population in cities by 2050 (UN Habitat 2011); changing diets in favour of more meat and fish; losses of biodiversity and ecosystem life-support functions; and the near impossible challenge of producing large amounts of healthy food from new genetic technologies and ecologically adaptive farming methods - which will combine to bear out Beddington's prognoses.

Lang and Ingram (4.1) assert that the global food industry aggressively markets foods which encourage ill health and overeating by both poor and rich. The industry is one of the most sophisticated lobbies in an arena of oppressive business bias, acting well beyond the reach of national governments. Indeed, according to Action Aid, these lobbies control the international trading bodies:

Under the Influence reveals a worldwide explosion of corporate lobbying which contributes to unfair trade rules that undermine the fight against poverty. The report highlights examples of privileged corporate access to, and excessive influence over, the WTO [World Trade Organization] policy-making process. In the EU alone, there are 15,000 lobbyists based in Brussels – around one for every official in the European Commission. Annual corporate lobbying expenditure in Brussels is estimated at €750 million to €1 billion. In the US, 17,000 lobbyists work in Washington DC – outnumbering US Congress lawmakers by 30 to one. Meanwhile, the pharmaceutical industry is reported to have spent over \$1 billion lobbying in the US in 2004.

(Action Aid 2012: 2)

Lang and Ingram do not offer any easy or reliable resolution. They see tensions between political and commercial priorities (for example in the increasingly troublesome conflict between biofuels and food needs), between all levels of competing governments (rendering them easy to pick off), and awesome overlapping complexities of governing organizations. If sustainability was to be shared as the overriding objective, there would be a chance of shifting to lower and healthier food and drink consumption, of building adaptive resilience in food-producing societies and economies, and of sharing food and water use with the natural world before its inherent diversity is irrecoverably lost.

Patricia Howard (4.2) documents the losses of both natural and cultural biodiversity. She concludes that the declines and extinctions of highly interconnected and interdependent natural species will be magnified by the removal of long-established cultural restraints which were designed to safeguard against the dangerous narrowing of the historical range of food **(p.79)** plant species. She is concerned over the disruption of the cultural transmission of language and farming practices which are needed to accumulate social and ecological resilience. She also sees a failure of governing leadership, and the meddling of corporates and lobbies as contributing to what may become the sixth mass extinction of the global evolutionary journey. In this human-induced case there will be no prolonged, largely stress-free period of restoration and reconstitution as was available in past biodiversity recoveries and transformations.

Munang *et al.* (2011) point to emerging experiments in ecosystem-based adaptation (EbA) in African agriculture as an exciting opportunity for redesigning farming and biodiversity:

Ecosystem-based adaptation is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people and communities adapt to the negative effects of climate change at local, national, regional and global levels. EbA provides many other benefits to communities including food security (from fisheries to agro-forestry), sustainable water management and livelihood diversification (through increasing resource-used options).

(Munang *et al.* 2011)

But such positive schemes rely on robust and extended leadership, investments in transport and marketing arrangements, and integrative behaviour by farmers and food suppliers/distributors protected from the volatilities of the international food markets. This is a tall order. But it could be met if honourable experiments are carefully monitored for their fairness, community well-being, and ecosystem integrity. The outcome could result in better land care and public health, improved incomes and community security, and avoidance of the perfect storm.

Toby Gardner (4.3) offers a genuinely interdisciplinary analysis of one of the more immediate tipping points. This is the insidious drying of the Amazon rainforest, the hugely debilitating subsurface slow-burning fires, and the self-reinforcing perverse climate changes caused by loss of forest to cattle and soya production to feed the new meat cultures of Brazilian megalopolises and further afield. Gardner provides the scientific bases for prognoses and the hope of new approaches to forest management and regeneration which will require global financial support. The loss of the rainforest has global as well as regional repercussions. If paying for ecosystem services has any meaning, then the nearby urban populations, which are experiencing periodic but severe water shortages, should be investing in forest replanting which mixes the triumphs of ecosystem restorative cultures with the best of applied sustainability science.

(p.80) Gardner also points to the instabilities of Amazonian land use futures. Variations in the US Dollar/Brazilian Real exchange rate can have huge and sudden impacts on soya production and resulting forest loss or recovery. If the prices offered for stewarding the carbon and biodiversity of the virgin rainforest biomes are not adjustable to highly variable food prices, then the best laid plans of carbon sequestration could fail to achieve their intended sustainability outcomes. And if the long-established forest safeguarding cultures of the Amazon are forced to migrate in the face of drought and savannah incursion, then Patricia Howard's anxieties may be fulfilled. Tipping points may be metaphors. But they can point to unsettling and deeply destabilizing interconnecting processes with no obvious entry points and no clear pathways for guidance and proactive intervention.

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